

PROJECT CHINA STONE

Draft Environmental Impact Statement

SUPPLEMENT

6

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1 INTRODUCTION

MacMines Austasia Pty Ltd (the proponent) is proposing to develop Project China Stone (the project), a large-scale coal mine on a greenfield site in Central Queensland. A draft Environmental Impact Statement (EIS) was prepared for the project and was placed on public exhibition between 25 July and 7 September 2015. During this time, stakeholders were invited to lodge a submission about the draft EIS. A total of 65 submissions were received on the draft EIS.

This supplement has been prepared in response to the submissions that were received from members of the public and advisory agencies regarding the draft EIS. It is Volume 6 of the draft EIS and supplements the draft EIS Volumes 1 – 5 that were publicly exhibited. This supplement should be read in conjunction with Volumes 1 – 5 of the draft EIS. To the extent of any inconsistencies, the information in this supplement (Volume 6) supersedes any information in any other volume of the draft EIS. The combined Volumes 1 – 6 form the revised draft EIS for the project.

This supplement was prepared by Hansen Bailey, on behalf of the proponent. Input to this supplement was provided by the proponent as well as EIS technical specialists including Hansen Bailey, Australasian Groundwater and Environmental Consultants, Cumberland Ecology, Cardno (Qld), Gordon Geotechniques, and Katestone Environmental.

This supplement is structured as follows:

- Section 2 describes the stakeholder consultation undertaken after the submission of the draft EIS, including consultation during the public exhibition of the draft EIS and during the preparation of this supplement;
- Section 3 provides an overview of the submissions that were received on the draft EIS including submissions from advisory agencies, other organisations and individuals;
- Section 4 provides an overview of proponent responses to submissions. More detailed responses are provided in the attachments to the supplement; and
- Section 5 provides an overview of the additional information provided in response to issues raised in submissions. Detailed technical information is provided in the attachments to the supplement.

2 CONSULTATION

This section describes the stakeholder consultation that has been conducted since the submission of the draft EIS on 2 July 2015. It includes a description of the public exhibition of the draft EIS, consultation conducted in relation to the draft EIS during the public exhibition period, and consultation conducted with the key regulatory agencies during the preparation of the supplement.

2.1 PUBLIC EXHIBITION OF THE DRAFT EIS

The draft EIS was publicly exhibited between 25 July and 7 September 2015. Public notices were placed in the following newspapers, inviting stakeholders to review and provide comments on the draft EIS:

- The Australian;
- Courier Mail;
- Mackay Daily Mercury; and
- Central Queensland News.

During the public exhibition period, the draft EIS was available for stakeholders to review at the following locations:

- Charters Towers Excelsior Library;
- Clermont Library;
- Moranbah Library;
- State Library of Queensland;
- National Library of Australia;
- Proponent's website;
- Hansen Bailey's website; and
- Office of the Coordinator-General's website.

Copies of the draft EIS were also distributed to stakeholders upon request.

2.2 DRAFT EIS CONSULTATION

Consultation was conducted during the public exhibition of the draft EIS. This included a series of meetings with key stakeholders to discuss the project, and to present and explain the key technical findings of the draft EIS. The objective of this consultation was to assist stakeholders in understanding the results of the specialist studies including proposed mitigation and management measures.

Stakeholders were targeted for consultation based on their previous interest in the project or their potential to be impacted by the project. This included sending a total of 84 letters to all stakeholders previously involved in consultation for the project, notifying them of the public exhibition of the draft EIS and offering a meeting to discuss the draft EIS. Meetings were held during the draft EIS public exhibition period with the stakeholders listed in Table 2-1.

Table 2-1 Project Stakeholders Consulted on the Draft EIS

KEY STAKEHOLDER GROUP	STAKEHOLDER NAME
Councils	Charters Towers Regional Council
	Isaac Regional Council
	Mackay Regional Council
Landowners within and adjacent to the project site	Matt and Nicole Stevenson ("Moonoomoo")
	Brian and Lorraine Corbett ("Hyde Park")
	Adani Mining Pty Ltd (owner of "Moray Downs" and proponent for the adjacent Carmichael Mine Project)
Government Agencies	Federal Department of the Environment and Energy
	Office of the Coordinator General
	Queensland Police Service
	Department of Transport and Main Roads
	Department of State Development
	Department of Agriculture and Fisheries
	Department of Infrastructure, Local Government and Planning
	Department of Natural Resources and Mines
	Department of Environment and Heritage Protection
	Department of Energy and Water
	Department of Justice
	Department of Housing and Public Works
	Department of Communities, Child Safety and Disability Services
	Public Safety Business Agency
	Department of Education and Training
Regional environmental and industry groups	Charters Towers Chamber of Commerce and Mines
	Townsville Enterprise Limited
	Regional Development Australia – Mackay Isaac and Whitsunday, and Wide Bay Burnett
	North Queensland Dry Tropics

It is noted that some key stakeholders declined the proponent's offer of a meeting to discuss the draft EIS. This included the legal representatives of the Traditional Owners and two of the landholders within the project site.

2.3 CONSULTATION DURING PREPARATION OF THE SUPPLEMENT

Consultation was also conducted with the key government agencies during the preparation of the supplement. This consultation included a series of meetings to discuss the agency's submissions and the proponent's proposed response to key submission issues. The meetings were conducted with the objective of resolving key issues raised in the agency's submissions. The key regulatory agencies consulted during the preparation of the supplement are listed in Table 2-2.

Table 2-2 Stakeholders Consulted During Preparation of the Supplement

KEY STAKEHOLDER GROUP	STAKEHOLDER NAME	MEETING DATE
Federal Government Agencies	Department of the Environment and Energy	21 December 2015 29 November 2016 21 June 2017
	Office of Water Sciences	29 November 2016
Queensland Government Agencies	Office of the Coordinator General	16 December 2015 21 December 2015 20 January 2016 10 November 2016 29 November 2016 21 June 2017
	Department of State Development	20 January 2016
	Department of Transport and Main Roads	16 December 2015
	Department of Natural Resources and Mines	10 November 2016 29 November 2016 21 June 2017
	Department of Environment and Heritage Protection	10 November 2016 29 November 2016

3 OVERVIEW OF SUBMISSIONS

A total of 65 submissions were received on the draft EIS. These included 60 submissions received during the public exhibition period, plus an additional 5 submissions that were received after the public exhibition closing date. All 65 submissions have been considered by the proponent and responses are included within this supplement. Stakeholders who lodged submissions are listed in Table 3-1.

Table 3-1 Stakeholder Submissions

KEY STAKEHOLDER GROUP	STAKEHOLDER NAME
Federal Government	Department of the Environment and Energy
State Government	Department of Aboriginal and Torres Strait Islander Partnerships
	Department of Agriculture and Fisheries
	Department of Communities, Child Safety and Disability Services
	Department of Education and Training - Training and Skills
	Department of Environment and Heritage Protection
	Department of Energy and Water Supply
	Queensland Fire & Emergency Services
	Queensland Health - Mackay Public Health Unit
	Department of Housing and Public Works – Government Employee Housing
	Department of Housing and Public Works –Housing Services
	Department of Natural Resources and Mines
	Public Safety Business Agency
	Queensland Police Service (Townsville, Charters Towers and Mackay Districts)
	Department of State Development – Business Solutions and Partnerships
	Department of State Development – Major Projects Office
	Department of State Development – Regional Services, Mackay Isaac Whitsunday Regional Office
	Department of Transport and Main Roads
	Queensland Treasury – Hazardous Industries and Chemicals Branch Office of Industrial Relations
	Department of Tourism, Major Events, Small Business and the Commonwealth Games

KEY STAKEHOLDER GROUP	STAKEHOLDER NAME
Local Government	Isaac Regional Council
	Mackay Regional Council
Landowners within and adjacent to the project site	Private submitter
	Private submitter
	Adani Mining Pty Ltd
Other regional landowners	Private submitter
	Private submitter
Aboriginal Group	Wangan and Jagalingou Traditional Owners Family Representative Council
Environmental Groups	Black-Throated Finch Recovery Team
	North Queensland Conservation Council
	Lock the Gate Alliance
	Correct Planning and Consultation for Mayfield group
	Mackay Conservation Group
	Protect the Bush Alliance
	Queensland Conservation Council
	Australian Marine Conservation Society
	Greenpeace Australia Pacific
	Land Services of Coast and Country
	Rural Services of Coast and Country
	Environmental Justice Australia – Australian Youth Climate Coalition
	BirdLife Australia
	BirdLife Southern Queensland
Other Stakeholders	Aurizon
	SunWater
	Other private citizens (21 submissions)

In addition to these formal submissions, the Federal Department of Environment and Energy and the Queensland Office of the Coordinator-General lodged a joint request for advice to the Independent Expert Scientific Committee (IESC) on 24 August 2015 (IESC 2015-070). The IESC provided their advice on 9 October 2015. This supplement also provides the proponent's response to this advice.

The Department of State Development (DSD) also provided advice regarding the project's Social Impact Assessment (SIA) on 15 October 2015. Although this was not a formal submission, this supplement also provides the proponent's response to this advice.

4 RESPONSE TO SUBMISSIONS

4.1 STRUCTURE OF THE RESPONSE TO SUBMISSIONS

This section provides an overview of the way the submissions have been responded to in the supplement. Table 4-1 provides a list of each submitter, their submitter number (assigned by the Office of the Coordinator-General (OCG)) and a cross reference to the location of the response to the submission within the supplement.

In summary, responses to submissions received on the draft EIS have been provided in the following ways:

- Many submitters raised similar issues regarding the project or a particular aspect of the draft EIS. For these common issues, responses have been provided in Section 4.2.
- Individual responses to submissions that raised specific issues about the project or the draft EIS are provided in Attachment A. Submissions were deemed to require an individual response if they raised specific issues about the project or referred to specific sections of the draft EIS. The OCG conducted a detailed review of the submissions and provided instructions to the proponent as to which submission issues required a response. Attachment A – Individual Responses to Submissions includes a replication of the submission issues determined by the OCG to require a response, and the proponent's response to each.
- Responses to non-specific submissions are provided in Attachment B. Submissions were considered to be non-specific if they did not raise any specific issues directly related to the draft EIS or if they were deemed to be a pro-forma submission. Pro-forma submissions typically raised similar issues using similar text and often discussed the personal opinions of the stakeholder who was often philosophically opposed to coal mining in general.
- A detailed response to the Independent Expert Scientific Committee (IESC) Advice is provided in Attachment C. This advice was not received as a formal submission; however the proponent has considered the advice during the preparation of the supplement. Attachment C – Response to IESC Advice includes a replication of the IESC advice and a response to each specific issue raised.
- A response to the Department of State Development (DSD) Advice on social impact assessment is provided in Attachment G. This advice was not received as a formal submission; however the proponent has considered the advice during the preparation of the supplement. Attachment G – Response to DSD SIA Advice includes a replication of the DSD issues and a response to each issue raised.

Table 4-1 Guide to Responses to Submissions

STAKEHOLDER GROUP	SUBMITTER	SUBMITTER NUMBER	SUPPLEMENT CROSS REFERENCE
Federal Government	Federal Department of the Environment and Energy	42	Attachment A – 42
Queensland Government	Department of Environment and Heritage Protection	24	Attachment A – 24
	Department of Natural Resources and Mines	41	Attachment A – 41
	Department of Transport and Main Roads	23	Attachment A – 23
	Department of State Development – Regional Services, Mackay Isaac Whitsunday Regional Office	3c	Attachment A – 3

STAKEHOLDER GROUP	SUBMITTER	SUBMITTER NUMBER	SUPPLEMENT CROSS REFERENCE
Queensland Government (continued)	Department of Agriculture and Fisheries	11	Attachment A – 11
	Queensland Treasury – Hazardous Industries and Chemicals Branch Office of Industrial Relations	8	Attachment A – 8
	Public Safety Business Agency	16a	Attachment A – 16
	Queensland Fire & Emergency Services	16b	Attachment A – 16
	Queensland Police Service (Townsville, Charters Towers and Mackay Districts)	16c	Attachment A – 16
	Queensland Health - Mackay Public Health Unit	25	Attachment A – 25
	Department of Aboriginal and Torres Strait Islander Partnerships	63	Attachment A – 63
	Department of Communities, Child Safety and Disability Services	65	Attachment A – 65
	Department of Education and Training - Training and Skills	30	Attachment B
	Department of Energy and Water Supply	62	Attachment B
	Department of Housing and Public Works – Government Employee Housing	5	Attachment B
	Department of Housing and Public Works –Housing Services	15	Attachment B
	Department of State Development – Business Solutions and Partnerships	3a	Attachment B
	Department of State Development – Major Projects Office	3b	Attachment B
	Department of Tourism, Major Events, Small Business and the Commonwealth Games	10	Attachment B
Local Government	Isaac Regional Council	27	Attachment A – 27
	Mackay Regional Council	26	Attachment B
Landholders within and adjacent to the project site	Private submitter	38	Attachment A – 38
	Private submitter	39	Attachment A – 39
	Adani Mining Pty Ltd	40	Attachment A – 40
Other regional landholders	Private submitter	18 & 20	Attachment A – 18
	Private submitter	64	Attachment A – 64
Aboriginal Group	Wangan and Jagalingou Traditional Owners Family Representative Council	45	Attachment A – 45
Environmental Groups	Black-Throated Finch Recovery Team	12	Attachment A – 12
	BirdLife Australia	37	Attachment A – 12

STAKEHOLDER GROUP	SUBMITTER	SUBMITTER NUMBER	SUPPLEMENT CROSS REFERENCE
	Environmental Justice Australia – Australian Youth Climate Coalition	44	Attachment A – 44
	Lock the Gate Alliance	17	Attachment A – 17
	Mackay Conservation Group	28	Attachment A – 28
	Protect the Bush Alliance	29	Attachment A – 29
	Land Services of Coast and Country	35	Attachment A – 35
	Rural Services of Coast and Country	36	Attachment A – 35
	North Queensland Conservation Council	21	Attachment B
	Correct Planning and Consultation for Mayfield group	22	Attachment B
	Queensland Conservation Council	31	Attachment B
	Australian Marine Conservation Society	32	Attachment B
	Greenpeace Australia Pacific	33	Attachment B
	BirdLife Southern Queensland	46	Attachment B
Other stakeholders	Aurizon	9	Attachment A – 9
	Private submitter	7	Attachment A – 7
	Private submitter	43	Attachment A – 43
	Private submitter	2	Attachment A – 2
	SunWater	34	Attachment B
	Other private citizens	1, 4, 6, 19, 53, 55, 56, 57, 13, 14, 47, 48, 49, 50, 51, 52, 54, 58, 60, 61	Attachment B

4.2 RESPONSES TO COMMON ISSUES

A number of common issues were raised by multiple stakeholders including issues relating to:

- The project description;
- The draft EIS groundwater assessment;
- The draft EIS surface water assessment;
- The draft EIS terrestrial ecology assessment; and
- The draft EIS social impact assessment.

The specific issues relating to these aspects of the draft EIS are discussed in the following sections. The proponent's response to each of these common issues is also provided.

4.2.1 Project Description

A number of submitters raised issues relating to the assessment of impacts from off-lease infrastructure, the interaction of the project with the neighbouring Carmichael Coal Mine Project, and the assessment of impacts on the workforce accommodation village. The proponent's response to these issues is described in the following sections.

Assessment of Impacts Relating to Off-lease Infrastructure

A number of submitters raised issues relating to the absence of an assessment of impacts resulting from off-lease infrastructure required for the project (i.e. port capacity, rail connection to port, mine site access road connection and raw water supply). As stated in Section 4.13 of the draft EIS, the scope of the draft EIS was limited to assessing the impacts from the mine. This was because the off-lease infrastructure components will be subject to separate environmental impact assessments and approvals. Many of these off-lease infrastructure components will also be developed by other proponents and require further assessment before a final preferred option can be selected. Section 4.13 of the draft EIS includes a description of the current preferred option and status of each off-lease infrastructure component.

Interactions with the Carmichael Coal Mine Project

A number of submitters raised issues relating to the project timing and relationship with and/or reliance on the Carmichael Coal Mine and Rail Project (CCM&RP). The potential interactions with the CCM&RP are discussed in Section 4.13.5 of the draft EIS.

The CCM&RP is some years ahead of Project China Stone in terms of gaining the necessary approvals to enable the commencement of construction. For the purposes of the assessment of potential cumulative impacts, the draft EIS has, therefore, assumed the CCM&RP would be operating at the same time as Project China Stone. The draft EIS has recognised the commitments of the CCM&RP proponent in the discussion of management of environmental impacts that are common to both projects. The draft EIS outlines the proponent's own commitments that have been developed with consideration of those proposed for the CCM&RP, where relevant.

The proponent recognises that there are significant external factors that create uncertainty for the timing of the development of both projects. In the unlikely event the project proceeds in the absence of the CCM&RP, the proponent will continue to implement the commitments made in the draft EIS and would be solely responsible for the delivery of mitigation and management measures to address the environmental impacts of the project that are identified in the draft EIS.

Impacts on the Accommodation Village

A number of submitters were concerned about the potential impacts on the health and wellbeing of workers housed in the accommodation village, due to the proximity of the accommodation village to the airstrip, the open cut mine and mining infrastructure. In accordance with the Department of Environment and Heritage Protection (EHP) model mining conditions, the on-site accommodation village is not considered to be a sensitive receptor in the draft EIS and has, therefore, not been included in the assessment of residential amenity impacts (such as noise) described in the draft EIS. However, the health and wellbeing of workers staying at the accommodation village during their block shift has been considered in Section 22 of the draft EIS. Specifically, the accommodation village will primarily be used for workers to rest and sleep between work shifts. At the end of their block shift, workers will return home to their normal place of residence. The accommodation village will therefore be mostly used for sleeping, eating and relaxation activities predominantly within air conditioned rooms with closed windows. The air conditioned nature of the accommodation village facilities will prevent any impacts on the health and well-being of the village occupants due to dust and noise from the mining operations. In particular, the installation of air-conditioning is a well-established and effective means of mitigating noise impacts inside buildings due to external industrial noise levels. The detailed design process for the accommodation village will consider the need for acoustic insulation and it will be included in the design of accommodation units, if necessary.

4.2.2 Groundwater Assessment

A number of submitters raised issues relating to the groundwater assessment, in particular the parameterisation of the groundwater model and the need for a peer review of the groundwater model to be included in the draft EIS. The specific issues raised and the proponent's response is described in the following sections. Detailed responses are also provided in the relevant sections of Appendix A – Individual Responses to Submissions. Technical clarifications relating to the groundwater assessment has also been provided in Attachment D – Additional Information on Groundwater.

Groundwater Model Parameterisation

The draft EIS included a numerical groundwater model (Appendix B of Appendix I – Groundwater Report). The groundwater model parameters were derived from analysis of geology and groundwater data compiled from site investigations at the project site, other Galilee Basin mining projects and landholder bores. The groundwater dataset specifically incorporated all relevant geological and groundwater information collected as part of the proposed CCM&RP groundwater studies. The draft EIS groundwater study therefore presents the most comprehensive groundwater dataset compiled in this part of the Galilee Basin.

A number of submissions on the draft EIS raised issues in relation to model parameters. The submissions indicated that the model parameterisation would benefit from either more data or further analysis of existing data. The submissions highlighted groundwater levels and flow directions, recharge rates and hydraulic conductivity as key model parameters.

An additional 23 months of 6-hourly groundwater level data has been collected from dataloggers installed at the project site. This additional data is presented in Attachment D – Additional Information on Groundwater. The total baseline groundwater monitoring covers a period of 37 months from December 2012 to January 2016. The additional groundwater monitoring data is consistent with the data presented in the draft EIS Groundwater Report (Appendix I), and therefore provides further support to the groundwater levels in the numerical groundwater model presented in the draft EIS.

Recharge rates in the draft EIS were inferred from the groundwater data. The additional monitoring data shows that, despite several significant rainfall events with the potential to generate recharge, groundwater levels remain relatively uniform with no significant seasonal recharge response. This data therefore provides supporting evidence for the low recharge rate conceptualised within the draft EIS groundwater assessment. The modelled recharge rates are also consistent with previously reported groundwater studies in the Galilee Basin.

The modelled hydraulic conductivity values were based on 154 rising/falling head and packer tests conducted at the project site and the Carmichael Coal Mine site. Additional justification of the modelled coal seam hydraulic conductivity data has been provided based on publicly available data from coal seam gas wells within the wider Galilee Basin. This data demonstrates that coal seam permeability is extremely low at depth and confirms the model parameterisation of low coal seam conductivity at depth. The modelled hydraulic conductivity of the Clematis Sandstone was also considered and found to be appropriate given the range of measured values and within the context of the local geological setting.

More detailed responses regarding specific groundwater issues are provided in Attachment A – Individual Responses to Submissions. Technical information relating to the groundwater assessment has been provided in Attachment D – Additional Information on Groundwater.

Groundwater Peer Review

A number of submitters queried if a peer review of the groundwater model was required. There is no requirement for a peer review of the groundwater model in the EIS Terms of Reference (TOR) nor is it standard practice for mining EISs. The draft TOR for the project prepared by the OCG did not include a requirement for a groundwater model peer review. The draft TOR were publicly exhibited and EHP, the Department of Natural Resources and Mines (DNRM) and the Department of the Environment and Energy (DoEE) were provided an opportunity to comment on the draft TOR prior to its finalisation. EHP, DNRM and DoEE's submissions on the draft TOR did not request a peer review of the groundwater model for the project. In addition, all specific submission issues that

were raised in relation to the draft EIS groundwater model have been responded to in the supplement. No issues have been raised in the submissions that indicate any material deficiencies in the groundwater model or justify the need for a peer review. The proponent considers that it is therefore not reasonable to require a peer review of the groundwater model at this stage, given that it is not a requirement of the TOR, the groundwater study has addressed the project's TOR and all specific groundwater issues that were raised by regulatory agencies have been addressed, in consultation with the agencies.

4.2.3 Surface Water Assessment

Attachment 24-4 of the draft EIS proposed draft Environmental Authority (EA) release conditions for the controlled release of mine-affected water to the receiving water of the Belyando River. A number of submitters raised issues relating to the proposed conditions and requested that the proposed use of the Belyando River as the receiving water for the project be reconsidered to provide greater protection to potential environmental values of North Creek, including any potential ecological values and water users downstream of the proposed release point.

In response to the submissions, and in consultation with the regulatory agencies, the receiving waters for the controlled release of mine-affected water has been changed to North Creek rather than the Belyando River, as proposed in the draft EIS. However, there is currently insufficient receiving water quality and flow data to enable the detailed calculation of flow triggers and water quality release limits for North Creek, in accordance with the EHP model mining conditions. Consequently the proponent is proposing to implement a baseline water quality and flow monitoring program for North Creek. The data collected from this monitoring program will enable the calculation of water quality objectives for the receiving water, flow conditions, and criteria for the release of mine-affected water in accordance with the EHP model mining conditions, prior to the commencement of the project. The details of the proposed amended mine affected water EA conditions and the proposed baseline monitoring program are described in Attachment E – Additional Information on Surface Water

The release of mine-affected water based on flows in North Creek and the strict application of the EHP model mine conditions will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse impacts on downstream environmental values in North Creek, including aquatic ecosystems.

4.2.4 Terrestrial Ecology Assessment

A number of submitters raised issues relating to the terrestrial ecology assessment, in particular the assessment of the Black-throated Finch (BTF), an endangered species that was recorded on the project site during field surveys, and adequacy of the Biodiversity Offsets Strategy. The issues raised and the proponent's response is described in the following sections. Detailed responses are also provided in the relevant sections of Appendix A – Individual Responses to Submissions.

Black-throated Finch Habitat Modelling

The draft EIS included a definition of BTF habitat based on information contained in conservation advice for the species, particularly the Black-throated Finch Recovery Plan and the SPRAT profile (Appendix G of Appendix F – Terrestrial Ecology Report). The definition accounted for vegetation communities listed in the Black-throated Finch Recovery Plan located within 3 km of permanent water.

A number of submissions on the draft EIS raised issues in relation to the BTF habitat modelling. The submissions indicated that the habitat definition was too restrictive because it relied on the presence of permanent water and hence did not account for seasonally available habitat in times of good rainfall. The submissions highlighted specific areas of the project site (i.e. southern and central areas) that were not mapped as habitat and indicated that these areas should be considered to be habitat, particularly given that there are records of the species from these areas.

The habitat mapping has been revised in response to the issues raised in the submission. Although the definition used in the draft EIS captured the most significant areas of habitat, a broader, more conservative definition has

been adopted for the supplement. The revision of BTF habitat modelling was undertaken in consultation with the Federal DoEE and the Queensland EHP.

The revised habitat model includes ephemeral drainage lines and there is a good correlation between the revised BTF habitat and records of the species (including records obtained during field surveys for the proposed CCM&RP). The revised habitat model and associated potential offset requirements are described in Attachment F - Additional Information on Ecology.

It is noted that the revised BTF habitat model has increased the area of BTF habitat within the project site and also increased the amount of BTF habitat that will potentially be impacted by the project. However, although the area of impact has increased, the key findings of the draft EIS Terrestrial Ecology Report (Appendix F) have not changed. The impact assessment continues to conclude the project would give rise to the permanent loss of habitat within the project site which has the potential to have a significant, residual impact on the species. As such, offsets for the species continue to be proposed to address these potential project impacts.

Biodiversity Offsets Strategy

A number of submitters raised concerns about the fact that the draft EIS Biodiversity Offset Strategy (Appendix H) was not publicly exhibited. The purpose of the Biodiversity Offset Strategy was to demonstrate that there are suitable properties available that could satisfy the project's offset requirements. As such, it included an assessment of several properties with potential to fulfil the biodiversity offset requirements for the project. As the proponent does not currently own any land and does not currently have any agreements with any landowners regarding offset properties, information about these properties is commercially sensitive and is unsuitable to be released publicly. However, the Biodiversity Offset Strategy was provided to the relevant government agencies that are responsible for determining the offset requirements for the project. In addition, any specific issues that were raised by the government agencies responsible for the regulation of offsets have been responded to as part of the supplement. In response to concerns from submitters, a redacted version of the Biodiversity Offset Strategy has been provided in Attachment J.

4.2.5 Social Impact Assessment

A number of submitters were concerned that the income from the sale of coal adopted in the draft EIS economic impact assessment (Appendix A of the draft EIS Socio-Economic Impact Assessment (Appendix N)) did not reflect the thermal coal price at the time the draft EIS was publicly exhibited. These submitters implied that the economic assessment was flawed due to the change in the coal prices.

It should be noted that there are a wide range of complex factors that can influence the global coal market, which make accurate long term forecasting of pricing (and demand) difficult. The draft EIS assumed a value for the income from the sale of coal that was considered to be representative of the fluctuations in the coal price that would be expected to occur over the 50 year life of the mine. As such, the assumed value was not necessarily comparable to the price of coal in the year the economic modelling was conducted, nor was it comparable to the value of coal at the time the draft EIS was publicly exhibited. It should be noted that, over the past 5 years, the monthly thermal coal spot price has varied from AUD$126 (per metric ton) in October 2011 to AUD$131 in October 2016, with a low of AUD$71 in April 2016 (IndexMundi, 2016). This variation and the recent return to prices above AUD$100 per ton, confirms that comparison between the coal price at the time of the public exhibition of the draft EIS and the assumed coal price in the draft EIS is not valid.

5 ADDITIONAL INFORMATION

This section presents the additional information that has been provided in response to specific issues raised in submissions on the draft EIS. To the extent of any inconsistencies, the information in this section supersedes any information in Volumes 1 – 5 of the draft EIS. This section confirms the changes to the project description that have been made since the draft EIS was publicly exhibited (Section 5.1) and provides an overview of the additional information that has been provided in response to specific issues raised in submissions (Section 5.2). This section also describes the editorial corrections that have been made to Volumes 1 - 5 of the draft EIS (Section 5.3).

5.1 CHANGES TO THE PROJECT

There are no changes to the project description presented in Section 4 of the draft EIS other than an amendment to the conceptual final landform of the Tailings Storage Facility (Refer Attachment E).

5.2 ADDITIONAL INFORMATION

Additional information has been provided in support of the responses to issues raised in submissions and associated stakeholder consultation. The additional information is predominantly related to clarifying particular aspects of the draft EIS or additional details about the draft EIS technical studies. The additional information has not resulted in any material changes to the conclusions of the draft EIS. The additional information is as follows:

- Attachment D - Additional Information on Groundwater, provides:
  - Additional figures that clarify:
    - Baseline groundwater levels;
    - The conceptualisation of Lake Buchanan as a groundwater discharge zone;
    - The sensitivity analysis scenarios provided in the draft EIS, as well as an additional sensitivity analyses of the effects of increasing the hydraulic conductivity values in the coal seams and a more conservative representation of the change in hydraulic conductivity of the coal seams with depth; and
    - An example of the modelled factors applied in the draft EIS to account for the effects of subsidence on vertical hydraulic conductivity.
  - Clarification of how the changes in coal seam conductivity with depth were represented in the EIS groundwater model.
- Attachment E - Additional Information on Surface Water, provides information on the proposed baseline surface water monitoring program, the revised mine-affected water EA release conditions, the compliance monitoring program of mine-affected water releases and the proposed Receiving Environment Monitoring Program (REMP). It also provides details of the revised conceptual drainage design of the Tailings Storage Facility and Power Station Waste Storage Facility final landform.
- Attachment F - Additional Information on Ecology, provides revised habitat modelling for two threatened fauna species (namely the Black-throated Finch and the Squatter Pigeon) and provides preliminary habitat modelling for the Yakka Skink. It also provides further information on biodiversity offsets, including additional information about the most prospective offset property.

- Attachment H - Additional Information on Social Impact Assessment, provides a content guide for the SIA management plans proposed to be developed for the project, as well as a Community Consultation and Engagement Strategy for all phases of the project.
- Attachment I - Additional Commitments, lists the additional environmental management commitments that are detailed throughout the supplement. The source of the additional management commitments within the response to submissions are found are also referenced. The additional commitments are provided in addition to the commitments provided in the draft EIS Attachment 24-2 Project Commitments List.
- Attachment J – A redacted version of the draft EIS Biodiversity Offset Strategy (Appendix H) is provided.
- Attachment K – Final Landform Cross Sections, provides a conceptual decommissioned final landform layout plan and two cross sections of the final landform. These were requested by EHP during consultation on the draft EIS.

5.3 EDITORIAL CORRECTIONS

Table 5-1 includes a list of minor editorial corrections and/or clarifications that have been made in response to submissions.

Table 5-1 Draft EIS Editorial Corrections

EIS SECTION	EDITORIAL CORRECTION AND EXPLANATION
Any applicable sections of the draft EIS	Reference to the Federal Department of Environment (DotE) in the draft EIS should be read as the Federal Department of Environment and Energy (DoEE) due to a change in department name during preparation of the supplement.
Section 2 - Regulatory Framework Attachment 2-1 Other Commonwealth and Queensland Legislation	Text relating to the VM Act is appended to include: *The project is not subject to assessment under the VM Act as clearing of remnant vegetation for the project is exempt from approval under Part 1, Schedule 24 of the Sustainable Planning Regulation 2009*.
Section 3 – Consultation	To clarify, Mackay Regional Council was consulted as part of issue scoping consultation completed for the project.
Section 4 – Project Description, Figure 4-28	Flue gas desulfurization is not proposed and is deleted from the conceptual layout figure.
Section 5 – Land Use Subsection 5.4.4	To clarify, the proposed consultation in regard to the stock route *will occur prior to the commencement of construction.*
Section 9 - Terrestrial Ecology	Text relating to the VM Act not applying to the project is deleted and replaced with the following: *The project is not subject to assessment under the VM Act as clearing of remnant vegetation for the project is exempt from approval under Part 1, Schedule 24 of the Sustainable Planning Regulation 2009*.
Section 11 – Matters of National Environmental Significance Appendix F – Terrestrial Ecology Report	On 30 June 2015, the list of migratory species under section 209 of the EPBC Act was amended to remove the Australian Painted Snipe (*Rostratula australis*, formerly known as *Rostratula benghalensis*) as a migratory species. References to the species being migratory are deleted. However, potential for impacts on the species are still considered in the draft EIS under its threatened species listing.

EIS SECTION	EDITORIAL CORRECTION AND EXPLANATION
Section 11 – Matters of National Environmental Significance Appendix F – Terrestrial Ecology Report	On 9 June 2016, the list of migratory species under section 209 of the EPBC Act was amended to remove the Rainbow Bee Eater, the Cattle Egret and the Great Egret as migratory species. References to these species being migratory are deleted.
Section 12 – Groundwater, Subsection 12.3.3	Insertion of the following additional text to clarify that, the relatively deep localised water table in the vicinity of Darkies Range, *together with the low permeability and lack of groundwater discharge*, are indicative of a low rate of recharge in this area.
Section 12 – Groundwater, Subsection 12.4.11 Appendix I – Groundwater Report, Subsection 8.6	To clarify, where the project is predicted to contribute to cumulative water supply bore impacts, the proponent will liaise with Adani to negotiate make good agreements, proportionate to the predicted project contribution to any impacts. To clarify, potential options for alternative landholder water supplies may include modifying or deepening existing bores or the installation of new bores.
Section 15 – Air Quality, Subsection 15.9.2	To clarify, the proponent will implement the GHG initiatives listed in this section.
Section 19 – Traffic and Transport, Subsection 19.2.5	To clarify, the heavy vehicle factor of 30% was adopted for the SIDRA assessment.
Section 19 – Traffic and Transport, Subsection 19.2.5	To clarify, the predominant turns at the Gregory Developmental Road/Elgin Moray Road intersection are right in and left out.
Section 22 – Hazard and Risk, Figure 21-1	NA 29 Petroleum Product or Oil Storage is deleted from the raw coal stockpile area and the product coal stockpile area.
Section 22 – Hazard and Risk, Table 22-1	*Disaster Management Act 2003* should be inserted into this table.
Section 22 – Hazard and Risk, Subsection 22.6 and Table 22-5 Preliminary Hazard Analysis	To clarify, the risk of spontaneous combustion of coal relates to *any stage during mining, handling, processing or transporting coal* and is not limited to stockpiling. The risk of outbreak of fires due to spontaneous combustion of coal is considered a key hazard for the project.
Section 25 - References	An additional reference has been added: *IndexMundi 2016. Coal, Australian thermal coal Monthly Price - Australian Dollar per Metric Ton, accessed online November 2016 at: http://www.indexmundi.com/commodities/?commodity=coal-australian&months=60&currency=aud*
Appendix F – Terrestrial Ecology Report, Appendix L	To clarify, re-establishing habitat for threatened fauna species as part of mine rehabilitation was not a material consideration of the impact assessment.
Appendix G – Aquatic Ecology and Stygofauna Report, Subsection 3.2.4 and 3.2.6	To clarify, the sampling was consistent with the AusRivAS methodology (NRM 2001) and reference to Turak and Waddell 2002 is deleted.

EIS SECTION	EDITORIAL CORRECTION AND EXPLANATION
Appendix I – Groundwater Report, Subsection 7.3.3	The following should be inserted: *Representing Lake Buchanan as a discharge zone in the groundwater model provides a conservative basis for the assessment of potential impacts on Lake Buchanan due to groundwater drawdown.*
Appendix I – Groundwater Report, Appendix B Subsection B1.2	To clarify, in relation to the description of recharge: ■ Figure B3 of the Groundwater Report shows the variation in modelled recharge rates applied in the groundwater model. The figure legend has been amended to correct errors in the mapped recharge rates. The amended figure is provided in Attachment D. ■ Table B2 has been amended to align with Figure B3 and correctly reflect the applied recharge rates in mm per year. ■ The description of the recharge calculation method presented in Section B1.2 has been clarified.
Appendix N – Socio-Economic Impact Assessment	Reference to the Queensland Department of Education and Training (DET) relating to the employment role should read as Queensland Treasury due to a change in department.
Appendix N – Socio-Economic Impact Assessment, Subsection 7.3.1	To clarify, mental health and isolation adjustment support will be provided *for employee families, as well as* employees for the first year of employment.
Appendix N – Socio-Economic Impact Assessment, Subsection 7.2.2	An Indigenous Participation Strategy will be prepared, instead of an Indigenous Participation Plan.
Appendix O – Road Impact Assessment	Any references to Mirtna Road in text or on figures should be read as Yarromere Road.

Underlined, italicised text indicates additional text inserted



PROJECT CHINA STONE

Attachment A Individual Responses to Submissions

PROJECT CHINA STONE
INDIVIDUAL RESPONSES TO SUBMISSIONS ON THE DRAFT EIS
for
MacMines Austasia Pty Ltd

1 INTRODUCTION

1.1 OVERVIEW

This attachment to the Supplement to the draft Environmental Impact Statement (EIS) provides the proponent's individual responses to selected submissions that were received for Project China Stone (the project). Submissions have been provided an individual response if they raised specific issues about the project, referred to specific sections of the draft EIS and/or were submitters who will contribute to the assessment and conditioning of the project.

1.2 HOW TO READ THIS ATTACHMENT

Upon lodgement of a submission with the Office of the Coordinator General (OCG), each submission was numbered and each submission issue was given a unique number identifier. For the purposes of assisting the OCG with the assessment of the responses to submissions, these unique identifiers have been retained. The following is a list of the submitters that have been responded to individually and the corresponding submitter number:

Federal Government

- Federal Department of the Environment and Energy (Submitter 42).

State Government

- Department of Environment and Heritage Protection (Submitter 24);
- Department of Natural Resources and Mines (Submitter 41);
- Department of State Development (Regional Services) (Submitter 3C);
- Department of Transport and Main Roads (Submitter 23);
- Department of Agriculture and Fisheries (Submitter 11);
- Queensland Treasury (Submitter 8);
- Queensland Public Safety Business Agency (Submitter 16A);
- Queensland Fire and Emergency Services (Submitter 16B);
- Queensland Police Service (Submitter 16C);
- Queensland Health (Submitter 25);
- Department of Aboriginal and Torres Strait Islander Partnerships (Submitter 63); and
- Department of Communities (Submitter 65).

Local Council

- Isaac Regional Council (Submitter 27).

Other Stakeholders

- Adani Mining Company (Submitter 40);
- Aurizon (Submitter 9);
- Black-throated Finch Recovery Team (Submitter 12);
- Birdlife Australia (Submitter 37), refer to Submitter 12 response;
- Australian Youth Climate Coalition (Submitter 44);
- Wangan and Jagalingou Traditional Owners Family Representative Council (Submitter 45);
- Protect the Bush Alliance (Submitter 29);
- Lock the Gate (Submitter 17);
- Mackay Conservation Group (Submitter 28);
- Land Services of Coast and Country (Submitter 35);
- Rural Services of Coast and Country (Submitter 36);
- Private submitter (Submitter 2);
- Private submitter (Submitter 7);
- Private submitter (Submitter 18);
- Private submitter (Submitters 38 and 39);
- Private submitter (Submitter 43); and
- Private submitter (Submitter 64).

If you are interested in a response to a particular submitter, find the submitter number and go to the corresponding page. For example, if you are interested in reading the proponent's response to the EHP, you would go to page 24-1 of this attachment, as the EHP is submitter 24.

In addition to the individual responses to submissions provided in this attachment, submissions were also responded to in other ways. Please refer to Section 4 – Response to Submissions for an explanation and navigation guide to responses to other submissions.

Each individual response includes a replication of each submission issue (boxed) followed by the response. Where relevant, responses refer to additional information which is provided in the technical attachments to this Supplement.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 2 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

2 SUBMISSION

Submitter Issue Number 2.001
The standard of aquatic ecological assessment undertaken for this project is not of the standard we've come to expect on mining EIS projects in Queensland. Poor quality EIS specialist reports undermine an EIS. My comments reference sections in the EIS Appendix G – Aquatic Ecology and Stygofauna Report and include:

The submitter's opinions on the assessment of aquatic ecology are noted. The proponent disagrees with these opinions as the assessments were undertaken by appropriately qualified and experienced aquatic biologists, in accordance with the Environmental Impact Statement (EIS) Terms of Reference (TOR) requirements and in line with appropriate methodologies. The specific issues raised in the submission are addressed in the following responses.

Submitter Issue Number 2.002
Section 4.5.1 –
Both the abundance of fish (six) and number of fishes (three species) encountered from a total of 22 aquatic survey sites across the study area appears to be an underestimate, considering the extent of aquatic habitat evident in the photos (Section 4.2).
This may be a result of inadequate fish survey effort, which was limited to dip netting and seine netting using an inappropriate mesh size (1cm mesh) (Section 3.2.7). This mesh size is too large for many of the smaller fishes that contribute to biodiversity in the Burdekin Basin, such as gudgeons, hardyheads and blue eyes. Many of the freshwater fishes occurring within water bodies of the study area may have simply passed through the oversized mesh of the nets, avoiding capture. Best practice freshwater fish survey includes both active (electrofishing or seine netting, with appropriately sized mesh) and passive survey techniques (deployment of fyke nets and baited box traps) to sample an adequate representation of fishes within a study area.
The fish survey effort for this project is grossly inadequate in comparison to survey effort for similar mining projects across Queensland.

Extent of Aquatic Habitat
The project site contains no permanent water and is characterised by ephemeral drainage lines, seasonal wetlands and farm dams used by cattle. The aquatic ecology surveys conducted indicated that aquatic ecology values were very low, due to the highly ephemeral and degraded nature of drainage lines due to stock access. The majority of drainage lines were observed to have no distinct riparian zone and aquatic habitat, such as in-stream vegetation, rocks and snags, was variable between ephemeral drainage lines. Some drainage lines are completely devoid of

aquatic habitat and are characterised by bare banks, no woody debris and no macrophyte cover for shelter and spawning.

Survey Methodology

Survey sites were chosen and assessed in accordance with the Queensland Australian River Assessment System (AusRivAS) Sampling and Processing Manual (DNRM 2001). Surveys were undertaken in accordance with best practice freshwater fish survey techniques and included active methods (seine nets) as well as passive survey techniques (the use of baited box traps). It is noted the survey effort is consistent with surveys undertaken for the proposed Carmichael Coal Mine and Rail Project (CCM&RP) EIS.

Submitter Issue Number 2.003

Turtle species richness may be underrepresented by inadequate turtle survey effort, which was limited to observation only (Section 3.2.7). As per the Queensland Vertebrate Fauna Survey Guidelines for Queensland (DSITIA 2014, and previous version DSITIA 2012), visual survey of turtles can be used as the first step in ascertaining turtle species within a study area, but should be followed up by capture techniques including trapping, snorkelling survey / capture, spotlighting survey / netting, and / or seine netting (with a mesh size of 5.5 – 15.2 cm); to capture an adequate dataset for biodiversity values.

The majority of the survey sites consisted of remnant pools in ephemeral drainage lines. These were very small in size and ranged from 0.2 to 1.5 m in depth. These areas were observed prior to fish surveys to determine turtle presence and due to their small size and depth it is considered that if turtles were present they would have been recorded during the surveys.

Other techniques, such as trapping, spotlighting survey / netting, and / or seine netting (with a mesh size of 5.5 – 15.2 cm) were therefore not considered necessary due to low probability of turtles being present. No snorkelling surveys were undertaken in larger water bodies (i.e. the dams) due to the high degree of turbidity (i.e. low visibility) of the water.

Submitter Issue Number 2.004

Section 3.3 states that water temperature was not recorded for survey sites A1, A2, A3, A4, A5 and A20 due to equipment malfunction. However, dissolved oxygen (DO) and electrical conductivity (EC) readings were still obtained. The 90-FLT multi-parameter water quality meter used (Section 3.2.8) relies on in-built temperature compensation to obtain accurate/adequate measurement of DO and EC. How did the study team account for this factor in the collection of DO and EC measurements when the temperature sensor was inoperable? Consequently, how reliable are the baseline results?

The DO and EC recordings did not indicate any results for those sites that appeared to be inaccurate.

Submitter Issue Number 2.005
The report fails to demonstrate that adequate aquatic macroinvertebrate sampling (used as a bio-indicator of stream health and ecosystem integrity) has been undertaken. Section 3.2.6(i) states that sampling was consistent with Turak and Waddell 2002, being the (superseded) Australia-Wide Assessment of River Health: New South Wales AusRivAS Sampling and Processing Manual. The project site is in Queensland. Queensland AusRivAS protocols (NRM 2001) differ greatly from NSW AusRivAS protocols, including the habitats sampled.

Section 5.3 – Editorial Corrections clarifies that the Turak and Waddell 2002 reference was included in error and should be deleted and replaced with NRM 2001.

The macroinvertebrate data from each survey site were assessed using the AusRivAS modelling programme (AUSRIVAS Macroinvertebrate Bioassessment Predictive Modelling Software V3.2.0), to enable comparison to other AUSRIVAS data sets from the region, which was the most current software available during the time of the surveys. The AusRivAS models compare the abundance and identity of macroinvertebrates collected from a sample site with a database from a large number of reference sites throughout Australia. The AusRivAS models match the sample site to reference sites for similar types of streams in the same State or region.

Submitter Issue Number 2.006
The Queensland AusRivAS protocol (NRM 2001) requires that samples be collected separately from the edge and bed habitats of stream reaches. The field team collected a composite edge/bed habitat sample (Section 3.2.4) and claim (on page 3.7) that this is a recognised approach supported by Barmuta et al. 2002, and Turak and Waddell 2002. However, neither Barmuta et al. 2002 nor Turak and Waddell 2002 condone this approach, nor is it a recognised approach for aquatic macroinvertebrate sampling in Queensland. The authors of these references have been misquoted and this should be rectified.

Section 5.3 – Editorial Corrections clarifies that the Turak and Waddell 2002 reference was included in error and should be deleted.

Submitter Issue Number 2.007
The provided photos (Section 4.2) suggest that both edge habitat (ie stream habitat within 0.5 m of the bank as per the Queensland AusRivAS protocol) and bed habitat were available to sample at a number of sites. These habitats should have been sampled separately and the data modelled separately, consistent with the Queensland AusRivAS protocol (NRM 2001). AusRivAS model outputs in the report are consequently erroneous and misleading.

As stated in Section 3.2.4 of the draft EIS Aquatic Ecology and Stygofauna Report (Appendix G), the data was compared to AusRivAS models for both edge and pool habitats and, where these differed, the lowest score was taken for the survey site.

Submitter Issue Number 2.008

The collected aquatic macroinvertebrate community data is unreliable as a baseline dataset. Oversights of macroinvertebrate sampling protocols raise questions as to whether the ecologist/s who undertook the macroinvertebrate sampling were AusRivAS accredited and have an appropriate understanding of stream bioassessment protocols in Queensland.

The aquatic macroinvertebrate community data is a reliable baseline dataset. The project site is located at the top of the catchment and as such is highly ephemeral and contains no permanent water. Aquatic ecology values identified during field surveys were very low, due to the highly ephemeral and degraded nature of drainage lines.

Submitter Issue Number 2.009

Any subsequent Receiving Environment Monitoring Program (REMP) or equivalent monitoring program prepared for the mine should first capture a baseline dataset of the aquatic macroinvertebrate community compositions prior to site preparations for the proposed mine to allow for accurate monitoring and comparisons during future operations. This baseline dataset should be collected consistent with the Queensland AusRivAS protocols (NRM 2001) so that future monitoring data can be accurately compared against baseline data. This will also allow for the baseline data to be compared (accurately) against comparable Queensland reference sites in the AusRivAS model. Unfortunately, the opportunity to achieve project efficiencies by undertaking this sampling as part of the EIS aquatic ecology assessment has been lost.

The baseline dataset was collected in accordance with the Queensland AusRivAS protocols (NRM 2001) and is appropriate to use as reference sites for the REMP.

PROJECT CHINA STONE
RESPONSE TO DEPARTMENT OF STATE DEVELOPMENT - MACKAY ISAAC WHITSUNDAY REGION SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

3C DSD MIW REGION SUBMISSION

Submitter Issue Number 3.003
The consultation undertaken by the China Stone Coal Project did not identify Mackay Regional Council (MRC) or Whitsunday Regional Council (WRC) as key stakeholders. The result of this omission is these key local authorities were not adequately consulted on the project. The impact of limited consultation with MRC and WRC may have disadvantaged the proponent and the proponent's access to relevant and supportive information to inform the EIS of the China Stone Coal Project. The lack of consultation may also introduce and impact to the Mackay region due to the lack of visibility of the region in the project.
Mackay Regional Council (MRC) and Whitsunday Regional Council (WRC) should be identified as key stakeholders and be provided equal opportunity to be engaged by the proponent to inform the Environmental Impact Statement.

The Mackay Regional Council was consulted as part of Environmental Impact Statement (EIS) issue scoping consultation undertaken for the project. This has been clarified in Section 5.3 – Editorial Corrections.

Consultation on the results of the draft EIS also included meetings with the Mackay Regional Council and the MIW RDA. This consultation is discussed in more detail in Section 2 – Consultation.

As stated in Section 7.6 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), the proponent intends to continue to engage with relevant councils as necessary in relation to the potential social impacts of the project including impacts in home-base locations.

Submitter Issue Number 3.004
The Social Impact Assessment (SIA) guideline states: Appendix 3, The social baseline assessment should include impact at the project site and, as appropriate, along the supply chains to where the associated service activity is located.'

The SIA guideline states:
Core SIA Principal
SIA will only assess impacts (both beneficial and detrimental) arising from the project and cumulatively with other developments in the region. Proponents are expected to mitigate impacts that are directly related to their project.

Area of Impact- Whitsunday Regional Council: The rail traffic of coal from the project is proposed to be transported to the Abbot Point Coal Terminal located at the Port of Abbot Point, within Whitsunday Regional Council's area of operation. The proponent will be responsible for developing the off-site rail spur connection. The rail line connecting the Galilee Basin to Abbot Point Coal Terminal will be developed by another party and will be subject to an Environmental Impact Statement.

MRC's area of operation hosts the largest and most innovative resource sector supply chain and has the highest capability and capacity to supply the sector, located within a 300km radius of the proposed operational mine. The Resource Industry Network (RIN) is the only not-for-profit member group representing the resource sector and allied industries servicing the Bowen Basin and emerging Galilee Basin. The members of RIN and associated Industrial Precinct Paget are considered to be the most comprehensive and innovative resource sector supply chain in Australia. The China Stone Coal Project may have disadvantaged their planning by not engaging fully with MRC and the resource sector supply chain in the area. Prior to commencement of the construction, the proponent is required to develop a comprehensive Stakeholder Consultation strategy, it is proposed MRC and RIN be identified as key stakeholders and consultation be undertaken.

WRC must be identified as a key stakeholder in relation to use of Abbot Point Coal Terminal and the off-site rail spur connection. The rail transport of coal, to Abbot Point Coal Terminal is a subject of impact to the communities within WRC's area and may impact MRC area depending on the alignment of the rail spur when it is determined. The off-site rail spur connection will occur under a separate environmental impact assessment and approval. This must include consultation around ancillary works and impacts associated with the spur and the use of the port.

The Mackay Regional Council will continue to be engaged in future consultation undertaken for the project. The Resource Industry Network will also be included as a key stakeholder for future consultation. This has been included in Attachment H – Additional Information on SIA.

As the submitter correctly identifies, the assessment and approval of port capacity and the off-site rail spur required for the project will be undertaken separate to this EIS process for the mine. These processes will follow regulatory requirements for consultation with relevant parties.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 7 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

7 SUBMISSION

Submitter Issue Number 7.001
Section 7.4.5 Rehabilitation and Decommissioning (and the associated Appendix that address tailings disposal and management ie Appendix C). Some information is presented in the EIS that is not supported by evidence. In Queensland, and more broadly in Australia and overseas, there are scarce examples of land disturbance associated with mining activities that have been successfully rehabilitated according to agreed standards. The statements "..successful rehabilitation experience at other mine sites.." and "A self sustaining native ecosystem will be established..." are provided without substantiation. The relevant technical appendix ie Appendix C devotes less than 1 page to the topic of TSF rehabilitation and closure. There is an absence of demonstrated performance of rehabilitation of mine disturbance against agreed performance specifications. This is a problem of long standing in Queensland, and is now increasingly widely reported in published literature.

Rehabilitation of mines in Queensland is regulated by conditions outlined in an Environmental Authority (EA) that is approved by the Department of Environment and Heritage Protection (EHP). The draft EIS Attachment 24-3 includes rehabilitation goals, objectives, indicators and completion criteria that were developed in accordance with the EHP Guideline *Rehabilitation Requirements for Mine Resource Activities.* This table is typically used as a basis for the rehabilitation conditions in an EA and is refined, as necessary, prior to the finalisation of the EA, to the satisfaction of the EHP. The project mining lease cannot be relinquished until these agreed rehabilitation completion criteria are met to the satisfaction of the EHP.

Submitter Issue Number 7.002
The engineering consultants who have prepared the technical information do not appear to provide:
1. information concerning the longevity of the landform created, the performance expectations (in terms of runoff/seepage quality and quantity and the assimilative capacity of the receiving environment),
2. the residual risks that the licence holder and ultimately the State is accepting for the landform created as a result of their advice, and
3. the nature and extent of works required to maintain the landform for the notional 1000 years espoused in the ANCOLD 2012 TSF guideline.
The disconnect between promises and performance means that the sector (industry and regulators) can not point to demonstrated success. In terms of the EIS process it is recommended,
1. the consulting engineers who wrote the relevant reports provide binding written agreement made in the favour of the State guaranteeing the TSF will be stable and not cause any environmental harm forever (with appropriate level of PI insurance held and maintained forever); or if this is not

possible,
2. devote effort to calculating the residual risk associated with the TSF, and nominating the associated maintenance regime [for a nominated duration (for which justification is provided) - as a starting point select 150 years)] and derive a monetary value to account for the financial liability associated with this mine disturbance for inclusion in the EIS. It is understood that the FA process, undertaken post the issue of an EA, exists; however, it is argued that this information should be made available before the decision to proceed with the project is made.

The submitter's opinions are noted. However, the submitter recommends actions that are not a requirement of an EIS and are not consistent with the current regulatory process regarding the provision of Financial Assurance (FA). FA will be provided by the proponent prior to the commencement of construction.

PROJECT CHINA STONE
RESPONSE TO QUEENSLAND TREASURY – HAZARDOUS INDUSTRIES AND CHEMICALS BRANCH OFFICE OF INDUSTRIAL RELATIONS SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

8 QUEENSLAND TREASURY SUBMISSION

Submitter Issue Number 8.001
HICB acknowledged that the EIS has strong coverage of mine safety however we believe the EIS could be strengthened by ensuring WH&S related safety considerations are also clearly addressed. These typically include understanding that whilst under construction WH&S legislation applies and WH&S legislative requirements will have to be met.
Emergency management planning needs to address non-mining specific matters including transport emergencies in remote locations, mass medical treatment and or evacuations within the camp community, communications and resourcing (without reliance on quick response from emergency services) due to the remoteness of the location.

Section 22 and Attachment 2-1 of the draft Environmental Impact Statement (EIS) acknowledge the existence and application of the *Work Health and Safety Act 2011* to the project. The proponent recognises that this legislation will apply to all phases of the project, including construction.

An Emergency Response Management Plan (ERMP) is proposed to be developed for the project, prior to the commencement of the construction phase of the project, which will discuss how site emergency response will integrate with response from emergency service providers. In addition, the proponent will also commit to addressing non-mining specific matters in the ERMP including transport emergencies, mass medical treatment and/or evacuations due to the remoteness of the project site. This has been included in Attachment I – Additional Commitments.

Submitter Issue Number 8.002
We also note that the project has a significant expectation of support from and access to infrastructure and resources associated with the proposed nearby Adani project, and that at the agency briefing it was mentioned that the China Stone project would most likely proceed regardless of the Adani project. We believe the EIS should address this matter so as to ensure a shared understanding of the extent to which the project is relying on Adani and how the project would be adequately supported regardless of the Adani project proceeding or not.

This issue has been addressed in the draft EIS. Section 4.13.5 of the draft EIS describes the potential interactions of the project with other northern Galilee Basin developments including the Carmichael Coal Mine and Rail Project (CCM&RP). Whilst the current preferred option for the rail connection to Abbot Point is to utilise the CCM&RP rail connection, the proponent also has the option of developing its own rail connection or sharing a rail connection with another proponent.

However, at this point in time Adani is indicating that it is proceeding with the development of the CCM&RP in the near future and the development of that project is therefore likely to precede Project China Stone by some years. On this basis the preferred rail connection option remains unchanged.

PROJECT CHINA STONE
RESPONSE TO AURIZON SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

9 AURIZON SUBMISSION

Submitter Issue Number 9.001
While the daft EIS does not provide for the rail infrastructure required to transport the mine production to port, the project will require new rail infrastructure which will either connect to or interoperate with the Newlands rail system operated by Aurizon Network
Accordingly, it is important both the draft EIS and any proposed EIS for the rail component of the project, properly consider (and give Aurizon Network the opportunity to respond to) the connection to, interface with and interoperability with the Newlands rail system. It is also vital for the continued development of both Bowen and Galilee Basins that the further expansion of the Newlands system be preserved in any future rail line from the Galilee Basin to the Abbot Point Coal Terminal. This corridor must provide not only for the location of the required rail infrastructure, but also for associated works such as drainage works and access roads.

The submitter correctly confirms that off-lease infrastructure for the project (such as the rail connection to port) was not included in the draft Environmental Impact Statement (EIS). As stated in Section 4.2 of the draft EIS, the rail line will be subject to separate environmental assessment and approval. The scope of this separate environmental assessment is yet to be determined. However, it would be expected to include a requirement to evaluate the interface with and interoperability of Aurizon's existing rail network, as relevant.

Submitter Issue Number 9.002
In the event that rolling stock transporting coal for the China Stone Project were, at any time, to utilise the Central Queensland Coal Network (CQCN) rail corridor operated by Aurizon network, there would be a need to comply with the mandatory requirements of Aurizon Network's Coal Dust Management Plan.

Noted. Section 15.8.12 of the draft EIS has assumed measures to control and manage dust emissions would include compliance with the relevant requirements of the Aurizon Coal Dust Management Plan at the train loading facility.

Submitter Issue Number 9.003

Future traffic management plans prepared in support of the China Stone Project's establishment/construction phase must appropriately address potential impacts to road-rail crossings of the CQCN's Goonyella and Newlands Systems. Aurizon Network is to be provided with the opportunity to review these traffic management plans, and it is recommended that the proponent engage with Aurizon Network to ascertain the requirements of same.

The project's primary transport route is expected to be from the project site to Townsville, via the Gregory Developmental Road and Flinders Highway. This route does not cross the Goonyella and Newland Rail Network. In the event of any change to this expected route, potential impacts to road-rail crossings of the Goonyella and Newlands Systems would be reassessed and, if necessary, incorporated into future traffic management plans prepared for the project.

PROJECT CHINA STONE
RESPONSE TO DEPARTMENT OF AGRICULTURE AND FISHERIES SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

11 DEPARTMENT OF AGRICULTURE AND FISHERIES SUBMISSION

Submitter Issue Number 11.001
Attachment 2-1, Table 1, pg 20) Materials affected under the Forestry Act 1959 - Further information
The Proponent should emphasise the need to contact DAF (Forestry) as early as possible in the project development process, for any required authorisations under the *Forestry Act 1959* in relation to State-owned forest products and quarry materials that would be impacted by the project.

As stated in Section 5.6 of the draft Environmental Impact Statement (EIS), timber resources or quarry materials are not currently proposed to be taken, disturbed or used for purposes other than mining within the boundaries of the proposed mining lease, or outside of the proposed mining lease as part of the project. As such, it is not expected that any authorisations under the *Forestry Act 1959* will be required. In the event this changes during project development, the proponent will contact DAF (Forestry) regarding any required authorisations.

Submitter Issue Number 11.002
Section 4.13, page 4-19) Off-lease infrastructure
For waterway barrier works outside of the Mining Leases, approval will be required for operational works that is the building or raising of waterway barrier works under the *Fisheries Act 1994* including any and all waterway diversions; levee designs; culvert or bed level crossings; rock armouring; or all and any other works within a waterway as defined under the Act. Any waterway barrier works within these mapped waterways need to meet the requirements of a Fisheries self-assessable code or be authorised through a development permit for operational works that is constructing or raising of waterway barrier works.

Noted. The draft EIS for the project specifically excludes assessment and approval for any off-lease infrastructure, as stated in Section 4.13. All necessary off-lease infrastructure will subject to separate environmental impact assessments and approvals. This will include assessment of the need for approval for any proposed waterway barrier works under the *Fisheries Act 1994.*

Submitter Issue Number 11.003
Section 5.3.2, pg 5-3 and section 5.4.4, pg 5-6 -The potential for an unmitigated loss of availability and utility of agricultural land as:
• currently grazing is the primary land use within the project site
• a stock route traverses the southern part of the project site
The Department's preferred outcome is that non-agricultural land uses coexist with agriculture.

DAF requires the upfront demonstration of:
• how the project will be mutually beneficial to both agricultural interests and resource activities;
• how the project will not cause agricultural interests to pause then restart in order to fit in with the project's development schedules;
• how the project will recognise and ensure the continual and ongoing agricultural production in areas affected by development and production activities;
• how the impacts to agriculture productivity (e.g. size of cattle herd, carrying capacity) will be minimised and mitigated during the Project;
• how the impacts to agriculture productivity (e.g. size of cattle herd, carrying capacity) will be maintained and enhanced on an ongoing and continual basis from post completion of project related activities; and
• how the project will provide positive flow-on benefits for the agricultural supply chains in and out of the local/regional community."

Given the safety requirements of an operating mine, it will not be feasible for grazing land uses to co-exist with the mine over a significant portion of the project site. In regard of the loss of agricultural use of the site, Section 8.3 of the draft EIS explains that the project site comprises either marginal grazing land (i.e. is suitable for light grazing of native pastures in accessible areas) or land that is not suitable for agricultural land uses. The grazing lands within the project site are a relatively small proportion of much larger grazing properties. The proponent is required to enter into agreements with affected landholders to gain access to the land for the project. These agreements would address the impacts of the project on landholder's agricultural land uses, as necessary.

As discussed in Section 5.4.4 of the draft EIS, the proponent will liaise with the Department of Natural Resources and Mines, the Isaac Regional Council and affected landowners in relation to the management and possible realignment of the stock route that traverses the project site. This consultation will occur prior to commencing construction. This will ensure that the project will not have a significant impact on the availability or use of the stock route.

Submitter Issue Number 11.004
Figure 5-4, pg15 Carrying and productive capacity of the property has not been identified.
The Proponent should describe the current carrying and productive capacity of the property and outline the project's impact on these capabilities.

The Terms of Reference for the project do not require the draft EIS to assess the carrying and productive capacity of the project site. However, Section 5.4.4 of the draft EIS describes the existing land uses on the project site and Section 5.6 of the draft EIS describes the potential impacts on these land uses, as required by the Terms of Reference.

Submitter Issue Number 11.005

Section 8.4.1, pg8-11 to 8-12

Coexistence is the Department's preferred position but this application has not detailed how the industries can co-exist. The Proponent indicated that "no grazing is proposed on these areas" in order to protect the integrity of the rehabilitation to achieve a self-sustaining native ecosystem post mining."

It is recommended that the proponent be required to:

• secure equivalent land for permanently impacted agricultural land (e.g. final void areas, any contaminated land, and areas of steep slopes post rehabilitation) for ensuring that there is no permanent net loss of land for agricultural production as a result of the proposed resource activity, in perpetuity; and

• securing to locate displaced cattle on adjoining land that has the capacity to support additional cattle for the period of displacement; and

• providing an 'uplift measure' to ensure the ongoing development of agriculture in the region."

The submitter correctly states that Section 8.4.1 of the draft EIS confirms there are areas of the project site that will not be suitable to be returned to their pre-mining land suitability class and agricultural land class. These areas are the open cut mine areas (including the overburden emplacement areas and the final voids) and the Tailings Storage Facility and Power Station Waste Storage Facility. These areas will not be suitable for grazing post-mining due to the need to prevent erosion initiated by cattle grazing on the rehabilitated overburden emplacements and waste facilities. However, post-mining, the remaining 13,989 ha of the project site (or 70% of the project site) will continue to be suitable for pre-mining land uses including grazing.

There is currently no legislative requirement to secure equivalent land for permanently impacted agricultural land and/or secure land for displaced cattle. The proponent will continue discussions with affected landholders regarding access to the land for the project and negotiation of associated compensation agreements.

Submitter Issue Number 11.006

"Section 9.8, pg 9-21 - Sterilisation of land due to environmental offsets.

It is recommended that the Proponent does not sterilize the availability or utility of agricultural land.

The draft EIS, including Section 9.8 of the draft EIS, does not refer to the sterilisation of land due to environmental offsets. As stated in the draft EIS Biodiversity Offset Strategy (Appendix H), an Offset Management Plan will be developed for the project to compensate for significant residual impacts on Matters of National Environmental Significance and Matters of State Environmental Significance as required under relevant Queensland and Commonwealth legislation. The Offset Management Plan will include details of the management methods that will be put in place for the offset properties to achieve appropriate conservation outcomes. This will include consideration of appropriate management of grazing pressures, pests, weeds and fire.

Submitter Issue Number 11.007

Section 10.6.1, pg 10-5 - Possible significant loss of fish habitat.

The proposed works may cause a significant loss of fish habitat through the removal of waterways mapped as green, amber and red in DAF's waterway mapping layer. This in turn may cause flow on effects to downstream purple waterways. DAF request that works involving the loss of fish habitat give consideration to the requirements of the State Development Assessment Provisions Module 5.2 Fisheries Resources WWBW to adequately provide for fish passage, and provide equal or enhanced habitat values and habitat complexity. If impacts cannot be avoided, DAF request that the impacts are minimised, mitigated or offset as per the Queensland *Environmental Offsets Policy 2014.*

The project site is located at the top of the catchment. Consequently the drainage lines that occur on the project site are highly ephemeral and flow only for short durations when sufficient rain has fallen in the wet season. Remnant pools form along these drainage lines during the wet season and generally dry out during the dry season. The drainage lines generally lack a distinct riparian zone. Section 10.6.2 of the draft EIS concluded that the majority of the drainage lines are unlikely to support significant freshwater fish communities due to a lack of both woody debris and macrophyte coverage for shelter and spawning; generally low flow; and the intermittently dry nature of the ephemeral drainage lines. This conclusion was supported by fieldwork, which confirmed very few fish records. The fish species that were recorded are common and widespread. Given this setting, the drainage lines that are proposed to be cleared do not provide significant fish habitat or fish passage values.

Section 10.7 of the draft EIS describes the mitigation measures that will be adopted to minimise impacts on aquatic ecology, including potential impacts on fish passage. These include ensuring that construction along drainage lines is only undertaken when flows have ceased; installing erosion and sediment controls and making use of a clearing procedure that restricts the area of remnant vegetation to be cleared to the minimum area required for the safe construction and operation of facilities.

Submitter Issue Number 11.008

Section 12.4.11, pg12-14 to 12-15

The potential for depressurisation of bores beyond the project site as a direct result of the Project. The details of provisions for reduction/loss of bore water supply to properties due to mining and post mining activities have not been provided.

The Proponent has indicated that "the project is not predicted to impact on bores that are located beyond the project site". However, in the event that these bores are impacted the Proponent should outline:

• make good provisions for water bores – details are not currently provided; and

• provisions for reduction/loss of bore water supply to properties due to mining and post mining activities.

The predicted impacts of the project on water supply bores are discussed in Section 12.4.8 of the draft EIS. Section 12.6 of the draft EIS discusses the licensing requirements under the *Water Act 2000* that will apply to the project and require the make good for any affected water supply bores. As is normal practice, make good arrangements for affected water supply bores typically involves either modifications or deepening of existing bores or the installation of a new bore.

Submitter Issue Number 11.009
Section 18.6.2, pgs 18-9 to 18-10
The operations phase 1 will have an average annual workforce of 3,119 and phase 2 will have an average annual workforce of 1,016 persons. However, the EIS does not specify where this workforce will be sourced or how it will be trained when required.
The Proponent should consider:
• how labour from the existing local workforce will be trained to meet emerging skill needs
• how training will be sourced and if there are Registered Training Organisations available to meet these needs.

Section 18.6.5, pgs 18-11 to 18-12
The predicted home-base locations of the workforce area stated in the EIS does not include the Fitzroy or Mackay-Isaac- Whitsunday Regions.
The Mackay-Isaac-Whitsunday and Fitzroy regions have been traditionally linked to the long history of mining in the Bowen Basin. The primary centres of Mackay and Rockhampton have good transport links and have provided long term home base locations for skilled resource workers. This involvement over many years has resulted in the experience to *'absorb any relatively minor additional population growth that may arise from the project.'*
If, *'the selection of multiple potential home base locations also aid to disperse the workforce*...', then the CQ Region, and particularly the Isaac LGA, where the project is located, should be considered as a home base location for the workforce.

The draft EIS Social Impact Assessment (Appendix N) provides detailed information regarding the likely source of labour (including assessment of possible home base locations), training of the workforce and commitments to manage associated impacts including the following:

- Section 4.3.1 discusses workforce recruitment in the construction phase.
- Section 4.1.1 discusses workforce recruitment in the operations phase.
- Section 4.4.4 discusses workforce training.
- Section 6.3.5 discusses skills enhancement in the Local Area and home base locations.
- Section 7.2 discusses the proponent's commitments relating to recruitment and training including the development of a Recruitment Plan and a Training and Skilling Plan.
- Appendix D of the draft EIS Social Impact Assessment (Appendix N) is a Labour Market Study which is a detailed study undertaken to inform the labour source locations for the project.

Section 4.4.1, Section 4.4.5 and Appendix D of the draft EIS Social Impact Assessment (Appendix N) specifically addresses the submitters concern that the Fitzroy or Mackay-Isaac-Whitsunday Regions were not currently included in the predicted home base locations. These sections explain that these regions weren't considered as likely home base locations for the project workforce as, at the time the SIA baseline was prepared, the Mackay and Fitzroy Regions were experiencing sustained population growth driven by significant expansion in the surrounding mining industry. This population growth resulted in housing availability and affordability issues across both regions, particularly in the Mackay Region. It also placed considerable pressure on existing services and facilities as well as labour supply for non-mining sector businesses. For this reason, it was assumed that the majority of project labour would not be able to be sourced from the Mackay and Fitzroy Regions. However, it was also noted that, due to the recent significant downturn in the coal mining industry since the Labour Market Study was undertaken, there has been a reduction in the number of mine employees across the Mackay and Fitzroy Regions, leading to marked changes in housing availability and affordability across these regions. House prices and rents have reduced substantially and housing availability has increased. This suggests that these areas may now have an existing supply of suitable labour and capacity to accommodate a proportion of the project workforce as permanent residents. However, given the cyclical nature of mining it is likely that within the proposed 50 year mine life, these regions will again experience sustained population growth coupled with high demand for housing, and services and facilities. Alternative regional centres will be considered as home base locations if current labour market conditions persist into the construction and operations phase of the project. To this end, and as explained in the draft EIS, the proponent has committed to updating the project labour study prior to the commencement of the project construction phase.

Submitter Issue Number 11.010

Table 30-1, pgs 30-66 to 30-67 - Further detailed planning

DAF also notes that the project proponent needs to undertake more detailed planning to identify its quarry material requirements and their proposed sources of supply for its mining operations and associated mine infrastructure within the proposed mining lease, for works to construct or upgrade roads to the proposed mine lease from the Moray-Carmichael Road, for construction of a rail spur line from the proposed Galilee Basin to Abbot Point Coal Terminal, and for any coal terminal requirements.

The proponent must consult with DAF as early as possible about its quarry material requirements for its project and the related infrastructure to ascertain if the proposed sources of quarry material are available to the project proponent and, if so, to obtain any required authorisation under the *Forestry Act 1959* to remove and use State-owned quarry material.

Noted. Refer also to response to issue 11.001.

Submitter Issue Number 11.011

Waterway Barrier Works applications and approvals under the *Sustainable Planning Act 2009* are not required within Mining Leases for projects authorised under the *Mineral Resources Act 1989*. Waterway Barrier Works applications and approvals are relevant outside the Mining Lease area.

Any waterway barriers inside or outside of the Mining Lease do however have capacity to impact upon fish movement and waterway habitats with ramifications to the fisheries resources of the region. The DAF request that for any waterway barrier works within the Mining Lease, consideration is given to the requirements of the State Development Assessment Provisions Module 5.2 Fisheries Resources WWBW to adequately provide for fish passage, and provide equal or enhanced habitat values and habitat complexity. For waterway barrier works outside of the Mining Leases, development approval will be required for operational works that is the building or raising of waterway barrier works under the *Fisheries Act 1994* including any and all waterway diversions; levee designs; culvert or bed level crossings; rock armouring; or all and any other works within a water as defined under the Act. The *Fisheries Act 1994* requires that waterway barrier applications may only be approved following consideration of impacts of the works upon fisheries resources and fish habitats.

Noted. Refer also to response to issue 11.002.

PROJECT CHINA STONE
RESPONSE TO BTF RECOVERY TEAM SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

12 BTF RECOVERY TEAM SUBMISSION

This response has been specifically prepared to address issues raised in the Black-throated Finch Recovery Team submission. It is also noted that Birdlife Australia (Submitter 37) also referred to the Black-throated Finch Recovery Team submission issues, directly quoting the Black-throated Finch Recovery Team submission.

Submitter Issue Number 12.001

The Black-throated Finch Recovery Team (BTFRT) has reviewed the Project China Stone Terrestrial Ecology Report (the Report), prepared by Cumberland Ecology for Hansen Bailey and dated July 2015. The following letter documents the BTFRTs main concerns with respect to the assessment work and findings. In summary:

- There is insufficient survey effort to assess the distribution and abundance of BTF on the site.
- There is insufficient information contained in the Report to ascertain the significance of the project area to BTFs.
- There is insufficient information to assess the significance of the proposals impact on the BTF (i.e. the MNES significant impact criteria).
- Potential impacts on the BTF may have been understated due to erroneous assumptions made about the importance of the project site to BTFs, the location and extent of suitable habitat for BTFs and the capacity to restore and/or offset BTF habitats impacted by mining.

The BTFRT is aware that the China Stone Project site adjoins the proposed Carmichael Mine where the largest known (from across the species range) populations of BTFs occur. The habitats supporting BTFs on the proposed Carmichael Mine site are contiguous with that found on the China Stone Project site. On available information, the totality of these habitats is likely to be critical to the viability and long term survivorship of the local and regional BTF population, and ultimately the conservation status and population trend of the species.

The BTFRT's main concerns regarding the China stone EIS are detailed below.

The specific concerns raised in the submission are discussed in the following responses.

Submitter Issue Number 12.002

a) There is insufficient information contained in the Report to ascertain the significance of the project area to BTFs.

b) According to the Report, BTFs were recorded at 'several locations' (shown on Figure 14 and 17) in the southern portion of project area, and the species is 'moderately common' in this area [4.33]. Mention is made of a flock of 12 BTFs and 'several individuals and small flocks' [4.33]; however, no data are provided on the number of sightings or the details of those sightings. Reliable information on BTF abundance and distribution (spatially and seasonally) is necessary to establish the importance of the project site to BTFs. The Report has not provided this.

The Terrestrial Ecology Report (Appendix F) of the draft Environmental Impact Statement (EIS) provides sufficient information to allow an assessment of the project's potential impact on the Black-Throated Finch (BTF). It includes the results of multi-season flora and fauna surveys, provides maps of available habitat and includes the location of species records within the project site. Survey data and general findings from other projects in the Galilee Basin were also considered as part of the development of the draft EIS, allowing for a robust assessment of potential impacts on the species. An Assessment of Significance in accordance with the requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is included in the Terrestrial Ecology Report (Appendix F) of the draft EIS. It concluded that the project has the potential to give rise to a significant, residual impact on the species, and offsets are therefore required to compensate for these impacts. This conclusion would not be altered by additional data on BTF abundance and distribution.

The proponent acknowledges the value, in general terms, of gathering further information about the ecology and distribution of the BTF. This information would assist with conservation efforts for this species. Recent approvals for Galilee Basin Projects have therefore included approval conditions that require further research and/or contribution to research funds. For example, Recommendation 4 of the Office of the Coordinator General's (OCG's) Evaluation Report for the Carmichael Coal Mine and Rail Project (CCM&RP) EIS describes the development of a BTF Bioregional Management Plan, funded by pro-rata contributions from Galilee Basin proponents. According to Recommendation 4, the BTF Bioregional Management Plan must provide for the bioregional survey and assessment of the BTF population and habitat in the Galilee Basin and Desert Uplands bioregion, including identifying a schedule of baseline bioregion-wide surveys and ongoing bioregion-wide surveys for the species. Conditions 15 to 19 of the CCM&RP EPBC Act approval require the contribution of funds (amounting to $1 million) to the implementation of research programs on EPBC Act threatened species. According to Environmental Authority Condition I6, the CCM&RP is also required to prepare a BTF Species Management Plan, aligned with any Bioregional BTF Management Plan, which includes a baseline research program on the specific nesting and feeding requirements of the species.

The proponent believes that supporting well planned, carefully scoped research is the best approach for improving scientific knowledge about the BTF. In contrast, undertaking additional, ad hoc site specific survey work has very limited potential to deliver meaningful data that could be

used to benefit the species, and further site work would not change the draft EIS's overall conclusion in relation to potential impacts on the species.

Submitter Issue Number 12.003
Furthermore, BTF sightings made on the China Stone site during work by GHD for the Carmichael Mine site are not shown on the Report's mapping and have not been used to inform habitat modelling. This is a significant omission of relevant information.

Please refer to Figure 1 in Attachment F - Additional Information on Ecology, which shows BTF records from the CCM&RP EIS and associated documentation. This figure also provides revised habitat modelling for the BTF and shows an excellent correlation between the revised habitat modelling and the CCM&RP EIS BTF records.

Submitter Issue Number 12.004
Information relating to the presence and abundance of BTFs has been attained via a general fauna survey program. This included timed bird census surveys (10 to 30 minutes) at various locations [3.23]. The total sampling effort for birds over the 3 surveys was 37 hours (i.e. on average 12.3 hours per survey) which is a low sampling intensity for such a large area and not in accordance with the EPBC Survey Guidelines. While the sampling design has successfully identified BTF presence, it has not properly assessed BTF distribution and abundance (spatially and seasonally) within this area. The distribution and abundance of BTFs on the project site should be ascertained via targeted studies that utilise an appropriate sampling regime and performed by suitably experienced persons. The study should consider both the southern and northern portions of the project site.

The purpose of the Australian Government's 2010 *Survey guidelines for Australia's threatened birds* (i.e. the "EPBC survey guidelines" referred to in the submission) is to "determine the likelihood of a species' presence or absence at a site" (refer page 1 of the guideline). Given that the field survey undertaken for the draft EIS has been successful in recording the BTF within the project site, the survey effort was suitable for the purpose outlined in this guideline.

Please refer to the response to issue 12.002 in relation to the issue of undertaking further surveys of the BTF, particularly surveys designed to map distribution, abundance, etc. Please also note that the habitat modelling presented in the draft EIS and Attachment F – Additional Information on Ecology is not dependent on BTF records and consequently gathering further data about the abundance and distribution of the BTF within the project site would not alter the conclusions of the draft EIS.

Submitter Issue Number 12.005

When assessing the significance of the project site to BTFs more detailed consideration should be given to work undertaken on the neighbouring proposed Carmichael Mine site. Studies by GHD indicate that large numbers of BTFs occur in the north of the Carmichael Mine site and in the south of the China Stone project site (i.e. the GHD reports contain data collected from the China Stone project site). This information and data should have received greater attention in the Report and informed assessments about the significance of the China Stone project site to BTFs.

Please refer to response to issue 12.003.

Submitter Issue Number 12.006

Modelling has been used to identify the location of 'High value', 'Low value' and 'Unsuitable' habitat for BTFs (Figure 17)[G.3]. The decision criteria for the habitat model are based on Regional Ecosystem types and distance to permanent water. The problem with this approach is that important habitats for BTFs may also occur near to ephemeral water sources; for example, in the Townsville region breeding habitat is known to occur near to ephemeral water points. With respect to the project site, these concerns are supported by the presence of BTFs in 'Low value' habitat (five of the ten (50%) BTF sightings on Figure 17 occur in 'Low value' habitat). For example, if BTF are known to use feeding areas near ephemeral water seasonally – and this is a critical resource during breeding and nesting periods. If this habitat is removed, this removes part of its annual habitat (ergo the BTF does not just use habitat around permanent water) and therefore the impact on the BTF is significant. The division between low and high value habitat is spurious. The habitat model is therefore considered unreliable, and it underestimates the area of habitat to be effected.

The BTF habitat modelling for the project site has been revised in consultation with the Federal Department of the Environment and Energy (DoEE) and the Queensland Department of Environment and Heritage Protection (EHP). An overview of the revised habitat modelling is provided in Attachment F - Additional Information on Ecology. The revised habitat modelling now includes proximity to ephemeral drainage lines.

Submitter Issue Number 12.007

The habitat mapping seems to use the REs listed in the Recovery Plan; but the data from the GHD reports clearly indicate that there are other RE types used by the BTF in the region, and other REs contain the resources (i.e. grass types, tree types for nesting) that the BTF would clearly use (e.g. 10.3.28a, 10.3.6a, 10.3.10, 10.3.11a, 10.3.14c, 10.3.14, 10.3.15k, 10.3.16, 10.5.4b, 10.10.3, 10.10.4a/c, 10.10.5a).

As noted in the response to issue 12.006, the BTF habitat modelling has been revised. An overview of the revised habitat modelling is provided in Attachment F – Additional Information on Ecology. The majority of regional ecosystems listed in this submission are now included as BTF habitat.

Submitter Issue Number 12.008
The habitat mapping seems to be missing permanent watering points, and there are springs in the sandstone ranges that the BTF would also use in the dry season, to access food resources in key REs (i.e. land zone 10 REs). These must be included in the habitat mapping to more accurately present the distribution of high value habitat.

As indicated in the draft EIS Groundwater Report (Appendix I), there are no springs on the project site. The closest springs are 22 km to the south. As noted in the response to issue 12.006, the BTF habitat modelling has been revised. An overview of the revised habitat modelling is provided in Attachment F – Additional Information on Ecology. The revised habitat modelling is no longer reliant on permanent water and also includes proximity to ephemeral drainage lines.

Submitter Issue Number 12.009
The habitat mapping and surveys do not assess the condition of the habitat or REs for the BTF in terms of diversity and composition of food resources (i.e. grass types) or potential nesting resources.

Habitat condition across the site was considered and is discussed in Section 4.2.1 of the draft EIS Terrestrial Ecology Report (Appendix F). This section concludes that, overall, all vegetation was considered to be remnant and in very good condition, although the structure of the understorey and condition of ground layer was modified in many areas by cattle grazing. The draft EIS, therefore, conservatively did not seek to differentiate project impacts on threatened species on the basis of better or poorer quality habitat and has proposed to offset impacts of clearing of all remnant vegetation, regardless of habitat condition. On this basis, a detailed habitat condition assessment for the BTF is not considered to be warranted at this stage and such an assessment would not alter the predicted impacts of the project or the requirement for offsets.

It is also noted that detailed field surveys will be undertaken of the project site and offset properties during the development of the Offset Management Plan for the project. This will include an assessment of habitat condition for the purpose of confirming offset area calculations. This will occur prior to construction of the project.

Submitter Issue Number 12.010
Potential impacts on the BTF may have been understated due to erroneous assumptions about the importance of the project site to BTFs, the location and extent of suitable habitat for BTFs and the capacity to restore and/or offset BTF habitats impacted by mining.
Understanding the significance of a site to BTFs, and the location of important habitats, is essential for identifying and quantifying impacts. As described above, the abundance and distribution (spatially and seasonally) of BTFs is poorly known for the project site, and the habitat model is unreliable. It is likely that the Report has understated the importance of the site to BTFs.

The draft EIS acknowledges the importance of the project site in providing habitat for the BTF. As detailed in Attachment F – Additional Information on Ecology, habitat mapping for the BTF has

been revised in consultation with DoEE and EHP. A conservative approach to habitat modelling has been adopted, which has substantially increased the modelled extent of BTF habitat within the project site, compared to the habitat modelling in the draft EIS.

An Assessment of Significance, provided in the draft EIS Terrestrial Ecology Report (Appendix F) was undertaken in accordance with the requirements of the EPBC Act and concluded that the project has the potential to give rise to a significant impact on the BTF as a result of BTF habitat clearing required as part of the project. Offsets are proposed for this impact in accordance with the Australian Government's 2012 *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (EPBC Act Environmental Offsets Policy)*. Attachment F – Additional Information on Ecology indicates that sufficient suitable areas are present in the region for offsets. The submitter's general concerns about offsets are noted, but the provision of offsets is a standard approach, required by Queensland and Commonwealth legislation.

Submitter Issue Number 12.011
Significant impact determinations are based on the premise that 4434ha of BTF habitat will be impacted [L8]. This assessment is based on 'High value' habitat and ignores potential impacts on 6879ha of 'Low value' habitat. This is an under estimate of true impact because the available data indicate that habitats of potential importance to the BTF occur in the areas mapped as 'Low value' habitat. A reliable habitat model should be prepared and the assessment of potential impacts should be based on this revised model. The habitat model must be informed by site-specific data collected via specialised studies.

As detailed in the response to issue 12.006, the habitat modelling for the BTF has been revised. The revised habitat model is described in Attachment F – Additional Information on Ecology. As noted in these sections, the revised habitat now includes many of the areas that were previously mapped as low value habitat.

Submitter Issue Number 12.012
Significant impact determinations are based on the premise that rehabilitation will restore woodland habitats, and in the long term (20-40 years) restore 'similar levels' of habitat [L9]. While it may be possible to restore some areas to a woodland vegetation type there is no evidence, or precedent at other locations in the Galilee Basin, that the proponent will be able to restore exactly what is being lost, noting that BTFs have specific/specialised habitat requirements (e.g. preferred vegetation structures, densities and species composition). Restoration of suitable habitat will not be possible over large portions of the project site (e.g. open cut mine areas) and these limitations have not been quantified, or considered, when assessing impacts.

The Assessment of Significance prepared for the BTF provided in the draft EIS Terrestrial Ecology Report (Appendix F), concluded that the project would give rise to the permanent loss of habitat within the project site and, for this reason, has the potential to give rise to a significant, residual impact on the species. The assessment considered potential mitigation measures (e.g. installation of watering points, mine rehabilitation) but concluded that even with these measures, the impact

was predicted to be significant and residual. For this reason, and in keeping with the requirements of the *EPBC Act Environmental Offsets Policy*, offsets will be required to be provided. Section 5.3 – Editorial Corrections clarifies that re-establishing BTF habitat as part of mine rehabilitation was not a material consideration of the impact assessment.

Submitter Issue Number 12.013

Significant impact determinations regarding the "long term decrease in the population", "reduce area of occupancy", "fragment existing populations", "adversely affect habitat critical to survival", "disrupt the breeding cycle", "modify, remove", destroy, or decrease in quality of habitat" "result in invasive species that harmful to endangered species", "introduce diseases that might cause a species to decline" and "interfere with the recovery of a species" are not undertaken in a quantitative, formal or transparent manner. There is no quantitative data (i.e. population size, indices of abundance, seasonal variation) on BTF in the project area. There is not data on breeding or breeding cycles in the project area. There is no formal analysis of area of occupancy. There is no data on habitat condition. There is analysis of the distribution of invasive species such as buffel grass (a highly invasive species that is present there) that can overtake the native grasses, often facilitated by clearing and soil disturbance. This can cause severe decline in habitat quality for the BTF. There are many modelling tools that can be used to transparently address the above MNES criteria (i.e. population viability and spatial analysis). There is also a reasonable link between increased dust, air sac mites and the decline in Gouldian Finches in the Northern Territory. This must be assessed too.

There are varying degrees of detail that can be provided in an assessment of significance, ranging from a qualitative, desktop assessment to the collection of detailed, long term monitoring data over a number of years. However, irrespective of the level of detail included in the assessment of significance, the purpose of the assessment is to determine whether an action is likely to give rise to a significant impact on a matter of national environmental significance (MNES). In the event of a significant, residual impact being predicted, biodiversity offsets are required. The assessment provided in the draft EIS is at a suitable level, and contains a similar level of detail to assessments provided in other EIS documents for projects within and beyond the Galilee Basin. There is no requirement in the Australian Government's 2013 *Matters of National Environmental Significance - Significant impact guidelines 1.1* or in the EIS Terms of Reference for a quantitative assessment as suggested in the submission. The Assessment of Significance provided in the draft EIS Terrestrial Ecology Report (Appendix F) and the revised habitat modelling provided in Attachment F – Additional Information on Ecology has provided sufficient information to support the conclusion that the project has the potential to give rise to a significant, residual impact on the species, and this has triggered the need for offsets. The additional analysis suggested in the submission would not change this conclusion.

Submitter Issue Number 12.014

The Report concludes that the proposed action will not result in a long term decrease in the size of the BTF population on the basis that: (a) unmined habitats are extensive in the Galilee Basin; (b) each mine will restore habitats; and (c) considerable offsets are proposed for each mine [L9]. Of concern is the fact that: (a) in the Galilee Basin the majority of predicted BTF habitat falls within granted MLAs; (b) the successful establishment of woodlands habitats of a type suitable for BTFs has not been demonstrated at any site in Queensland, and it is impossible to restore woodland habitats on some post-mine areas; and (d) with respect to approved MLAs in the Galilee Basin, research has demonstrated that attempts to offset impacts on BTF habitats will ultimately result in the net loss of habitat. On current knowledge these losses will impact the largest known (across the entire species range) populations of BTF. Further, the success of offsets to avoid or reduce impacts on BTFs is an unproven science and has not been quantified.

This submission relates to a broad concern from the submitter about the effectiveness of offsets and their potential to compensate for residual adverse impacts on the BTF. Offsets are well established in government policy (e.g. *EPBC Act Environmental Offsets Policy*) and proponents are required by law to provide offsets in the event of significant, residual impacts being predicted. Any concerns in relation to the general concept and effectiveness of biodiversity offsets are best directed towards the government agencies that administer the legislation and policy related to offsets.

Submitter Issue Number 12.015

Predictions about the potential impacts of the proposed action should consider all direct, indirect, on-site, off-site, secondary and cumulative impacts. This includes consideration of the potential impacts associated with mine dewatering, or other activities that may alter the temporal availability, quality and abundance of surface and ground-stored water. In circumstances where predicted impacts are uncertain the potential range in magnitude of impact should be discussed.

The draft EIS considers all relevant direct, indirect and cumulative impacts from the project. The impacts of mine dewatering are addressed in the draft EIS Groundwater Report (Appendix I) along with all other potential impacts on groundwater. The potential impacts of the project on surface water, including catchment yield impacts, are addressed in Section 13 of the draft EIS.

PROJECT CHINA STONE
RESPONSE TO PUBLIC SAFETY BUSINESS AGENCY SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

16A PUBLIC SAFETY BUSINESS AGENCY SUBMISSION

Submitter Issue Number 16.001

a) *Recently draft guidance material for Bushfire hazard has been developed in support of the State Planning Policy in the form of a draft model code (attached). The draft model code has been developed to meet QFES operational needs and adopt key recommendations for bushfire mitigation. The code is currently in consultation with peak bodies and key industry groups. In support of this process, please consider relevant sections of the draft model code as a guide to address SPP requirements for bushfire hazard. Applicable performance and acceptable outcomes within the model code are numbered 1-3, 10-15.*

b) *The State Planning Policy (SPP) interactive mapping system indicates a very high, high, and medium potential bushfire area including potential impact buffer affecting the site as shown at http://www.statedevelopment.qld.gov.au/about-planning/spp-mapping-online-system.html. This means the SPP applies to the site and relevant provisions within the draft model code given above provide a pathway to address the requirements of the SPP. The draft EIS acknowledges the site is affected by bushfire hazard areas as part of the State Planning Policy Mapping. A number of facilities and infrastructure are susceptible to bushfire risk such as the warehouse and storage of dangerous goods, LPG and explosives. The accommodation village has also been identified as susceptible to bushfire risk.*

c) *To manage the bushfire risk the draft EIS states that a bushfire management will be developed and at the advisory agency briefing the proponent stated that much of the site will be cleared to reduce the bushfire risk. PSBA supports both these measures and advises that a site assessment should be conducted to determine the level of bushfire risk to the site. This in turn will guide adherence requirements to the draft model code.*

16.001 a) The proponent has committed to developing a Bushfire Management Plan as part of the project's Safety and Health Management System to address bushfire hazards, risks and management. The draft model code for Bushfire Hazards will be consulted in the development of this plan. This has been included in Attachment I - Additional Commitments.

16.001 b) Noted.

16.001 c) A site assessment will be conducted as part of the development of the Bushfire Management Plan, if necessary, to determine the level of bushfire risk at the project site. This has been included in Attachment I - Additional Commitments.

PROJECT CHINA STONE
RESPONSE TO QUEENSLAND FIRE & EMERGENCY SERVICES SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

16B QUEENSLAND FIRE & EMERGENCY SERVICES SUBMISSION

Submitter Issue Number 16.002
The locality of the China Stone Project is approximately 2.5 hours response time for QFES appliances from the nearest QFES Station.
Any increase in road traffic, light and heavy, will impact on QFES resources and response capabilities. This impact is increased with the extended travel distances.
QFES requests consultation with the proponent to discuss whether a collaborative and mutual agreement can be reached where the Emergency Response Team (ERT) to be established for the China Stone Project will have the training and resources to assist QFES at any Road Traffic Crash or other emergency incident along this route.

The proponent acknowledges the remoteness of the project site and is committed to working with the relevant emergency response providers to ensure adequate training and resources are available to respond to emergencies. As part of this, an Emergency Response Management Plan (ERMP) is proposed to be developed for the project, which will include discussion of how site emergency response will integrate with response from emergency service providers. In addition to addressing major on-site emergencies and incidents that could impact on surrounding land uses, the proponent will also commit to addressing non-mining specific matters in the ERMP including transport emergencies, mass medical treatment and/or evacuations due to the remoteness of the project site. This has been included in Attachment I - Additional Commitments.

Submitter Issue Number 16.003
The locality of the China Stone Project and proposed airstrip is approximately 2.5 hours response time for QFES appliances from the nearest QFES Station.
The EIS identifies that approximately 40 flights per week will occur for the transportation of the Fly-In/Fly-Out workforce and construction materials when the airstrip is established. With approximately 170 persons per flight, that equates to an annual passenger manifest of approximately 353,600 persons. It is the QFES's understanding that when an average annual passenger manifest exceeds 350,000 for an airstrip, then a permanent Aviation Fire Fighting force is required to be established.
The proponent will be required to identify what China Stone's ERT's capabilities and resources will be and how any aviation incident will be managed.

As discussed in Sections 22.3.2 and 22.8 of the draft Environmental Impact Statement (EIS), the proponent will address emergency response preparedness by developing an ERMP as part of the Safety and Health Management System for the project. The ERMP will address major

emergencies and incidents that could impact on surrounding land uses. It will include firefighting requirements for all on-site activities, including aviation, in accordance with all relevant legislation. The ERMP will be developed in consultation with emergency service providers, including the QFES.

Submitter Issue Number 16.004
Installation of Special Fire Services to Australian Standards and compatibility of equipment installed with these installations to QFES appliances.
As this accommodation site is being constructed on a mining lease, the project and Special Fire Services to be installed throughout will not be required to be assessed by QFES as a referral/advice agency under the Sustainable Planning Regulation Schedule 7.
QFES recommends that they are engaged to provide the proponent with advice on compatibility of resources and any other issues that may require clarification.

Noted.

Submitter Issue Number 16.005
Safety and Health Management System (SHMS).
QFES accepts to be involved with planning for the Emergency Preparedness and Response for the SHMS.

Noted.

PROJECT CHINA STONE
RESPONSE TO QUEENSLAND POLICE SERVICE SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

16C QUEENSLAND POLICE SERVICE SUBMISSION – TOWNSVILLE DISTRICT

Submitter Issue Number 16.006
Consultation should be made with company representatives to ensure heavy vehicle movement is restricted to Port access road and not access via Boundary St and Abbot St. These suburban streets include tight turning areas at the intersections of Boundary St and Railway Ave, several traffic lights along Railway Ave, Abbot St and Flinders Highway, a pedestrian overpass at Railway Estate School, Railway Ave, a narrow pass on Rooneys Bridge on Railway Ave, and Abbot St Oonoonba.

Noted. Section 19.2.3 of the draft EIS acknowledges the need to obtain relevant permits for over dimensional vehicles from the Queensland Police Service (QPS) and includes a commitment to provide the QPS with a detailed schedule of these vehicles as part of detailed construction planning.

Submitter Issue Number 16.007
A larger than present volume of heavy vehicle movement in and out of the Townsville Port predominantly along the Port Access Rd poses potential for an increase in traffic incidents involving heavy vehicles with inherent risks.
Potential for major incident type road incidents and associated trauma requiring concentrated police reaction, heavy machinery recovery equipment, and heavy damage to road infrastructure etc.

Refer response to Issue 16.006.

Submitter Issue Number 16.008
Need for QPS representatives including the OIC at the Townsville Station. The Road Policing Unit will need to formulate a working party with Port and Main Roads representatives to identify potential 'weak point' in port exit route and city exit route in regards to large vehicles, wide load escorts, protest/blockade areas and to formulate risk management plans around those risks.

Noted.

Submitter Issue Number 16.009

There is also an issue with a perceived increase in policing presence regarding protestors along the Port access road. This could result in inherent risk of serious injury/death to protestors attempting to block movement of mining equipment.

This is a matter for the QPS. It is noted that the issue of concern is purely speculative.

Submitter Issue Number 16.010

Issues with road movement of excess dimension loads of material and machinery through heavy traffic areas within the city limits, which could impose on the availability of wide load escorts and police vehicles for the district.

Refer response to Issue 16.006.

Submitter Issue Number 16.011

Depending on the size of machinery moved, the ability for heavy vehicles to turn safely off the Port access road onto the Flinders Highway at Stuart poses traffic risks which may require police presence additional to wide load escort duties.

Refer response to Issue 16.006.

16C QUEENSLAND POLICE SERVICE SUBMISSION – CHARTERS TOWERS DISTRICT

Submitter Issue Number 16.012

- The China Stone mine will be situated approximately 30km from the Adani Carmichael holding.
- It will effectively use the same road and rail infrastructure that has been or is being built for Adani.
- At a meeting on Thursday (OCG agency briefing 20 August 2015), an Adani Executive advised that China Stone was about 3yrs behind Adani in its planning and development.
- China Stone, like Adani does not support a drive in/drive out workforce and advocates fly in/fly out or bus in/bus for safety. That said, contractors at the mine-site may not do so.
- Regardless, there will be a significant increase in the traffic flow on the Flinders Highway and Gregory Developmental Road much of which being heavy transports and in the build phase, many excess dimension loads of material and machinery.

Refer response to Issue 16.006.

Submitter Issue Number 16.013

- The heavy vehicle by-pass at Charters Towers has a narrow/low rail overpass [Dungavell Drive] which routinely requires excess dimension vehicles to be detoured through suburban streets. This increases risk to other motorists and damage to infrastructure. See photo below (Submission contains photo of overpass)
- The heavy vehicle by-pass also passes through residential areas in Charters Towers and the increase in heavy transport traffic will increase the risk to those residents. See below (Submission contains photo of road in residential area)
- The peaceful enjoyment of those residences on or adjacent to the by-pass will also be negatively affected due to the increased noise and traffic flow.
- The best solution would be to construct a heavy vehicle by-pass around the city.
- The road is generally suitable for excess dimension vehicles with there being only one narrow section, that being at the Cape River [100km south]. Advice is that this crossing will be upgraded before the mines commence.

Attachment I – Additional Commitments includes a commitment to develop a Road Use Management Plan. A Road Use Management Plan is required to address suitable routes and management measures for over-dimensional vehicles and is developed in consultation with relevant stakeholders including the QPS.

The suggestion for a heavy vehicle by-pass should be directed to the relevant road authorities who would be responsible for any such works.

Submitter Issue Number 16.014

There are sporadic communication black-spots [both radio and mobile phone] on the Gregory Developmental Road in the Division. Additional radio and mobile phone infrastructure may be necessary.

The mine access road is south of the Belyando and is within the Mackay District. Communication issues in that area are addressed in the Mackay response.

As discussed in Section 18.7.1 of the draft EIS, the proponent is proposing to coordinate project infrastructure upgrades, including communication infrastructure upgrades, with local emergency services and Adani to enable cost-effective expansion of emergency service communications along the Gregory Development Road.

16C QUEENSLAND POLICE SERVICE SUBMISSION – MACKAY DISTRICT

Submitter Issue Number 16.015
The cumulative effect of potential negative impacts on roads, traffic and safety including increased traffic and traffic disruption along the Gregory Development Road and Flinders Highway will be significant. There will be a significant increase in the movement of excess dimensional loads on the mentioned roads that has the potential to impact operational policing.

The draft EIS includes a Road Impact Assessment (RIA) (Appendix O) that addresses the traffic impacts of the project.

Refer response to Issue 16.006 in relation to over dimensional vehicles.

Submitter Issue Number 16.016
Communications including mobile phone and radio are non-existent for the majority of the Gregory Development Road and proposed mining area. It is requested that consideration is given to the proponent providing a suitable tower for the installation of communications equipment suitable to the needs of all emergency services and mobile phone coverage. It is recommended that consultation occurs with Sergeant Steve Falzon, Radio & Electronics Section, Mackay on 49683450 with respect to communications.

Refer response to Issue 16.014.

Submitter Issue Number 16.017
In addition to the Public Safety Business Agency, Queensland Fire and Emergency Service, Queensland Ambulance Service and QPS, consultation in relation to the development of Risk Management plans should take place with Local and District Disaster Management Groups. This would ensure that the emergency /risk management plans for the project do not conflict with and/or place unnecessary burdens on existing disaster management arrangements

As discussed in Section 22.3.2 of the draft EIS, the proponent is proposing to consult with key stakeholders, including emergency service providers and other relevant stakeholders, during the development of the Site Health and Safety Management System and associated Integrated Risk Management Plan for the project.

Submitter Issue Number 16.018
QPS requests that the proponent reference the Disaster Management Act 2003 and any reference to a 'disaster' should be in consideration of the definition provided for in this Act.

Section 5.3 – Editorial Corrections includes insertion of the *Disaster Management Act 2003* in Table 22-1 of the draft EIS.

Submitter Issue Number 16.019

The QPS further requests that the proponent include elements within the Risk Assessment in relation to how the proponent will deal with trespass action, nonviolent direct action, and other protest related activities that could close operations and place police, workers and protesters in danger. The QPS invites consultation with the proponent in the development of plans.

It is recommended that ongoing consultation occur with the District Officer, Mackay Police District on 48400800 and the District Officer, Townsville District on 47268640.

Section 22.6.7 of the draft EIS describes how malicious acts have been considered in the Preliminary Hazard Analysis completed for the project.

PROJECT STONE
RESPONSE TO LOCK THE GATE ALLIANCE SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

17 LOCK THE GATE ALLIANCE SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent.

Submitter Issue Number 17.001
MacMines Austasia Pty Ltd proposes to develop a very large-scale coal mine on a greenfield site in Central Queensland at the northern end of the Galilee Basin, within the southern block of Exploration Permit for Coal (EPC) 987.
On 31 October 2012, the Coordinator-General declared the project to be a 'coordinated project' under section 26 of the State Development and Public Works Organisation Act 1971 (Qld) (SDPWO Act). This declaration initiated the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an EIS for the project.
An Environmental Authority (EA) and Mining Lease (ML) application was lodged with Department of Natural Resources and Mines (DNRM) on 30 January 2014. The Department of Environment and Heritage Protection (EHP) notified MacMines on 18 March 2014 that the EA and ML application requires additional information, which is purported to be satisfied by this EIS, lodged with the Queensland Coordinator-General with a Draft EIS public consultation from 25 July 2015 to 7 September 2015.
The project was declared a controlled action on 30 October 2014 and requires approval under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) before it can proceed. The controlling provisions are: Listed threatened species and communities (Sections 18 & 18A); Listed migratory species (Sections 20 & 20A); and A water resource, in relation to coal seam gas development and large coal mining development (Section 24D).
The proposal includes: 1. open-cut and underground coal mines 2. coal handling and preparation plant 3. tailings and water storage facilities 4. airstrip 5. accommodation village 6. power station. The mine will produce up to 55 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal, and approximately 38 Mtpa of washed thermal coal for the export market for in the order of 50 years.

A comprehensive draft Environmental Impact Statement (EIS) has been prepared in accordance with the EIS Terms of Reference (TOR) and relevant guidelines in each specialist technical area and, as such, further assessments are not necessary nor warranted. The draft EIS discusses the potential for impacts (including cumulative impacts), and the significance of impacts. Detailed assessments of Matters of National Environmental Significance (MNES) were completed in accordance with relevant Commonwealth guidelines, including Assessments of Significance for Threatened Species. The draft EIS also includes monitoring and management measures for all relevant potential impacts of the project including impacts beyond the project site. The majority of

these measures will be approval conditions applied to the project. The relevant Queensland and Commonwealth Government agencies will take this information into account when assessing the project and imposing approval conditions.

Submitter Issue Number 17.002

The scale of the China Stone Coal Project is out of proportion to global coal demand and will significantly contribute to the already oversupplied global coal market and thus further drive down the current historically low prices for Australian eastern seaboard thermal coal.

The EIS states that the indicative schedule for development is subject to change based on detailed planning as well as economic and mining conditions. Mine site infrastructure, including the accommodation village and airstrip is scheduled to commence in Project Year 1 (2016) and completed in Project Year 5 (2021). The first coal production from the open cut and underground mines is scheduled for Project Year 3 (2019).

Given the costs involved with developing this project, it seems unlikely that the mine will be developed before the FOB thermal coal price reaches the $100 mark. Long-term forecasts of coal prices predict this may not until after 2025. Others predict the price will never fully recover to this level. It is irresponsible for an Australian government to provide a foreign owned entity with a saleable mine lease that may never be developed, and according to reputable forecasts at least not before 2025.

It is noted that the spot price of thermal coal was AUD$131.05 in October 2016.

Submitter Issue Number 17.003

The proponent has already delayed the project. Originally proposed to begin production in 2014/15, it is now not expected to be in operation until 2019 at the earliest, with rehabilitation and decommissioning starting in 2066.

Open cut mining is expected to be completed by Project Year 32 (2048) with underground mining continued until Project Year 49 (2065). Mining will be followed by a final rehabilitation and decommissioning period. At the completion of mining in Project Year 49 (2065), a four-year Final Rehabilitation and Decommissioning Phase will run from Project Year 50 (2066) to Project Year 53 (2069). It is unlikely that the people now charged with assessing and determining this project will still be alive to see its rehabilitation commitments fulfilled.

The Department of Environment and Heritage Protection (EHP) will have responsibility for enforcing compliance with any Environmental Authority for the mine, regardless of the mine life.

Submitter Issue Number 17.005

The EIS states that the project's peak water demand for the operation will be in the order of 14.3 GLpa. The EIS indicates that the proponent intends, ideally, to source almost 35% of this from external and unidentified sources (Appendix F:3 Table 1). In addition, the peak evaporation is estimated to be 2.7 GLpa resulting in a total estimated peak water demand of 16.2 GLpa in year 16 (Chapter 13:19). However, this ideal scenario is never likely to arise. Indeed, our calculations suggest that the offsite median water demand is likely to be in the order of 44% of the project's

total water demand. Should climate conditions over the life of the project alter from those historical conditions the proponent used to forecast water use and supply, this could rise substantially.
Over the life of the project, the volumes of water predicted to be consumed are staggering. Table 1 sets out an estimate of water use for the project, projected from the staged water balance set out in the EIS. It suggests that the project will consume almost 706 GL of water, including 311 GL of unknown externally sourced water and 318 GL of on-site groundwater.
The EIS identifies the sources of water supply for the project are as follows:
- Mine-affected underground pit water including: Variable groundwater dewatering volumes of up to approximately 850 MLpa in the Northern Underground and 920 MLpa in the Southern Underground; and Recycled underground raw water supply of up to approximately 500 MLpa in the Northern Underground and 250 MLpa in the Southern Underground.
-Mine-affected open cut pit water including: Variable groundwater dewatering volumes of up to approximately 2,440 MLpa; and Variable rainfall runoff to the open cut pit catchments. Mine-affected TSF return water including:Variable recovered supernatant from the deposited tailings of up to approximately 1,500 MLpa; Variable rainfall runoff from the TSF area; and o Variable rainfall runoff from the PSWSF area.
-Variable mine-affected runoff quantities from contained infrastructure area catchments including: Underground and open cut MIAs; Coal and reject stockpile areas; CHPP and CHPP ROM loading station; Power station; and Train loadout.
- External raw water supply, as required (13:14).

This submission does not provide any data that invalidates the assessment of water supply requirements presented in the draft EIS. The raw water supply for the project is discussed in Section 4.13.4 of the draft EIS.

Submitter Issue Number 17.006
The proposed coal mines that make up this project stands to have a significant impact on the region's groundwater resources and potentially the Great Artesian Basin (GAB), yet these risks have not been sufficiently assessed due to modelling uncertainty and a paucity of groundwater data. The proposed open cut mining area will extend over a 12km strike length and reach a depth of approximately 300m at its deepest point. The project will also involve establishing up to three longwall operations in the Northern and Southern Undergrounds. The southern underground operation will take place below the open cut pit (Chapter 12:6).The EIS sets out the key potential impacts on the groundwater regime that could arise directly from the proposed mining operations as:
-Dewatering and lowering surrounding groundwater levels;
- Subsurface subsidence cracking of strata overlying the proposed longwall mines, changing the permeability of the overlying units and influencing surrounding groundwater levels;
- Construction of a tailings storage facility (TSF) and power station waste storage facility (PSWSF), which have the potential to generate leachate and give rise to groundwater contamination;
- Use of hydrocarbons and chemicals which have the potential to give rise to groundwater contamination; and
- Formation of a residual void in the final mine landform, that has the potential to influence

surrounding groundwater levels and quality (Chapter 12:6).
The mines will target coal seams within the late Permian Betts Creek Beds which are interbedded with sandstone, siltstone, mudstone and shale. This unit is an equivalent of the Colinlea Sandstone and Bandana Formation units (Appendix I:12). These formations are regulated under the *Burdekin Water Resource Plan.*

The EIS makes it clear that the point of transition between the Betts Creek Beds and the Colinlea Sandstone and Bandana Formation units is unknown, due to inadequate drilling data in the region. In response, the consultant for the EIS set the transition boundary between these formations in the geological model at approximately 24°S, level with the northern extent of Springsure Shelf.This point is well south of the southern extent of the project site boundary and the Betts Creek Beds, the coal bearing formation proposed for mining (Appendix I:11). The decision about where to site this point may affect the results of the modelling.

The Betts Creek Beds contains seven coal seams, named sequentially from A to G with increasing depth. Typically, the A Seam is approximately 30m below the upper boundary of this unit. Cumulative thickness of coal within the Betts Creek Beds is approximately 35m, with the thickest coal horizon being the A and B Seams (Appendix I:11).

Water take from the Betts Creek Beds and the Joe Joe Group, the formation below it, will initially range from 2 to 16 ML/day (730 MLpa and 5.8 GL pa) during open cut and underground operations, and reduce to less than 5 ML/day (1.83 GLpa) following completion of open cut mining. These formations are located within the Greater Western Sub-Artesian Area declared under the *Queensland Water Regulation 2002 (Water Regulation)* (Chapter 12:10).

Modelled groundwater inflows to the final void suggests the water take from these non-GAB units is predicted to decrease post-mining and reach an equilibrium of approximately 0.5ML/day (Appendix I:35).

The GAB aquifers relevant to the project include the Clematis Sandstone, the Moolayember Formation and the Ronlow Beds, all regulated under the *Water Resources (Great Artesian Basin) Plan 2006* (GAB WRP). The Clematis Sandstone, which occurs on the project site, and the Moolayember Formation, which subcrops between 1km and 7km west of the project site, are together designated as GAB Management Unit 3. The Ronlow Beds, which subcrop in excess of 26km west of the project site, is designated GAB Management Unit 2.

Modelling predictions in the EIS, “indicate that the project will locally depressurise the Clematis Sandstone where it is saturated within and adjacent the project site. This depressurisation will result in water from these GAB aquifers flowing into the mine. It will also reduce the volume of water flowing from the connected Rewan Formation and Betts Creek Beds into the Clematis Sandstone” (Chapter 12:9).

Accordingly, depressurisation will propagate through the Betts Creek Beds, Rewan Formation and

Clematis Sandstone (where saturated), and will be enhanced by the increased hydraulic conductivity of connective subsurface subsidence cracking" (Appendix B:17).

Exploration drilling detected a normal fault running through the northern portion of the project site aligned north-northwest to south-southeast within the Triassic and Permian sediments. The EIS suggests that geological data indicates, "the fault opens and closes at the southern and northern extremities with 100m maximum displacement in the centre. The fault breaks the continuity of the Clematis Sandstone and on the downthrown eastern side of the fault, places this unit in direct contact with the Rewan Formation that lies on the western side of the fault" (Appendix I:13).

The EIS identifies a fault located in the northern area of the project site which controls local groundwater flows, with the effect that "Groundwater effectively pools against the low permeability unit and the fault forms a localised flow boundary" (Appendix I:27). The Clematis Sandstone is predicted to be depressurised most significantly where it is saturated on the eastern side of this fault. The saturated thickness of the Clematis Sandstone prior to mining in this area is approximately 50m. The modelling predicts that the potentiometric surface may be lowered by up to 33m in response to mining. Beyond the extents of mining subsidence, the depressurisation effects within the Clematis Sandstone rapidly diminish with distance (Appendix B:17).

The EIS claims that water levels in the Moolayember Formation and the Ronlow Beds are not predicted to be affected by the project (Appendix I:33). However, the EIS admits the natural variability in hydraulic conductivity within fractured porous rocks can vary by orders of magnitude. While the EIS suggests that, "calibrated hydraulic conductivity for each unit generally falls within the range of the field measurements. The exception is the modelled hydraulic conductivity for the Quaternary sediments and the weathered rock regolith that falls outside of the range of available field data, in both the project and Carmichael models. There is limited field data for both units…" Indeed, no field data was available for horizontal hydraulic conductivity for two of the affected GAB aquifers, the Moolayember Formation and the Ronlow Formation, which were assumed to be 0.07m/day and 0.1 m/day respectively (Appendix B:21).

Clearly the EIS relies on a significant degree of gap-filling where there are uncertainties about the geology and groundwater hydrology of the area being targeted. Such an enormous and long-lasting mine demands far more data collection and confidence in its assessment. It is imperative that further data collection, analysis and modelling be undertaken to prepare an accurate picture of the groundwater impact of this project before any decisions are made.

The EIS does not quantify the water take from the Moolayember Formation, it merely states that water take from GAB aquifers is all from Management Unit 3, comprising the Clematis Sandstone and Moolayember Formation (Chapter I:35), which it estimates to peak at 9 ML/day in year 32 (Figure 42 at Appendix I:92). This coincides with mining in operations phase 2 when longwall mines begin in the A and D seam in the Northern Underground (Chapter 4:24).

Lake Buchanan is an inferred indirect discharge zone for the Clematis Sandstone groundwater via

the Moolayember Formation (Chapter 12:3). According to the Queensland Groundwater Database, at least one bore on the Doongmabulla property (RN16895) intersects the Moolayember Formation (Appendix I:24). The EIS identifies eight private bores that intersect the Moolayember Formation within 20km of the project site. Three of the bores are located on the Yarrowmere property, three on the Moonoomoo property, one on the Ulcanbah property and one on the Carmichael property (Appendix I:25).

The draft EIS Groundwater Report (Appendix I) includes a detailed groundwater assessment that is based on an extensive data set.

Submitter Issue Number 17.007

The EIS states that the mines' water take from the GAB aquifers due to the depressurisation induced by mining will increase over the project life with the maximum predicted extent of depressurisation extending to 4km from the project site during mining and 11km after mining (Appendix I:38).

The EIS estimates that water take from the GAB aquifers will peak at 9 ML/day (3.3 GLpa) when subsurface subsidence cracking from the A seam longwall first interconnects the Northern Underground with the saturated Clematis Sandstone on the downthrown side of the fault. The volume of the water take it predicted to reduce post mining due to the lesser hydraulic gradients present around the mining areas (Appendix B:18). The long term take from Management Unit 3 peaks at a most 0.5 ML/day. There is also a small take from the Ronlow Beds (Management Unit 2) of 0.015 ML/day. This take occurs indirectly as a very slight reduction in flow from the Moolayember Formation to the Ronlow Beds (Appendix I:35).

Despite the groundwater assessment assuming that the permeability of the cracked strata overlying the mine is effectively 'freedraining' (Chapter 12:10), the EIS fails to consider important potentialities that may cause unacceptable impacts on the Great Artesian Basin aquifers. The EIS fails to adequately consider the possibility and the potential impacts of faulting through the Rewan Formation that could provide a preferred flow path from the Colinlea Sandstone to the surface, the regional groundwater flow within, and likely discharge from, the aquifers above and below the Rewan Formation, the potential spring source aquifers above and below the Rewan Formation and whether they have the necessary potentiometric head to drive artesian spring flow or competing conceptualisations that may explain the source aquifer/s of the Doongmabulla Springs.

The groundwater assessment in the draft EIS Groundwater Report (Appendix I) is based on a groundwater model. The groundwater model has been developed based on an extensive data set. Sensitivity analyses have been conducted for any areas of uncertainty in the model. The results of the sensitivity analyses, including sensitivity analyses on the permeability of the fault, indicate that the Doongmabulla Springs are not likely to be impacted by the project.

Submitter Issue Number 17.008

The EIS claims that the project will not impact on the Doongmabulla GAB discharge springs, the closest springs to the project site, 22 km to the south of the proposed mining area. The EIS also claims the sole source aquifer for these springs is the Clematis Sandstone.

Evidence presented to the Queensland Land Court in Adani Mining Pty Ltd v Land Services of Coast and Country & Ors.(Footnote 5 Joint Groundwater Experts Report; Adani Mining Pty Ltd v Land Services of Coast and Country & Ors. p5) and accepted by Adani's experts was that, "the source aquifer for the Doongmabulla Springs Complex is inconclusive and that the Colinlea Sandstone aquifer is likely to contribute to the Doongmabulla Springs."

The Colinlea Sandstone and Bandana Formation units are an equivalent of the late Permian Betts Creek Beds that include the targeted coal seams interbedded with sandstone, siltstone, mudstone, shale and coal. (Appendix I:12).

The EIS for the China Stone Coal Project states that "The only mechanism by which the underground mining could impact on the springs would be via depressurisation of the underlying low permeability Betts Creek Beds and Rewan Formation in the Southern Underground propagating upwards to the Clematis Sandstone and laterally 22km to the springs. The maximum predicted extent of depressurisation in the Clematis Sandstone extends to 2km from the project site. This means that no significant depressurisation of the Clematis Sandstone due to the project will occur within 20km from the Doongmabulla Spring Complex during or post mining and therefore no impacts on the springs are predicted" (Appendix B:18). However, the EIS also states that the mines' water take from the GAB aquifers due to the depressurisation induced by mining will increase over the project life with the maximum predicted extent of depressurisation extending to 4km from the project site during mining and 11km after mining (Appendix I:38).

The EIS uses predictions relating to the Carmichael Coal Mine from the Carmichael Coal Mine EIS and Supplementary EIS documents with the 1m drawdown contour as the limit of impact for each project (Appendix B:20).

In other words, the estimated maximum predicted extent of depressurization of 11km from the China Stone project site is the extent of a 1m drawdown. This is unsatisfactory when determining the impacts on a GAB spring and dependant ecosystems that make up the MNES inherent for the springs.

The 1 m drawdown contour is typically used as the limit of predicted drawdown as 1 m is the reasonable limit of precision for a numerical groundwater model. A drawdown of less than 1 m is also unlikely to be distinguishable from monitored natural variations in groundwater levels. Regardless, the suggestion that the theoretical projection of the predicted drawdown below 1 m, over a distance of 11 kms, would potentially have a significant impact on the Doongmabulla Springs is not technically feasible.

Submitter Issue Number 17.009

To date, approved Galilee coal projects include:

- GVK Hancock's Alpha Coal (29 May 2012) and Kevin's Corner (30 May 2013) projects,
- Waratah's China First (Galilee Coal) Project (9 August 2013),
- Adani's Carmichael Coal and Rail Infrastructure Project (7 May 2014),

• AMCI (Alpha) and Alpha Coal PL South Galilee Coal (2 December 2014).
The proposed Carmichael Coal Mine, located immediately south of the China Stone project site, has a very high potential to contribute to cumulative groundwater impacts from this mine. However, the China Stone EIS has failed to adequately identify these potential impacts. The EIS suggests that the "cumulative depressurisation effects will be most extensive in the coal seams targeted by the mining operations, with cumulative depressurisation predicted in the A, C and D seams by the end of mining. The project effects on groundwater levels are most extensive in the Southern Underground, where up to 200m additional depressurisation will occur. Outside this area, the project could add between 1m to 50m to the depressurisation predicted for the Carmichael Coal Mine" (Appendix B:20). That is a very wide range.
Evidence presented to the Land Court by Land Services of Coast and Country showed that Adani's numerical groundwater modelling for the Carmichael Mine cannot be relied on as a basis for assessing the likely impacts of the mine and is no basis to assess the risk of the mine to the Doongmabulla Springs. The evidence showed that Adani's predictions underestimated the groundwater drawdown of the Carmichael mine as its groundwater model was inappropriately constrained by the unjustifiably low conductivity values (particularly in the Rewan formation and the units underlying it). Nevertheless, the conclusion of the evidence was that the understated drawdown impacts predicted in the modelling done by GHD on behalf of the Adani demonstrates that even those drawdown impacts will be sufficient to cause an unknown but significant number of the Doongmabulla Springs to dry up and the springs and their exceptional ecological value to be lost.

Section 8 of the draft EIS Groundwater Report (Appendix I) provides predictions for drawdown for the project in isolation and estimates of cumulative drawdown with the Carmichael Project, based on the approved Carmichael EIS groundwater study. Even if the Carmichael Project groundwater study has under predicted drawdown, as suggested, the project is not predicted to significantly impact groundwater levels within 11 km of the springs and will therefore not result in any cumulative impacts on the springs.

Submitter Issue Number 17.010
The EIS states that "groundwater use in the region is sporadic and dispersed over a wide area due to the generally significant depth to groundwater and typically low yields. Water quality is variable, but is generally suitable for stock watering. During mining operations the project is not predicted to impact on bores that are located beyond the project site. Private bores within the project site will be managed through land access arrangements with landholders. As part of mine closure planning, the proponent will enter into agreements with landholders of any bores potentially impacted by drawdown post mining" (Executive Summary: 35).

Modelling for the EIS predicts that during mining operations the project will not impact bores located beyond the project site and that private bores within the project site will be managed through land access arrangements with landowners. However, post-mining groundwater drawdown may affect up to 19 private bores (Chapter 12:11).

As discussed in Section 12.4.8 of the draft EIS, the post mining groundwater impacts have been predicted using highly conservative modelling assumptions and groundwater monitoring over the 50 year mine life will be used to assess the extent of likely drawdown in the post mining phase. The proponent has committed to entering make good agreements with potentially impacted water supply bore owners.

Submitter Issue Number 17.011

The EIS suggests that groundwater monitoring over the life of the mine will confirm the actual extent of groundwater impacts and validate predictions which will inform the potential post-mining groundwater impacts and identify bores that will potentially be impacted in the long-term post mining (Chapter 12:12). Despite a bore census undertaken for the EIS that identified 52 bores that could potentially be impacted by the project within a radius of 20km beyond the project site (Chapter 12:11), the proponent does not intend to enter into Make Good Agreements for any potentially impacted bores until mine closure planning (Chapter 12:12).

Obligations under Make Good Agreements (MGA) are triggered when groundwater impacts lead to bores no longer being able to supply adequate water supply of adequate water quality. It will therefore have no material impact on the proponent to enter into MGAs with owners of all potentially affected bores identified in the census unless the bores are affected. Negotiating MGAs with all these bore owners must occur to prevent the risk that landholders will be left with impacts that cannot or will not be alternatively mitigated.

MGAs are proposed for any water supply bores predicted to be impacted by the project. In the event that the extent of drawdown is greater than predicted, this would be identified by the groundwater monitoring program. Any unexpected monitoring results would trigger an investigation in accordance with the Environmental Authority conditions and additional mitigation measures, where necessary. This would include the requirement for additional MGAs in the event that an investigation indicated that additional water supply bores were likely to be impacted.

Submitter Issue Number 17.012

The EIS states that, “the project site comprises approximately 20,000 ha of well vegetated land, with low-lying scrub in the south and east and a densely vegetated ridgeline, known as Darkies Range, running north to south through the western portion of the site.” Of this 11,000 ha will be cleared by the project (Appendix F: 5.29).

Studies for the Terrestrial Ecology Report undertaken by Cumberland Ecology found only four of the ten fauna species listed under the *Nature Conservation Act (Qld)* and only three of the nine EPBC listed fauna species that had potential to occur within the project site.

The fauna species found were: 1.The Squatter pigeon (southern subspecies) (*Geophaps scripta scripta*) (EPBC vulnerable), 2. Black-throated finch (white-rumped/southern subspecies) (*Poephila cincta cincta*) (EPBC endangered), 3. Koala (*Phascolarctos cinereus*) (EPBC vulnerable) and 4. Short-beaked Echidna (*Tachyglossus aculeatus*) (special least concern, NC Act) (Chapter 9:7).

The studies found only three of the five migratory species listed under the EPBC Act that had potential to occur within the project site. 1. Eastern Great Egret (*Ardea modesta*), 2. Rainbow Bee-eater (*Merops ornatus*) and 3. Satin Flycatcher (*Myiagra cyanoleuca*) (Executive Summary: 33).

The project will clear high value habitat for: 1. Squatter Pigeon (southern subspecies) - 1,439 ha and 8 ha disturbed, 2. Black-throated Finch (white-rumped subspecies) - 4,443 ha and 10 ha disturbed, 3. Australian Painted Snipe - 15 ha and 0.03 ha disturbed, 4. Fork- tailed Swift -11,010 ha and 53 ha disturbed, 5. Cattle Egret - 11,010 ha and 53 ha disturbed, 6. Rainbow Bee-eater - 11,010 ha and 53 ha disturbed 7. Satin Fly-catcher - 11,010 ha and 53 ha disturbed, 8. Eastern Great Egret - 15 ha and 0.03ha disturbed. 9. Latham's Snipe - 15 ha and 0.03ha disturbed, 10. Koala - 3,246 ha and 21 ha disturbed. 11. Short-beaked Echidna 10, 892 ha and 24 ha disturbed (Appendix F:5.30-5.35 Table 5.6).
The EIS further states that the project will clear approximately 24ha of *Eucalyptus drepanophylla* open-woodland on sandstone ranges (RE 10.10.3) and 359ha of riparian vegetation (Executive Summary: 29), but that "there are no groundwater dependent ecosystems in the project site, given the lack of shallow groundwater and "no threatened flora species were recorded during the surveys" (Appendix F: 4.25).

The submitter's views on the clearing proposed to be undertaken as part of the project are noted. With respect to the specific issue of the adequacy of the field survey methodology, the intensity of field surveys is appropriate and is typical of field survey work undertaken for EISs. The methodology was guided by the draft EIS TOR and relevant survey guidelines. The draft EIS has also drawn on the results of fieldwork undertaken in the region by other proponents. This has provided a sound knowledge base of the ecology within the project site and the broader region. In instances where a threatened species was not recorded during field surveys, but had the potential to occur based on available habitat, a conservative approach was adopted and the species was assessed in the same way as species that were recorded during field surveys.

Submitter Issue Number 17.013
The EIS admits that "the project will give rise to potentially significant residual impacts on the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala, but does not predict any significant impacts on the Australian Painted Snipe or the Shortbeaked Echidna (Executive Summary: 29).

The EIS claims to contains a Biodiversity Offset Strategy "which describes the offsets that will be provided for impacts on these MSES" (Executive Summary: 29) but this Biodiversity Offset Strategy is not included in the EIS as it is deemed "commercial in confidence." The adequacy of mitigation of the very severe impacts set out in the EIS cannot be properly evaluated without being provided with the details of the Biodiversity Offset Strategy. It is not acceptable that this document should not have been made available to the public to scrutinise with the rest of the EIS documents.

Please refer to Section 4.2 – Response to Common Issues regarding the confidentiality of the Biodiversity Offsets Strategy.

Submitter Issue Number 17.014

The Terrestrial Ecology Report is poorly prepared and fails to adequately assess the cumulative impacts on MNES in the region. The report merely states that there will be cumulative impacts, but fails to provide estimates of habitat clearing and the impacts this additional clearing will have on the species likely to inhabit the project site.

Please refer to submitter issue 17.012 in relation to the adequacy of field surveys, and please refer to submitter issue 17.013 in relation to the availability of the biodiversity offsets strategy. Cumulative impacts are discussed in Section 5.8 of the draft EIS Terrestrial Ecology Report (Appendix F).

Submitter Issue Number 17.017

The EIS states that "Hydraulic modelling of the mine drainage system was conducted for the 1 in 20 and 1 in 50 Annual Exceedance Probability flood events in order to assess surface water impacts on downstream properties and stream geomorphology" (Executive Summary: 40).

"The modelling results also indicate that the mine water management system has adequate capacity to contain mine affected water generated by the project with a low probability of uncontrolled discharge. During extended rainfall periods the open cut pit will collect significant volumes of rainfall runoff and this will result in a surplus of mine-affected water within the mine water management system. Following such events, in order to dewater the open cut pits and allow continuing production, it will be necessary for accumulated pit water to be discharged from site under controlled conditions"(Executive Summary: 40).

The EIS indicate that under median conditions the average annual discharge requirement is approximate 400 MLpa, with a peak annual discharge requirement of median conditions, the equivalent of less than two discharges of the total Mine Water Dam storage capacity would be required. (Chapter 13: 23) The EIS predicts the release of mine affected water in 30% of the projected years. The model relies on 124 years of historical data and extrapolates mine storage air space according to this data set.

The EIS appears to have failed to account for predicted climate change impacts.

The Queensland EPA Guidelines for preparing a Climate Change Impact Statement (CCIS) includes predicted impacts on Queensland infrastructure including:

-An average annual temperature rise of up to 4.5C.

-A potential increase in intensity of extreme rainfall events.

-Changes in relative humidity and potential evaporation of 7% to 15%

-A 10% increase in cyclone intensity and frequency.

-An increase in frequency and intensity of storms.

Queensland's Inland Flood Study proposed that Queensland local governments work into their planning a climate change factor for 5% increased rainfall intensity per degree of warming, and suggested that they plan for 2 degrees of warming by 2050, and 3 degrees by 2070. There is no recognition in the EIS that the proponent should be planning for a 10% or 15% increase in rainfall intensity over the 50 year life of the mine.

The EIS states that "these climate changes on the proposed water management system would be a potential minor reduction in the long-term accumulated rainfall runoff within the system, but an

increase in short-term storm events. Due to the robust nature and design of the proposed water management system, the predicted changes in rainfall intensity and frequency will not have a material impact on the effective operation of the water management system. In particular, any increase in runoff from higher intensity storm events would be accommodated by the conservatively sized catch dams (Table 13-3). These dams have been conservatively sized to contain 100% runoff from the 72 hour 20 year ARI storm event. Any minor increase in external water demand due to reduced rainfall associated with climate change could be managed by securing additional external water supply" (Chapter 13: 26).

As indicated in the submission, the effects of climate change on the operation of the mine water management system are discussed in Section 13.5.7 of the draft EIS. The catch dam sizing in the draft EIS has been conducted by a mine water management specialist based on appropriate long duration design storm events.

Submitter Issue Number 17.018
The EIS identifies the Belyando River for the release of mine-affected water. The EIS states that mine-affected water in the Mine Water Dam reaching salinity levels of 3,200µS/cm, "predominantly contributed by groundwater inflow to the underground workings and open cut pit" (Chapter 13: 24). The EIS appears not to incorporate the predicted increases in evaporation rates due climate change when calculating salinity levels in the Mine Water Dam" (Chapter 13: 24).

Discharges of mine affected water will only be required following extended rainfall periods. At these times, excess mine water will be predominantly fresh rainfall runoff that has collected in the open cut pits. The effect of any increase in the evaporation rate on the salinity of discharged mine affected water will therefore be minimal.

Submitter Issue Number 17.019
The EIS suggests that "controlled discharges will only be required during and following extreme wet periods when the proportion of fresh rainfall runoff in the open cut pit water and the Mine Water Dam storage is higher and groundwater salinity is diluted. The maximum modelled salinity of water in the Mine Water Dam during controlled releases is less than 1,500 µS/cm" (Chapter 13: 24). The Aquatic Ecology and Stygofauna Report fails to even discuss potential impacts on the Belyando River ecology of mine affected water releases.

The impacts of the release of mine affected water on downstream aquatic ecology, including the Belyando River, is discussed in Section 10.6.4 of the draft EIS.

Submitter Issue Number 17.020

The EIS suggests that "controlled discharges will only be required during and following extreme wet periods when the proportion of fresh rainfall runoff in the open cut pit water and the Mine Water Dam storage is higher and groundwater salinity is diluted. The maximum modelled salinity of water in the Mine Water Dam during controlled releases is less than 1,500 µS/cm" (Chapter 13: 24) and nowhere in the EIS are the potential impacts on downstream water users assessed.

Section 13.6.5 of the draft EIS discusses impacts on downstream water quality and environmental values. Downstream water use is discussed in Section 13.2.3 of the draft EIS.

Submitter Issue Number 17.021

The EIS predicts long-term void water level fluctuates in the range from 249 to 260m AHD with an average elevation of 255m AHD. The average final void water level is 50 m below the final void spill point elevation of 305m AHD. They argue that discharge from the final void is therefore extremely unlikely based upon the range of climate conditions experienced in the last 124 years. (Appendix K: 27)

The EIS states that, "Modelling of the final void water balance indicates that a lake will form in the final void. The modelling indicates that the lake will reach a quasi-equilibrium level approximately 50 m below the spill point of the final void". The predicted lake level is also below the level of the pre mining water table. This means that the final void will continue to act as a groundwater sink in the post mining phase and void lake water will not migrate way from the void and will not potentially affect groundwater quality. Groundwater modelling also indicates that groundwater inflows to the final void will be relatively minor in the post mining phase, based on conservative groundwater modelling assumptions (Chapter 8: 25).

Conditions for approval must include backfilling of the mine void in line with world's best practice.

As discussed in the referenced section of the draft EIS, the final void is not expected to result in any adverse impacts on groundwater or surface water. Backfilling the void is therefore not necessary and is also not economically feasible.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBERS 18 & 20 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

18 & 20 SUBMISSION

This response relates to submitters 18 and 20, who together, are the landholders of the Wilandspey Station.

Submitter Issue Number 18.001 and 20.001
Our property Wilandspey Station is a 19,200 hectare property situated approximately 214 kilometres south of Charters Towers and approximately 190 kilometres north of Clermont. It is a mixture of Brigalow/Gidyea scrub, Coolibah floodplains, lronbark and Box forest country, open plains of developed buffel grass pasture and Gidyea melon hole forest country. It is naturally watered by a permanent supply in the Belyando River; seasonally watered by numerous creeks and melon holes and is principally watered by large dams equipped with tanks and troughs. There is also an auxiliary supply of water via an equipped bore with a pipeline network to tanks and troughs.
We have an estimated carrying capacity of approximately 4000 head of cattle. We have owned and operated the property for over 60 years and are in the business of breeding and fattening cattle for the beef export markets.
Our western boundary is approximately 25 kilometres from the Project China Stone Site. Due to the close proximity of the proposed Project China Stone Site and furthermore the project site's location at the headwaters of North Creek, Tomahawk Creek and Sandy Creek we believe we have strong grounds upon which to make the following submission stating the matters of concern to us in relation to the proposed China Stone Coal Project.

It is noted that the submitter's property boundary is located approximately 25 km east of the project site and the homestead on the property is approximately 50 km from the project site. Due to the considerable distance from the project site to the property and the homestead, it is not likely that the project would have any significant direct or indirect impacts on the property.

Detailed responses to specific submission issues are provided below.

Submitter Issue Number 18.002 and 20.002
Volume 1B Chapter 18: Social Economic Impact Assessment
We note discussions around socio-economic impacts relating to the project. However we feel the following areas have not been adequately discussed in 'Draft EIS - Volume 1B Chapter 18: Social Economic Impact Assessment'.
We are concerned as to how the workforce proposed for the mine construction and operation is going to be managed in relation to:
a) Drug and alcohol use

b) Code of conduct particularly in relation to neighbouring grazing properties i.e. Trespassing on private property; causing damage or stress to equipment, vehicles, livestock and pastures.
c) Safety and well being of families and associated staff who live and work on grazing properties.
We would like to know how these areas are to be addressed.

Further detail on these issues is provided in the draft Environmental Impact Statement (EIS) Socio-Economic Impact Assessment Report (Appendix N). Workforce management is discussed in detail in Section 7.3 of Appendix N. The proposed Workforce Code of Conduct will include a Drug and Alcohol Management Procedure and a Behavioural Management Procedure (Section 7.3.2 of Appendix N). Management strategies related to potential impacts on the local community are addressed in Section 7.5 of Appendix N. Proposed stakeholder engagement, including consultation with local landholders and the complaints procedure, is also discussed in Section 7.6 of Appendix N.

Submitter Issue Number 18.003 and 20.003
Volume 1B Chapter 19: Traffic and Transport
Concerns are noted around the Elgin-Moray Rd.
We note in 'Draft EIS - Volume 1 B Chapter 19: Traffic and Transport' acknowledgements are made that there will be an increase in traffic on all roads used including the Elgin-Moray Rd.
However in the road impact assessment report there is no apparent specific discussion re the impact of increased traffic on the condition of the Elgin-Moray Rd which is an unsealed road.
a) This unsealed road is the only means by which our grazing business located at Wilandspey Station can operate.
b) The Elgin-Moray Rd is difficult to maintain with the current volume of traffic particularly in dry times and there is not an adequate water supply available to continually maintain the road in good condition.
c) With current traffic volumes the road becomes extremely corrugated and large bull dust sections emerge; impeding traffic.
d) The Elgin - Moray Rd is necessary to transport livestock, fodder, machinery and business mail. There is no other route available to our business.
e) Increased traffic to the Elgin - Moray Rd would render the road unreliable; hazardous and dangerous.
f) As rate payers will we have to contribute the extra funds required to maintain the Elgin - Moray Rd if the project goes ahead?
See attachment 1 - Location of Wilandspey Station on Elgin-Moray Rd

As discussed in Section 4.2 of the draft EIS Road Impact Assessment Report (Appendix O), the Carmichael Coal Mine and Rail Project is required to seal the Elgin-Moray Road and upgrade the intersection of Elgin-Moray Road and the Gregory Developmental Road. There are no further upgrades to Elgin-Moray Road required for the project. The proposed sealing of the road will address the issues raised in the submission.

Submitter Issue Number 18.004 and 20.004

Volume 1A Chapter 9: Terrestrial Ecology

We note the inclusion of comments on the spread of weeds during the construction and operations phases of the mines. We don't believe the seriousness of the problem has been addressed for those areas affected downstream of the project.

a) There are many weeds pastoralists have been struggling with including parthenium; mimosa; parkinsonia and rubber vine for many years at great cost.

b) It is part of our lease agreement with the state government that we manage weeds on an ongoing basis.

c) It is well understood that any disturbance of soil encourages the spread of weeds. Soil disturbance on or near a water course will of course exponentially increase the potential for the spread of weeds.

d) Due to the mine's location at the head of the drainage areas for Tomahawk Creek Catchment Area; Belyando River Catchment Area and North Creek Catchment Area any uncontrolled seed disturbed during construction and or operational phases can be rapidly spread along the watercourses that flow into Wilandspey causing major negative impacts to grazing lands and waterways and native flora and fauna.

The proposed Feral Animal and Weed Management Plan described in Section 9.7.3 of the draft EIS will be designed to effectively manage the potential introduction and spread of weeds, including all relevant risks.

Submitter Issue Number 18.005 and 20.005

Volume 1A Chapter 5: Land Use

a) We note certain 'sensitive receptors' were included at a number of isolated rural residences to monitor air quality, noise and visual amenity impacts.

i) It is of concern to us that although our western boundary is only approximately 25 kms from the project site there appears to be no recorded assessments at our homestead location which is further east of the project site.

Refer to Draft EIS Volume 1A Chapter 5 Table 5-1 Sensitive Receptors and see attachment 2 - location of sensitive receptors.

ii) Therefore there is no quantitative data recorded to date for the Wilandspey residence in relation to dust (Section 15 -Air Quality); noise and blasting (Section 16 - Noise and Vibration) within the EIS.

The Wilandspey Homestead is approximately 50 km to the east of the project site. It is not listed in Table 5-1 of the draft EIS as there are a number of homesteads to the east that are closer to the project site (R2, R5 and R6). As indicated in the draft EIS air quality and noise assessment reports (Appendices L and M, respectively) the predicted air quality and noise and blast impact levels are predicted to comply with the relevant criteria at the closest homesteads to the project site, including those to the east (in the direction of the Wilandspey Homestead). In addition, the contour plans of predicted noise and air quality levels indicate that the project would essentially have no effect on the Wilandspey Homestead. This is not unexpected given that the homestead is approximately

50 km from the project site. Background monitoring at the Wilandspey Homestead is therefore not justified or necessary.

As explained in Section 17.3.2 of the draft EIS, the visual assessment was based on the three closest receptors to the project site including the closest receptor to the east. The visual impacts of the project at all receptors were assessed as low and it was noted that any potential visual impacts at more distant locations will generally be less. At a distance of 50 km, significant visual impacts would not occur due to the limited visibility at this distance.

Submitter Issue Number 18.006 and 20.006
"b) Of concern to us is the following statement in 5.3.2
"Grazing - The primary land use within the project site and surrounding area is cattle grazing. Government mapping shows there are no priority agricultural areas, strategic cropping areas or strategic environmental areas within the project site."
i) With future development of our property we hope to develop the potential available to us for agricultural areas including areas of cropping as well as producing cattle for both the EU markets and organic beef market.
ii) The location of Wilandspey has been a long established and well regarded location for beef cattle breeding and most importantly fattening.
iii) We are concerned that the construction and operation of such a mine will endanger and limit the potential of our property in relation to cropping and beef markets particularly with the concerns of hydro carbons and other chemicals from tailings and leakage from on-site waste landfills (refer to Draft EIS Volume 1B Chapter 21) that could make their way downstream through controlled and uncontrolled run off, contaminating waterways and wetlands that are fed from the Tomahawk Creek Catchment Area; Belyando River Catchment Area and North Creek Catchment Area.
iv) In fact it should also be noted that in order for us to sell our cattle we have to sign a LPA National Vendor Declaration with each consignment to the meatworks. The purpose of the LPA National Vendor Declaration is to ensure the food safety of Australia's meat and livestock industry. When we sign off on this document we are declaring compliance with all LPA requirements; we are guaranteeing that our cattle are compliant with all food safety standards to the buyer. How can we guarantee compliance if through the proposed mine our waterways and wetlands become subjected to unknown and unquantified toxins?"

The quoted statement from Section 5.3.2 of the draft EIS is factually correct. Measures to prevent contamination from leachate from the on-site landfill and the Tailings Storage Facility are described in Sections 21.3.5 and 7.4 of the draft EIS, respectively. In addition, the approval conditions for the project would require monitoring of surface water and groundwater to confirm there is no contamination. In the unlikely event that contamination was detected, the approval conditions would require investigation and rectification. Given the proposed controls and the application of standard regulatory approval requirements for mining projects, it is not likely that a property 25 km from the project site would be at risk from contamination of surface water or groundwater.

Submitter Issue Number 18.007 and 20.007

Volume 1B Chapter 19: Traffic and Transport

a) We have serious concerns regarding air traffic with the proposed construction of an air strip on the mine site. Current planning estimates approximately 40 flights per week to use the proposed air strip.

b) Helicopter mustering is a vital part of operations on Wilandspey in handling and husbanding our cattle. Helicopter mustering on Wilandspey; particularly along our western boundary will be negatively impacted by strict guidelines set out by the Civil Aviation Act 1988 if an air strip is to be constructed.

c) All helicopter flight travel to and from neighbouring properties in the vicinity of the project site will also be constrained by aircraft travel to and from the proposed air strip and strict guidelines set out by the Civil Aviation Act 1988.

The operation of the project air strip would be required to comply with the Civil Aviation Safety Authority requirements. As the Wilandspey property is located 25 km from the project site it is unlikely that the operation of the air strip would have a significant impact on low level helicopter mustering.

Submitter Issue Number 18.008 and 20.008

Volume 1A Chapter 9: Terrestrial Ecology

a) We have concerns regarding the Wilandspey Conservation Park which is gazetted for the preservation of natural ecosystems including the gidgea tree and the scrub turkey.

b) This park is located in both the Tomahawk Creek Catchment Area and Belyando River Catchment Area.

c) Currently it is a pristine area and with the proposed mine site the conservation park becomes vulnerable to any hydro carbons and other chemicals from tailings and leakage/run-off from on-site waste landfills (refer to Draft EIS Volume 1B Chapter 21) that could make their way downstream through controlled and uncontrolled run off, contaminating waterways and wetlands. The flora and fauna within the park would be severely compromised.

Refer response to issue 18.006. The discharge of hydrocarbons and other chemicals to downstream waterways is not proposed and will not be permitted by the project approvals.

Submitter Issue Number 18.009 and 20.009

Volume 1A Chapter 12: Groundwater, Chapter 13: Surface water, Chapter 10: Aquatic Ecology

Of most concern to our grazing enterprise are the following two issues:

1. Water quality of surface water and ground water
2. Water quantity of surface water and ground water

Back Ground:

The China Stone Coal Project site is not located on a water course; however it is located at the head of the drainage lines(headwaters) to three very important catchment areas. All three catchment areas are integral to the success of our cattle grazing business. (see attachment 3 - Land and Natural Waters Wilandspey Station)

Tomahawk Creek Catchment Area - includes the following water courses/wetlands through Wilandspey: Tomahawk Creek; extensive floodplains/wet lands.
Belyando River Catchment Area - includes the following water courses/wetlands through Wilandspey: View Hill Creek; Sandy Creek; extensive floodplains/wet lands.
North Creek Catchment Area - includes the following water courses/wetlands through Wilandspey: Belyando River and extensive floodplains/wet lands. (see the following attachments: Attachment 4 - Location of Wilandspey Station and three Catchment Areas; Attachment 5 - Location of Existing Site Drainage)
Proposed drainage corridors will release into these catchment areas. (see attachment 6 - Location of Drainage Corridors)
a) All of our cattle watering points (dams and water holes in Sandy Creek and Tomahawk Creek and the Belyando River) are derived from flows of water in the Tomahawk Creek Catchment Area, Belyando River Catchment Area and the North Creek Catchment Area.
b) We have two large dams-No.3 x 2;floodplains/wetlands and semi -permanent water holes relying on water from Tomahawk Creek and other creeks within the Tomahawk Creek Catchment Area along the full southern side of our property.
c) We have 7 large dams - House Dam, Sandy Creek Dam, Brigalow Dam, No.1 Dam, Middle Dam, Tony's Dam, Wellington Dam; floodplains/wetlands and semi permanent water holes relying on water from Sandy Creek and other creeks within the Belyando River Catchment Area along the full length of the property; west to east.
d) We have permanent water holes and floodplains/wetlands along the whole of our Eastern Boundary due to the Belyando River running along the complete eastern boundary of Wilandspey. North Creek and other creeks run into the Belyando upstream of Wilandspey Station and are located within the North Creek Catchment Area. (see attachment 7 - Bores and Dams Wilandspey)

Any drainage from the project site to the downstream catchments will be subject to sediment controls to control suspended sediment levels as described in Sections 13.4 and 13.6 of the draft EIS. The project does not involve any discharge of mine-affected water into the Tomahawk Creek catchment. As explained in Section 13.5.5 of the draft EIS, any discharges of mine-affected water into North Creek would be conducted in accordance with the Department of Environment and Heritage Protection's (EHP's) model mining conditions. These conditions are designed to prevent any adverse impacts on downstream environmental values and water users.

As discussed in Section 13.6.2 of the draft EIS, the impacts of the project on the Tomahawk Creek and Belyando River catchment areas are minor and the associated impacts on catchment yields at downstream properties would be minimal.

As indicated in Section 12 of the draft EIS, the project will not affect the quantity of quality of groundwater at the Wilandspey property.

Submitter Issue Number 18.010 and 20.010

e) Surface Water quality Concerns:

i) Apart from controlled discharge of mine affected water there is also potential for uncontrolled run off from open cut pit catchments and uncontrolled run off from tailings storage facilities and leakage/run-off from on-site waste landfills during extended wet seasons and heavy storm activity when storage facilities overflow.

The control of runoff from all areas of the project site is explained in Section 13 of the draft EIS. The mine affected water storages, including the tailings storage facility, are designed with sufficient storage capacity to ensure they do not overflow even during extreme rainfall events. The on-site management of the on-site landfill is described in Section 21.3.5 of the draft EIS.

Submitter Issue Number 18.011 and 20.011

ii) As noted in Draft EIS - Volume 1A Chapter 10.9: Aquatic Ecology - quality of water due to controlled (or uncontrolled) releases may increase salinity of water. It is also noted that run off waters may include hydro carbons and other chemicals.

iii). Our concerns are will all waters affected by the mine project (controlled or uncontrolled) be maintained within applicable guidelines and is it possible to maintain waters within the applicable guidelines when dealing with so many unknown factors involving unpredictable weather events? (we have experienced 8-10 inches in one storm in past weather events)

iv) There are many potential risks to properties downstream from the mine project particularly Wilandspey. The risks to our cattle enterprise are extremely high and may be irreversible. Change in the quality of water will affect all our cattle watering points; pasture quality as well as affecting our domestic usage of water- water used for cooking, cleaning, bathing and growing vegetables.

Refer response to issue 18.009.

Submitter Issue Number 18.012 and 20.012

v) All three catchment areas noted above include wetlands/flood plains - how will increased salinity and hyrdo carbons and other chemicals affect the growth and health of these pastures? There are certain grasses that only grow on these flood plains/wetlands; they are extremely nutritious and fatten cattle very quickly. If these pastures were to be affected by either increased salinity or the introduction of chemicals they would be rendered contaminated and we would no longer be able to graze cattle on these pastures; seriously effecting our business.

The discharge of hydrocarbons and other chemicals to downstream waterways is not proposed and will not be permitted by the project approvals. As explained in Section 13.5.5 of the draft EIS, any discharges of mine-affected water into North Creek would be conducted in accordance with the EHP's model mining conditions. These conditions are designed to prevent any adverse impacts on downstream environmental values and water users. The conditions include limits on the salinity and rate of discharge water, minimum receiving water flow rates and limits on downstream salinity that are set at levels designed to protect downstream environmental values and water users. The Wilandspey property is located on the Belyando River, more than 120 km

downstream of the discharge location for mine affected water on North Creek. Given the controls on any discharges of mine affected water, and the high level of dilution that would occur upstream of the Wilandspey property due to the large catchment area, it is not likely that river water salinity at the property would be significantly affected by any mine affected water discharges. Adverse effects on pastures due to increased salinity or chemical contamination are therefore not likely to occur.

Submitter Issue Number 18.013 and 20.013
vi) Further concerns over water quality control will be exacerbated if the Adani project is also successful as this project will release mine affected water into the North Creek Catchment Area and there will be a cumulative effect in the Belyando River.

As explained in Section 13.6.5 of the draft EIS, the EHP model mining conditions for the discharge of mine affected water address potential cumulative impacts with other mining projects. This is achieved by taking into account the assimilative capacity of the receiving environment in the calculation of discharge limits.

Submitter Issue Number 18.014 and 20.014
f) Surface Water quantity Concerns:
i) Any decrease in water quantity flowing through the Tomahawk Creek Catchment Area, Belyando River Catchment Area and North Creek Catchment Area will negatively impact our many floodplains/wet lands. These floodplains rely on large floods and the valuable pastures found on these floodplains/wetlands only grow during such flood conditions.

Refer responses to issue 18.009.

Submitter Issue Number 18.015 and 20.015
ii) Any decrease in water quantity will mean that the majority of our dams and waterholes will not be filled. Our dams have been strategically placed on current flow paths with calculations allowing for current flow velocities.

Refer responses to issue 18.009.

Submitter Issue Number 18.016 and 20.016
"g) other Surface Water Impact Concerns:
i) As noted in Draft EIS - Volume 1 A Chapter 13.6: Surface Water the key potential impacts of the construction and operation of the project include:
a. "Sedimentation of downstream waterways during construction and operations due to erosion from disturbed areas on the project site and increased sediment loads in site drainage water"
Comment: sedimentation fills up waterholes and dams which in turn decrease the capacity of waterholes and dams to hold water. Large storage dams have been constructed on Wilandspey to hold adequate water; the current storage capacity of these dams is extremely important in dry years.

b. "Mining disturbance and mine site drainage changing catchment areas, potentially resulting in downstream catchment yield impacts"
Comment: this will also result in our dams and waterholes not able to be filled as our dams have been strategically placed on current flow paths.
c. "Mining disturbance and mine site drainage altering downstream drainage and potentially resulting in: Changes to flood behaviour including flow paths, flood inundations areas and flow velocities and geomorphic impacts on watercourses and drainage lines including on channel bed and bank stability"
Comment: this will also result in our dams and waterholes not able to be filled. Our dams have been strategically placed on current flow paths and current flow velocities.
ii) Despite proposed management and mitigation measures to the project site itself we are extremely concerned that key potential negative impacts to our water ways will be not be prevented.
iii) We do not believe there has been any consideration of the potential for stock losses due to any interruption of surface water supply and the negative impacts this would have on our business; on a short term and long term basis.

The assessment and, where necessary, mitigation of the potential surface water impacts quoted are discussed in Section 13.6 of the draft EIS. As indicated in Section 13.6, these potential impacts will not affect the Wilandspey property, as suggested.

There has not been any consideration of stock losses on the Wilandspey property due to interruption to surface water supply in the draft EIS, as there is not expected to be any significant loss of water supply due to the project.

Submitter Issue Number 18.017 and 20.017
"h) Ground Water Quality and Quantity Concerns:
i) We have one bore on our western boundary against Hyde Park Station. We are concerned that this bore has not been included as one of the private bores in the area surrounding the proposed project site area to be monitored. (see attachment 8 - Location of Groundwater Monitoring Bores)
ii) This bore (known as the War Bore) is vital during dry times as dams; watercourses etc recede to low levels. This bore provides a reliable source of water and has an existing pipeline so that water from the bore can be pumped to 3 dams during dry times. (see attachment 7 - Bores and Dams)

All private bores within 20 km of the project site were identified as part of the groundwater study (Figure 12-6 of the draft EIS). The Wilandspey bore is approximately 25 km from the project site. The maximum extent of predicted groundwater depressurisation due to the project is shown in Figure 12-10 of the draft EIS. The predicted maximum extent is approximately 15 km from the western boundary of the Wilandspey property. Consequently, monitoring of the bore on the Wilandspey property is not justified.

Submitter Issue Number 18.018 and 20.018
iii) We are planning on sinking more bores in the future; will the potential for future groundwater now be compromised?

As indicated on Figure 12-10 of the draft EIS, the project will not impact groundwater levels on the Wilandspey property and will therefore not affect any future bores. The maximum extent of groundwater level impacts due to the project are approximately 15 km from the western property boundary.

Submitter Issue Number 18.019 and 20.019
iv) As already discussed by their very nature, the proposed mining activities have the potential to impact existing continuous supplies of good quality and quantities of ground water on our property. Subsidence will cause, at the very least, changes to aquifer characteristics in terms of storage, recharge and permeability. In terms of surface water and groundwater interactions, the activities could alter drainage patterns and flows that may then influence recharge rates, thus affecting groundwater supplies.
v) We do not believe there has been any consideration of the potential for stock losses due to any interruption of ground water supply and the negative impacts this would have on our business; on a short term and long term basis.

The draft EIS groundwater and surface water assessments (Sections 12 and 13, respectively) indicate that the water supplies on the Wilandspey property will not be affected by the project. The draft EIS groundwater assessment takes into account the impacts of subsidence on groundwater using a conservative assessment methodology.

There has not been any consideration of stock losses on the Wilandspey property due to interruption to surface water supply in the draft EIS, as there is not expected to be any significant loss of water supply due to the project.

Submitter Issue Number 18.020 and 20.020
Summary of Surface Water and Ground Water Concerns:
a) I note it is mentioned at 5.3.1 " agricultural activities have largely been constrained by unreliable permanent water sources and regional climatic conditions" (see Draft EIS - Volume 1A Chapter 5: Land Use) I think this highlights the importance and value of the catchment areas available to us; of particular value to us are all three catchment areas affected by the proposed China Stone Coal Project.
b) We have invested substantial capital over many years to build adequate water storage facilities which have been strategically placed on existing water flow paths; flow velocities and flood inundation areas and underground water streams in order to be unconstrained by regional climatic conditions and have reliable water sources.
c) We have invested substantial capital over many years to build riparian fences to protect creeks and waterholes
d) Other investments in infrastructure include 100's of kilometres of fencing and internal roads;

creek crossings and cattle yards which have been designed around existing watering points; wetlands and creeks.
e) Our long term investments in infrastructure are at risk given the consequences anticipated in changing the current catchment areas or underground drainage pathways which guarantee the supply of quality water for the continutation of our business activites.
f) Our business plan/model going forward in order to remain as a viable business have also been created around current catchment areas and current underground drainage pathways.
[*(g) moved to issue 18.021 by OCG*]
h) Should any of the water impacts noted above be realised our cattle grazing business will be put in a very precarious position. This would lead to the property becoming unviable given that we would have inadequate volumes of quality water to sustain our current cattle herd and some pastures would likely be compromised also undermining the ability for us to sustain our current cattle herd.
i) Any negative changes to water entitlements or pasture quality could result in a potentially significant decrease in the market value of the property which currently includes the added value of these water entitlements and wetlands floodplains.
j) Any negative changes to water entitlements or pasture quality could result in a potentially significant decrease in the carrying capacity of cattle on Wilandspey. This would seriously compromise the economic viability of our grazing business.

Refer responses to issues 18.009 and 18.012.

The project will not affect the submitter's water entitlements.

Submitter Issue Number 18.021 and 20.021
g) We agree that the Belyando is a regionally significant watercourse. (as per Draft EIS - Volume 1A Chapter 13.2.2: Surface Water). We believe that it should be noted that Sandy Creek and Tomahawk Creek and North Creek are also significant watercourses and do warrant a plan outlining environmental values and water quality objectives specific to these catchment areas to be developed.

Noted. The Queensland government is responsible for administration of the *Environmental Protection Water Policy 2009* (EPP Water) and the development of associated plans.

Submitter Issue Number 18.022 and 20.022
Conclusion:
In our view the EIS - China Stone Coal Project does not adequately outline the miner's capacity, capability and willingness to rapidly and effectively respond to any of the potential problems that may occur to properties in the catchment areas downstream of the project site as and when they may arise. We do not know the effectiveness of measures proposed to manage those impacts at the project site as set out in the EIS. It troubles us that measures proposed to manage those impacts at the project site as set out in the EIS are predominantly relating to the project site itself. Management and mitigation measures must extend beyond the project site.

The draft EIS includes monitoring and management measures for all relevant potential impacts of the project including impacts beyond the project site. The majority of these measures will be approval conditions applied to the project. In particular, both surface water and groundwater monitoring programs extend beyond the project site (Section 24 of the draft EIS).

Submitter Issue Number 18.023 and 20.023
We expect the potential negative environmental impacts likely to be created by the China Stone Coal Project in relation to Wilandspey Station will be given due consideration; particularly in view of the obviously weak future outlook for the coal industry by comparison to the very positive future outlook for the Australian clean beef industry which is highly regarded the world over.

All relevant environmental impacts of the project have been assessed in the draft EIS. The Wilandspey property is not specifically addressed in the draft EIS as it is 25 km from the project site and is too far away to be significantly impacted.

PROJECT CHINA STONE
RESPONSE TO TMR SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

23 TMR SUBMISSION

MacMines, Hansen Bailey and Cardno (project traffic engineers) representatives met with Transport and Main Roads (TMR) representatives and the Office of the Coordinator-General (OCG) in relation to the TMR submission on 16 December 2015. Following the meeting TMR confirmed their final requirements for the responses to the submission issues via an email to the OCG dated 17 December 2015. The issue responses below have been confirmed to be acceptable by TMR in the correspondence to the OCG dated 17 December 2015.

Submitter Issue Number 23.001
B-Doubles are shown as the largest vehicle used for construction and operation even though the routes used permit up to Type 1 or 2 Road Trains. Confirm in the Additional information to the EIS (AEIS) that vehicles larger than B-Doubles will not be used.

The information presented in the referenced sections of the draft EIS Road Impact Assessment (RIA) (Appendix O) is correct.

Submitter Issue Number 23.002
Key roads are listed in Table 3-1 and expected project generated traffic is shown in Table 6-3. No mention is made of which roads are expected to see an increase of more than 5% of background average annual daily traffic (AADT).
Bowen Developmental Road connects the mine site to the townships of Bowen and then Proserpine. It is conceivable that these towns are likely to be sources for the construction/operational workforce.
The southern end of Bowen Developmental Road currently has very low (AADT-29) traffic volumes and has numerous hazards – gravel road of low standard, floodway's etc. An extra 2 vehicles/day would exceed 5% of background traffic.
Include an assessment of development generated traffic on Bowen Developmental Road in the AEIS. If AADT exceeds 5% undertake a safety assessment of the route south of Collinsville (88B) with a particular focus on whether signage of any new hazards is required in accordance with the *Manual of Uniform Traffic Control Devices* and TMR's *Transport Road Use Management Manual.*

As discussed in Section 4.5 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), due to the remote location of the project site and concerns related to driver fatigue, the proponent will not support long distance Drive-In Drive-out (DIDO) workforce arrangements. Bowen and Proserpine are located approximately 7 hours drive (370 km) and 8 hours drive (460km), respectively, by road from the project site. Consequently there is not expected to be any DIDO workforce traffic on the Bowen Development Road.

Attachment I – Additional Commitments includes the following additional commitments:

- The RIA will be updated six months prior to the commencement of construction;
- The proponent's DIDO workforce policy will be enforced through the project employment agreements; and
- A Road Use Management Plan, including a commitment to monitor project generated traffic, will be prepared for the project, if necessary.

Submitter Issue Number 23.003
Maps throughout the Road Impact Assessment (RIA) incorrectly show Yarromere Road as Mirtna Road In the AEIS update the maps within the RIA to show the correct road name.

The referenced road section is not impacted by the project and is not relevant to the draft EIS RIA (Appendix O). Section 5.3 – Editorial Corrections notes the amendment of the road name in the RIA figures, as requested.

Submitter Issue Number 23.004
Figure 3-2 shows outdated background traffic data from 2012/13.
Subsequent Road Impact Assessments are to use the latest traffic data available from TMR/Local Government if less than 12 months old. If no recent data is available, the proponent should obtain their own traffic data.

The draft EIS RIA (Appendix O) utilised intersection traffic count data from late 2013 and link volumes from 2012 and 2013 calendar years as identified in Tables 3.3 and 3.2, respectively. Use of this data is appropriate given that the data is still representative if not slightly conservative as background traffic volumes have decreased slightly since 2012 and 2013 as identified in Table 6-2. The performance of the assessed intersections and links is therefore likely to be slightly better than that reported given the lower baseline volumes more recently observed.

The request for use of recent data for any future RIA updates is noted.

Submitter Issue Number 23.005
Section 4.2 mentions the traffic associated with the Carmichael coal mine and rail project has been included in the traffic assessment but section 9.1 mentions Equivalent Standard Axle's associated with the Carmichael coal mine and rail project have not been included in the pavement assessment.
The RIA should provide assessment of road impacts with and without the Carmichael coal mine and rail project. There is uncertainty regarding the timing of the delivery of the Carmichael coal mine and rail project and necessary assessment should be undertaken so as to understand what the impacts of the project will be on the state-controlled transport network. The proponent is also to commit to a final RIA that includes Carmichael coal mine and rail project impacts if at the time it is clear the Carmichael coal mine and rail project will/has preceded the China Stone project.

As discussed in Section 9.1 of the draft EIS RIA (Appendix O), there is insufficient detail within the Carmichael Coal Mine and Rail Project (CCM&RP) RIA Report in relation to pavement loadings associated with the CCM&RP for the purposes of calculating detailed future baseline pavement loadings. Consequently a conservative approach was adopted to identify areas of potential pavement impacts from the project. As discussed in draft EIS Section 19.2.7 and Section 9.2.3 of the draft EIS RIA (Appendix O), the proponent has already committed to recalculate the road pavement impacts, including any associated monetary contributions to TMR, prior to the commencement of construction and based on confirmed estimates of CCM&RP traffic from Adani's RIA which is required to be submitted to TMR in the future, prior to the commencement of the CCM&RP.

At this point in time, the most likely scenario is that the CCM&RP will commence well in advance of the project. In the unlikely event that the CCM&RP does not proceed prior to Project China Stone, should Project China Stone proceed on its own, any update of the project RIA pre-construction would take into account the absence of CCM&RP traffic in the baseline. Attachment I – Additional Commitments includes a commitment to update the RIA six months prior to the commencement of construction. On this basis, it is not necessary to provide an assessment of the road impacts without the CCM&RP as this is an unlikely scenario and if it were to eventuate, it would be addressed in the pre-construction RIA update.

Submitter Issue Number 23.006
Sections 3.2 and 6.2.1 propose a linear background growth rate of 3% for all state roads.
TMR Mackay has projected growth rates for all state roads within this district. These take into account some expected future development and in most cases are higher than 3% and compound figures.
It is acknowledged in recent years there has been a reduction in AADT on some roads. TMR accepts the use of 3% growth but compound growth rates must be used in the updates of the RIA.
To be consistent with other development assessments and traffic growth as described in TMR's Traffic Analysis and Reporting System (TARS) software.

The draft EIS RIA (Appendix O) assumed global traffic growth of 3% (linear) per annum in addition to specific traffic volume growth associated with the nearby CCM&RP project. The assessed value of the global growth parameter (i.e. 3%) was selected after consideration of various indicators on the basis that it would be linear not compound. The net effect of the two growth allowances (i.e. global and specific growth associated with CCM&RP) results in an effective rate of 4.3% linear or 3.3% compound on the Greggory Development Road. It is noted that Table 6.2 identifies that in fact negative growth has recently occurred and therefore in this context the assessed growth is still considered to be conservative (i.e. likely to result in a worst case assessment scenario). No changes to the adopted growth forecasting approach are therefore considered warranted.

Appropriate growth rates will be used in any future updates of the RIA.

Submitter Issue Number 23.007
A SIDRA performance assessment was undertaken for the intersection of Flinders Highway/Gregory Developmental Road. No mention is made of the percentage of heavy vehicles used in the assessment.
In the AEIS use a heavy vehicle percentage that is representative of the development traffic.

The draft EIS RIA (Appendix O) SIDRA assessment adopted a 30% HV factor for all movements associated with the Flinders Highway/Gregory Developmental Road intersection. This factor is considered representative. Irrespective the analysis indicates that even at the 2028 design horizon with the addition of project generated traffic demands the intersection will operate at 10% of maximum capacity as compared to the industry accepted 80% thresholds. This result establishes that the acceptable operation outcome is highly insensitive to the precise HV factor adopted given the very significant extent of spare capacity.

Section 5.3 – Editorial Corrections includes clarification that a heavy vehicle factor of 30% was adopted for the SIDRA assessment.

Submitter Issue Number 23.008
For the intersection assessment of Gregory Developmental Road/Elgin-Moray Road there appears to be no correlation between Figure C15 and D7. Given that the access is on a 110km/h section of rural highway and large vehicles will frequently be decelerating and using the access the proposed Short Channelized Right and Basic Auxiliary Left treatment may not be deemed necessary.
In the AEIS the Gregory Developmental Road/Elgin-Moray Road intersection should be reassessed to further take into consideration the potential safety issues of large, fully loaded vehicles decelerating from 110km/h along the Gregory Developmental Road and turning into the Elgin-Moray Road. The majority of turning movements are right into the Elgin-Moray Road which may warrant the upgrade to a CHR/AUL(S). A CHR(S) may not adequately provide heavy vehicles to satisfactorily decelerate safely. The intersection assessment should also include lighting. The assessment is to be in accordance with TMR's *Road Planning and Design Manual.*

There is no correlation between Figure D7 and the Gregory Developmental Road/Elgin-Moray Road intersection assessment. This is to be expected given that Figure D7 reports the results of an assessment undertaken for a different intersection. Figure D6 which provides the assessment for the Gregory Developmental Road/Elgin-Moray Road intersection however confirms the appropriateness of the completed assessment. That is Figure D6 confirms that a more "substantial" intersection form than strictly warranted based upon application of the standard turn warrants is proposed to be provided.

The provision of turn lanes at the Gregory Developmental Road/Elgin-Moray Road intersection has been assessed against both efficiency criteria being degree of saturation and safety criteria being the industry standard Austroads Turn Warrants. The SIDRA assessment identified that the intersection will have significant spare capacity and therefore no upgrading of the existing form is warranted based upon efficiency considerations. The Austroads Turn Warrants assessment

identified that a Basic Left (BAL) and Basic Right (BAR) turn treatment would be appropriate based upon strict application of the industry accepted Austroads turn warrant assessment procedure. The research underpinning the Austroads turn warrant assessment methodology directly considers the likely crash cost reductions due to reduced speed differentials. The draft EIS RIA (Appendix O) identified that whilst not strictly required based upon direct application of the Austroads turn warrants it was proposed to provide a Channelised (Short) Right Turn (CHR(s) treatment instead of a Basic Right Turn treatment. That is a more substantial right turn treatment was proposed than strictly warranted based upon either safety or efficiency criteria. It is noted that it appears that the author of the submission has mistakenly referred to Figure D7 which relates to the assessment undertaken for a different intersection and therefore their concerns may be resolved by reference to the correct figures. Review of the relevant figures being Figures D4 to D6 will confirm the appropriateness of the assessment already undertaken.

Section 5.3 – Editorial Corrections includes clarification that the predominant turns at the Gregory Developmental Road/Elgin-Moray Road intersection are right in and left out.

This intersection is proposed to be upgraded as part of the development of the CCM&RP. The TMR approval of this upgrade would include lighting, if necessary.

Submitter Issue Number 23.009
The section mentions a 10 year mitigation time frame for pavement impacts. Pavement assessment should be for the whole of the project.
The AEIS is to reflect a pavement assessment horizon that covers the life of the project.
To meet the requirements of the Guidelines for Assessment of Road Impacts of Development.

The pavement assessment included within the draft EIS RIA (Appendix O) adopted a full project life impact assessment period and a 10 year mitigation period as per the requirements of Section 9.1 of the *Guidelines for the Assessment of Road Impacts of Development*. Section 9.1 clearly identifies including a worked example that consideration of a 10 year mitigation period for pavement impacts is appropriate furthermore this is consistent with practice adopted by TMR across Queensland.

Submitter Issue Number 23.010

Section 8.0 shows the Level Of Service for key roads used but makes no mention of increased safety risks associated with increased heavy vehicles where in Table 9-2 suggests ESA's will increase on Gregory Developmental Road by up to 70%.

There are sections of Gregory Developmental Road and Peak Downs Highway where seal width is under 6.5m and narrow structures exist. There will be an increased risk associated with a higher number of multi-combination vehicles passing opposing traffic at these locations.

In the AEIS for Gregory Development Road and Peak Downs Highway undertake a route assessment in accordance with TMR's *Route Assessment Guidelines for Multi-Combination Vehicles in Queensland*.

To assist the preparation of the assessment attached is a memo prepared by TMR in response to the Carmichael coal mine and rail project.

The Gregory Developmental Road and Peak Downs Highway are designated Multi-Combination Vehicle routes and the proposed use of these routes by b-doubles is therefore appropriate.

The Gregory Developmental Road is an approved "Type 1 & Type 2 road trains, 23 metre & 25 metre B-double" route whilst the Peak Downs Highway is an approved "Type 1 road trains, 23 metre & 25 metre B-doubles only" route. The proposed use of these routes by b-doubles associated with the project is appropriate as it is in compliance with the vehicle combinations approved for use on both routes. The referenced guideline describes the assessment process to be undertaken for the consideration of new routes not already approved routes. Furthermore the guideline notes that only TMR employees directed to do so by a Regional Director of the Department are authorised to undertake such an assessment. Any reconsideration of the suitability of the Gregory Developmental Road and Peak Downs Highway to continue to accommodate multi-combination vehicles into the future is therefore a strategic network planning decision for the Department. It is asserted that it would not be a reasonable onus for the development proponent to be required to undertake such an assessment. Instead the proponent should be required to only utilise vehicle combinations that are approved for use on any specific route.

Submitter Issue Number 23.011

The Road Impact Assessment does not mention the need to provide a Road Use Management Plan (RMP) as described in section 8.1 of *Guidelines for Assessment of Road Impacts of Development*. Also the proponent may need to enter into an infrastructure agreement (IA) with TMR particularly if it is determined that any ameliorative measures are to be staged.

The AEIS is to include a commitment to provide a finalised RMP 6 months before commencement of project traffic in accordance with TMR's Guideline for preparing a Road Use Management Plan (attached) and an IA if required.

Attachment I – Additional Commitments includes commitments to develop a Road Use Management Plan and an Infrastructure Agreement, if necessary.

PROJECT CHINA STONE
RESPONSE TO EHP SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

24 EHP SUBMISSION

The proponent, Hansen Bailey and the Office of the Coordinator General (OCG) met with representatives from the Department of Environment and Heritage Protection (EHP) on 10 November 2016 and 29 November 2016 to discuss the EHP submission issues and the proponents proposed approach to resolving their issues.

24.1 EHP SUBMISSION

Submitter Issue Number 24.001
Appendix L – Air Quality Report (Katestone Environmental) Section 5.3.2. Emission inventory
Issue 1: Sulfur dioxide emission rate is very high.
The sulphur dioxide emission rate of the proposed power station is provided in Table 20. This was based on the information provided by the proponent and/or estimated using the NPI emission factors. According to Figure 4-28 (Section 4: Project Description) two flue gas desulfurization units will be installed at the proposed power station. The sulphur dioxide mass emission rate of 891 g/s is very high after the flue gas desulfurization process. It is not clear that the emission inventory considered the sulphur control efficiency.
Further information is required on how the sulphur dioxide emission rate was calculated and the sulphur control efficiency adopted for the flue gas desulfurization units. This information will assist in setting the sulphur dioxide emission limit for any environmental authority.

Flue gas desulfurization is not proposed and should not be shown on the conceptual layout in Figure 4-28. This has been clarified in Section 5.3 – Editorial Corrections.

The sulphur dioxide emission rate noted in Table 21 of the draft Environmental Impact Statement (EIS) Air Quality Report (Appendix L) is correct and has been calculated using NPI methods and the coal sulphur content provided by the proponent, as explained in Section 5.3.2 of the draft EIS Air Quality Report (Appendix L).

Submitter Issue Number 24.002
The sensitive receptors are sufficiently distant to avoid potential noise or vibration issues. The regulatory requirement is correctly addressed for noise given all the relevant policies were referenced and used. The sleep disturbance was correctly addressed using the relevant World Health Organisation references. The modelled worse case included a temperature inversion gradient of 3deg/100m. The sound power levels used for the model are in line with other data reviewed. The sound contours produced by the model reflect acceptable impact to sensitive receptors.

Noted.

Submitter Issue Number 24.003
Advice on MNES is provided in this review to reflect the EHP jurisdiction and assessment responsibility set out in the Environmental Assessment Bilateral Agreement with the Commonwealth government. Many of the identified MNES species impacted are also defined as MSES values by the Queensland Environmental Offsets Act 2014 and supporting policy.

Noted.

Submitter Issue Number 24.004
From a EHP officer site visits during wet season BTF surveys carried out within the adjacent Carmichael project footprint in early March 2015 breeding BTF were observed watering at non-permanent waters such as roadside puddles. The assumption that only 3km around permanent waters is high value habitat is unlikely to be valid – refer to previous EHP advice (18 May 2015).

The proponent has not carried out wet season surveys at sites in the south-eastern part of the project area – an area that the Carmichael Project proponent identified as having very high BTF habitat values with multiple BTF records. There are five BTF records within the proposed project area from the Carmichael Project survey work.

There is also permanent water in the southern part of the proposed China Stone project area.

The proponent should comprehensively account for all likely BTF habitat and revise impact estimates on BTF habitat. EHP can assist by participating in a workshop or meeting to detail the issues to be resolved. The session should involve the respective experts on BTF in the region and relevant agencies.

The BTF habitat modelling for the project site has been revised in consultation with the Federal Department of the Environment and Energy (DoEE) and the Queensland EHP. The revised habitat modelling is provided in Attachment F – Additional Information on Ecology.

In response to the specific issues raised in this submission:

- The revised habitat modelling includes habitat around non-permanent sources of water (the habitat modelling contained in the draft EIS was based on permanent water sources only); and
- The revised habitat modelling incorporates the south-eastern part of the project site, and the BTF records from the Carmichael Project wet season survey work that are referred to in this submission fall in an area mapped as BTF habitat (using the revised BTF habitat modelling).

Please note that the assertion in the submission that the southern part of the project site contains permanent water is contrary to findings of field survey work undertaken during the preparation of the draft EIS and contrary to advice from the landowner. It may be that the submission is referring to cattle troughs. These are only supplied with water when cattle are grazing in adjacent paddocks and do not provide a permanent source of water. Nevertheless, this point is no longer material to the BTF habitat modelling, given that the definition has been extended to include ephemeral watercourses, and the southern part of the project site is now mapped as BTF habitat.

Submitter Issue Number 24.005

Appendix F – Terrestrial Ecology Impact Assessment, Table H.2 Assessment of Likelihood of Occurrence – Yakka Skink

There are nine identified potentially present MNES species. EHP officers advise that suitable habitat is present for the yakka skink. Previous Galilee mining project EIS's have reported similar habitat for yakka skink. The known habitat distribution model and known wildnet records demonstrate that this skink core habitat is within the Brigalow Belt. Records exist in the Desert Uplands to the west of the project area in the same habitat and to the north in the Einsleigh Uplands bioregions. Habitat is likely to be present within the project area. It is recognised that no habitat was reported during the 2012 and 2013 EIS flora fauna surveys.

Yakka skink distribution is at the edge of its range and therefore the population in this area is important as it is at its limit of its distribution and important to establishing habitat linkage to more western known habitat.

Habitat requirements of the yakka skink are poorly known. The species is known from rocky outcrops, sand plain areas and dense ground vegetation, in association with open dry sclerophyll forest (ironbark) or woodland, brigalow forest and open shrub land. The yakka skink has also been recorded in lancewood forest on coarse gritty soils in the vicinity of low ranges, foothills and undulating terrain with good drainage.

Within these broader habitat types the yakka skink is often associated with partly-buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. It is also known to excavate deep burrow systems. The yakka skink can persist in cleared habitats if shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens are available.

The yakka skink is endemic to Queensland and its distribution is highly fragmented, at least partly as a result of land clearing. Isolated populations occur throughout sub-humid to semi-arid areas in the interior of Queensland from St George in the south, to Coen and Cape York Peninsula in the

north.
The proponent should more comprehensively account for likely Yakka skink habitat and include impact estimates on habitat. EHP can assist by participating in a workshop or meeting to detail the issues to be resolved. The session should involve the respective experts on Yakka skink in the region and relevant agencies.

The draft EIS Terrestrial Ecology Report (Appendix F) contains a detailed assessment of the likelihood of the Yakka Skink occurring within the project site. It explains that the species was not recorded during the draft EIS field surveys conducted for this project, nor was it recorded during field surveys conducted for the Carmichael Coal Mine and Rail Project (CCM&RP). The draft EIS Terrestrial Ecology Report (Appendix F) explains that the project site lacks core habitat for the species, given that it is not located with the Mulga Lands or Brigalow Belt South Bioregions. Based on these factors, the draft EIS Terrestrial Ecology Report (Appendix F) concluded that there is a low potential for the Yakka Skink to be present in the project site.

The EHP indicated in its submission on the draft EIS that EHP officers believe that the project site contains suitable habitat for the species, although the submission explained that the habitat requirements for the Yakka Skink are poorly known.

The conclusions of the draft EIS in relation to the potential presence of the Yakka Skink within the project site are valid based on publicly available information about the species. However, it is acknowledged that there is some uncertainly in relation to the distribution and habitat requirements of this species. Given this uncertainty, the Yakka Skink has been considered as part of the assessment of project impacts. This information is included in Attachment F – Additional Information on Ecology.

Submitter Issue Number 24.006
Biocondition data of impact areas

a) Noting the clarifications in Section 9 – Terrestrial Ecology (Subsection 9.4.5), Section 11 MNES (Subsection 11.5.5) and Appendix F (Subsection 3.3) – the Threatened Species Habitat Mapping does not detail clearly the assessment of habitat condition at the impact sites for any matter. The TOR clearly state this requirement:

The methodology in Biocondition: A Condition assessment framework for terrestrial biodiversity in Queensland: Assessment Manual (version 2.1) (Eyre et al. 2011) and Ecological Equivalence Methodology Guidelines (version 1) (Department of Environment and Resource Management 2011) is suitable for impact sites possibly requiring offset considerations under the Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014).

b) The referenced guideline should be used when offset property surveys are undertaken which appear to be intended post the EIS process.
c) The guideline should also be used for habitat quality assessment for threatened species and EPBC listed migratory species habitat to be impacted by the project. Existing ecological equivalence data can be adapted for this purpose. Habitat condition assessment

for all matters (both MNES and MSES) that are to be impacted by this project should be fully addressed in line with these guides. The basis of both Ecological Equivalence and Habitat Quality are the same (i.e. biocondition) and therefore any field data is readily interchangeable.

d) The proponent should assess the habitat quality of all matters impacted that are likely to require offsets for use in the relevant offset calculators for MNES and MSES.

The proponent intends undertaking habitat condition surveys as part of the development of the Offset Management Plan. It is noted that the Ecological Equivalence Methodology referred to in the Terms of Reference (TOR) has been superseded, and the proponent will therefore make use of the methodology in current use at the time of the survey (e.g. *Guide to Determining Terrestrial Habitat Quality* [EHP 2015]). The survey work undertaken as part of the development of the Offsets Management Plan will:

- Address all species (MNES and MSES) that require offsets;
- Include survey of the land proposed to be used for offsets (i.e. offset property/properties); and
- Include survey of the areas that require offsets (i.e. sections of the project site proposed to be cleared).

Section 4.4 and 4.6 of the draft EIS Biodiversity Offset Strategy (Appendix H) explain that habitat quality surveys will be undertaken as part of the development of the Offset Management Plan. The proponent is unable to undertake the surveys at this point in time, given that it is currently undertaking commercially sensitive land access negotiations with the owner of the most prospective property. Surveys of the properties cannot be undertaken until negotiations are concluded.

Information gathered during these field surveys will be used in the relevant offset calculators for MNES and MSES to determine the size and quality of the offset required.

Submitter Issue Number 24.007

Impacts on Threatened Fauna Species – Impact area of BTF habitat likely to be greater than estimated.

The definition of high and low value habitat is not accepted. There appears to be an underestimation of BTF habitat on the site. The interpretation of the BTF habitat definitions need to be discussed further. Previous study methodologies that addressed BTF habitat mapping in the region should be considered. EHP can assist by participating in a workshop or meeting to detail the issues to be resolved. The session should involve the respective experts on BTF habitat mapping in the region and relevant agencies.

Please refer to the response to issue 24.004, which explains that the BTF habitat mapping has been revised as part of the preparation of the Supplement, and that the revised mapping does not

distinguish between high and low value habitat. The extent of the area mapped as BTF habitat has increased as a result of the revised habitat modelling methodology.

Submitter Issue Number 24.008
Offsets – Impact areas for BTF habitat and Yakka Skink habitat and the consequential offset requirements need to be reconsidered.

Refer to responses to issues 24.004 and 24.005.

Submitter Issue Number 24.009
Need for verification of EIS revised mapping by the Queensland Herbarium
The Terms of Reference for the project state that '*for each significant natural vegetation community likely to be impacted by the project, vegetation surveys should be undertaken at an appropriate number of sites, at once in the wet season and once in the dry season and satisfy the following:*
• *The relevant regional vegetation management codes*
• *Site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database and HERBRECS*
• *Minimum site size should be 10 x 50 metres*
• *A complete list of species present at each site should be recorded*
• *The surveys to include species structure, assemblage, diversity and abundance*
• *The relative abundance of plant species to be recorded*
• *Any plant species of conservation, cultural, commercial or recreational significance to be identified*
• *Specimens of species listed as protected plants under the NCA (Wildlife) Regulation, other than common species, are to be submitted to the Queensland Herbarium for identification.*
• *The methodology in Biocondition: A Condition assessment framework for terrestrial biodiversity in Queensland: Assessment Manual (version 2.1) (Eyre et al. 2011) and Ecological Equivalence Methodology Guidelines (version 1) (Department of Environment and Resource Management 2011) for sites possibly requiring offset considerations under the Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014).*
The changes to regional ecosystem mapping should be submitted to the Herbarium in the format defined in the terms of reference.
In the interim and for the purposes of the EIS outcome the proponent should provide EHP with the 2012 and 2013 survey site data that supports the proposed regional ecosystem mapping changes. EHP can then provide advice on any conflicts with site mapping and Herbarium mapping as well as the methodology used.

The EHP has produced an information sheet, *How to Address Environmentally Sensitive Areas and Offset Requirements in an Application for an Environmental Authority for Resource Activities* (EHP, 2016), which addresses vegetation mapping, including the use of government RE mapping and ground-truthed mapping. The guidelines note that ground-truthing can be used as the basis of the assessment if the details of the ground-truthing surveys are provided and if "an appropriately qualified person can confirm that the surveys completed were sufficient for describing ESAs and

MSES". The guideline also notes that "*Applicants are encouraged to undertake ground-truthing surveys to accurately assess the RE type, condition and ecological value of any vegetation proposed to be significantly disturbed before lodging an EA application…Where ground-truthing surveys are undertaken, the survey approach adopted should be consistent with the relevant methodologies published by the Queensland Government (For example, REs should be described in accordance with the 'Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland' published by the Queensland Herbarium …)."*

Details of the ground-truthing surveys are provided in the draft EIS Terrestrial Ecology Report (Appendix F), the surveys were undertaken in accordance with the methodology specified in EHP (2016) and the surveys were undertaken by an appropriately qualified person. The draft EIS therefore makes use of the ground-truthed mapping. It should be noted that neither the EIS TOR nor EHP (2016) contain any reference to a requirement for the Queensland Herbarium to verify the ground-truthed mapping.

Submitter Issue Number 24.010

6.2.4 Rehabilitation of subsidence cracking.

Given the evidence of sandstone at the surface in some of the EIS photos, it is likely that subsidence cracking in areas of double seam extraction may result in block style slumping and tilting that may not be able to be rehabilitated by conventional methods. This has been observed in the first panels at Moranbah North Mine and the southern end of panels at Bundoora Mine. This would mean increased disturbance as part of rehabilitation. This would also affect offset requirements.

Appendix F

Impact on flora due to subsidence.

Ironbark is a species that appears to be susceptible to root shear and tree death. Crinum Mine had observed high mortality rates in ironbark and significant dieback in red gums. This would also affect offset requirements.

These issues were discussed with the proponent on 20/21 August 2015.

Further work is required to determine high risk areas of blocky subsidence and the consequences for subsidence area management and any biodiversity offsets.

Further work is required to determine the risk areas of tree deaths and methods for management as well as any biodiversity offset requirements.

Introduction

Subsidence effects due to longwall mining and the potential for subsidence effects to impact trees are dependent on a number of factors that can vary considerably from one mine site to another. In the absence of a detailed consideration of these factors, it is not reasonable to assume that simply because effects have occurred at one mine site that they are likely to occur at another mine site. The subsidence predictions for the project have been prepared by Gordon Geotechniques. Nick Gordon is a leading longwall mine subsidence specialist with more than 30 years' experience in the Australian coal mining industry. He has unparalleled experience with subsidence predictions and subsidence effects at Queensland longwall mines and has operating and consulting experience at

all of the mines used as examples to support the claims in this submission. Highlights of Nick's relevant experience include the following:

- Full time onsite geotechnical engineer at the Kestrel longwall mine (5 years) and the Kenmare longwall and Laleham bord and pillar operations (6 years).
- Provision of geotechnical design advice to the Ensham bord and pillar mine since the pre-feasibility studies commenced in 2004. Nick still spends two full days underground at this operation checking, assessing and back analysing the design recommendations.
- Contractual geotechnical roles at the Crinum, Broadmeadow, Dendrobium, Bundoora longwall mines in Queensland and NSW.
- Subsidence assessments at numerous operating longwall mines in Queensland such as the Grasstree, Newlands, Kestrel, Crinum, Moranbah North, Grosvenor, Ensham mines (for a proposed longwall layout).
- Subsidence assessments and reviews for a number of projects, including the Aquila, Belvedere, Sarum and Moranbah South projects.
- Annual subsidence reviews and inspections at the Grasstree Longwall Mine.
- Geotechnical services to more than fifty longwall and bord and pillar mines in the western, northern and southern coalfields of the Sydney Basin.

The following sections respond to each of the specific claims made in this submission. The response draws on Nick Gordon's detailed technical understanding of Project China Stone and each of the operations used as examples in the submission. It is noted that the examples given in the submission appear to be anecdotal and unreported.

Given the evidence of sandstone at the surface in some of the EIS photos, it is likely that subsidence cracking in areas of double seam extraction may result in block style slumping and tilting that may not be able to be rehabilitated by conventional methods. This has been observed in the first panels at Moranbah North Mine and the southern end of panels at Bundoora Mine. This would mean increased disturbance as part of rehabilitation. This would also affect offset requirements.

Project China Stone Overburden Geology and Subsidence Effects

The effect of the Clematis Sandstone overburden unit was considered in the development of the subsidence predictions for the project. As discussed in Section 4.5.3 and Section 12.3.3 of the draft EIS, the Clematis Sandstone outcrops in Darkies Range in the area that will be subject to longwall subsidence. In this area the sandstone is deeply weathered and clay bound, and consequently has very low strength. The strength of the overburden units and the assessment of the potential for blocky rock movements and massive spanning units were assessed in Sections 3.6 and 3.7 of the draft EIS Subsidence Report (Appendix A). The assessments concluded that caving behind the retreating longwalls will occur readily, due to the low strength of the overburden units and the width of the longwall panels.

It should also be noted that dual seam extraction is also not in itself a reason why potential block style subsidence would occur, as suggested. The predicted tensile strains for the dual seam longwall mining areas are actually less than the single seam areas due to a number of factors including the depth of cover and the relatively thin interburden thickness between the two extracted coal seams.

The claim in the submission that block style subsidence is likely to occur due to the presence of Clematis sandstone near the surface in dual seam mining areas is therefore not scientifically supported.

Bundoora Mine

The submission uses the example of subsidence effects at Bundoora Mine as support for the claim that blocky style subsidence may occur at the project site. The submission does not, however, provide any comparison between the two operations in relation to overburden geology and mining parameters in order to justify the relevance of this example.

Nick Gordon worked as the Bundoora Mine geotechnical engineer during the extraction of Longwalls 402 and 403 in 2008. He continued his geotechnical assistance to the Bundoora operation by providing consulting advice to the on-site geotechnical engineer whilst the remaining 400 and 401 longwalls were extracted. As well as the day to day underground work, Nick compiled a subsidence assessment report for Longwall 403. This was required because the longwall panel retreated close to surface infrastructure such as transformers, power poles and dams. The subsidence effects from Longwall 402 were reviewed and ground-truthed as part of this assessment. Subsequent to this work, Nick was engaged to provide a subsidence assessment of the Aquila longwall layout in 2014. This required ground-truthing of the subsidence effects above the Bundoora, Aquila and Grasstree mines at the German Creek mining complex.

Nick is not aware of any "block style slumping and tilting that may not be able to be rehabilitated by conventional methods" at Bundoora Mine. It is also worth noting that there are significant differences in the overburden geology between Bundoora Mine and Project China Stone and any experiences at Bundoora are not relevant to Project China Stone. The overburden lithology at Bundoora is characterised by strong and thickly bedded sandstone units of Permian age, compared to the weak and poorly cemented sandstones (Clematis Sandstone Unit) of Triassic age at Project China Stone. The longwall mining at Bundoora was also relatively shallow with a depth of cover ranging from 45 m to 130 m compared to between 140 m and 420 m at China Stone. In the shallower parts of China Stone at depths of cover similar to Bundoora, the sandstone is not present. Due to the significant differences in the overburden geology and mining operations at Bundoora Mine, any comparison between subsidence effects at Bundoora Mine and Project China Stone is not valid.

Moranbah North Mine

The submission also uses the example of subsidence effects at Moranbah North Mine as support for the claim that blocky style subsidence may occur at the project site. The submission does not,

however, provide any comparison between the two operations in relation to overburden geology and mining parameters in order to justify the relevance of this example.

Nick Gordon was first involved at Moranbah North Mine whilst working at the Kestrel mine as part of a due diligence exercise carried out by Rio Tinto in 2002. He subsequently prepared subsidence predictions for Longwalls 201 to 204 in 2006. More recently, as part of work on the Moranbah South Project and for the Grosvenor Mine, Nick undertook a review of surface and subsurface cracking effects at Moranbah North Mine. In addition, Nick audited the Moranbah North Mine and the Grosvenor Mine as part of due diligence assessments earlier this year.

Nick's work at Moranbah North Mine has not identified any examples of block style subsidence. In addition, Nick is not aware of published accounts of block style subsidence at Moranbah North Mine. It is noteworthy that the Moranbah South Subsidence Assessment, prepared by Mine Subsidence Engineering Consultants (MSEC) references subsidence behaviour above Longwalls 101-108 and 201-203 at Moranbah North, but makes no mention of block style subsidence. Irrespective of any possibility of block style subsidence at Moranbah North Mine, the overburden geology and depth of cover at Moranbah North Mine are distinctly different to those at Project China Stone. Similar to Bundoora, the sandstones in the Moranbah Coal Measures are strong and of Permian age, whereas the sandstones at Project China Stone are weak and poorly cemented. The initial longwall panels at Moranbah North were also shallow at a depth of around 100 m. Sandstone is not present at Project China Stone in the areas that will be mined at these depths. The comparison with Project China Stone is therefore not technically valid.

Hansen Bailey has also undertaken work at Moranbah North Mine for a number of years, including a recent audit of the mine, and is not aware of instances of blocky subsidence or significant tree deaths.

Rehabilitation Disturbance and Offsets

The submission claims that, by not accounting for the potential for blocky style subsidence that cannot be rehabilitated by conventional methods, the draft EIS has underestimated rehabilitation disturbance and this could affect offset requirements.

As discussed above, the claim that blocky style subsidence is likely to occur on the project site appears to be based on invalid comparisons with unreported subsidence effects at mines with distinct differences in material factors related to potential subsidence effects. The claim that rehabilitation disturbance has been underestimated and offsets could be affected is therefore not technically justified.

Ironbark is a species that appears to be susceptible to root shear and tree death. Crinum Mine had observed high mortality rates in ironbark and significant dieback in red gums. This would also affect offset requirements.

Widespread tree deaths due to root shear are not common at Queensland longwall mines. Any instances where this occurs would be due to particular site-specific surface geology and longwall mining factors. The factors that could potentially increase the potential for tree root shear are numerous and, in addition to tree species, include the nature of surface soil and rock material in the rooting zone, surface tensile strains and the extent of and nature of surface cracking.

Nick Gordon has worked on site at Crinum Mine and also provided subsidence assessments for the Crinum South, Crinum East and Crinum North mining areas. Nick also worked for 5 years at the adjacent Kestrel longwall operation. A substantial part of the Crinum longwall mining area is overlain by thick basalt deposits of Tertiary age at the surface. The basalt material is high strength and is in places >90 m thick.

The majority of the Crinum longwall panels are also < 150 m deep. The overburden characteristics and depth of cover at Crinum Mine are again distinctly different to Project China Stone and the subsidence effects are therefore not comparable. Hence any claim that tree deaths at Crinum Mine indicate that tree deaths are likely to occur at Project China Stone is not technically valid.

Further work is required to determine high risk areas of blocky subsidence and the consequences for subsidence area management and any biodiversity offsets.
Further work is required to determine the risk areas of tree deaths and methods for management as well as any biodiversity offset requirements.

As discussed above, blocky subsidence and tree deaths are not predicted to occur at Project China Stone due to the highly weathered and low strength nature of the Clematis Sandstone.

As noted above, Nick Gordon has experience with each of the mines listed as examples in this submission. These mines are not directly comparable to Project China Stone due to significant differences in overburden geology and/or mining depth and so even if block style slumping or tree deaths had been observed at these mines, this would not mean that these effects are likely to occur at Project China Stone.

The claims in the submission that blocky style subsidence or tree deaths are likely to occur are purely speculative and based on invalid examples. The submission therefore does not provide any reasonable justification for any further work in relation to these issues.

As discussed in Section 9.7.3 and Section 24.4.3 of the draft EIS, the Subsidence Management Plan will include a vegetation monitoring program which will be undertaken to confirm that subsidence does not give rise to impacts greater than those listed in the draft EIS Terrestrial Ecology Report (Appendix F) and to identify additional mitigation measures in the event of unanticipated impacts. This existing management measure will ensure that the actual impact of subsidence on vegetation is confirmed and, if necessary, additional mitigation measures would be identified. In the case of any significant residual impacts on matters of state environmental

significance or national environmental significance, mitigation measures would potentially include additional offsets.

Submitter Issue Number 24.011

Appendix H – Biodiversity Strategy – Potential Offset properties

a) Given the large area of impact to a significant population of BTF and cumulative impacts from other proposed Galilee mining projects – the offset strategy needs to present existing BTF habitat as offset areas.
b) The habitat quality assessment of threatened species habitat impacted by the project needs to be carried out for use in the EPBC calculator and EOA calculator to determine the size and quality of the offset required for each MNES and MSES value respectively (where they don't overlap).
c) The terms of reference state (see page 30) that if land-based offsets are proposed for terrestrial ecosystems, an assessment of ecological equivalence (habitat quality) for each impact area and proposed offset area should be provided.
d) Appendix H provides potential direct offset areas that are not the basis for an adequate EIS outcome or post EIS process offset approvals without further information on calculator based offset requirements. For the EIS outcome the proponent's 22 June response is not acceptable. An estimation of offset requirements via the calculators is required. The maximum offset habitat quality of 7 and multiplier of 4 may be applied in the calculator (MSES) unless other biocondition data is presented. For the purposes of the EIS the proponent should:

1. carry out habitat quality assessment (the updated methodology for assessing habitat condition) of all MNES and MSES values to be impacted on the site.
2. present offset requirements for MNES values in the EPBC calculator using estimated habitat quality for known habitat based on field data or expert advice
3. present offset requirements for MSES values in the EHP land-based calculator using estimated habitat quality for known habitat based on field data of expert advice for the nominated properties
4. propose known habitat for species as potential offset areas
5. estimate the habitat quality of the direct offset site offered relative to the habitat quality at the impact site.
6. provide an assessment of the offset availability for each MNES and MSES value in the context of available known habitat for each impacted MNES and MSES value on relevant tenure types. The aim is to identify known habitat available, whether adequate habitat is available and the cumulative impacts in the basin
7. provide details on the likely staged impacts of the project and timing of the availability of any direct offsets.

24.011 a) As the proponent does not own any land or have agreements with any landowners regarding offset properties, the draft EIS Biodiversity Offset Strategy (BOS) (Appendix H) has conservatively assessed several properties for the purpose of demonstrating that there are suitable offset properties. In relation to the BTF, two of the four properties are confirmed as providing BTF habitat (i.e. Property C and Property D) and have records of the species from the properties. As

discussed in Attachment F – Additional Information on Ecology, the most prospective property (i.e. Property C) has in excess of 68,000 ha of estimated potential BTF habitat. This is considerably more habitat than the 8,524 ha of BTF habitat estimated to be disturbed by the project.

24.011 b) As stated in the response to 24.006 D, the proponent intends to undertake an assessment of habitat quality of the threatened species habitat proposed to be cleared. This will be undertaken as part of the development of the project's Offset Management Plan and will include detailed field surveys of both the project site and potential offset properties. This information will be used in the relevant offset calculators for MNES and MSES to determine the size and quality of the offset required. It is not possible to undertake this work at this stage, given that field surveys of the offset properties are not currently possible as the proponent does not have formal access agreements with the relevant landowners.

24.011 c) It is noted that since the TOR was issued, the Ecological Equivalence Methodology (as outlined in *Ecological Equivalence Methodology Guidelines (version 1) (Department of Environment and Resource Management 2011)),* has been superseded by the methodology described in *Guide to Determining Terrestrial Habitat Quality* (EHP 2015). As acknowledged in the EHP submission (issue number 24.006) and as stated in Section 4.6 of the draft EIS BOS (Appendix H), the *Guide to Determining Terrestrial Habitat Quality* (EHP 2015) will be consulted prior to undertaking habitat quality surveys of the potential offset property/properties and the project site. The detailed habitat quality field surveys will be undertaken as part of the process of developing the Offset Management Plan. The surveys will occur once project approval has been received, when the proponent has entered into a formal access agreement with the relevant landowners. As noted above, it is not possible to undertake this work at this stage because the proponent does not have formal access agreements with the relevant landowners.

24.011 d) As stated in the response to 24.011 b, the proponent intends undertaking detailed field surveys as part of the development of the project's Offset Management Plan. These surveys will provide the necessary data for input into the relevant MNES and MSES offset calculators. It is not currently possible to undertake the work at this stage, given that the proponent does not have formal access agreements with the relevant landowners of the potential offset properties. This approach is consistent with precedent set by the recent EPBC Act approval for the South Galilee Coal Project issued in July 2015. This approval contains a table listing the area of threatened species habitat proposed to be cleared and requires that on Offset Management Plan be provided (post-EBPC Act approval) which provides details of the offsets to be provided for this clearing. The approval does not provide minimum areas for the offsets or stipulate the way in which the offset area is to be calculated.

Submitter Issue Number 24.012
Additional management options for BTF should be considered.

There are no additional management options for the BTF reasonably required over and above the proposed land based offsets. It is noted that this issue was not included in the submission provided by the EHP.

Submitter Issue Number 24.013
Subsidence impact on the northern seasonal wetland - uncertain impact and uncertain offset offered

a) For the EIS outcome the wetland area impact should be more fully described and contingency offsets outlined if required. It is not clear if this is an impact or not and to what extent.
b) The mitigation and offset requirements for the wetland area should be finalised before submission/approval of any Plan of Operations for the relevant area and Biodiversity Offset Strategy for the project. The subsidence management issues outlined ~~on page 18~~ (in issue 24.10) of this submission are also relevant.

The draft EIS Aquatic Ecology and Stygofauna Report (Appendix G) provides a preliminary assessment of impacts on the Northern Seasonal Wetland. The assessment predicts the wetland will potentially experience impacts due to surface cracking, changes in drainage including increased surface area and storage capacity, and a reduction in the wetland pond catchment. The assessment in the draft EIS is based on the current mine layout and even minor changes in the mine plan could significantly alter the predicted nature and extent of impacts on the wetland. The draft EIS indicates that the assessment of impacts will be reviewed prior to subsidence of the wetland based on detailed mine planning (informed by further exploration work) and subsidence predictions. In the event of significant, residual impacts being predicted, offsets will be provided. This additional assessment work will be described in the Plan of Operations for the relevant area. Attachment I – Additional Commitments includes this commitment.

It should also be noted that Sections 5.3.3, 5.4.3, 5.5.3, and 5.6.3 as well as Figure 2, 7, 12 and 17 of the draft EIS BOS (Appendix H) confirms that mapped wetlands occur on all four offset properties that were assessed. These include HES wetlands on all four properties.

Submitter Issue Number 24.014
As wetlands exist on the site that constitute suitable habitat for Australian painted snipe, this species would have a high potential of occurring within the project site and that this habitat is important to the population. The wetlands described in Appendix G - Aquatic Ecology and Stygofauna report are suitable habitat for this species. The proponent should account for Australian painted snipe habitat within the project area and detail the likely impacts and mitigation activities.

The draft EIS has accounted for Australian Painted Snipe habitat in the project site and the following sections of the draft EIS provide findings in relation to the Australian Painted Snipe:

- Section 4.6.6 iii of the draft EIS Terrestrial Ecology Report (Appendix F) concludes there is a moderate potential for the Australian Painted Snipe to occur within the project site based on the presence of suitable habitat including the two seasonal wetlands.
- Figures 19 and 20 and Appendix G of the draft EIS Terrestrial Ecology Report (Appendix F) describe the habitat modelling conducted for the species and show the 135 ha of high value habitat for the species that was identified within the project site, including the two seasonal wetlands.
- Appendix L3 of the draft EIS Terrestrial Ecology Report (Appendix F) includes an assessment of significance for the species, conducted in accordance with the *EPBC Act Significant Impact Guidelines for Endangered Species*, which concludes that the project will not have a significant residual impact on the species.

Submitter Issue Number 24.015
It is unclear how the proponent would ensure sufficient drying and compaction of the Tailing Dam wastes.
For the EIS outcome and development EA conditions details should be provided on the methodology to achieve the required dewatering of the tailings dam. There should also be commitments to regular testing of tailings dam density / compaction throughout the life of the tailings dam.

The proposed life-of-mine tailings storage facility (TSF) is a conventional wet tailings dam. Wet tailings dams operate by progressive drying and consolidation of deposited tailings solids. The progressive drying and consolidation process increases the shear strength and bearing capacity of the deposited solids.

The operation of the tailings dam, including the drying and consolidation process, will be controlled by the deposition strategy described in Sections 6.2.3 and 6.2.4 of the draft EIS Mine Waste Storage Facility Conceptual Design Report (Appendix C). Tailings will be deposited in successive layers that are allowed to dry and consolidate through evaporation, seepage and runoff. Section 6.2.3 and 6.2.4 of the draft EIS Mine Waste Storage Facility Conceptual Design Report (Appendix C) describe the method for dewatering the tailings dam. The management of tailings return water is described in Section 2.3.2 of the draft EIS Water Management System Modelling Report (Appendix K).

The tailings deposition strategy allows for the formation and maintenance of a sloped tailings beach. The beach slopes to a central decant pond where supernatant tailings water and incidental rainfall runoff will collect under gravity. The tailings decant pond will be dewatered by a pontoon mounted return water pump moored in the TSF decant pond. The return water pump will maintain a low level in the TSF decant pond by transferring water to the Return Water Dam for reuse as a

priority supply to the Coal Handling and Preparation Plant. This deposition strategy is well-established and commonly used in conventional wet tailings storage facilities in the coal mine mining industry. Section 7.4.5 of the draft EIS describes the rehabilitation and decommissioning of the TSF. The final rehabilitation includes dewatering of the TSF decant pond and allowing the final tailings surface to dry and consolidate prior to capping. Capping the final tailings surface is also standard practice and generally also results in further consolidation of deposited tailings.

EHP Guideline EM944: Model Mining Conditions requires that tailings management procedures are included in the Plan of Operations. In addition, model conditions presented in *EHP Guideline EM634: Structures which are dams or levees constructed as part of environmentally relevant activities* require that a detailed design plan for the TSF be developed and certified prior to commencement of operation of the TSF.

Consistent with the EHP guidance, a TSF design plan will be developed prior to lodgement of the Plan of Operations or commencement of TSF construction. The TSF design plan will describe the physical dimensions of the TSF, the materials and standards to be used for construction of the TSF and the criteria to be used for operating the TSF. The design plan will address dewatering, seepage and stability issues and any associated design assumptions. Detailed tailings management procedures will be developed as part of the TSF design plan, including procedures for managing the deposition, dewatering and consolidation of deposited tailings.

The draft EIS presents sufficient information on the methodology to achieve the required dewatering of the tailings dam to allow the development of draft EA conditions that are consistent with the EHP guidelines.

Section 6.2.7 of the draft EIS Mine Waste Storage Facility Conceptual Design Report (Appendix C) describes the TSF monitoring program. Additional detailed monitoring procedures will be developed as part of the TSF design plan. The monitoring procedures will include regular testing of tailings dam density throughout the operational life of the TSF. A new commitment to include monitoring of the consolidation of the deposited tailings in the TSF design plan has been included in Attachment I – Additional Commitments.

Submitter Issue Number 24.016

TSF and PSWSF final landform design - stormwater shedding

The Tailings Storage Facility (TSF) and Power Station Waste Storage Facility (PSWSF) are proposed to be rehabilitated using the same techniques as are proposed for Waste Rock Emplacements. The discharge of storm water from the plateaus on top of these structures is proposed to be achieved using contour drains running down the external batters, the drains having a capacity to discharge the 20 year ARI critical duration storm event.

Because the TSF and PSWSF contain fine material they are different to the Waste Rock Emplacements, and present a higher environmental risk where long term, post closure erosion of the batters may expose the finer material in the core sections of these containments. Contour drains designed to carry the design discharge for a 20 year ARI storm event are unacceptable as a

permanent solution for the management of runoff coming off the top of the TSF and PSWSF.

This proposal to direct runoff down contour drains designed for the 20 year ARI storm on the external batters of these structures is described in a number of different sections of the EIS including :

EIS Section 13 Surface Water Section 13.4.1 "Site Drainage Plan and Design Principles" sub-section "Rehabilitation Contour Drains"

Appendix C Mine Waste Facility Conceptual Design Section 7.1 "Closure and Final Landform" Section 7.3 "Runoff Management"

EIS Section 7 Mine Waste Management Section 7.4.2 "Overview of TSF and PSWSF Design" Section 7.4.5 "Rehabilitation and Decommissioning" sub sections "Landform" and "Runoff Management"

To prevent the escape, in perpetuity of tailings stored in engineered structures such as Tailings Storage Facilities, the Australian National Committee on Large Dams (ANCOLD) recommends that "At the end of mine life, closure spillways should be designed for PMF flows for all Consequence Categories". This is discussed in section 5.1.4 of the ANCOLD Guideline on Tailings Dams – Planning, Design, Construction, Operation and Closure. May 2012.

Because the China Stone Coal TSF is proposed to drain to the north or to the north west during the mine's operational life, the northern end of the TSF is the most logical place for a Probable Maximum Flood (PMF) spillway at closure.

The proponent should make this commitment in the EIS, in the same way as the commitment in Section 13.4.1 of the EIS to construct the highwall drains above the pit and the final voids with sufficient capacity to convey peak flows from the PMF.

The PSWSF is proposed to be immediately adjacent to, and abutting onto the TSF. It contains fine material in its core sections like the TSF, and although not strictly a dam because this material is proposed to be placed dry, the containment PSWSF would be 30 metres high at closure and will be subject to the same risks as the TSF in regard to erosion of the outside face by storm runoff. The planning for closure of the PSWSF should therefore include the same kind of protections which are appropriate for the TSF.

TSF and PSWSF final landform design - Final Batter Slopes on the TSF and PSWSF at Closure

It is proposed to construct both the TSF and the PSWSF with 1V:4H external slopes during the operational life of the mine (Appendix C Mine Waste Facility Conceptual Design Section 3.1 "Design Drivers and Criteria" dot point 6).

At closure, it is proposed to buttress the external slopes of the TSF with mine overburden, so that the final slope on the external face is 1V:6H. For the PSWSF it is proposed to doze down the external slopes, also to achieve the final external slope of 1V:6V; but in this case by effectively stripping material from the upper sections on the PSWSF embankment. This is unnecessarily increasing the risk of erosion failure in the long term by thinning of the PSWSF embankment in the upper levels. These differing plans for the two structures are outlined in the following sections:

Appendix C Mine Waste Facility Conceptual Design Section 7.1 "Closure and Final Landform"

EIS Section 7 Mine Waste Management Section 7.4.5 "Rehabilitation and Decommissioning" sub section "Landform"

For the EIS outcome further information is required on the rehabilitation design including

• E-W cross-sections through the southern mine section to gain perspective of natural landform,

depth of residual void, height of spoil and tailings dam
• PMF spillway design at mine closure
• Final batter slopes on TSF and PSWSF
Additional details will be required for any EA application outcome and this topic should be the subject of a workshop or meeting to detail the issues to be resolved.

Detailed recommendations
The runoff from the PSWSF should be directed to a purpose built PMF spillway. This could be achieved by raising the PSWSF to the same final Elevation Level as the TSF. Extreme flood runoff from the PSWSF could then be directed across onto the TSF, adding to the flow which would be occurring simultaneously from the TSF, and both flows may be discharged through the PMF spillway at the northern end of the TSF.
Sections of text in the EIS which should be reconsidered include :-
• Sections 13.4.1 , 7.4.2 , and 7.4.5 in the EIS Main Report
• Sections 7.1 and 7.2 in Appendix C to the EIS
• figures should be also be reconsidered, which at present show the TSF and PSWSF at closure as green rehabilitated areas, without any spillways for the shedding of extreme rainfall events from the plateaus on top of the structures. Final spillway arrangements need to be shown for the TSF and the PSWSF in
o EIS Section 4 Project Description Figure 4-16
o EIS Section 7 Mine Waste Management Figure 7-2
o EIS Section 8 Rehabilitation Figure 8-5
o EIS Section 13 Surface Water Figure 13-7
o Appendix C MWSF Design Report Figure F007
o Interim spillway arrangements for the PSWSF after Year 10 for the shedding of runoff from the PSWSF plateau to the TSF would also need to be considered on some other Figures.

The external face of the PSWSF should be buttressed with imported mine waste to achieve the desirable slope of not more than 1V:6H, rather than be dozed down as presently proposed. Sections of the text sections in the EIS which need to be reconsidered include Appendix C Mine Waste Facility Conceptual Design Section 7.1 “Closure and Final Landform” and EIS Section 7 Mine Waste Management Section 7.4.5 “Rehabilitation and Decommissioning” sub section “Landform”

A new commitment has been included in Attachment I – Additional Commitments in response to this issue. The new commitment is that the conceptual design of the final surface of the TSF plateau will include an internal drain with capacity to convey runoff from the (Probable Maximum Precipitation) to natural ground at the northern end of the TSF. The drain will have a gradient of less than 6H:1V that is suitable to ensure the long term stability of the TSF capping layer. The construction of the drain may involve the use of mine overburden to extend the TSF landform to the north-west and enable the TSF plateau to tie into the natural ground level with a gentle gradient. The PSWSF final landform will also be integrated with the TSF final landform so that the plateau area of the PSWSF is at the same level and contiguous with the TSF plateau. A revised

conceptual final landform figure for the PSWSF and TSF is included in Attachment E – Additional Information on Surface Water.

The PSWSF will be constructed by truck and shovel dumping and the final 6H:1V landform slopes in the waste material will need to be constructed with dozers. Once formed at 6H:1V slopes, the final waste slopes will then be capped with overburden. There is no embankment proposed on the PSWSF as indicated in the submission and the rehabilitation method does pose an erosion risk from the batters, as suggested. Interim spillways for the PSWSF are not necessary prior to the decommissioning of the TSF as any erosion on the slopes of the PSWSF can be maintained during the operational phase of the project.

As discussed in the response to issue 24.015, the model mining conditions require a detailed design plan to be developed for the TSF and certified by a Registered Professional Engineer of Queensland. The detailed design planning process will address the TSF closure commitments including appropriate drainage from the plateau area of the TSF to ensure the long term integrity of the capping layer and the integration of the PSWSF and TSF final landforms.

An east-west cross-section of the final landform through the southern section of the mine has been previously provided to EHP and is presented in Attachment J – Final Landform Cross Sections.

Submitter Issue Number 24.017

Drainage off the top of the TSF and the PSWSF at closure is not adequately addressed.

The Tailings Storage Facility (TSF) is proposed be a regulated structure with a significant consequence category. Section 7.4.2 states that the TSF will have a footprint at closure of 603 hectares (approximately 6 square kilometres). The Power Station Waste Storage Facility (PSWSF) which is immediately adjacent to the TSF would have a smaller footprint at closure of 80 hectares.

The proposed Final Landform for Overburden Emplacements at the end of mine life (section 8.2.1) proposes an external slope of 6H:1V and a 2% grade on top plateau areas “to promote runoff”.

The proposed Final Landform for the TSF and the PSWSF (section 7.4.5) proposes that external slopes of the TSF and PSWSF also be 1V:6H, and that the top surfaces be profiled with a 2% crossfall “to promote runoff”.

It is proposed that the water shedding and runoff management for the TSF and PSWSF be designed at the same standard as the water shedding and runoff management for overburden emplacements.

The difficulty of successfully shedding runoff water from the 6 km2 top surface of the TSF is not fully addressed. The volume and rate of runoff generated in a large storm event are not addressed. Preferential flow paths would develop, and there is no adequate discussion of how erosion would be prevented in these flow paths in large events.

Contour drains (section 13.4.1) down the sides of the TSF and PSWSF could be installed to convey the peak runoff from a “20 year ARI” storm however these would not provide adequate protection for the TSF and PSWSF. These two structures contain fine material with no cohesive strength easily mobilised if erosive forces were to expose it.

For the EIS outcome the conceptual designs of TSF and PSWSF are not acceptable. Please refer to the detailed recommendations and background information on pages 26-29 of the DEHP submission.(Not included in spreadsheet due to length)"

Refer to response to issue 24.016. The revised conceptual final landform design includes an internal drain on the TSF plateau with sufficient capacity to convey runoff from the (Probable Maximum Precipitation) to natural ground at the northern end of the TSF. The conceptual drain capacity calculations are provided in Attachment E – Additional Information on Surface Water.

Submitter Issue Number 24.018
The draft EIS does not describe in detail the sewage management system for the three proposed sewage treatment plants for the disposal of effluent and sludge. Any EIS outcome involving stated EA conditions for sewage management would require the EIS to provide further sewage management details.
The conceptual design of the sewage management system should be revised to conceptually reflect the guideline attached to this submission (Attachment 2) particularly incorporating in the EIS the need for "Class A" effluent and proposed irrigation site options.
Attachment 2 Information Required For "Project China Stone" Waste Management Issues – "Sewage Treatment" (ERA 63) Component

As indicated in Table 12-1 of the draft EIS, the sewage treatment plants will be designed and operated in accordance with relevant regulatory requirements, including the referred guideline and the model mining conditions. As is normal practice for projects of this nature, the proponent has not completed the detailed design of the sewage treatment plants or the associated effluent disposal systems at this stage. Regardless, the proponent will ensure that the designs are compliant with the relevant requirements and guidelines as part of the detailed design process, including ensuring appropriate treated effluent water quality standards and effluent disposal methods.

Submitter Issue Number 24.019
Section 24 Water Release criteria
There is high environmental risk releasing into a predominating dry drainage line, which then reaches North Creek and eventually reaches the Belyando River. Discharge flow should not be based on Belyando River flow criteria as there is a high risk of discharge not reaching Belyando River. There is also the chance of no flushing flow down North Creek for extended periods of time so any remnant pools would be mine affected water.
The amount of dam storage will dictate how much water needs to be released as opposed to in pit storage. Pressure to continue mining with an open pit would increase the risk to allow mine water release
The potential environmental impact of controlled releases to North Creek have not been assessed
The proposed release point (RP) for controlled releases of mine-affected water is located on North Creek, >60 km upstream of the confluence with the Belyando River. Because the proposed release to flow criteria are to be developed on the basis of flow within the Belyando River, it is likely that

releases will occur at times when natural flows in North Creek have receded to very low or no flow conditions.

Although, the ephemeral creeks in the project area do not constitute waterways under the Water Act, it is not appropriate to argue that the ephemeral creeks in the project area, including North Creek, do not have environmental values (such as aquatic ecosystems), under the Environmental Protection (Water) Policy.

EIS Appendix G demonstrated that even the upper reaches of Pigeonhole Creek and Tomahawk Creek included remnant pools that harboured aquatic fauna, including macroinvertebrates and fish. Site A10 in the Tomahawk Creek catchment, and site A13 high up in the Pigeonhole Creek catchment harboured fish, and could be considered as refugia sites.

EIS Appendix G did not provide information on the ecological condition of North Creek downstream of the proposed release point.

EIS Appendix G included only two survey sites (A1 & A2) high up in the North Creek catchment, and did not include sites downstream of the proposed release point.

The Queensland Government Wetland summary maps (http://www.wetlandinfo.com.au/resources/pdf/maps/v3.0/wetlands-tile-100k-bulliwallah.pdf) indicate lacustrine wetlands located on the lower reaches of North Creek and palustrine wetlands on the Belyando floodplain downstream of the confluence. EIS Appendix G did not include this information.

The potential impacts of controlled release of mine affected water on the environmental values of North Creek (particularly the aquatic ecosystems and possibly the riparian ecosystems) were not assessed in the EIS.

Sediment control

The EIS does not commit to release limits for suspended solids or turbidity. Smaller scale activities such as quarries design to a 50 mg/L release limit based on containment of at least a 1 in 10 year 24 hour duration storm event.

http://www.ehp.qld.gov.au/era/prescribed/stormwater-guideline-era-em368.pdf

Whilst the design storm events for release may be different in mining due to the need to attain optimum water balance between water input (groundwater inflow plus stormwater), water needs and release, the objective should be to minimise the amount of sediment and turbidity discharged to waterways in accordance with best practice erosion minimisation and sediment control.

To develop model and site specific conditions for the site the water quality information requested should be provided.

For the purpose of the EIS outcome and any EA conditions the discharge criteria should be based on least flow in North Creek (the intended discharge point).

An assessment of the potential impacts on downstream environmental values as a consequence of controlled release of mine affected water will be required. It is recommended that this occur for the EIS process. This assessment should address the likely impacts to aquatic and riparian ecosystems.

For the development of any EA conditions information is required on controlled releases of mine-affected water to North Creek, occurrence at times of low or no flow in North Creek, and the level of monitoring to assess the impacts of the releases. The following requirements should be addressed:

• develop a Receiving Environment Monitoring Program (REMP) that would
a. encompass the extent of North Creek downstream of the release point and any lacustrine and palustrine habitats associated with North Creek and the proximal reaches of the Belyando River.
b. determine baseline water quality with respect to all toxicants and physio-chemical indicators of concern before any releases commence. These would include, electrical conductivity, total dissolved solids, major ions (i.e. Na2+, Ca2+, Mg2+, K+, Cl-, SO42+, HCO3-), hardness, alkalinity, pH, turbidity, total suspended solids, dissolved oxygen, nutrients (i.e. ammonia, oxidised nitrogen, total nitrogen, total phosphorus, free reactive phosphorus), chlorophyll a.
c. determine baseline ecological condition, including riparian vegetation, emergent macrophytes, aquatic macroinvertebrates and fish.
d. monitor any changes in physico-chemical and ecological parameters during and subsequent to controlled releases of mine-affected water.
e. Information to discriminate between any potential impacts due to the China Stone Project and those subsequent to releases from the Carmichael project and any other users of the Belyando River and North Creek.
• describe the objectives and methodology of the REMP within a REMP design document.
• require that the REMP design document be approved by the regulatory authority before commencement of monitoring.
• mitigate against any erosion and sediment transport that are likely to occur as a consequence of controlled releases of mine affected water.
• the EIS should include specific commitments to meet best practice for turbidity and suspended solids management, with likelihood of releases minimised, as demonstrated by a water balance.

Receiving Waters and EA Conditions for Mine-Affected Water Releases

In order to address the key issues raised in this submission, the proponent has agreed that discharge flows for mine-affected water releases will be based on the flows in North Creek rather than the Belyando River, as proposed in the draft EIS.

As discussed in Section 13.2.4 of the draft EIS, the project site is remote and is located at the head of the catchment. It has highly ephemeral, short duration, surface water flows. These factors severely limit the ability for any regular sampling of surface water flows from the project site hence there is currently insufficient receiving water quality and flow data to enable the detailed calculation of flow triggers and water quality release limits associated with this change in accordance with the EHP model mining conditions.

Consequently the proponent is proposing to implement a baseline water quality and flow monitoring program so that that receiving water flow criteria for discharge, maximum release rates, Electrical Conductivity (EC) and turbidity release limits can be calculated, in accordance with the EHP model mining conditions, prior to the commencement of the project. The details of the proposed amended mine affected water EA conditions and the proposed monitoring programs are described in Attachment E – Additional Information on Surface Water.

Impacts on Downstream Environmental Values in North Creek

The release of mine-affected water based on flows in North Creek and the strict application of the EHP model mine conditions will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse impacts on downstream environmental values in North Creek, including aquatic ecosystems.

The draft EIS does not suggest that ephemeral creeks in the project area (and specifically North Creek) have no environmental values under the Environmental Protection (Water) Policy, as suggested in this submission. Downstream environmental values, including aquatic ecology, are discussed in Sections 13.2.2, 13.2.3 and 13.2.4 of the draft EIS. The downstream impacts on environmental values due to the release of mine-affected water (based on the original release proposal) are discussed in Section 10.6.4 of the draft EIS.

Monitoring of Mine-Affected Water Releases

Additional information in relation to the proposed monitoring of mine-affected water releases is also provided in Attachment E – Additional Information on Surface Water. The proponent has also agreed to the specific requirements listed in this submission to be included in the REMP (Attachment E – Additional Information on Surface Water). Other REMP requirements mentioned in this submission are already requirements of EHP's model mining conditions.

Water Management System Design and Suspended Sediment Control

The project water management system, that is specifically designed to minimise the likelihood of releases, and the results of water management system performance modelling are described in detail in Section 13 of the draft EIS. The draft EIS already contains clear commitments to minimise erosion and suspended sediment levels in site runoff in Sections 13 and 24. The requirement to control erosion and sediment in accordance with an Erosion and Sediment Control Plan prepared by an appropriately qualified person is also a requirement of the EHP model mining conditions. As discussed above, turbidity limits will be determined for releases based on further baseline monitoring and in accordance with the EHP model mining conditions.

Submitter Issue Number 24.020

The water quality of any releases of mine-affected water to North Creek should conform to the WQOs for that waterway. As the WQOs of the Burdekin Basin have yet to be scheduled under the Environmental Protection (water) Policy (2009), it will be necessary to develop locally relevant WQOs for North Creek as a basis for the REMP.

Some sampling and data collection for monitoring locations MP1 and MP2 is shown in the EIS. MP1 was the only site representing North Creek (the exact location is not shown in the EIS - Figure 13-2 of the Surface Water Chapter 13 indicates that it is slightly downstream of the confluence with Eight Mile Creek). MP2 provides data representative of the Belyando River, and appears to be the same as the proposed upstream monitoring point. Both of these sampling sites appear to be Carmichael Coal Mine sampling sites. None of the other data collected at DNRM monitoring locations (i.e. MP3 at the 120301B Belyando River at Gregory Development Road, and gauging station, MP4 on the Suttor River, MP5 at the outfall of the Burdekin Dam) can be considered suitable for the development of WQO for the receiving waters for this project. These data were

presented in summary Tables 1 & 2 in the attachments to the Surface Water chapter 13 of the EIS. Both these tables indicate that the number of samples was ≥5. This does not provide sufficient information to allow interpretation or assessment of the data. If it is possible to calculate a median, as has been presented in these tables, the number of samples represented by that statistic must be indicated.

Five water quality samples are not adequate to develop WQOs for North Creek, and that more data will need to be collected in accordance with section 4.4.3 of the Queensland Water Quality Guidelines. This would form the basis of REMP baseline data in the event that controlled releases of mine affected water to North Creek are to be permitted.

For the EIS outcome the following advice should be addressed.

Water quality

For the development of EA conditions the proponent will need to collect substantial water quality data in order to develop locally relevant WQOs for North Creek. These data should be collected in accordance with section 4.4.3 of the Queensland Water Quality Guidelines. These data will form the basis of the REMP baseline for North Creek.

For the purpose of monitoring water quality downstream of any controlled releases of mine affected water, the proponent should propose a downstream monitoring location that is:

• downstream of the upstream monitoring location MP2 on the Belyando River.

• at a minimal distance downstream of the confluence of North Creek and the Belyando River but upstream of the confluences of any other tributaries of the Belyando River (i.e. upstream of the confluence with Tomahawk Creek) or any other sources of potential dilution or contamination.

Water flow

For the development of EA conditions the proponent should collect water flow data. These data should be collected in accordance with section 4.4.3 of the Queensland Water Quality Guidelines. These data will form the basis of the REMP baseline for North Creek. The proponent will need to install a flow gauging station to measure stream flow at a suitably close location upstream of the confluence between North Creek and the Belyando River. The most suitable location is likely that currently designated as the upstream MP2 monitoring point with access via the Moray Carmichael Boundary Rd. Release to flow conditions will need to be developed with consideration of the likely cumulative impacts of releases from the Adani Carmichael project approximately 30 km upstream."

The monitoring data presented in Section 13 of the draft EIS was focussed upon the potential impacts to the Belyando River as the receiving waters for releases of mine-affected water from the project site. The draft EIS cited extensive water quality and flow data from which to derive a suitable baseline, locally relevant water quality objectives and EA discharge conditions.

As discussed in the response to issue 24.019, in response to numerous submissions the proponent has agreed to adopt North Creek as the receiving water for mine-affected water rather than the Belyando River. This change in discharge strategy was not anticipated and consequently the available water quality and flow data relating to North Creek is limited. In addition, the project site is remote and is located at the head of the North Creek catchment and experiences highly

ephemeral, short duration, surface water flows which severely limits the ability for any regular sampling of surface water flows from North Creek.

As discussed in the response to issue 24.019, the proponent is proposing to implement a baseline water quality and flow monitoring program for North Creek. The baseline monitoring program will be undertaken in accordance with the Queensland Water Quality Guidelines, prior to the commencement of the project.

Baseline water quality and flow data collected as part of this monitoring program will also be used to establish locally relevant water quality objectives for North Creek in accordance with the Queensland Water Quality Guidelines. The water quality objectives will be used in the development of site-specific EA conditions for the controlled release of mine-affected water to North Creek in accordance with the EHP model mining conditions.

The baseline water quality data (and derived water quality objectives) will also inform the REMP baseline and objectives. The REMP is described in detail in Attachment E – Additional Information on Surface Water.

The details of the proposed baseline water quality and flow monitoring programs are provided in Attachment E – Additional Information on Surface Water. Water quality and flow gauging will be undertaken on North Creek downstream of the proposed controlled release point and on the Belyando River. In order to address the specific submission requests the monitoring programs include:

- A monitoring location downstream of EIS monitoring location MP2 on the Belyando River (as shown on Figure 13-2 of the draft EIS) and a minimal distance downstream of the North Creek-Belyando River confluence.
- A flow gauging station located at EIS monitoring location MP2.

Release conditions will be developed in accordance with the EHP model mine conditions and this approach will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse cumulative impacts on downstream surface waters.

Submitter Issue Number 24.021
There is no discussion about the potential downstream impacts of controlled releases of mine-affected water.
Section 13.6.5 Controlled Releases Of Mine-Affected Water should provide specific information on the risks to downstream environmental values consequent to the controlled release of mine-affected water. There is no recognition that downstream aquatic ecosystems harboured within the "remnant pools" of the ephemeral streams ("drainage features") will potentially be inundated with comparatively saline (up to 1,500 µS/cm) water.
An assessment of impacts to downstream aquatic ecosystems should be provided including

• potential salinity of mine-affected water to be released under controlled release management strategies or the presence of the presence of any other chemicals of potential concern;
• downstream extent of any contamination;
• duration of any contamination;
• expected impact on ecological communities.

In response to issue 24.019, the proponent has agreed that discharge flows for mine-affected water releases will be based on the flows in North Creek rather than the Belyando River, as proposed in the draft EIS.

The release of mine-affected water based on flows in North Creek and the strict application of the EHP model mine conditions will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse impacts on downstream environmental values in North Creek, including aquatic ecosystems.

Submitter Issue Number 24.022
There are watercourses likely to be impacted by the proposed mining activities.
This section states that; "A water course determination was undertaken by DNRM for the project in order to identify any water courses in the study area. It determined that there are no water courses in the study area." However, that does not mean that the ephemeral streams that form the catchments of Pigeonhole-Tomahawk and North Creeks do not possess environmental values as aquatic ecosystems. The aquatic ecosystem values of these streams are clearly stated within the Appendix G and the EIS. For example:
• Figure 9 of the Cumberland Ecology Aquatic Ecology and Stygofauna Impact Assessment report (Appendix G) describes the upper tributaries of Pigeonhole Creek as being a "General Ecological Significance Wetland".
• the Cumberland Ecology Aquatic Ecology and Stygofauna Impact Assessment report (Appendix G) provides extensive evidence that the ephemeral tributaries of Pigeonhole, Tomahawk and North Creeks contained numerous remnant pools (if not flow) that persist into the dry season, and that although most dried up during the dry season, some persisted through to the end of the dry season.
• remnant pools harboured aquatic fauna, including macroinvertebrates and fish. Site A10 in the Tomahawk Creek catchment, and site A13 high up in the Pigeonhole Creek catchment harboured fish, and could be considered as refugia sites.
• Section 13.2.2 of the Surface water Chapter (Chapter 13) describes Pigeonhole Creek as a 4th order "drainage feature", Tomahawk Creek as a 1st to 2nd order "drainage feature" and North Creek as a 2nd order "drainage feature". The use of the term "drainage feature" is inconsistent with the allocation of "stream order" to the waterways in the project area.
Any management strategy that will see the controlled release of mine-affected water to any of these ephemeral streams (referred to in the EIS as "drainage features") will need to consider any potential risks to their ecological sustainability.
Although the ephemeral streams in the project area do not appear to comply with the definition for watercourses under the Queensland Water Act 2000, the risks to aquatic ecosystems within these

waterways should be considered as part of the EIS, particularly if mine-affected wastewater is to be released into these systems at times of no or low flow. Section 13 should be revised to reflect this.

The response to issue 24.019 clarifies that the draft EIS does not suggest that ephemeral creeks in the project area (and specifically North Creek) have no aquatic ecology environmental values. As acknowledged in this submission, the aquatic ecology environmental values are clearly described and assessed in the draft EIS Aquatic Ecology and Stygofauna Report (Appendix G).

Section 13.2.2 of the draft EIS states the Strahler stream order for relevant watercourses and drainage features. The Strahler stream orders have been provided in order to satisfy a requirement of the EIS TOR. The Strahler stream orders presented in the draft EIS are based upon the Geoscience Australia '1:100,000 drainage network of Queensland' dataset managed by the Department of Natural Resources and Mines (DNRM). This dataset provides Strahler stream orders for watercourses and drainage features including rivers, streams and gullies. On this basis, there is no inconsistency in the allocation of stream orders to drainage features. Nonetheless, this minor terminology issue has no bearing on the assessment of aquatic ecology environmental values in the draft EIS Aquatic Ecology and Stygofauna Report (Appendix G).

Notwithstanding, as discussed in the response to issue 24.019, the proponent has agreed that discharge flows for mine-affected water releases will be based on the flows in North Creek rather than the Belyando River, as proposed in the draft EIS. The release of mine-affected water based on flows in North Creek and the strict application of the EHP model mine conditions will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse impacts on downstream environmental values in North Creek, including aquatic ecosystems.

Submitter Issue Number 24.023

The water quality data-set for ephemeral creeks has not been used within the EIS. This data offers the best available data for the development of a baseline characterisation for the receiving environment.

Cumberland Ecology collected water quality data with respect to physico-chemical indicators, nutrients and metals / metalloids for the survey sites in the ephemeral streams in the project area. None of these data have been used in the Surface Water Chapter. However, although substantially larger volumes of data would be required to assess background water quality, the data presented in the Ecology report are extremely valuable and can contribute to the characterisation of receiving waters. This characterisation is needed to develop controlled release conditions for a release to these ephemeral systems. The only caveat on these data is the fact that they were collected from non-flowing waters, which would likely limit the usefulness of the data collected in October 2012 (post-dry season) which would not be indicative of wet-season base-flows. However, the May 2012 data (post-wet season) are likely to provide a good representation of waters flowing within these ephemeral streams at the end of the wet season.

The physico-chemical and nutrient water quality indicators collected as part of the Aquatic Ecology

surveys were not evaluated using appropriate guidelines. The ANZECC & ARMCANZ (2000) trigger (guideline) values for the protection of slightly to moderately disturbed aquatic ecosystems in Tropical Australia (Tables 3.3.4 and 3.3.5) were used, but the most appropriate source of default guideline values (nutrients and physicochemical) for the protection of slightly to moderately disturbed upland streams is Table 3.2.1a of the QWQG (DEHP 2013b). With regard to Wetlands, Table 3.2.1a of the QWQG defaults to ANZECC & ARMCANZ (2000) and Tables 3.3.4 and 3.3.5 in ANZECC & ARMCANZ (200) would be appropriate. None of these water quality data appear to have been used within the Aquatic Ecology Chapter (Section 10).
The water quality data collected in May 2012 as part of the Cumberland Ecology Aquatic Ecology and Stygofauna Impact Assessment report (Appendix G) should be used to help develop a baseline condition for the ephemeral streams in the project area.
The EIS should be amended to reflect the available data for managing controlled releases of mine–affected water to these ephemeral streams.

It is noted that while the submission initially indicates that water quality data-set for ephemeral creeks may be valuable in characterising the receiving waters of North Creek, the submission goes on to state that water quality data collected from 'non-flowing' water within remnant pools is of limited usefulness. This is consistent with the approach adopted in the draft EIS.

The submission specifically cites the data collected in October 2012 as unrepresentative of 'wet season baseflow' within the creek. In order to avoid misunderstanding, it should be noted that sampling locations and the proposed receiving waters are highly ephemeral headwaters and as such are highly ephemeral systems, with essentially no baseflow component and no sustained post wet season baseflow following rainfall events.

The submission states that the data collected in May 2012 is likely to represent flows at the end of the wet season. This data was collected approximately one month after rainfall (and two months after significant rainfall) and is therefore not representative of flowing streams. It should also be noted that these locations are extensively grazed and following the recession of ephemeral flows in these headwaters, remnant pools are an immediate focal point for cattle watering. Water quality within cattle-impacted remnant pools is therefore not representative of ephemeral flows.

Due to these limitations, the proponent has agreed to implement a baseline water quality monitoring program so that receiving water quality objectives can be calculated prior to the commencement of the project. The details of the proposed baseline monitoring program are described in Attachment E – Additional Information on Surface Water. Water quality data collected from the baseline monitoring program will be used in the development of draft EA conditions for mine water release.

The draft EIS Aquatic Ecology and Stygofauna Report (Appendix G) provides a description of the existing ecological conditions in the surface water environment. This description is supported by water quality monitoring data. These data are presented alongside water quality guideline values for illustrative purposes only. While the submission correctly notes that alternative guidelines could

have been used to support this description, this would not materially change the description of the existing ecological values.

Submitter Issue Number 24.024
Strategies should be presented for the controlled release of mine-affected water during extended rainfall events.
The need to release mine-affected water to the Belyando River catchment in the event of extended rainfall was stated in the EIS Sections 10 and 13. The EIS states that controlled releases would be conducted in accordance with the EHP's model EA discharge conditions" referring to the EHP Model Mining Conditions. The information that would facilitate the development of EA conditions is still required (see previous issues raised) and draft EA conditions still need to be presented within the EIS.
The EIS should provide information that will permit the development of EA conditions for the release of waste-waters to the environment

Refer to the response to issue 24.019 which describes the proponent's commitment to implement a baseline water quality and flow monitoring program to facilitate the development of EA conditions. Details of the proposed monitoring programs are described in Attachment E – Additional Information on Surface Water.

Amended mine affected water EA conditions are also presented in Attachment E – Additional Information on Surface Water. Additional information in relation to the proposed monitoring of mine-affected water releases is also provided in Attachment E – Additional Information on Surface Water.

Submitter Issue Number 24.025
For the EIS outcome further information is required in the form of a groundwater monitoring program.
For the development of EA conditions a map is required of all relevant groundwater monitoring bores and nominated triggers.
EHP can assist by participating in a workshop or meeting to detail the issues to be resolved. The session should involve the respective agencies with groundwater expertise for the region. "

Section 12.5 of the draft EIS and Section 9 of the draft EIS Groundwater Report (Appendix I) provide details of the groundwater monitoring program. The groundwater monitoring program has been developed by a suitably qualified person and is appropriate for detecting significant change in groundwater quality and standing water levels due to the project.

The draft EIS provides an explanation of the proposed groundwater monitoring program in relation to the wider groundwater regime, the collection and review of monitoring data, the reconciliation of the monitoring data against model predictions, and the further investigations triggered in the event that significant departures from the model predictions are observed.

Attachment 24-4 of the draft EIS presents a full list of the bores that form part of the groundwater monitoring program. Figure 12-12 of the draft EIS has been amended to show all listed groundwater monitoring program bores. The amended figure is provided in Attachment D – Additional Information on Groundwater.

As discussed in Section 12.5 of the draft EIS, the groundwater triggers will be finalised based on the outcomes of the ongoing baseline groundwater monitoring program.

Submitter Issue Number 24.026
A number of issues should be confirmed before finalising the EIS and before developing EA conditions including
• possible peer review of the groundwater modelling to confirm assumptions made and methodology used
• clearer alignment with the Carmichael Project predictions on drawdown and the proposed monitoring program as well as the cumulative impact
• groundwater flow direction
• groundwater monitoring network
• Lake Buchanan source water
The issues raised have not been adequately addressed in the proponent's response and are not finalised for the purposes of the EIS. For the purpose of the EIS outcome the dot point issues should be fully addressed across relevant agencies. Any EA conditions on groundwater issues may be developed when these issues are confirmed in consultation with Department of Natural Resources and Mines, Commonwealth Department of the Environment including the IESC.

Peer Review of the EIS Groundwater Model
There is no requirement for a peer review of the groundwater model in the EIS TOR nor is it standard practice for mining EISs. The draft TOR for the project prepared by the OCG did not include a requirement for a groundwater model peer review. The draft TOR were publicly exhibited and EHP, DNRM and DoEE were provided an opportunity to comment on the draft TOR prior to its finalisation. EHP, DNRM and DoEE's submissions on the draft TOR did not request the need for a peer review of the groundwater model for the project. In addition, all specific submission issues that were raised in relation to the draft EIS groundwater model have been responded to as part of the preparation of the Supplement. This has included discussions with the key regulatory agencies, including EHP, DNRM and DoEE. It is not reasonable to now require a peer review of the groundwater model at this stage, given that it is not a requirement of the TOR, the groundwater study has addressed the project's TOR and all specific groundwater issues that were raised by regulatory agencies have been addressed, in consultation with the agencies.

Alignment with Carmichael Coal Mine Project EIS – Drawdown Predictions
The groundwater drawdown/depressurisation predictions presented in the groundwater assessments undertaken as part of the Carmichael Coal Mine Project EIS are a function of the groundwater, geology and mine planning data available, and also the way that this information was used to construct, parameterise and calibrate the groundwater model.

The relevant hydrogeological data from the Carmichael Coal Mine Project EIS was included in the Project China Stone EIS groundwater assessment, and includes relevant geology from bore logs within the Carmichael Coal Mine site and surrounds. This initial dataset was developed with the addition of groundwater and geological data collected from the project site and surrounding area. The outcome is that the Project China Stone EIS groundwater assessment draws from a significantly larger body of data relevant to the groundwater assessment.

In developing the EIS groundwater model, the parameters used in the Carmichael Coal Mine Project EIS groundwater model were considered, along with publicly available feedback from regulators on the groundwater studies undertaken for the Carmichael Coal Mine Project.

Therefore, while it is not the responsibility of the proponent, nor is it possible based on publically available information, to conduct a detailed comparative assessment with the CCM&RP groundwater assessment, the proponent has nonetheless taken all reasonable steps to ensure alignment with, or improvement upon, the CCM&RP groundwater model and drawdown predictions.

It should be noted that the Project China Stone site and the Carmichael Mine site are located in distinctly different groundwater settings. The Project China Stone site is dominated by Darkies Range that is formed by an elevated and unsaturated outcrop of the Clematis sandstone. The site is also located at the top of the surface water catchment and has highly ephemeral drainage lines with no significant creeks or watercourses traversing the site. In contrast, the Carmichael Mine site is located in lower lying topography and is traversed by a major river and its floodplain. It is therefore not surprising that there are some differences in the groundwater impacts between the two projects.

Alignment with Carmichael Coal Mine Project EIS – Cumulative Impacts

Section 12.4 of the draft EIS explains the method of superimposition that has been used to determine the potential cumulative effects of groundwater depressurisation associated the project and the adjacent Carmichael Coal Mine. This method is widely used to determine the cumulative depressurisation effects of multiple coal mining activities. Within the Galilee Basin, the Galilee Coal Project SEIS states that the Coordinator General and DNRM endorsed this approach to cumulative impact assessment (although a lack of published drawdown contours from adjacent mines ultimately prevented its use). This method is therefore considered theoretically sound and suitable for the purposes of undertaking a cumulative impact assessment.

The depressurisation effects of the Carmichael Coal Mine were approved as part of the EIS assessment process for that project. There is insufficient publicly available information to accurately recreate the approved depressurisation effects of the Carmichael Coal Mine in the Project China Stone groundwater model. The proponent has therefore used approved maximum depressurisation contours presented in the Carmichael Coal Mine Project EIS as the basis for the cumulative groundwater impact assessment.

The draft EIS Groundwater Report (Appendix I) provides contour plans showing the maximum predicted cumulative depressurisation associated with the project and the adjacent Carmichael Coal Mine. The use of maximum predicted depressurisation for the project and the Carmichael Coal Mine represents a worst-case scenario. This ensures that the cumulative impact assessment is conservative.

Section 12.4 of the draft EIS explains that the magnitude of cumulative depressurisation at a given location corresponds to the sum of these contours.

Alignment with Carmichael Coal Mine Project EIS – Groundwater Monitoring Network

Refer to the response to issue 24.025 which describes the proposed groundwater monitoring program. This program includes offsite groundwater monitoring locations to provide additional coverage of the GAB sediments to the north, south and west of the project site and the groundwater regime in the vicinity of the Carmichael Mine.

Groundwater Flow Direction

There is no specific information provided in the submission on which to respond. Refer to the responses to DNRMs issue 41.016, 41.020 and 41.026 for a specific response to specific issues raised in relation to groundwater flow direction.

Groundwater Monitoring Network

There is no specific information provided in the submission on which to respond. Refer to the response to issue 24.025, issue 41.019 and Attachment C – Responses to IESC Advice issues 33 and 47 for specific responses to specific issues raised in relation to the groundwater monitoring network.

Lake Buchanan Source Water

There is no specific information provided in the submission on which to respond. Refer to the responses to DNRMs issue 41.016 and Attachment C – Responses to IESC Advice issue 25 for specific responses to specific issues raised in relation to groundwater interactions with Lake Buchanan.

24.2 EHP SUBMISSION ON CONFIDENTIAL BIODIVERSITY OFFSETS STRATEGY

Submitter Issue Number 24.027

Appendix H – Biodiversity Offset Strategy Section 5 – Potential Offset Properties

a) The offset areas identified on [redacted] (Property A) and [redacted] (Property B) mainly consist of regional ecosystem 10.5.1 in water remote areas. While the BTF recovery plan mentions 10.5.1 as suitable habitat, there are no BTF records from this regional ecosystem. 10.5.1 generally contains less suitable native perennial grass cover, more shrubs and is generally remote from water as most landholders do not place artificial water in paddocks containing this regional ecosystem due to the presence of heartleaf (*Gastrolobium grandflorum*)– a plant noxious to cattle. The areas of potential habitat that are presented in page 14 Appendix H Table 2 are therefore not accurate, especially for [redacted] and [redacted] (Property A and Property B).

b) The results of the EPBC Act Protected Matters Search Tool presented in Appendix A state the following:

[redacted] (Property D)

- Squatter pigeon – likely to occur
- Black-throated finch – may occur (note that the proponent's own records confirm that BTF are known to occur on this property)
- Australian Painted Snipe – may occur
- Koala –may occur
- Yakka skink – may occur

[redacted] (Property C)

- Squatter pigeon – likely to occur
- Black-throated finch – known to occur
- Australian Painted Snipe – may occur
- Koala –may occur
- Yakka skink –may occur

[redacted] (Property A)

- Squatter pigeon – likely to occur
- Black-throated finch – likely to occur
- Australian Painted Snipe – may occur
- Koala – may occur
- Yakka skink – may occur

[redacted] (Property B)

- Squatter pigeon – likely to occur
- Black-throated finch –likely to occur
- Australian Painted Snipe – may occur
- Koala – may occur
- Yakka skink – may occur

The search tool maps are indicative rather than definitive.

May occur – these are areas within a broad environmental envelop or geographic region that encompasses the probable range of the species. With sufficient reliable location points, modelling tools such as Maxent may be used to define the broad environmental envelope within which the species or its habitat may occur.

Likely to occur - these are areas of preferred habitat, within the range of the species. A conservative threshold chosen from a species modelling tool (e.g. Maxent) may be used where appropriate. The use of buffers is avoided where possible.

Presenting potential habitat as a direct offset is not acceptable. The proponent should provide proposed direct offset areas where the MNES or MSES values are known to occur. For BTF offsets the locations should be sourced from known habitat where current or demonstrated BTF records exist and within habitat that is: • Defined as high quality or quality similar to the impact area eg predominantly RE 10.5.5n or RE 10.3.6 • with low infestations of buffel grass and other exotic ground cover. EHP can assist by participating in a workshop or meeting to detail the issues to be resolved. The session should involve the respective experts on BTF habitat mapping in the region. The issues include making use of the latest knowledge on BTF ecology and the points outlined in the adjacent column including the areas of RE 10.5.1 as only being suitable habitat when they occur adjacent to large areas of RE 10.5.5 with adequate water sources in the vicinity.

24.027 a). The BOS included an assessment of four potential properties in order to demonstrate there were several options available for securing offsets for the project. The inclusion of these different properties wasn't, however, meant to detract from the fact that one property (Property C) is the most prospective. The draft EIS explained that the most prospective property has sufficient vegetation to satisfy the projects considerable offset requirements, alone. Attachment F – Additional Information on Ecology has included a revised property profile of the most prospective offset property, based on the revised BTF habitat modelling. The revised property profile demonstrates that this property will still be able to satisfy the project's offset requirements alone, even with the revised habitat definitions.

As discussed with EHP, in the unlikely event the most prospective property is not able to be secured for the project's offset requirements, one or more of the other potential properties may be used. If necessary, the suitability of RE 10.5.1 on Property A and B would be assessed as part of the development of the Offset Management Plan.

It is noted that RE 10.5.1 is listed in the species recovery plan, unrestricted. The project will disturb approximately 2,678 ha of RE 10.5.1, requiring offsets. It would be unreasonable to require offsets for the clearing of this RE, whilst not permitting this RE to be used for the provision of offsets.

24.027 b) The proponent considers it inequitable for potential offset properties to be restricted to properties containing records of threatened species, whilst requiring that impacts on *potential* habitat be offset (including potential habitat where there are no records of a threatened species) despite recent surveys. For example issue 24.005 states that "*EHP officers advise that suitable habitat is present (within the project site) for the Yakka Skink*", despite acknowledging that the Yakka Skink was not recorded during field surveys (nor was it recorded during field surveys of the nearby CCM&RP). Offsets are now being proposed for potential impacts on the Yakka Skink, despite a total lack of records of the species within the project site and surrounding area.

With respect to the BTF, the response to issue 24.011 explains that two of the four offset properties are confirmed as providing BTF habitat and there are records of the species from the

properties. The most prospective of these properties has in excess of 65,000 ha of estimated potential BTF habitat.

As discussed in response to 24.011 a), the proponent does not own any land or have agreements with any landowners regarding offset properties. As such, the draft EIS BOS (Appendix H) has conservatively assessed several properties for the purpose of demonstrating there are suitable offsets that could be provided for the project. The suitability of any of the potential properties to provide offsets for the project will be confirmed based on ground-truthed information gathered during detailed field surveys proposed to be undertaken as part of the development of the Offset Management Plan for the project. These surveys may confirm the presence of various threatened species, as well as assessing the quality of vegetation and habitat. This approach is consistent with precedent set by the recent EPBC Act approval for the South Galilee Coal Project (issued in July 2015).

PROJECT CHINA STONE
RESPONSE TO QUEENSLAND HEALTH SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

25 QUEENSLAND HEALTH SUBMISSION

Submitter Issue Number 25.001
Drinking water: Describe where drinking water will be sourced from, treated and how it will be stored. Describe details of a drinking water quality sampling and monitoring program for potable water.

As stated in Section 4.8.5 and 13.5.2 of the draft Environmental Impact Statement (EIS), potable water will be sourced as part of the external raw water supply for the project and treated on-site. On-site package water treatment plants will be installed at the mine industrial areas and at the accommodation village in accordance with relevant standards and regulatory requirements. Water quality sampling and monitoring programs will be developed as necessary to comply with regulatory requirements and to protect the integrity of potable water supply on the site.

Submitter Issue Number 25.002
Disease vectors: The disposal of liquid wastes or contouring of the ground should not allow ponding of water or other liquids, which are likely to provide a breeding site for mosquitoes. A mosquito management plan may be desirable should a nuisance exist on site.

The Preliminary Hazard Analysis presented in Table 22-5 of the draft EIS identifies possible avenues for disease vectors to be a potential hazard on the site and provides an assessment of the possible consequences. With the proposed risk control measures that will be put in place to reduce the risk of this becoming an issue on the site, it has been assessed as a low risk.

Submitter Issue Number 25.003
Workforce accommodation camp/s: Outline detail about the provision of food to the construction workforce.

Food management at the accommodation village will comply with all relevant legislative requirements. Further detail is beyond the reasonable scope of the draft EIS.

Submitter Issue Number 25.004
Workforce accommodation camp/s: Provide detail on the accommodation village, and if this will be included as a sensitive receptor.

Sections 4.3.5 and 4.4.6 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N) describe the workforce accommodation for the construction and operations phases of the project.

In accordance with the Department of Environment and Heritage Protection Model Mining Conditions, the on-site accommodation village is not considered to be a sensitive receptor and has, therefore, not been included in the assessment of residential amenity impacts described in the draft EIS. However, the health and wellbeing of workers staying at the accommodation village has been considered and is discussed in Section 22.3.3 of the draft EIS.

Submitter Issue Number 25.005
Workforce accommodation camp/s: Provide the frequency of turnover of workers (ie. shift rotation) at the accommodation village.

As stated in Section 4.3.3 and 4.4.3 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), the construction and operations phase workforces are anticipated to operate on a 7-day-on/7-day-off roster arrangement.

Submitter Issue Number 25.006
Health services: Outline the health services that are likely to be affected and the impact of these services on neighbouring communities / towns. The number of employees involved in the construction and future operation of the project has the potential to impact on the existing health, medical and community health services.

As stated in Section 4.4.6 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), employees will access the following on-site health services:

- A permanent sick bay with 24/7 nursing staff;
- Registered nurse(s) able to dispense and administer prescribed drugs and to handle all restricted pharmaceutical items;
- A link to an internet medical service and a relationship and agreement with emergency air services (Royal Flying Doctor Service);
- Firefighting, rescue and emergency services to serve the mine, the village and the airport;
- Mine security and safety services to provide on-site security and policing services; and
- A working relationship and agreements with the local police force for major security and or safety issues.

Employees and their families will also continue to access health services in their respective home base locations during rostered time off. The potential for project induced population growth in home base locations has been assessed in the draft EIS and is considered unlikely to be a significant impact. However, as shown in Table 27 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), the proponent has committed to monitoring potential impacts in home-base locations including through engagement with service providers.

Submitter Issue Number 25.007
Air Quality: Provide details of the air monitoring and measuring programs to be conducted during construction and the operational phases of the project, particularly at sensitive receptor locations.

Section 15 of the draft EIS and the draft EIS Air Quality Report (Appendix L) assess the potential air quality impacts of the project during the construction and operations phases. This technical assessment confirms that the project has a low potential for adverse air quality impacts. This is largely due to the considerable distances to the closest sensitive receptors, the closest of which is approximately 7 km from the project site and only four of which are located within 20 km of the project site. As impacts are predicted to be low, any potential air quality issues that arise during the construction and operations phases are proposed to be managed through a complaints handling process. This process will include an investigation into the complaint and air quality monitoring, if necessary.

Submitter Issue Number 25.008
Recycled Water: Provide detail on any water that is intended to be recycled on-site.

Section 13.5 and Figure 13-9 of the draft EIS provide an overview of the water management system proposed for the project. This includes identifying the following supplies/sources to reuse water on the site:

- Water from underground operations;
- Tailing Storage Facility return water;
- Power Station Waste Storage Facility runoff ;and
- Runoff from the mine infrastructure areas.

Water that is reused on the site is predominantly used in the Coal Handling Preparation Plant or for dust suppression.

PROJECT CHINA STONE
RESPONSE TO ISAAC REGIONAL COUNCIL SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

27 IRC SUBMISSION

Submitter Issue Number 27.001
The ammonium nitrate storage area is in close proximity to the rail line, mine access road, and in the vicinity of the Airport. In the event of an explosion caused by the ammonium nitrate storage area, its location and the potential blast radius may put employees at serious risk and hinder emergency vehicle access.
Relocate the ammonium nitrate storage area to a location where the risk from a potential blast is minimised.

To clarify, the ammonium nitrate storage area is located approximately 1.2 km from the mine access road and rail line and is more than 2 km from the airstrip at the closest point.

The storage of explosives on mine sites is regulated under the *Explosives Act 1999* and the *Coal Mining Safety and Health Act 1999*. The storage areas will be designed, constructed and operated in accordance with all applicable legislative requirements. These requirements are designed to identify and manage the potential risks including any risks to employees and emergency vehicle access in the event of an emergency.

Submitter Issue Number 27.002
(Project need Executive Summary p1) "the long term forecast is for demand to remain strong, particularly in Asia" – A$140 to A$63 since 2011 "recent softening"?
According to the International Energy Agency 450 scenario in World Energy Outlook 2014, there is a projected 35% reduction in global thermal coal usage over project life (2040). How is the strong demand for this project consistent with IEA projection?

Due to the wide range of complex factors that can influence the global coal market, it is not surprising that long term forecasting of demand and pricing has commonly been proven to be unreliable and inaccurate. Over the past 5 years the thermal coal price has varied from AUD$126 (per metric ton) in October 2011 to AUD$131 in October 2016, with a low of AUD$71 in April 2016 (IndexMundi, 2016). This variation in prices and the recent return to prices above AUD$100 per ton, are indicative of fluctuations in the thermal coal market. These fluctuations would be expected to occur over the 50 year life of the project, and were discussed in the assessment of economic impacts described in the draft Environmental Impact Statement (EIS) Socio-Economic Impact Assessment Report (Appendix N). It is noted the reduction in the coal price during this period was not related to demand. The drop in coal price was related to an oversupply rather than a reduction in demand.

There are many different predictions of the future demand of thermal coal. Despite the variation in the actual forecast numbers, demand for thermal coal is forecast to continue, particularly in Asia and India.

Submitter Issue Number 27.003
Off-lease infrastructure not included – port capacity, rail connection to port, mine site access road and water supply. What potential impacts on Isaac Regional Council and IRC area?
Further consultation with IRC/CTRC as project progresses

As explained in Section 4.2 of the draft EIS, the off-lease infrastructure listed in this submission will be subject to separate environmental assessments and approvals.

These separate environmental assessments and approvals will evaluate the impacts on the Isaac Regional Council (IRC) and land within the IRC area and will include consultation between the respective proponents for this infrastructure and the IRC and the Charters Towers Regional Council (CTRC), as relevant.

Submitter Issue Number 27.004
A workforce accommodation village will be located in the south-eastern part of the project site.
Detailed design of civil works for service road, pathway, stormwater infrastructure, sewer and water infrastructure must be provided including but not limited to the following:
1.Stormwater management plan
2.Erosion and sediment control plan
3.Site based management plan

Detailed design plans and related management plans for civil works within the mining lease would be provided to the IRC, as necessary, prior to the commencement of construction as part of any IRC building approvals that are required.

Submitter Issue Number 27.005
Power station – 3x350MW (1 standby) yet Moray Power at Carmichael start at 150MW. This appears to be a significant difference in power needs or supply.
Please clarify if there is any intent to export power to other users or indicate if this misunderstanding on our part (700MW x 40% = 280MW, say almost 5% of Queensland coal generating , see http://www.nem-watch.info/widgets/RenewEconomy/)

In regards to the capacity of the power station, it is proposed to have 3 x 350 MW supercritical generating units, which will provide a sufficient guaranteed supply for the potential peak power demand of the mine. 350 MW generating units are proposed in order to enable maximum thermal efficiency, consistent with best practice. Peak mine power demand is estimated to be equivalent to approximately 400 MW.

Project operations during peak power demand will include the operation of:

- Open cut mine at peak production having two separate pits using:
  - Two large scale draglines; and
  - In-pit crushing and conveying (supplemented by truck and shovel), to transport overburden to waste dumps and Run-of-Mine (ROM) coal from open cut mining areas to the washplant.
- Three longwalls;
- 55 Mtpa raw coal feed washplant; and
- Other associated facilities such as workshops, workforce accommodation village and supporting infrastructure.

A single generating unit will have a net 325 MW of available power and hence two generating units will need to be operational for the peak mine demand. The third generating unit provided will be provided as redundancy. Due to the remote location of the project site, the power station is required to have redundancy to ensure a continuous, reliable power supply for mining operations.

The proponent is not seeking approval for any off-site provision of power supply to other users. However, this is a potential option for the future and the proponent is currently investigating the feasibility of this option. Additional power generation could be achieved by the construction of additional generating units and/or utilisation of any redundancy which would be determined in the future and based on the performance of the mine generating units. As part of the ongoing assessment of the feasibility of off-site power supply, the proponent is consulting with a range of potential power supply customers and relevant government agencies. Should off-site power supply be determined to be feasible and economically viable in the future, this would be subject to separate environmental assessment and approvals.

Submitter Issue Number 27.006
Proponent to seek up to 12,500 MLpa external supply from third party.
Further consultation with IRC/CTRC as project progresses to assess other potential water users and to assess expected total yield from each of the possible sources

Refer to response to issue 27.003.

Submitter Issue Number 27.007
50 year climate sequences based on 124 years of historical records. EIS suggests 1-7% reduction in rainfall and runoff offset by greater number of extreme rainfall events.
Please clarify how these projected rainfall reduction and temperature/evaporation increases due to climate change over project period are offset.

The point being made in Section 13.5.7 of the draft EIS is that climate change predictions indicate a reduction in average rainfall as well as an increase in extreme events like cyclones. A reduction

in average rainfall would result in a decrease in the accumulation of mine water whereas an increase in the frequency of extreme events including cyclones would result in an increase in the accumulation of mine water. Regardless, the design of the mine water management system is robust and these changes would not impact the effective operation of the system.

Submitter Issue Number 27.008
Proximity of accommodation village to airstrip QDCMP3.3 – is airstrip industrial/development activity?
Provide ANEF contours and explain acoustic design of accommodation village

Aircraft noise is discussed in Section 16.6.7 of the draft EIS and Section 4.9 of the draft EIS Noise Report (Appendix M). The accommodation village will comprise air conditioned units that are unlikely to be adversely impacted by external noise. The detailed design process for the accommodation village will consider the need for acoustic insulation and it will be included in the design of accommodation units, if deemed necessary. This has been included in Attachment I – Additional Commitments.

Submitter Issue Number 27.009
It is uncertain whether the studies that were done in terms of the detailed noise assessments for this development included the impacts on the proposed workers accommodation that will from part of the mining operation (and that will be in close proximity to it). It may be assumed (or not) that this is the case.
The study conducted for the development does not clearly indicate the effects of the noise resulting from the mining operations, construction noises, road traffic and aircraft noises (associated with the nearby landing strip in the latter case) and blasting impacts will have on the workers accommodation that forms part of this proposed development which is also a residential receptor). It is stated in the *Hazards and Risks* section that there will be no negative impacts in this regard on the workers accommodation. This will need to be clearly indicated as well, as well as mitigating.

In accordance with the Department of Environment and Heritage Protection (EHP) Model Mining Conditions, the on-site accommodation village is not considered to be a sensitive receptor and has, therefore, not been included in the assessment of residential amenity impacts (such as noise) described in the draft EIS.

However, as described in Section 22.3.3 of the draft EIS, the health and wellbeing of workers staying at the accommodation village has been considered. The accommodation village will house workers for the duration of their block shift and will primarily be used for workers to rest and sleep between shifts. At the end of their block shift, workers will return home to their normal place of residence. The accommodation village will therefore be mostly used for sleeping, eating and relaxation activities predominantly within air conditioned rooms with closed windows. The air conditioned nature of the accommodation village facilities will prevent any impacts on the village occupants due to noise from the mining operations. The installation of air-conditioning is a well-established and effective means of mitigating noise impacts due to external industrial noise levels

on the occupants of the village. In addition, it is noted that the predicted external noise levels at the accommodation village are well below accepted Occupational Health and Safety levels for hazardous exposure, which are more than an order of magnitude above the residential amenity criteria.

Submitter Issue Number 27.010
Modelling conducted in June 2014, Table 3 in Appendix N suggests coal price of A$93.50. Is that correct and if so, mine gate or FOB Abbot Point? According to World Bank, Newcastle Coal in June 2014 was US$76, Jul 2015 US$63. What is the basis of the coal price forecasts?
What is the impact of significantly lower coal prices over the project life?
The EIS relates only to the proposed mine. Please clarify if the operating costs used in the financial analysis include the costs of accessing the third party infrastructure

Refer to response to issue 27.002.

The draft EIS has assumed the income from the sale of coal is AUD$93.50 per metric ton and is FOB. This coal price is considered representative of the fluctuations that would be expected to occur across the 50 year project life and, as such, is not necessarily tied to the year the modelling was conducted. To further elaborate, the income from coal sales is also directly related to the exchange rate ($US/AUD) which adds to the complexity and uncertainty of future long term income predictions.

The operating costs used in the financial analysis included the costs of transport using third party infrastructure.

Submitter Issue Number 27.011
Project is FIFO, further consultation with IRC to determine how to maximise local and regional benefits

The proponent is committed to continuing consultation with key stakeholders, including the IRC in relation to the management of social impacts of the project. In particular, as discussed in Section 24, Attachment 24-2 of the draft EIS, the proponent will consult with local governments in the home base locations regarding project labour sourcing strategies and the management of project induced population growth. The proponent has also committed to developing a Local Content Plan in consultation with the IRC (and other relevant parties) which aims to assist local industry and businesses to develop appropriate capabilities to tender for procurement opportunities and inform local industry of opportunities.

Submitter Issue Number 27.012

The proposal identified only key Council roads used by project traffic in the phase of construction &operation. E.g. Elgin Moray Road &Moray Carmichael Road.

It appears that construction materials are hauled through various council maintained roads.

No Council maintained roads are used as haul routes without a prior approval of Council and consequently infrastructure maintenance agreement must be entered between Council and the Project Proponent.

Restricted to use only approved haul routes in the phase of construction and operation.

As indicated in Section 19.2.3 of the draft EIS, the delivery of construction materials are anticipated to be via Moray-Elgin Road and Moray-Carmichael Road. IRC approvals for use of these roads for the delivery of construction materials will be obtained, as necessary. The proponents intention to consult with the IRC in relation to Council road issues is stated in Section 19.2.11 of the draft EIS.

Submitter Issue Number 27.013

Overlap in the usage of Council roads between Adani & China Stone Project. Adani is in the process of design and construction of Council Roads (Elgin Moray Road &Moray Carmichael Road). The impact of China Stone Project also to be incorporated in design and construction.

Consultation must be taken place with Adani to incorporate the impact of China Stone Project on Council roads and this must be reflected in the infrastructure agreement.

As discussed in Section 19.2 of the draft EIS, a new mine access road will be constructed from the Moray-Carmichael Road which will require a separate IRC approval. As discussed in Section 19.2.11 of the draft EIS, the proponent is proposing further consultation with the IRC in relation to the new mine access road and the location and design of the intersection with Moray-Carmichael Road. As explained in Section 4.13.5 of the draft EIS, any work on Moray-Carmichael Road by Adani is likely to completed prior to the commencement of construction of the project.

Submitter Issue Number 27.014

The mine site will be accessed through proposed mine access road from Moray Carmichael Road. It is unclear about the alignment of the access road. The alignment might affect crossing local roads, drainage features, private properties, etc.

The alignment and detailed design of mine access road and intersection with Moray Carmichael Road must be provided to Council for approval.

The need for a separate approval for the new mine access road is acknowledged in Section 19.2 of the draft EIS. The detailed design of the road and intersection will be submitted to the IRC as required for the approval application.

Submitter Issue Number 27.015
Road impact assessment was done only for State Controlled Roads where as Council maintained roads will be used as haul routes including Elgin Moray Road &Moray Carmichael Road and has impact.
Be advised that Gregory Development Road/Elgin-Moray Road intersection must be upgraded with high turn treatments considering the impact of all activities undertaken by both Adani and China Stone Project.

The draft EIS Road Impact Assessment (RIA) (Appendix O) includes project traffic estimates for the Council Roads and assessments of the Council road intersections.

The assessment of the Gregory Developmental Road/Elgin Moray Road intersection presented in the RIA includes consideration of traffic generated by the Carmichael Coal Mine and Rail Project (CCM&RP) in addition to Project China Stone.

Submitter Issue Number 27.016
This analysis identifies that channelized right turn (CHR) and basic left turn (BAL) treatments are required at the Gregory Development Road/Elgin-Moray Road intersection prior to construction operations.
Be advised that Gregory Development Road/Elgin-Moray Road intersection must be upgraded with high turn treatments considering the impact of all activities undertaken by both Adani and China Stone Project.

As noted in Section 19.2.5 of the draft EIS, the upgrade of the intersection to include protected turn lane treatments is required as part of the development of the CCM&RP, which will precede the development of Project China Stone.

Submitter Issue Number 27.017
It is noted that future rail line from mine site to Abbot Point Coal Terminal will be constructed & subject to a separate environmental impact assessment and approval.
Rail Manager must undertake and obtain approval for ALL statutory requirements of the Transport (Rail Safety) Act 2010 and any other applicable legislation in relation to construction, use and management of crossings (road, major and minor drainages and occupational). Those requirements include the preparation of interface agreements for the management and maintenance of crossings.

The submitter correctly states that the future rail line from the mine site to the Abbott Point Coal Terminal is not part of this draft EIS and will be the subject of a separate environmental impact assessment and approval.

Submitter Issue Number 27.018

It is noted that a private airstrip will be constructed in the southern part of project site for the transport of the mine workforce and materials.

The airstrip and all associated and necessary navigational aids and operational infrastructure must be designed, constructed and maintained at all times to comply with all relevant and applicable Federal and State aviation legislation, regulations, guidelines and design standards. A development application must be lodged for approval along with the detailed design.

As stated in Section 24, Attachment 24-2 of the draft EIS, the private airstrip will be designed, constructed and operated in accordance with all relevant Civil Aviation Safety Authority regulations and guidelines. All necessary approvals will be obtained for the airstrip, as required by law.

Submitter Issue Number 27.019

It is identified that water supply to the project site is through water harvesting system from Cape River/Belyando River/Suttor River Systems.

Hydraulic analysis is to be carried out to determine the demand of project site. Detailed design of water harvesting system must be provided as part of Environmental Impact Assessment and obtain approval.

Detailed design drawings must include, but not limited to the following in accordance with WSA 03-2002 (Water -Note : words missing from submission)

The raw water demand for the project site is discussed in Section 13.5.5 of the draft EIS. Note that MacMines is not the proponent for the development of the off-site water supply and is not seeking approval for this infrastructure. Refer to response to issue 27.003.

Submitter Issue Number 27.020

"The field inspection team located one site which was identified during the desktop review and the initial consultation. The site was subject to an assessment of significance, and was assess as having no nation, state or local heritage significance."

It is suggested that the location that was initially deemed to have cultural significance been identified, as well as the methods and reasoning behind it no longer holding that classification.

This quote is from Section 20.3.5 of the draft EIS, which provides a high level summary of the results of the cultural heritage assessment undertaken for the project. Further detail is provided in Sections 4.3 and 5.2.1 of the draft EIS Non-Indigenous Cultural Heritage Report (Appendix P) which explain the nature of the site and the methods and reasoning behind the assessment of significance and the conclusion the site did not have national, state or local heritage significance.

Submitter Issue Number 27.021

"The health and wellbeing of workers staying at the accommodation village has been considered … primarily used for workers to rest and sleep". The proximity of the airstrip to the accommodation village poses a high risk to the village in terms of providing a quiet dust free area for workers to rest.

Vast mitigation techniques will need to be implemented to ensure that sound and dust are not detrimental to the main purpose of the accommodation village.

Please refer to response to issue 27.009.

Submitter Issue Number 27.022

"Providing an adequate an accessible water supply for firefighting purposes" Water supply is a massive issue in this region, how is this expected to be achieved, what amount of water would be deemed sufficient for this purpose.

Further information is to be provided to ensure the safety of the project.

As indicated in Section 13.5.5 of the draft EIS, the proponent is proposing to secure an external raw water supply of up to 12,500 MLpa. As is standard practice and as required by mine safety regulations, dedicated and suitably sized fire water tanks will be required to be installed at the various mine facility areas. These tanks will be filled from the project raw water supply.

PROJECT CHINA STONE
RESPONSE TO MACKAY CONSERVATION COUNCIL SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

28 MACKAY CONSERVATION COUNCIL SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent.

Submitter Issue Number 28.009

• Impacts on pollution of groundwater from the fly ash wastes from the conventional coal-fired power plant is said to be negligible even though heavy metals and radioactive contaminants "radionuclides" are in the waste.

A new Duke University-led study has revealed the presence of radioactive contaminants in coal ash from all three major U.S. coal-producing basins.

The study found that levels of radioactivity in the ash were up to five times higher than in normal soil, and up to 10 times higher than in the parent coal itself because of the way combustion concentrates radioactivity.

The finding raises concerns about the environmental and human health risks posed by coal ash, which is currently unregulated and is stored in coal-fired power plants' holding ponds and landfills nationwide.

"Until now, metals and contaminants such as selenium and arsenic have been the major known contaminants of concern in coal ash," said Avner Vengosh, professor of geochemistry and water quality at Duke's Nicholas School of the Environment. "This study raises the possibility we should also be looking for radioactive elements, such as radium isotopes and lead-210, and including them in our monitoring efforts."

Radium isotopes and lead-210 occur naturally in coal as chemical by-products of its uranium and thorium content. Vengosh's research team revealed that when the coal is burned, the radium isotopes become concentrated in the coal ash residues, and the lead-210 becomes chemically volatile and reattaches itself to tiny particles of fly ash. This causes additional enrichment of radioactivity in the fly ash.

"Radioactive radium and lead-210 ends up concentrated in these tiny particles of fly ash, which though individually small, collectively comprise the largest volume of coal ash waste going into holding ponds and landfills," said Nancy Lauer, a Ph.D. student in Vengosh's lab who was lead author of the study.

We note that a small set of fly ash samples were tested for thorium and uranium in the lab but not for other radioactive radium isotopes such as radium isotopes and lead-210 which are not proposed to be monitored nor modelled as to their downstream rates of movement in groundwater. As heavy metals do not biodegrade and radioactive contaminants can be extremely long-lived, stating that leakage rates from the burial sites are low is meaningless for a coal mine that will operate for many decades. What will the cumulative concentrations be in the groundwater

downstream from the in the Belyando River then the Burdekin River and finally the Great Barrier Reef be from the nine proposed Galilee Basin coal mines in 100 or more years? That is what needs to be known before approval of such massive mines proceeds.
Fly ash will be trucked to the PSWSF so there is likely to be a large amount of it deposited on soils between the power station and the temporary storage area then the PSWSF and finally the open cut mine overburden emplacement. Rainfall will allow this waste to percolate into the soil and groundwater or runoff into tributaries of the Belyando River then downstream.

The draft Environmental Impact Statement (EIS) Groundwater Report (Appendix I) includes an assessment of all potential sources of groundwater contamination. In addition, Section 6.5 of the draft EIS Geochemistry Report (Appendix D) considered the potential for radioactive elements to be present within coal ash. Screening level analysis was undertaken as part of the draft EIS and radionuclide activities for gross alpha and gross beta (and potassium-40 corrected beta) were found to be less than the laboratory limit of recording. These results were also supported by levels of soluble uranium and thorium concentrations in bottle leachate from the coal ash sample that were also below the laboratory limit of recording. As the screening levels are very low, it is not necessary to undertake a detailed radionuclide assessment for the coal ash sample or to further consider radioactive elements as a potential contaminant.

Submitter Issue Number 28.010
9.5.5 Groundwater-dependent Ecosystems (GDEs)
The potential for GDE to be present within the project site was reviewed, with the review consisting of:
• A search of the Queensland springs database
• A search of the BOMs GDE Atlas
• Groundwater field investigations as described in the Groundwater Report (Appendix 1)
A search of the Queensland springs database indicated that no springs are located within the project site. The nearest springs are approximately 22km south of the southern boundary of the project site (Figure 9-1). BOM GDE mapping show that there are several potential GDE's in the project site
Section 12 – Groundwater provides an overview of the regional hydrogeology and water bearing strata within the project site. As indicated in Section 12 – Groundwater, there is no shallow groundwater within the project site. In the elevated Darkies Range, groundwater is typically more than 100m below ground. In low lying areas, east of Darkies Range, groundwater is at least 25 m below ground level and disconnected from the surface water features. Given the lack of shallow ground water BOMs GDE mapping of the project does not appear consistent with the hydrogeological setting of the project site. In addition, the vegetation survey did not identify any areas of vegetation that would appear to be dependent on groundwater. Consequently it is concluded that there are no GDEs in the project site
Given the above information from the EIS why did BoM map the presence of groundwater dependent ecosystems within the project site? Are there shallow ephemeral groundwater systems that come and go in larger Wet Seasons that GDE's depend on? This is semi-arid country where some plant species only grow in major La Niña years and can take 200 years to reach maturity as

they 'hibernate' in between.
We know that bird species like the cotton pygmy goose prefer to nest in ephemeral wetlands created in large Wet Seasons along rivers.

Government mapping is based on general features of the landscape, not ground-truthed data. It is accepted practice that information from field surveys is used to provide verification (or otherwise) of Government mapping.

Please also refer to response to issue 41.030 which provides a detailed response regarding the groundwater investigations that confirmed a lack of shallow groundwater on the project site and provides further explanation of the basis for the assessment that GDEs are not present within the project site.

Submitter Issue Number 28.016 and 28.017
Semi-arid areas need at least 10 years of seasonal fauna surveys to cover the range of climate variability found among years and seasons if the intent is to provide a comprehensive and representative record of which species are present under the variety of conditions found in such landscapes. Much of that variability is due to rainfall.
The closest BoM rainfall station with long-term records is 80km to the east of the proposed China Stone mine site 1km from Belyando Crossing at Mt. Douglas. Monthly rainfall in May 2012 was above the average and median values (Fig.1) See Submission - Fig. 1: 2012 Monthly rainfall (mm) at Mt. Douglas compared to mean and median values. But there was no rain in May until May 25 the last day of the survey (Fig.2). See Submission - Fig. 2 Daily rainfall (mm) at Mt. Douglas in May 2012. Rainfall for preceding months January through April were above or at the average values indicating wetter conditions. Monthly rainfall in October and November 2012 was zero for both months so was well below the average and median values. Except for September the preceding months from June through August may have had little to no rain as well. There was no data for June and July. June through October 2013 had no rain (Fig. 3). See Submission - Fig. 3 2013 Monthly rainfall (mm) at Mt. Douglas compared to mean and median values.
Flora and fauna surveys for the 22nd October through 9th November in 2012 and 14th through 20th October 2013 were done under very dry conditions. There were no surveys Dec through April (Wet Season) or June through August (winter).

Field surveys were undertaken in accordance with the EIS Terms of Reference (TOR) and used appropriate survey methodologies. This methodology is conservative in that it doesn't rely solely on records from field surveys to assess likely presence of species.

It is noted the May 2012 surveys were undertaken following a period of substantial rainfall, which is considered likely to have prolonged the wet season in 2012. The site was inaccessible in the preceding period before the May 2012 surveys due to the substantial rainfall across the site.

Submitter Issue Number 28.020

The potential impact on habitat connectivity has also been considered in relation to the cumulative impacts from the project and the CCM&RP, located adjacent to the project site. Figure 9-8 shows the proposed location of clearing associated with open cut mining and mine infrastructure development for the project and the CCM&RP. Key factors to be considered in assessing this impact are that the open cut mining/mine infrastructure footprints for these two projects are approximately 10 km apart, leaving a large corridor of remnant vegetation between the cleared areas. This will allow for continued movement and dispersal opportunities.

Noted.

Submitter Issue Number 28.021

What is not addressed is the need for north south connectivity, especially in light of climate change when wildlife will need to move south as latitudes rise in temperature. The China Stone project in conjunction with other planned projects along the Belyando River, which runs from the south to the north, will have a massive impact on wildlife connectivity and the resilience of the native vegetation and communities in this river basin.

Section 9.6.2 and Figure 9-8 of the draft EIS include an assessment of the potential impact on habitat connectivity.

Submitter Issue Number 28.036

7. Air Quality

All we got was information about standards and total emissions. This does not explain the level of impacts which is what an EIS should do.

Section 15 of the draft EIS and Section 6 of the draft EIS Air Quality Report (Appendix L) provide a detailed assessment of air quality impacts from the project.

Submitter Issue Number 28.037

At present the site is 20,000ha of well vegetated land. The mine will produce 55 Mtpa of ROM coal with up to 38 Mtpa of that to be exported.

The Katestone report appendiced in the EIS states that nitrogen dioxide, fine dust particulates and greenhouse gases will be the main sources of emissions from the project. It appears that diesel emissions which generally are high because of the combustion of diesel fuels on mine sites are not addressed. This is of concern because diesel emissions are carcinogenic.

""Most of the data in the world relates to occupational exposure, such as diesel equipment in mines, or transport, particularly railway workers, exposed to diesel,""

Australian Cancer Council CEO, Professor Ian Olver (2012)

Current scientific evidence links short-term NO2 exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Emissions that lead to the formation of NO2 generally also lead to the formation of other NOx. Ozone is formed when NOx and volatile organic

compounds react in the presence of heat and sunlight. NOx react with ammonia, moisture, and other compounds to form small particles. These small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death.

The draft EIS Air Quality Report (Appendix L) predicts the maximum 1 hour and annual average ground–level concentrations of NO_2 (including background levels) will be well below the relevant air quality objectives at all sensitive receptors.

Submitter Issue Number 28.038

Current advisories and standards do not account for the impacts on health of temperature inversions that increase emission concentrations downwind of emission sources. These are more common in winter especially close to elevated areas such as nearby ranges and mountains. We know of at least one recurrent problem with this issue at Collinsville coal mine next to the township of Scottville where emissions meet state guidelines and standards from a burning coal seam at the source but where some residents of Scottville suffered respiratory distress because of high particulate concentrations at their homes during weather conditions likely to cause a temperature inversion and where north winds blow emissions from this burning seam into Scottville in winter.

North winds would similarly blow emissions from the coal-fired power station at China Stone (5.5 km) and the coal stockpiles (2 km) directly towards the accommodation village and under temperature inversion conditions these emission concentrations would rise.

The World Health Organisation and the Australian government acknowledge that there is no known threshold below which dust particulate concentrations cause no harm to human health.

The assessment was undertaken in accordance with the EIS TOR and applicable regulatory requirements. Both the TAPM and CALPUFF models used in the draft EIS Air Quality Report (Appendix L) include the effect of temperature inversions.

Submitter Issue Number 28.040

The scope of the Katestone consultant's report Air Quality and Greenhouse Gas assessment is restricted to activities within the project site and no off lease activities are considered. Fine dust particulates can travel hundreds to thousands of kilometres downwind of their emission sources, and data from NPI records we have analysed for Bowen Basin mines suggests there are possibly downstream impacts at least within a 20km and 10 km radius of those coal mines from fine particulate and heavier PM10 emissions respectively.

The modelling undertaken for the project predicted potential air quality impacts at sensitive receptors (i.e. beyond the project site boundaries). Any dust generating activities associated with off-lease infrastructure required for the project will be assessed in separate environmental assessment applications for the respective infrastructure.

Submitter Issue Number 28.042
The Katestone report focuses on PM10 emissions as these are generally in larger amounts from coal mining operations than finer < PM 2.5. But these sized particulates travel much farther than PM10 particulates, are more harmful and large amounts will be produced over the mine and power station's lifetime. So their impacts need monitoring and assessment within and well outside the mine's boundaries.

Section 15 of the draft EIS and the draft EIS Air Quality Report (Appendix L) includes predictions of the maximum 24 hour average and annual average ground-level concentrations of $PM_{2.5.}$

Submitter Issue Number 28.043
The PM2.5:PM10 ratio is much larger for particulate emissions from coal-fired power plants and this does not seem to have been taken into account in the EIS in terms of large impacts from fine particulates on health.

Emission rates of air pollutants associated with the power station were estimated using a combination of analysis of samples of the feed coal, accounting for the proposed emission control measures, relevant emissions limits and emissions factors published in the NPI EET handbook for fossil fuel electric power generation.

Submitter Issue Number 28.044
Residual combustion emissions from the coal-fired power plant including heavy metals, particulates, oxides of sulphur and nitrogen and carbon monoxide will be discharged via a tall smoke stack apparently in the belief that the solution to pollution will be dilution as the tall stacks spread the pollutants far and wide. Over time this approach in the Four Corners area of the United States has produced a toxic haze that has damaged ecosystems, impaired the health of indigenous Navajo and diminished air quality in the Grand Canyon.

Section 3.2 of the draft EIS Air Quality Report (Appendix L) includes an assessment of the relevant air quality parameters associated with emissions from the power station stacks.

Submitter Issue Number 28.048
Increase in sediment deposition in the Burdekin Falls Dam

Section 13.2.3 of the draft EIS describes the water use and environmental values downstream of the project site including the Burdekin Falls Dam. Section 13.6 of the draft EIS includes an assessment of potential impacts downstream, including sediment control.

Submitter Issue Number 28.049
Sediment deposition in the Burdekin Falls Dam impacting on fill time of dam

Refer response to issue 28.048.

Submitter Issue Number 28.050
Concentrations of toxic non-biodegradable contaminants occuring in sediments in the Burdekin Falls Dam

Refer response to issue 28.048.

Submitter Issue Number 28.052
The EIS is very sparse on how it can meet its rehabilitation objective. As many thousands of hectares of original native ecosystems providing habitat for many thousands of species will be cleared and permanently lost this project presents a great and unwanted loss to central Queensland at a time where its justification is unwarranted and its benefits to the state and its citizens appear dubious and unproven.

Rehabilitation of mines in Queensland is regulated by conditions outlined in an Environmental Authority (EA) that is approved by the Department of Environment and Heritage Protection (EHP). The draft EIS Attachment 24-3 includes rehabilitation goals, objectives, indicators and completion criteria that were developed in accordance with the EHP Guideline *Rehabilitation Requirements for Mine Resource Activities.* This table is typically used as a basis for the rehabilitation conditions in an EA and is refined, as necessary, prior to the finalisation of the EA, to the satisfaction of the EHP. The project mining lease cannot be relinquished until these agreed rehabilitation completion criteria are met to the satisfaction of the EHP.

PROJECT CHINA STONE
RESPONSE TO PROTECT THE BUSH ALLIANCE SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

29 PROTECT THE BUSH ALLIANCE SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent.

Submitter Issue Number 29.004
The damage to the landscape of Queensland will be irreversible and critically we note, the 'offsets' for China Stone are commercial in confidence.

Please refer to Section 4.2 – Response to Common Issues regarding the confidentiality of the Biodiversity Offset Strategy.

Submitter Issue Number 29.011
•From the Fauna Survey Guidelines page 28: Species behavioural ecology – wide-ranging species, such as those with large home areas e.g. Powerful Owl *Ninox strenua* or those that locally migrate with resource pulses, may be temporally absent from the survey site, even if it is within their home range area. Other species may be less likely to call, or respond to detection techniques such as call playback, at certain times of their breeding cycle. Call playbacks were used for nocturnal species which may have resulted in bias results.

Noted.

Submitter Issue Number 29.013
•Red Goshawk *Erythrotriorchis radiates*.
Appendix F, page F.2 birds – recommended survey effort is 50 hours over 8 days Surveys done were approximately 37 hours total over 3 survey periods – this is not in line with the recommended survey effort for this species. Further states that targeted searches for this species were conducted as per Appendix D. Appendix D, page D.1 – D.5, do not list this species as a targeted survey – Blackthroated Finch, Squatter Pigeon, Ornamental Snake and Yakka Skink are mentioned as specific surveys.

The survey effort was considered appropriate. Refer to Table H.5 of the draft EIS Terrestrial Ecology Report (Appendix F) which provides an assessment of the potential for this species to be present in the project site, including consideration of potential habitat.

Submitter Issue Number 29.015

Offsetts for the Project China Stone cannot be examined as they are held in 'commercial confidence'. It is therefore impossible to quantify those offsets as reliably providing the required values for all affected species of wildlife, flora and fauna affected by this mining development. Suitable alternative habitats across all species are currently held within the surrounding and approved MLA's. Weak ground truthing method, results in reporting low species richness and commensurate ecology in locations where, due to low historic survey incidence, key database searches such as WildLife Online under-report biodiversity.

Please refer to Section 4.2 – Response to Common Issues regarding the confidentiality of the Biodiversity Offset Strategy.

As required by legislation, offsets are designed to compensate for significant, residual impacts on Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES). The proposed offset properties have therefore been selected based on the availability of habitat for MNES and MSES within the offset properties. It should be noted that any offsets proposed for mine developments are required to be approved by the Federal Department of the Environment and Energy and/or the Queensland Department of Environment and Heritage Protection, based on their assessment of the necessary values of the offset areas. The general comments in this submission in relation to putative under-reporting of biodiversity are not relevant to the consideration of offsets for specific MNES or MSES. Please also note that in instances where a threatened species was not recorded during field surveys, but had the potential to occur based on available habitat, a conservative approach was adopted and the species was assessed in the same way as species that were recorded during field surveys.

Submitter Issue Number 29.016

Predictions about the potential impacts of the Project China Stone Mine, should be considered for its cumulative impact, particularly in neighbouring the Adani Carmichael Mine. The potential for interruption of the temporal availability, quality and abundance of water throughout the seasons is of critical concern for all birdlife and for all of nature.

Please refer to Section 5.8 of the draft EIS Terrestrial Ecology Report (Appendix F), which addresses cumulative impacts, including cumulative impacts with the proposed CCM&RP. This section explains that there are only very limited water sources within the project site. It acknowledges potential impacts on water sources and includes mitigation in the form of a commitment to create fauna watering points within the project site.

PROJECT STONE
RESPONSE TO COAST AND COUNTRY SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

35 & 36 LAND AND RURAL SERVICES OF COAST AND COUNTRY SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent. Please note the submissions from the Land Services of Coast and Country (Submitter 35) and the Rural Services of Coast and Country (Submitter 36) were an exact replica and therefore the proponent is providing a collective response to these submitters.

Submitter Issue Number 35.008 and 36.077
Potential impacts on Great Artesian Basin include the following:
The EIS is incredibly dismissive of the recognised impacts on the GAB. It is recognised in the Subsidence Report (Appendix A), and reported on p30 of the Appendix I that the "height of connective cracking would therefore intersect the overlying Clematis Sandstone", which is a GAB aquifer.
•Section 12 describes the GAB impacts at pp 12-9 to 12-10, noting predicted a maximum take of 9ML/day. It goes on to state: "The long-term take from GAB Management Unit 3 is below 0.5 ML/day. Post mining water take from the Ronlow Beds is less than 0.015 ML/day. This modelled take occurs indirectly a very slight reduction in flow from the Moolayember Formation to the Ronlow Beds and is considered negligible."
•Similarly, Appendix I states at p35: "Obviously the predicted peak water take of up to 9ML/day is inconsequential when compared to the estimated 65,000 million ML estimated to be stored within the GAB" (emphasis ours).

The groundwater assessment in the draft Environmental Impact Statement (EIS) included a groundwater model based on an extensive data set. Sensitivity analyses have been conducted for any areas of uncertainty in the model. The quoted sections of the draft EIS are a factual reporting of the project's potential to impact the Great Artesian Basin (GAB).

Submitter Issue Number 35.014 and 36.003
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•The proponent has failed to meet many requirements of the ToR. It is the duty of both the proponent and the assessing agency to ensure each and every ToR is properly responded to and addressed.

The draft EIS was subject to a rigorous adequacy review undertaken by the Office of the Coordinator General (OCG) prior to the public exhibition of the document. The primary purpose of

this review was to confirm that the draft EIS complied with the EIS TOR, to the satisfaction of the OCG.

Submitter Issue Number 35.015 and 36.009
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•Noise or vibration impacts on Matter of National Environmental Significance (MNES) is in the TOR but not mentioned in ecology chapter. Assessment should also include impacts from plane noise, including waterbird avoidance of noisy areas and reduced reproductive success.

Section 5.5.1 of the draft EIS Terrestrial Ecology Report (Appendix F) assesses noise and vibration impacts on fauna.

Submitter Issue Number 35.016 and 36.010
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•Short- and long-term predicted impacts on MNES (see ToR) is absent. Short and long-term isn't actually defined anywhere.

Section 5 of the draft EIS Terrestrial Ecology Report (Appendix F) discusses the full range of potential impacts on MNES, including short-term and long-term impacts. Where relevant, the discussion of individual impacts distinguishes between impacts expected to be short-term, long-term or residual.

Submitter Issue Number 35.017 and 36.011
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•Detailed assessment of the reliability, date and uncertainties of information used to determine impacts on MNES is missing (see TOR). For example when identifying MNES there is an error margin in geographic location of species, (excluding the general trend of giving the location of listed species in wildlife online the midpoint of a grid), it's a poorly surveyed area overall, some species may only be there in summer and that period wasn't surveyed, and not all Regional Ecosystems were surveyed.

The information described in this submission is provided in various places in the draft EIS Terrestrial Ecology Report (Appendix F). In particular, the date of the field surveys is clearly described in Section 3.2.1. Section 3.5 describes any limitations in the field survey methodology and habitat modelling, and the manner in which these limitations have been overcome. With respect to the issue of seasonality, field surveys were undertaken over multiple seasons in order to address the issue of seasonal movement of species. The assessment was also able to draw on the results of field surveys undertaken for the proposed Carmichael Coal Mine and Rail Project (CCM&RP) EIS. These included multiple surveys undertaken on land adjacent to (or overlapping) the project site. Finally, in instances where a threatened species was not recorded during field surveys, but had the potential to occur based on available habitat, a conservative approach was adopted and the species was assessed in the same way as species that were recorded during field surveys.

Submitter Issue Number 35.018 and 36.012
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•The comparative description of the impacts of project alternatives on MNES is missing (see ToR), and the analysis of how the project conforms to the objective of sustainable development (ToR) is missing.

Section 4.16 of the draft EIS describes project alternatives, including alternatives relevant to ecological impacts. As noted in this section, opportunities for alternative layouts are constrained by the location of the coal resources and the area available for construction of infrastructure on the project site.

Section 2.4 of the draft EIS includes a description of how the objectives and principles of ecologically sustainable development have been considered during the development of the project.

Submitter Issue Number 35.020 and 36.092
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•The proponent was required to do standard biocondition assessments for areas requiring offsets (see ToR), however no biocondition sites and assessment is provided for review.

Refer to response to issue 24.006.

Submitter Issue Number 35.022 and 36.094
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•The proponent failed to undertake proper survey work to meet the diversity of species and their habitat. Wide-ranging species likely to have been missed due to this reason and matters of daily and seasonal timing of survey. Little or no blossom during surveys thus influencing detected species. No locations had a repeat survey. A difference in bird survey effort between sites.

Ecological surveys for the draft EIS were undertaken in accordance with all relevant guidelines. Refer also to response to issue 35.017 regarding the limitations of the surveys.

Submitter Issue Number 35.023 and 36.069
Draft EIS of terms of reference (ToR) requirements fail to be met, for example:
•The proponent failed to undertake proper assessment in relation to the railway link as identified within the draft EIS. Further assessment and public submission will be required for this transport impact.

Section 4.13.2 of the draft EIS clearly explains the off-site rail infrastructure that is required for the project and the uncertainty around the location of off-site rail infrastructure. As such, the off-site rail infrastructure that the proponent will be responsible for will be subject to separate environmental impact assessment and approvals and is, therefore, not described in the draft EIS.

Submitter Issue Number 35.024 and 36.095

The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:

•Omission of one EPBC and State Vulnerable sp. Corymbia clandestina (Qld: Vulnerable under Nature Conservation Act (NCA) (Wildlife) Regs current 12/12/2014). Entirely absent from EIS. Known location is in centre of ML70517. The proponent relied upon Qld Wildlife Online Database but one record comes from the Atlas of Living Australia. It is apparent the proponent is aware of this resource (CHAH 2015 in references). Mining exploration is a threat for this species under Australian Government approved conservation advice.

The EIS TOR did not specifically require a search of the Atlas of Living Australia to be conducted. It is not typically the primary source of species records utilised for an EIS, given this database is known to contain unverified and inaccurate records. An EIS will typically preference records contained within verified databases such as Wildlife Online and the EPBC Act Protected Matters Search Tool. It should also be noted that this record is from 1978 (i.e. is 38 years old), and appears to be a single record of this species.

The EHP notes that *C. clandestina* is closely related to both *C. lamprophylla* and *C. arnhemensis* (both Least Concern species under the NC Act) and these species differ only slightly in some floristic characteristics (refer http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/species/?corymbia-clandestina). Furthermore, *C. lamprophylla* is common in the vicinity of the project site, and *C. lamprophylla* was identified in the project site during field surveys. It is therefore feasible that the single record of *C. clandestina* recorded in 1978 in the Atlas of Living Australia was misidentified.

Regardless, the record is within the northern limb of the project site, where project activities are limited to underground mining. In the unlikely event this species is present, the potential impacts from the project would be limited to disturbance associated with the subsidence crack rehabilitation program and clearing associated with minor remedial drainage earthworks due to subsidence. These impacts are discussed in Section 9.6.3 and 9.6.4 of the draft EIS. The draft EIS Subsidence Management Plan (Appendix B) also includes a vegetation monitoring program which will be undertaken to confirm that subsidence does not give rise to impacts greater than those listed in the draft EIS Terrestrial Ecology Report (Appendix F) and to identify additional mitigation measures in the event of unanticipated impacts.

Submitter Issue Number 35.025 and 36.096

The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:

•The Death Adder is Near Threatened under NCA. The integrity of natural processes of habitat of this species (see ToR) is missing. Such information may exist in Appendix H (offsets) however this information has been withheld from the public.

The draft EIS Terrestrial Ecology Report (Appendix F) contains a comprehensive assessment of threatened species, and all other Matters of National Environmental Significance (MNES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Matters of State Environmental Significance (MSES) under the Queensland *Environmental Offsets Act 2014*. Near Threatened species are not MNES or MSES and offsets are not required for these species. The EIS TOR does not require a specific assessment of Near Threatened species.

Submitter Issue Number 35.026 and 36.097
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Effect of broadscale clearing on daily/weekly/seasonal movement of nectivores not clearly assessed and explained. Some species may not have been recorded because only a couple of seasonal conditions were surveyed. Fragmentation is noted as an impact of the proposed mine. This ties into enunciation of impacts that need to be described under Environmental Protection Act, but we can't see precisely what the effects will be nor how they will be addressed.

Surveys were undertaken over several seasons, including the end of the wet season and the dry season. The assessment was also able to draw on the results of CCM&RP's field surveys, which included multiple surveys, over several years, on land adjacent to the project site. The effect of clearing, for all species (including nectivores) is addressed in Section 5.2.6 of the draft EIS Terrestrial Ecology Report (Appendix F).

Submitter Issue Number 35.027 and 36.098
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Red goshawk (Endangered NCA) (solitary, secretive and silent) has large range with indications of seasonal movement from range country to lowlands. Large intact areas of rugged terrain (eg. of the nature of the patch of which these mines occurs) are required habitat. There may not be many individuals of the species utilising the area (thus a significant component of the total population). Red Goshawk (*Erythrotriorchis radiatus*) recommended survey effort inadequate as per guidelines.

The Red Goshawk was assessed in the draft EIS Terrestrial Ecology Report (Appendix H of Appendix F) and found to have a low potential to be present in the project site. This assessment took into account field survey results, the results of other studies undertaken in the region (e.g. CCM&RP EIS), a literature review and the availability of habitat within the project site.

Submitter Issue Number 35.029 and 36.014
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Climate Change is a threatening process for the Australian breeding ground of *Rostratula australis* (Aust. Painted snipe) (amongst other species). This project is not consistent with approved conservation advice for this and other species which have climate change as a threatening process under recovery plans or other approved conservation advice.

Appendix L.3 of the draft EIS Terrestrial Ecology Report (Appendix F) assesses the impact of project activities on the Australian Painted Snipe, and includes a section which considers the consistency of the action with conservation advice for this species. Broader impacts of climate change on this, or any other species, are typically beyond the scope of an EIS. There is no requirement in the EIS TOR to assess the ecological impacts of climate change on the breeding grounds of the Australian Painted Snipe or any other species.

Submitter Issue Number 35.030 and 36.099
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Proponent's sightings of the Black Throated Finch and other MSES should go in to an updated essential habitat map in the EIS to ensure clear and appropriate assessment.

The sightings of the Black-throated Finch (BTF) and other MSES are provided in the draft EIS (refer Figure 14 of the draft EIS Terrestrial Ecology Report (Appendix F)).

Submitter Issue Number 35.032 and 36.100
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•The groundwater Conceptual Model identifies potential impacts to the water table that affects Lake Buchanan. No assessment of Lake Buchanan related GDE (groundwater dependent ecosystem) has been made, including impacts to migratory bird species, their food, and the unique suite of endemic microfauna found there.

The draft EIS does not predict an impact on Lake Buchanan. Please refer to the draft EIS Groundwater Report (Appendix I) for further detail.

Submitter Issue Number 35.033 and 36.022
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•No assessment of air particulate matter and impacts to Lake Buchanan has been made.

Please note that Lake Buchanan is 17 km from the project site. As indicated in the draft EIS Air Quality Report (Appendix L), predicted particulate concentrations at Lake Buchanan are well within

the relevant air quality goals. Refer to response to issue 35.032 in relation to groundwater impacts on Lake Buchanan.

Submitter Issue Number 35.034 and 36.008
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•The proponent has failed to include multiple and historical bird surveys that have been done on Lake Buchanan and are not considered in the EIS.

A detailed desktop assessment was undertaken as part of the draft EIS Terrestrial Ecology Report (Appendix F), including a literature review. Species records from field surveys inform the databases that are available, and which were searched as part of the desktop assessment. The database search undertaken as part of the terrestrial ecology study included an area that extended beyond the project site. In the case of the Queensland Museum Database, the database search included a search area extending 25 km from the boundary of the project site. This search area includes Lake Buchanan.

.**Submitter Issue Number 35.035 and 36.023**
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•No assessment of air particulate matter has been undertaken to ensure impacts to local flora and fauna species are identified and addressed. For example it should be noted that in the Northern Territory that there is a reasonable link between the demise of Gouldian Finch in areas of increased dust. The proponent should further the assessment of PM205-10 impacts on the environment.

Section 5.5.4 of the draft EIS Terrestrial Ecology Report (Appendix F) includes discussion of the potential impacts to flora and fauna from dust.

Submitter Issue Number 35.036 and 36.101
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Weed management strategies have to be included in the main body of the EIS (ToR requirement) yet are not. The proponent has only referred to a weed management plan that will be prepared.

As noted in the submission, the draft EIS contains a commitment to the preparation of a Feral Animal and Weed Management Plan (refer Section 9.7.3 of the draft EIS). This section outlines the matters that will be addressed in the plan, and includes a commitment to detailed weed mapping, monitoring for the presence and abundance of exotic species and the provision of information on weed control (including control strategies, timing and specification for follow up works). This level of information in relation to weed management is appropriate and not inconsistent with the EIS TOR.

Submitter Issue Number 35.037 and 36.102
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•The EIS failed to identify any member of the cactus family or rubber vine or Parkinsonia aculeata, all of which are within the project and nearby area; the latter appearing in their Herbrecs search and a class 2 declared weed in Qld and weed of national significance.

Please refer to response to submitter issue 35.036 in relation to weed management. As noted in this response, detailed weed mapping will be undertaken as part of the implementation of a Feral Animal and Weed Management Plan.

Submitter Issue Number 35.038 and 36.103
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•There's no climate change avoidance, mitigation or adaptation plan in the ecology section. The proponent is required to address climate change on other aspects of the project in other EIS sections (ToR). The proponent states that impacts of climate change on habitats in the study area are unclear. Such a statement does not remove the requirement to identify foreseen impacts on ecological communities and species elsewhere in the ToR.

Please refer to Section 5.7 of the draft EIS Terrestrial Ecology Report (Appendix F) which considers the potential impacts of climate change on terrestrial ecology values.

Submitter Issue Number 35.039 and 36.104
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Assessment of 'indirect' impacts of the project on terrestrial ecology are lacking, particularly on localised off-site areas, eg. higher stream flow where its channelled, lower stream flow where it's cut off, changes in inundation regime, effect of subsidence on ephemeral waterholes. Further assessment needs to be made to ensure localised and downstream impacts are understood and properly assessed, including the quality and abundance of water throughout the seasons from impacted and overland water flows.

The impacts of the project on surface drainage are discussed in Section 13 of the draft EIS. There are no off-site surface water impacts that are likely to have a significant indirect impact on terrestrial ecology, as suggested in the submission. The impacts of subsidence on surface drainage and seasonal surface water are discussed in draft EIS Sections 13.6.4 and 10.6.3, respectively.

Submitter Issue Number 35.040 and 36.105
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•The proponent has failed to assess potential impacts of aircraft on any species.

Section 5.5.1 of the draft EIS Terrestrial Ecology Report (Appendix F) assesses noise and vibration impacts on fauna.

Submitter Issue Number 35.041 and 36.019
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•Release of materials from the mine area into watercourses – eventually residing in the Burdekin Dam and the Great Barrier Reef are not explicitly mentioned, modelled or assessed.

The impacts of the release of mine affected water on downstream aquatic biology, including the Belyando River, is discussed in Section 10.6.4 of the draft EIS.

Submitter Issue Number 35.042 and 36.070
The EIS has failed to identify known and listed species, and fails to properly assess known species, such as the following:
•An assessment of cumulative impacts of this project, along with other coordinated projects is required. The project is a threatening process of fragmentation and assessment of habitat destruction associated with Galilee Basin mining projects, including South Galilee, China First, Alpha, Kevin's Corner, and Carmichael in terms of endangering ecosystems or species is required.

Please refer to Section 5.8 of the draft EIS Terrestrial Ecology Report (Appendix F) which considers cumulative impacts of the project (and all of the other projects listed in the submission) on ecological values.

Submitter Issue Number 35.043 and 36.109
Important facts in relation to stygofauna found within the project area require further assessment, for example:
•The aquatic ecology chapter identified a mite at the bottom of a bore that had no pigment and no eyes. The fact of this discovery and the potential for this underground species has not been ruled out. The proponent is required to undertake a stygofauna assessment and failed to undertake the survey in an appropriate manner to enable non contaminated samples to be collected, as such a proper stygofauna assessment needs to be undertaken to ensure appropriate assessment, and community comment.

Section 12.4.10 of the draft EIS indicates that the mite is unlikely to be an obligate stygofauna taxon, given the depth from which the groundwater sample was collected. In particular, the sample was collected at a depth in excess of 80 m below ground level. This depth is typically inconsistent with stygofauna development, except in the presence of limestone caves and subterranean voids (which do not occur in this project site).

The entrainment of soil and vegetation during drilling and construction of a bore is not uncommon, particularly for deep bores. The bores in question are 91 m deep (MB08) and 110 m deep (MB26).

Having some surface material entrained in bores at this depth is a practical reality of fieldwork, not a deficiency in the survey methodology.

Submitter Issue Number 35.049 and 36.079
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
b) Further to the above and to support the need for a full mine closure plan provided for public submission and assessment of the draft EIS:
•figure 8-4 – does not provide vertical scale. It is expected a full digital terrain model of the post-mining landscapes which look like natural landscapes not rectilinear (30 years) be provided to ensure an understanding of the rehabilitated lands and closure needs.
•figure 8.5 - should show what the mine landforms will look like, to scale from different vantage points (using 3D conceptual images). There is no vertical scale on any of these figures - there are what appear to be contours but they are unlabelled.

This part of the submission raises a number of issues relating to the rehabilitation proposed in the draft EIS that are not required by the EIS TOR. The draft EIS provides information about decommissioning and rehabilitation that is consistent with the requirements of the EIS TOR. In addition, rehabilitation of mines in Queensland is regulated by conditions outlined in an Environmental Authority (EA) that is approved by the Department of Environment and Heritage Protection (EHP). The draft EIS Attachment 24-3 includes rehabilitation goals, objectives, indicators and completion criteria that were developed in accordance with the EHP Guideline *Rehabilitation Requirements for Mine Resource Activities.* This table is typically used as a basis for the rehabilitation conditions in an EA and is refined, as necessary, prior to the finalisation of the EA, to the satisfaction of the EHP. The project mining lease cannot be relinquished until these agreed rehabilitation completion criteria are met to the satisfaction of the EHP. The progressive rehabilitation to be undertaken during the life of the project is also documented in the project's Plan of Operations which is periodically submitted to the EHP for approval.

Submitter Issue Number 35.050 and 36.080
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
c) The Queensland Audit Office
•Following the 2013-2014 Queensland Audit Office assessment of environmental regulation, and compliance, within the context of mitigation of negative mining legacies, it is unclear how the proponent proposes to ensure this mine will meet the Queensland Governments expectation to ensure mining activity legacy is properly made.
See:https://www.qao.qld.gov.au/files/file/Reports%20and 20publications/Reports%20to%20Parliament%202013-14/RtP15Environmentalregulationoftheresourcesandwasteindustries.pdf
•As the proponent has not submitted a proper rehabilitation and mine closure plan, it is unclear how often are rehabilitation audits will be undertaken to check quality and quantify of rehabilitation and closure works.

Refer to response to issue 35.049.

Submitter Issue Number 35.051 and 36.081
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•The draft EIS to rehabilitation provides many motherhood statements about rehabilitation and how it will be undertaken, through the use of the term 'standard methods'. However the proponent fails to identify what these are, including what studies have been undertaken to justify the assumptions provided in the EIS report.

Refer to response to issue 35.049.

Submitter Issue Number 35.053 and 36.083
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•Best practice and fundamental industry standards, as outlined by the International Council on Mining and Metals have not be followed.

Refer to response to issue 35.049.

Submitter Issue Number 35.054 and 36.084
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•The EIS presents a lot of data but what is missing is how all of that translates into effective management of soils, sympathetic design of landforms (curves/concave slopes, natural looking landforms which are stable and sustainable), post-mining land uses which the community has agreed all tied together with a rehabilitation schedule showing how the landforms will be built and progressively rehabilitated over the life of the project (with firm years… year 1, year 2 etc) and non-polluting landforms and water storages can be objectively evaluated.

Refer to response to issue 35.049.

Submitter Issue Number 35.055 and 36.106
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•p6 appendix D needs to demonstrate that sufficient samples of each lithology have been gathered to be representative of the waste and ore (in line with GARD guide) industry standard. See here: http://www.gardguide.com/index.php?title=Main_Page

Refer to response to issue 35.049.

Submitter Issue Number 35.056 and 36.107
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•The proponent needs to state how many lithologies and how the sampling ensures representativeness against a standard. These records should be reviewed by a specialist to interpret if there is a need to segregate net acid producing wastes. It is not clear from the available data that there are going to be any specific measures applied.

Refer to response to issue 35.049.

Submitter Issue Number 35.057 and 36.108
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
d) Rehabilitation 'standard methods' not defined
•Final pit void water quality should be provided - via limnological modelling and an understanding of groundwater and geochemistry of pit walls. This should be referencing numerous reports from ACARP (there are a number of research projects on voids)

Refer to response to issue 35.049.

Submitter Issue Number 35.060 and 36.087
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
e) Community Engagement and Closure Plan
•section 8.2.5 highlights that the proponent has not adequately address mine closure - this should be done up front to conform to the ToR.

Refer to response to issue 35.049.

Submitter Issue Number 35.061 and 36.088
The draft EIS fails to comply to the ToR 4.6. Decommissioning and rehabilitation, and 5.9. Waste, including through the following key points.
f) Assessment professionals
•It is unclear if the rehabilitation professionals working on EIS are AusIMM members and Chartered Professionals (CP status) under AusIMM as a minimum. Further work is required by properly accredited professionals on the rehabilitation and closure plan, and made available for public submissions.

Refer to response to issue 35.049.

Submitter Issue Number 35.062 and 36.024

The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:

a) The Project China Stone mine will exceed nationally regulated safe levels of PM10 and PM2.5 and place locals and workers at risk:

•Air quality standards are not aligned to current national and state government objectives. P.15-3 Table 15-2 lists the relevant air quality objectives. Australia's environment ministers are currently varying the PM10 and PM2.5 standards. At their 14 July meeting ministers agreed to move to a 24 hour average PM2.5 standard of 20µg/m3 and an annual average concentration of 7µg/m3 over time. These should be used as the objective for this assessment.

See http://www.environment.gov.au/minister/hunt/2015/pubs/mr20150717.pdf for details. The decision regarding new PM10 standards was deferred until December. A stricter standard for 24 hour average PM10 concentrations is proposed (either 40 or 30ug/m3) and a new standard for annual concentrations of PM10 (20µg/m3). These new standards should be set as the objectives for new coal mines, and this mine assessed as such.

Section 2.5 of the draft EIS Air Quality Report (Appendix L) adopted air quality criteria that are currently applied to mines or power stations in Queensland. It is not appropriate to adopt criteria that are speculative.

The submitter's statement that "*the Project China Stone mine will exceed nationally regulated safe levels of PM10 and PM2.5 and place locals and workers at risk"* is incorrect. The draft EIS predicted all air quality parameters to be below the applicable air quality objectives at all sensitive receptors.

Submitter Issue Number 35.063 and 36.025

The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:

a) The Project China Stone mine will exceed nationally regulated safe levels of PM10 and PM2.5 and place locals and workers at risk:

•p.15-7 PM10 concentrations attributable just to the China Stone project are predicted to increase from the background concentration of 18.8micrograms/m3 to as high as 37micrograms/m3 – an increase of 18.2micrograms/m3 (or 97%).

Refer to response to issue 35.062. The quoted predicted concentrations are factually correct for the closest sensitive receptor to the site. All other receptors are predicted to have lower concentrations of $PM_{10,}$ as shown in Table 15-5 of the draft EIS. It is noted that the predicted 24 hour average ground-level concentration of PM_{10} at the closest receptor remains well below the air quality objective of 50 $\mu g/m^3$.

Submitter Issue Number 35.064 and 36.026

The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:

a) The Project China Stone mine will exceed nationally regulated safe levels of PM10 and PM2.5 and place locals and workers at risk:
•p.15-13 (Table 15-10) When the cumulative impacts of CCM&RP and MPP are considered, PM10 concentrations will increase to as high as 65.6µg/m3 at Dooyne Outstation and 65.2µg/m3 at the proposed Carmichael Coal Mine Accommodation Village. These concentrations are well above the current NEPM standard of 50µg/m3. The proponents table is not clearly identifiable as it includes several 'Ambient background' concentrations, contrary to the one baseline concentration of 18.8µg/m3 in Table 15-4.

Refer to response to issue 35.062. As explained in Section 15.8.11 of the draft EIS, the project's contribution to the cumulative impact is minor at the Dooyne Outstation (11.4%) and the Accommodation Village (2.8%). At both of these receptors, the air quality objective was predicted to be exceeded due predominantly to the Carmichael Coal Mine.

Submitter Issue Number 35.065 and 36.027
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
a) The Project China Stone mine will exceed nationally regulated safe levels of PM10 and PM2.5 and place locals and workers at risk:
•24 hour average concentrations of PM2.5 will increase from a background of 3.3µg/m3 by as much as 5.2µg/m3 (150%). At Dooyne Outstation and Bowie Homestead, PM2.5 concentrations are predicted to exceed the current NEPM standard of 8µg/m3.

Refer to response to issue 35.062. The NEPM standard referenced refers to an annual average concentration of $PM_{2.5}$. As shown in Table 15-5 the predicted annual average ground-level concentrations of $PM_{2.5}$ are below the relevant air quality objective at all sensitive receptors, including Dooyne Outstation (3.4 µg/m^3) and Bowie Homestead (3.7 µg/m^3).

Submitter Issue Number 35.066 and 36.028
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
b) The proponent has not properly assessed and developed air quality management practices to enable submissions to be made to the impacts and mitigation:
•p.15-2 This section argues for a focus on PM2.5. The particle size most strongly associated with mining is PM10 and there is significant national and international literature describing a range of adverse health impacts from particles in the size range PM2.5-10.

Noted.

Submitter Issue Number 35.068 and 36.030
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
c) In the case of China Stone, just 14 lines of text are provided to describe the intended pollution

mitigation measures (pp.15-14; 15-15). The apparent justification for this is the 'considerable distance to the closest receptor."
The China Stone air quality assessment included the key mining activities:
•Trucking Run of Mine coal from the open cut mining areas to the ROM coal stockpiles
•Trucking overburden from the open cut mining areas to the overburden emplacement areas
•Transport of coal by conveyor
•Crushing and processing of coal at the Coal Handling and Preparation Plant
•Wind erosion of stockpiles
•Stacking and reclaiming of coal at stockpiles
•Loading coal onto trains
The air quality assessment proposes the following generic dust mitigation measures:
•Haul roads will be watered
•Progressive rehabilitation will be conducted on the open cut mine overburden emplacement areas.
•Inactive disturbed areas will be rehabilitated as soon as possible.
•Electrostatic precipitators will be installed on the power station to minimise emissions of particulate matter
•Compliance with the relevant requirements of the Aurizon Coal Dust Management Plan at the train loading facility

Noted.

Submitter Issue Number 35.069 and 36.031
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
d) The proponent has not developed publicly assessable strategies to ensure public safety is prioritised:
•There is no EHP air quality monitoring in the region (p.15-5). The proponent of the Project China Stone mine, along with its power station will contribute to and impact public safety through increased levels of PM10 and PM2.5 materials. By comparison, the NSWEPA along with mine developers has 14 monitoring sites in the Hunter Valley to protect the community. http://www.environment.nsw.gov.au/aqms/20090735upperhunterAQM.htm

The submitter's recommendation that the EHP install an air quality monitoring station in the region is noted.

Submitter Issue Number 35.070 and 36.032
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
e) The proponent has not properly assessed the cumulative impact of its development and that of the surrounding environment and other mine developments:
•A cumulative impact assessment (Appendix L) was undertaken that considers the impacts of the Carmichael Coal Mine and Rail Project (CCM&RP) and Moray Power Project (MPP). In each case,

the cumulative impact assessment only focused only on the two pollutants that were closest to the relevant regulatory objective – PM10 concentrations associated with Carmichael and NO2 concentrations associated with Moray (p.15-12).

Noted. These pollutants were selected for the cumulative assessment as they will have the most potential for significant cumulative impacts.

Submitter Issue Number 35.071 and 36.033
The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
e) The proponent has not properly assessed the cumulative impact of its development and that of the surrounding environment and other mine developments:
•The CCM&RP doesn't reach the same conclusion as the China Stone EIS - that PM10 levels in the CCM&RP village will exceed the NEPM standard. There are two reasons for this. First, the modelling for Carmichael is based on a lower assumed baseline (pre-development) PM10 concentration of 11ug/m3 rather than the 18.8ug/m3 baseline concentration assumed for the China Stone EIS. Second, the impact assessment is specific to this project rather than a cumulative assessment that factors in China Stone. Such variation requires further assessment and the EIS updated accordingly.

By assuming a higher background air quality concentration for PM_{10}, Project China Stone is actually more conservative than the CCM&RP EIS air quality assessment. It is a standard approach for an impact assessment to consider the project in isolation and the cumulative assessment to consider other relevant projects that have the potential to have a cumulative impact.

Submitter Issue Number 35.072 and 36.034
"The assessment of air quality in the EIS has been inadequate and demonstrates unacceptable impacts for reasons including the following:
e) The proponent has not properly assessed the cumulative impact of its development and that of the surrounding environment and other mine developments:
•p.15-5, 15-6 Baseline ambient air quality is based on "air quality assessments from other coal mines in the region". It is not clear what the references for this assessment was based on, or how recently it was made. It is not clear what methodology was used or if this methodology was compliant to Qld, national or best practice standards, and thus can not be assessed properly. This baseline assessment does not include reference to an annual average PM10 concentration, and an annual average is currently being considered by Australia's environment ministers
(see http://www.environment.gov.au/protection/nepc/nepms/ambient-air-quality/variation-2014/impact-statement).

Section 4.4 of the draft EIS Air Quality Report (Appendix L) provides more detail on the methodology and references related to the determination of baseline ambient air quality in the absence of data from monitoring stations.

Refer to response to issue 35.062 regarding the consideration of speculative objectives.

Submitter Issue Number 35.078 and 36.042
Stated commitment to follow DSDIP SIA Guidelines 2013, but falls well short of best practice research methods and community engagement as part of SIA process on which a social license to operate could be achieved, as set out by the International Association for Impact Assessment:
•The SIA fails to consider socio-economic impacts that extend beyond the mine itself, but which are vital to the viability of the mine (ie. transport infrastructure). It is broadly accepted best practice in SIA and broader EIS to consider the whole of project impacts.

This part of the submission raises a number of issues relating to the methodology of the draft EIS Socio-Economic Impact Assessment (SIA) Report (Appendix N). The SIA was undertaken in accordance with the EIS TOR and relevant guidelines, including the DSDIP SIA Guideline 2013. The submitter's implications that the SIA is inadequate or contains omissions are not valid. Attachment H - Additional Information on SIA provides further clarification on SIA issues that were raised by the Department of State Development (DSD).

As stated in Section 4.13 the draft EIS was limited to the mine only and off-lease infrastructure required for the project will be subject to separate environmental impact assessments and approvals. These assessments will include consideration of socio-economic impacts of those projects.

Submitter Issue Number 35.079 and 36.043
Stated commitment to follow DSDIP SIA Guidelines 2013, but falls well short of best practice research methods and community engagement as part of SIA process on which a social license to operate could be achieved, as set out by the International Association for Impact Assessment:
•'Health' and 'change in rural character' impacts (eg. impacts to visual amenity) are not considered within the SIA, but relegated to other parts of the EIS, thereby overlooking consideration of the ways such impacts may affect quality of life in communities surrounding the project area. These should be considered in the SIA, thereby adopting a more holistic approach to analysis of impacts.

Section 6.6 of the draft EIS SIA Report (Appendix N) is titled Community Liveability and specifically considers the ways the project may affect the quality of life for residents, employees and visitors. The section includes discussion of accessibility, safety and health, local environmental conditions and the quality of social interactions.

Submitter Issue Number 35.080 and 36.044
Stated commitment to follow DSDIP SIA Guidelines 2013, but falls well short of best practice research methods and community engagement as part of SIA process on which a social license to operate could be achieved, as set out by the International Association for Impact Assessment:
•The SIA fails to consider impacts of a mine closure (p. 4 Appendix N). A mine closure could be expected to have 'high risk' impacts, and on this basis should be considered as part of the SIA. The SIA Report (p. 18) states it will address 'construction, operation and decommissioning' of the

proposed mine, yet omits the serious issue of a mine closure earlier than estimated decommission date.

The full quote from this part of the draft EIS SIA Report (Appendix N) is relevant to this response:

"*Consistent with advice from the Department of State Development (DSD), the SIA considers the impacts associated with the first 20 years of operation, acknowledging the limitations associated with predicting social impacts beyond this period. Mine closure and mine rehabilitation are therefore not considered in any detail in the SIA, however these elements have been described elsewhere in the EIS*."

Although mine closure was not considered in detail in the SIA, the social aspects of mine closure will be addressed in social impact management planning conducted during the 50 year mine life and as part of standard progressive mine closure planning over that time.

Submitter Issue Number 35.081 and 36.045
Stated commitment to follow DSDIP SIA Guidelines 2013, but falls well short of best practice research methods and community engagement as part of SIA process on which a social license to operate could be achieved, as set out by the International Association for Impact Assessment:
•The International Association for Impact Assessment (IAIA) is the global authority on best practice in the use of impact assessment for informed decision making regarding policies, programs, plans and projects. The IAIA provide International Principles for Social Impact Assessment that establishes minimum standards for SIA practices, and provides an articulation of best practice in SIA as a model to aspire to.

Noted.

Submitter Issue Number 35.082 and 36.046
Stated commitment to follow DSDIP SIA Guidelines 2013, but falls well short of best practice research methods and community engagement as part of SIA process on which a social license to operate could be achieved, as set out by the International Association for Impact Assessment:
•Firstly, the IAIA define SIA as including processes for analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions" (Vanclay, 2003, p. 6). This SIA falls well short in this regard, given its primary focus on positive impacts (ie. employment) and very limited focus on negative impacts (poor research methods reduce capacity of SIA to identify and document negative impacts, a theme we return to below).

The SIA was conducted in accordance with the EIS TOR, which do not require the project to address IAIA research methods for the SIA.

Submitter Issue Number 35.083 and 36.047

Key principles of SIA which the report falls short on in relation to IAIA principles (drawing from Vanclay, 2003):

1. Stakeholders should be included in the assessment of social impacts – on the basis of methods described and social impacts documented, there is no evidence that diverse stakeholder consultation was undertaken. For example, there is no evidence that women, indigenous or marginal groups were included in primary data collection. This stands counter to international principles of SIA, which should "encompass empowerment of local people, enhancement of the position of women, minority groups and other disadvantaged groups".
2. The improvement of social wellbeing of the wider community should be explicitly recognised as an objective, and as such should be an indicator considered by the assessment process. Here, the primary concern should be upon the differential distribution of impacts among different groups in society, and particularly the impact burden experienced by vulnerable groups in the community (p. 3). Again, no evidence that vulnerable groups (eg. women, indigenous) considered in data collection for base line study.
3. Identification of social impacts should include changes to peoples' way of life (for example how they live, work, play and interact with one another); their culture (including shared beliefs, customs and values), community (cohesion, stability and character), as well as fears and aspirations about the future of their community and for their children. Yet there is no evidence that data has been collected on these aspects.

Refer to response to issue 35.082 regarding IAIA research methods, and response to issue 35.079 regarding the consideration of social wellbeing and community liveability in the draft EIS SIA Report (Appendix N).

Section 3 of the draft EIS summarises the consultation undertaken for the project broadly and specifically for the SIA.

Submitter Issue Number 35.084 and 36.048

Shortcomings in SIA Research Methodology:

•An SIA is only as strong as the research methods on which it is based. There are some serious limitations to the methods employed in data collection for this SIA, which must be addressed to ensure the rigor and credibility of results presented.

•Firstly, there are significant limits in the methods by which knowledge of indigenous peoples was gathered, and failure to consider in proper detail the significance of Indigenous culture in this region.

•The SIA states that consultation with landholders in the project area was undertaken, and on this basis it was concluded there is "no contemporary use of the project site by indigenous people" (p. 102, Appendix N). There are a number of reasons why this method is problematic; including relying on a few landholders to speak for Indigenous people, including people who live remote to the land itself (2 of the 3 property owners do not live on the land in the project area – bizarre to expect them to speak for Indigenous connection to the land in question).

•In improving this method, direct engagement with the Indigenous community is required, so as to

address this current failing in the SIA. Additional data collection needed, including evidence talked to indigenous communities.
•The need for this is particularly acute, given the SIA identifies the Indigenous population to be above the state average, with an estimated 3% of the local community identified as Indigenous.
•It is also out of step with broader the broader values of the region to discount significance of indigenous communities. For example, in Charters Towers, the SIA acknowledges that community indigenous (and military) history is something community members are proud of, and part of the townships rural character, something to which they trade on in their tourism industry (p. 57 Appendix N). The SIA also acknowledges some tensions between mining industries and the town of Charters Towers, "impersonal communication also identified as major barrier to mining sector engagement in Charters Towers. (p. 59), as such, the industry would be wise to engage more effectively with diversity of community, especially if it seeks to obtain social license to operate.

As stated in Section 5.1 of the draft EIS SIA Report (Appendix N) there is no defined and separate Indigenous community (for example Woorabinda Aboriginal Shire) residing either within the project site or in proximity to the project site. In relation to consultation for the draft EIS, the legal representatives of the Wangan and Jagalingou People were contacted in relation to an offer to meet and discuss the draft EIS. The offer of a meeting was declined. Consultation with Indigenous training organisation, Jenagar Training, was also undertaken during preparation of the draft EIS SIA Report (Appendix N).

As discussed in Section 20.2.2 of the draft EIS, the proponent is required to prepare a Cultural Heritage Management Plan (CHMP) for the project in accordance with the *Aboriginal Cultural Heritage Act 2003*. The CHMP will be developed prior to commencement of construction in consultation with the relevant Aboriginal parties for the project and will address the management of Aboriginal cultural heritage on the project site. In addition, as stated in the draft EIS, the proponent will negotiate with the Wangan and Jagalingou People, as the registered Native Title claimants, in accordance with the requirements of the *Native Title Act 1993*.

Submitter Issue Number 35.085 and 36.049
Shortcomings in SIA Research Methodology:
•Secondly, clarification in terms of the assumptions that informed the process of data collection with landholders is required. The SIA reports local landholders saw China Stone has having 'low risk' in terms of affects on social values. Clarification is required as to whether discussion with landholders on this topic started from the assumption that CCM&RP was already going ahead, with its attendant impacts. It may be the case that landholders spoke about impacts of the project in terms of social values on the basis that the directly adjacent project was already established (or in construction). Given the SIA works from starting point that project established, it is imperative to get clarity on methodology around data collection with landholders.

The presence (or not) of the CCM&RP is largely irrelevant in the context of landholders that will be directly impacted by Project China Stone.

Submitter Issue Number 35.086 and 36.050

The assessment is based on a false assumption, and on this basis makes a series of improper assertions, and fails to collect required data on which a proper assessment can be made. The SIA builds from a false assumption; that the CCM&RP exists. On the basis of this false assumption, it makes a number of misleading statements:

•Firstly, the SIA states the CCM&RP will already have induced changes, and as such, China Stone will simply be a continuation of land use rather than a change in land use (eg. p. 134 Appendix N) – thus lowering the risks of any new changes brought about by China Stone.

It is a fact that the CCM&RP is significantly further advanced in the approval phase than Project China Stone, as the CCM&RP has received approvals from the State and Federal Governments. However, the CCM&RP has been, and continues to be, subject to repeated legal challenges from anti-mining environmental groups. As such, it is not possible to predict with any certainty the likely timing of the commencement of construction. However, it is noted that Adani are currently publicly indicating an intention to proceed with construction of the CCM&RP in 2017.

There are significant external factors that create uncertainty for the timing of the development of both projects. The proponent has committed to undertaking a review and revision of the SIA prior to the construction of the project. As such, in the event the project proceeds in the absence of the CCM&RP, the revised SIA will assess the change in land use solely from the project.

Submitter Issue Number 35.087 and 36.051

The assessment is based on a false assumption, and on this basis makes a series of improper assertions, and fails to collect required data on which a proper assessment can be made. The SIA builds from a false assumption; that the CCM&RP exists. On the basis of this false assumption, it makes a number of misleading statements:

•Secondly, the SIA states "it is worth noting that the CCM&RP to the south of the project site will likely have impacted the rural amenity of the region prior to the commencement of the CEW phase and as such the project would be a continuation of changes to amenity already occurring in the area." (p. 99 Appendix N).

Refer to response to issue 35.086.

Submitter Issue Number 35.088 and 36.052

The assessment is based on a false assumption, and on this basis makes a series of improper assertions, and fails to collect required data on which a proper assessment can be made. The SIA builds from a false assumption; that the CCM&RP exists. On the basis of this false assumption, it makes a number of misleading statements:

•The SIA is starting from the assumption that CCM&PR will already have caused an unknown and undefined level of impact to both land use and rural amenity, and China Stone's impacts are described as simply an extension of such impacts. Yet if CCM&RP does not go ahead – and it has had its license to operate withdrawn, and an additional two international funders have withdrawn financial support this month – then the scale of impacts is likely to be profound (and yet have not

been captured in the SIA). The SIA has failed to document these – particularly related to rural amenity.

Refer to response to issue 35.086. It is noted that Adani are currently publicly indicating an intention to commence development of the CCM&RP in 2017.

Submitter Issue Number 35.089 and 36.053
The assessment is based on a false assumption, and on this basis makes a series of improper assertions, and fails to collect required data on which a proper assessment can be made. The SIA builds from a false assumption; that the CCM&RP exists. On the basis of this false assumption, it makes a number of misleading statements:
•Thirdly, the SIA is based on the improper assertion that CCM&RP exists, and will collaborate with China Stone in the delivery of certain SIA compliance requirements.
Yet the SIA has failed to consider the viability of China Stone achieving these compliance requirements if CCM&RP does not go ahead. In particular, the SIA states the China Stone project will work with Adani to (1) ensure efficiencies in infrastructure upgrade (p. 104, Appendix N) and (2) to ensure regional emergency providers have adequate resources to respond to off-site project related incidents (p. 103, Appendix N).

In the event the project proceeds in the absence of the CCM&RP, the proponent for Project China Stone will continue to implement the commitments made in the draft EIS and would be solely responsible for the delivery of mitigation and management measures to address the environmental impacts of the project that are identified in the draft EIS.

Submitter Issue Number 35.090 and 36.054
The assessment is based on a false assumption, and on this basis makes a series of improper assertions, and fails to collect required data on which a proper assessment can be made. The SIA builds from a false assumption; that the CCM&RP exists. The current SIA has no contingency compliance requirements for China Stone as a sole operator in the northern Galilee.

Refer to response to issue 35.089.

Submitter Issue Number 35.091 and 36.055
There are omissions in findings presented, with outcomes that under-estimate the scale and types of socio-economic impacts:
•There is an under-estimate of the scale and types of impacts for those families, business and industries directly connected to the project site. The SIA states the project site covers 3 properties, and an additional property adjoining the southwestern boundary (p. 3, SIA report). It also states that only one couple resides within one of the three properties within the project area, and that the house itself is outside the project area. This description relegates people to the margins of the project area, thereby failing to capture anything of the story of these people or the scale of impact at the household, business and industry levels. A more detailed assessment across these scales – (household, private business and the livestock and tourism sectors) is urgently required.

The draft EIS SIA Report (Appendix N) factually reports the current structure of families, businesses and industries associated with the project site. The proponent is required to enter into land access agreements with the landholders within the project site.

The draft EIS Non-Indigenous Cultural Heritage Report (Appendix P) describes the non-Indigenous cultural heritage aspects of the project site.

Submitter Issue Number 35.092 and 36.056
There are omissions in findings presented, with outcomes that under-estimate the scale and types of socio-economic impacts:
•There is some important information that has been omitted, that must be considered as part of the SIA process to enable a fair assessment of household, private business and sector level impacts. For example, one of the three properties within the license area, Moray Downs, owned by Acton Land and Cattle, sold a controlling interest to Australian Country Choice (ACC) in July 2015. This joint venture between Acton Land and Cattle and ACC, represents one of the largest vertically integrated private beef operations in the country. An SIA must consider the impacts of the proposed mine for these large-scale livestock corporate actors, and for the livestock industry more broadly.
http://www.afr.com/business/agriculture/livestock/australian-country-choiceand-acton-join-to-boost-the-beef-supply-chain-20150712-giaheb

As indicated in Section 5 of the draft EIS, Moray Downs is owned by Adani Mining Pty Ltd.

Submitter Issue Number 35.093 and 36.057
There are omissions in findings presented, with outcomes that under-estimate the scale and types of socio-economic impacts:
•More detail should also be provided about the impacts of the proposed mine for property management, and the impacts of changes in property management for private business and the livestock industry. The SIA states the impacts for property management for 4 affected landholders are all protected by confidential negotiations. Yet it identifies at least one landholder will be required to change management approaches as a consequence of this project. The SIA fails to connect changes in property management (eg. transport costs to move livestock elsewhere for fattening) to impacts for private business and the industry. Questions such as – will changes in property management increase the cost of livestock handling, add new animal husbandry risks etc must be addressed within the SIA.

It is not appropriate to discuss commercial-in-confidence matters in a public document such as the draft EIS.

Submitter Issue Number 35.094 and 36.058
There are omissions in findings presented, with outcomes that under-estimate the scale and types of socio-economic impacts:
•The SIA is also misleading in stating that landholders see the project as having 'low risk' in terms

of affects for social values. An analysis of rural media indicates the Corbett family who own Hyde Park has deep concerns about the project and their engagement with the mining company. As it stands, the SIA downplays community concern and conflict, but it would do better to acknowledge and seek to deal with such concerns.
http://www.queenslandcountrylife.com.au/news/agriculture/agribusiness/generalnews/coal-mine-placing-so-much-at-stake/2482074.aspx?storypage=2"

Noted.

Submitter Issue Number 35.095 and 36.059
There are omissions in findings presented, with outcomes that under-estimate the scale and types of socio-economic impacts:
•The SIA concludes that due to the distance between the southern Galilee and this project area, significant cumulative social impacts are negligible. Yet this statement underestimates the culture of the livestock industry and related businesses. Further examination of impacts is needed.

The SIA conclusion is valid.

Submitter Issue Number 35.096 and 36.060
FIFO Employment model disconnected from local and regional planning and vision, yet no recommendations on how to manage the attendant problems:
•It is clear from the SIA that the employment model is FIFO. Yet what is also clearly reported is that most in affected areas do not like FIFO. FIFO is out of step with the local government agenda in Isaac. Eg. “Isaac continues to pursue sustainable growth outside of the FIFO mining industry”(p. 9 Appendix N). Similarly, Clermont “does not aspire to increase its non-resident workers population” p. 11 SIA). Added to this : the Isaac Region 2020 Vision 2009-2019 (IRC 2009), recognises mining as a major contributor to the economic development of the region, but focuses primarily on economic diversification and lifestyle improvements as major goals.” (p. 9)

Any employees residing within a 1 hour commute of the project site will be able to commute on a daily basis to the site. However, the project site is remote from any communities (the closest townships are Charters Towers, approximately 285 km by road to the north, and Clermont, approximately 260 km by road to the south-east). As such, the project requires a long-distance commuting workforce.

Submitter Issue Number 35.097 and 36.061
FIFO Employment model disconnected from local and regional planning and vision, yet no recommendations on how to manage the attendant problems:
•It is clear the employment plan for China Stone is out of step with the local government and regional agenda. As it stands, the SIA provides no recommendations to manage the expected tensions that will emerge.

Refer to response to issue 35.096. Section 7.3 of the draft EIS SIA Report (Appendix N) includes numerous measures to manage the proposed workforce accommodation arrangements that are required due to the remoteness of the project site.

Submitter Issue Number 35.098 and 36.062
FIFO Employment model disconnected from local and regional planning and vision, yet no recommendations on how to manage the attendant problems:
•A recent Federal Government FIFO Report charged the Australia Small Business Commissioner to ensure the capacity of small businesses to service the demands of the resource sector. There is no evidence in the SIA that the Commissioner been engaged, instead hollow statements about supporting local businesses, but a tangible plan is required.
http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_representatives_Committees?url=ra/fifodido/report.htm

Section 7.4 of the draft EIS SIA Report (Appendix N) describes the management strategies relating to regional development, which includes supporting local businesses. Attachment H – Additional Information on SIA also includes more information relating to these aspects.

Submitter Issue Number 35.099 and 36.063
As part of the traffic management plan – no detail is provided as to who will be paying for sealing the large section of Gregory Developmental Rd Road which is currently unsealed, as well as the cost of maintenance of this road.

The Gregory Developmental Road is sealed on the section that will potentially be impacted by the project, between Charters Towers and the Peak Downs Highway. The impacts of the project on the maintenance of the Gregory Developmental Road are addressed in the draft EIS Road Impact Assessment (Appendix O).

Submitter Issue Number 35.100 and 36.112
It is also not clear in Appendix N (p. 55) when it states “there is no defined and separate Indigenous community”. What does this mean?

There is no defined and separate Indigenous community (for example Woorabinda Aboriginal Shire) residing either within the project site or in proximity to the project site.

Submitter Issue Number 35.101 and 36.064
The Indigenous Participation Plan provides no detail about how indigenous inclusion will be achieved.

Attachment H – Additional Information on SIA provides more information relating to the Indigenous Participation Strategy.

Submitter Issue Number 35.102 and 36.065
The primary detail in the SIA relates to employment from the mine. A few issues require more information in this regard. The first relates to accommodation, where some details are simply not clear. For example, the SIA (p. 16) states 560 SPQs will be built in the first year. Yet the report also says accommodation can cater for up to 1,280 people. It is not clear; will workers be expected to share? As it stands, the data presented is unclear.

Section 4.3.5 of the draft EIS SIA Report (Appendix N) clarifies that the construction accommodation village will comprise approximately 560 rooms and operate on a motelling basis with a capacity of approximately 1,120 persons. Workers will not be expected to share rooms.

Submitter Issue Number 35.103 and 36.066
Feel good statements like "encourage the participation of local and under represented groups" (. P. 16, SIA) need to be matched with management plans. As it stands they are not, leaving these as hollow claims.

Attachment H – Additional Information on SIA provides more information on the proposed content of social management plans.

Submitter Issue Number 35.104 and 36.067
Northern Galilee Basin not a blank canvas waiting to be filled by China Stone; radical rework of SIA required to provide greater detail of the social relationships already at play in and around project area, with particular focus on Indigenous communities:
•As it stands, the SIA appears to present the project area as a blank canvas waiting to be filled by this mining project (eg. repeated claims "project will be located in a remote area, with limited direct impacts" (p. 134 Appendix N). Indeed, the project will invent a community through the FIFO employment model.
•Yet in a back flip, the SIA also acknowledges there are people living on the land within the project area, with businesses and international industries already tied to this land, or land directly adjacent to the project area. In repeatedly rolling out the blank canvas metaphor, the SIA is a tool that renders invisible the livelihoods of people, the business and industries that already exist. This is to say nothing of the complete absence, at least as I read the SIA, of engagement with Indigenous communities, instead defaulting to landholders to speak for Indigenous people.

It is a fact that the project site is remote from communities and is surrounded by grazing lands. The draft EIS SIA Report (Appendix N) does not attempt to "render invisible the livelihoods of people … that already exist". The assessment was undertaken in accordance with the EIS TOR and relevant guidelines and is appropriate in determining the potential social impacts of the project. Refer to response to issue 35.084 regarding consultation with Indigenous people.

Submitter Issue Number 35.105 and 36.068
The proponent has failed to assess impacts of air use on other air users, such as graziers for mustering.

The operation of the project air strip would be required to comply with the Civil Aviation Safety Authority requirements.

Submitter Issue Number 35.106 and 36.035
The proponent has failed to identify sensitive receptors to aircraft noise, and engage with locals to the appropriate flight path activity and noise limit scheduling.

Sensitive receptors are described in Section 16.2 of the draft EIS. Section 16.6.7 of the draft EIS includes consideration of aircraft movements and flight paths on receptors.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 38 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

38 SUBMISSION

Submitter Issue Number 38.001
Submission made by Emanate Legal on behalf of Corbett - Hyde Park Station (Lot 1 on Crown Plan AY31)/View Hills Station (Lot 2493 on Crown Plan PH771). Refer to submission attachments for location maps and direction and authority form.
Note: the cover letter, TOC, executive summary and dictionary submitted has been excluded from this register.

Noted. Detailed responses are provided to the specific issues as follows.

Submitter Issue Number 38.002
The adverse impacts which arise as a result of the Project are considered by Corbett to be detrimental to Corbett and Corbett's cattle grazing operation which are unacceptable. Greater emphasis, investigation and, where necessary, compensation to Corbett must be researched, considered and addressed.
The environmental, hydrological and economic/social impacts (amongst others) that Corbett will ensure as a result of the Project will lead to impacts which adversely and directly affect their livelihood.

The location of the landholder's two properties in relation to the project site (defined by the project Mining Lease Application (MLA) Areas) is shown in Figure 5-4 of the draft Environmental Impact Statement (EIS). Lot 1 on Crown Plan AY31 adjoins the northern boundary of the project site. Lot 2493 on Crown Plan PH 771 covers the northern portion of the project site and extends to the east and west of the project site. As indicated in Section 4.3.3 of the draft EIS, the proponent has commenced discussions with the landholder in relation to gaining access to the land within the proposed MLA areas. Appropriate compensation for the landholder will be addressed in the ongoing land access discussions.

Submitter Issue Number 38.003
Project China Stone - Land Use Section 5.
Section 5.3.2 of the EIS details the surrounding land use to include:
• Cattle grazing;
• A number of rural residences;
• Recreation facilities:
o Lake Buchanan located approximately twenty kilometres (20km) to the North-West of the Project;
o Wilandspey Conservation Park located approximately twenty five kilometres (25km) to the East of the Project;

o The Blackwood National Park and Nairana National Park located more than fifty kilometres (50km) to the East of the Project; and
• Commercial facilities:
o Belyando Crossing;
o Caravan park;
o Roadhouse; and
o Hotel.
The EIS does not give sufficient weight to the importance of current land use. The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:
• Accessibility of grazing stock to dense, well vegetated land; and
• Reproduction, growth and behaviour of grazing stock.
There are a number of recreational facilities within close proximity to the proposed Project. Should the Project be approved, it will impact on:
• Water quality values of facilities used for water skiing, camping and picnics; and
• Use and enjoyment of facilities and tourism.
The proposed Project will change the rural character of the region and must be compatible with the current surrounding land uses.
All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current land use. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

As indicated in Section 4.3.3 of the draft EIS, the proponent has commenced discussions with the landholder in relation to gaining access to the land within the proposed MLA areas. Appropriate compensation for the landholder will be addressed in the ongoing land access discussions. The land access agreement will address the impact of the granting of the mining leases over the landholder's property and the associated effects on the landholder's cattle grazing business.

The project is not predicted to adversely impact on the water quality of any regional recreational or tourism areas or facilities.

The potential impacts of the project on the rural character of the region and associated mitigation measures are discussed in Section 6.6 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N).

Submitter Issue Number 38.004

Project China Stone – Land Use Section 5.

Section 5.4.4 Current Land Use: Stock Route

The proposed Project will affect one (1) stock route on the Land:

• Stock Route U388BELY01, which traverses the Southern part of the Project site from South-West to North-East.

The EIS states in section 5.4.4 that:

Macmines will liaise with DNRM, the Isaac Regional Council and affected landowners in relation to the management and possible realignment of the sock route, as necessary.

The EIS does not give sufficient weight to the importance of the SRN nor does the EIS provide sufficient detail as to whether it is likely that the stock route will be impacted, and if so, to what extent and in what capacity.

Macmines fails to state whether, in the event that the stock route is impacted as a result of the Project, alternatives will be investigated, and Macmines will seek to modify its mine plan.

To be clear, the SRN is primarily used by the pastoral industry as an alternative to transporting stock by rail or road, and for pasture for emergency agistment and long-term grazing. It is used by utility companies to provide power lines, pipelines and telecommunications; and by the community generally for road transport, and recreational and other purposes such as beekeeping.

The Queensland SRN is a highly valued land management tool in respect of its environmental and iconic cultural heritage values, which are recognised nationally as being of significance.

Recent (and continuing) droughts have also established the importance of management arrangements for the SRN as the stock route network during times of drought has accrued greater significance, for example in 2002-03.

The pattern of stock route use remains one of periodic grazing; relatively short, infrequent periods of intense grazing interspersed with long periods of light or no grazing. Stock cannot walk the stock routes unless both pasture and water are present.

The value of the stock route is understood. The Department of Natural Resources and Mines (DNRM) is responsible for the management of stock routes. The stock route is within the proposed open cut mining area and may require realignment, as indicated in Section 5.4.4 of the draft EIS. The proponent will be required to address the impacts of the project on the stock route, including any realignment, to the satisfaction of the DNRM and the Isaac Regional Council (IRC), as indicated in the draft EIS.

Submitter Issue Number 38.005

The EIS does not address nor does it consider the significance of a loss of the SRN (whether on a long term or temporary basis) as to impacts on the business of landholders who use the stock routes (or may in the future) including:

• Cultural and historical values associated with SRN activities such as sites of stock route facilities; family and personal connections to certain stock routes for both indigenous and non-indigenous peoples; and intrinsic cultural values associated with the simple existence of the stock route network and its linkage to exploration and settlement.

There were no significant historical values associated with the stock route identified in the draft EIS Non-Indigenous Cultural Heritage Report (Appendix P). Similarly, stock routes are not typically considered to have any significant indigenous cultural heritage value. If relevant, these issues would be addressed as part of the DNRM approval process for any realignment of the stock route.

Submitter Issue Number 38.006

• Economic values associated with providing employment to drovers and providing more economical alternatives for moving stock. The increased costs as a result of having to relocate stock routes including increased management costs to Corbett. Environmental values associated with the benefits to the environment from walking stock routes as opposed to trucking or transporting by rail (e.g. reduced emissions).

Refer to responses to issues 38.003 and 38.004.

Submitter Issue Number 38.007

• Social values associated with employment opportunities in the droving and pastoral industries as well as local governments.

Refer to responses to issues 38.003 and 38.004.

Submitter Issue Number 38.008

Macmines has not established that it has taken the necessary steps to establish the present use of the SRN and accordingly in the absence of such cannot reasonably have assessed the potential impacts in the same.

Accordingly Corbett submits:

• The CG should adhere to the principle of preservation of stock route in terms of access as part of the Project unless the loss is deemed unavoidable in which case the landholder must be properly and adequately compensated as a result.

• In the circumstances, should the loss of SRN be unavoidable, the mine plan must be relevantly conditioned such that affected stock routes are not to be closed until a suitable realignment of the stock route has been approved by DNRM to minimise delays and disruption to stock route use and the business operations of users of stock routes.

• Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

Refer responses to issues 38.003 and 38.004.

Submitter Issue Number 38.009

Project China Stone – Tailings and Power Station Waste Storage Facilities Section 7.

The following Sections of the EIS are of concern to Corbett and addressed below:

- Section 7.3.5 management and monitoring;
- Section 7.4 conceptual design;
- Section 7.4.5 rehabilitation and decommissioning.

Corbett submits that, in respect of Tailings and Power Station Waste Storage Facilities, the EIS fails to:

- adequately assess the Project's environmental impacts;
- adequately propose measures to avoid or minimise any adverse impacts;
- propose environmental protection commitments to protect or enhance environmental values.

The environmental impacts of the Tailings Storage Facility (TSF) and Power Station Waste Storage Facility (PSWSF), including surface water, groundwater and ecology, are addressed in each of the relevant sections of the draft EIS.

Submitter Issue Number 38.010

Management and Monitoring

Section 7.3.5 relates to management and monitoring of tailings and power station waste.

Corbett submits Section 7.3.5 of the EIS does not give adequate consideration to:

- minimising the impact to the environment, safety and health and the steps to be taken to ensure harm will not be caused;
- control measures for routine operations to minimise likelihood of environmental harm.
- contingency plans and emergency procedures for non-routine situations.

Section 7.3 of the draft EIS relates only to the geochemistry of the tailings and power station waste material. Management and monitoring of other aspects of the TSF and PSWSF are addressed in the other sub sections of Section 7 of the draft EIS.

Submitter Issue Number 38.011

Macmines has not demonstrated procedures / processes to ensure tailings / power station waste is managed to:

- minimise waste generation;
- minimise environmental pollution;
- minimise the production of tailings and waste rock wherever possible
- prevent waste rock and tailings from contaminating the surrounding environment;
- manage and control disposal of all tailings and waste rock.

Refer to response to issue 38.010.

Submitter Issue Number 38.012

Macmines has not demonstrated adequate procedures in relation to potential hazards of tailings / power station waste facilities, including but not limited to:

- inadequate site security;
- structural failure;
- operational failure;
- equipment failure; and
- unforeseen circumstances or consequences.

Refer to response to issue 38.010. Hazards associated with mine waste storage are addressed in Section 22.6.2 of the draft EIS.

Submitter Issue Number 38.013

Conceptual Design of the Tailings and Power Station Waste

Section 7.4 relates to the conceptual design of tailings and power station waste storage facilities.

Corbett submits Section 7.4 of the EIS does not adequately address / consider the design of power station waste facilities to ensure:

- the safe and stable containment of tailings;
- the minimisation or control of seepage;
- a cost effective storage system; and
- a planned system for effective closure.

The design should be adequate for the proposed use, meet contemporary standards and have identified and addressed all the likely risks associated with the site, the nature of the containment materials, the nature, quantity and treatment of the tailings, construction process and closure.

The design of the TSF has been prepared by a leading geotechnical engineering consultancy in accordance with relevant standards. The environmental impacts of the TSF, including surface water, groundwater and ecology, are addressed in each of the relevant sections of the draft EIS.

Submitter Issue Number 38.014

Further, it is important for Macmines to demonstrate that the immediate and long-term risks associated with tailings handling and storage are acceptable and to justify the design and operational decisions using conventional risk management techniques.

Hazards associated with mine waste storage are addressed in Section 22.6.2 of the draft EIS.

Submitter Issue Number 38.015

Rehabilitation and Decommissioning

Section 7.4.5 relates to rehabilitation and decommissioning.

Corbett submits Macmines have not adequately considered / addressed:

- optimising the use of waste rock during rehabilitation;
- the views of landowners, surrounding community and interested stakeholders for rehabilitation;
- waste minimisation and reuse opportunities.

Corbett submits:
• Macmines should consult with landowners, surrounding community and interested stakeholders to exchange information and views in relation to the Project and its potential hazards and approaches to address them during rehabilitation.
• consultation before and during the design and operation of the tailings and power station waste facilities and further rehabilitation of same is an integral part of risk management and can provide benefits to all affected parties.

The design of the TSF has been prepared by a leading geotechnical engineering consultancy in accordance with relevant standards. Consultation was conducted with neighbouring landholders during the preparation of the draft EIS. Landholders did not raise any concerns with the TSF during consultation.

Submitter Issue Number 38.016
Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project. Deficiencies in design of power station waste facilities, management and monitoring, inadequate controls and the like will have serious impacts on the Land and Corbett. Macmines failure to adopt adequate measures for tailings and power station waste will have real and significant impacts on the Land, including but not limited to:
• threat to human life, health or infrastructure;
• short-term and long-term pollution of ground and/or surface waters;
• raised groundwater levels resulting in salinisation of the surface and streams;
• the release of a large volume of water and semi-fluid tailings which smother vegetation, blanket the land surface and restrict stream flow with sediment;
• threat to health or life of wildlife, livestock or domestic animals;
• loss of significant native vegetation; and
• generation of dust or odour.
In light of Corbett's concerns, Corbett submits:
• Macmines must further consider its proposed measures / strategies for tailings and power station waste storage facilities for the Project; and
• the CG should adhere to the principle of preservation of Land unless the loss is deemed unavoidable in which case the landholder (Corbett) must be properly and adequately compensated as a result.

Refer to responses to issues 38.003, 38.013 and 38.014.

Submitter Issue Number 38.017
Project China Stone – Rehabilitation Section 8.
The following Sections of the EIS are of concern to Corbett and addressed below:
• Section 8.2.1 Open cut mine overburden emplacements;
• Section 8.2.2 Underground mine subsidence areas;
• Section 8.2.3 Tailings and power station waste storage facilities;
• Section 8.2.5 Decommissioning and mine closure;

• Section 8.4.1 Post mining land suitability.
Corbett submits that, in respect of rehabilitation, the Draft EIS fails to:
• adequately assess the Project's environmental impacts;
• adequately propose measures to avoid or minimise any adverse impacts;
• address relevant requirements under the Code of Environmental Compliance for Mining Lease Projects;
• propose environmental protection commitments to protect or enhance environmental values.

The submitters concerns are noted. The proponent respectfully does not agree that the draft EIS does not adequately address issues associated with rehabilitation.

Submitter Issue Number 38.018
Open Cut Mine Overburden
Section 8.2.1 relates to open cut mine overburden. Corbett submits Section 8.2.1 of the EIS does not give adequate consideration to:
• the serious adverse long term effects of open cut mine overburden and potential for:
o impacts to water quality and proposed rehabilitation strategies; and
o acid mine drainage and proposed rehabilitation strategies;

Refer to response to issue 38.017.

Submitter Issue Number 38.019
• the quality and use of the Land after Macmines has proposed to have rehabilitated same;
Any impact on the Land, use of the Land, soil and grazing will have substantial impacts on Corbett's grazing operations by:
• lessening the palatability of the grazing Land, resulting in livestock losing weight thereby decreasing productivity and income to Corbett; and
• decreasing the quality of soil, meaning a decreased quality and quantity of grazing land.

Refer to response to issue 38.003.

Submitter Issue Number 38.020
Project activities at ground level will have significant long term impacts to not only Corbett and Corbett's quiet peace and enjoyment of the Land, but also to cattle, wildlife areas and the like.

The draft EIS addresses potential impacts on ecology and land use. Refer to response to issue 38.003.

Submitter Issue Number 38.021

Whilst Section 8.2.1 of the draft EIS does provide some measures in relation to revegetation, Corbett submits Macmines proposals do not adequately address the requirements imposed under the Code of Environmental Compliance.

In accordance with the Code of Environmental Compliance, Condition 35 provides:

The holder of the environmental authority must spread seeds or plant species that will promote vegetation of a similar species and Density of Cover to that of the surrounding undisturbed areas or vegetation that is appropriate for providing erosion control and stabilisation of the disturbed areas.

Note 49 - To revegetate disturbed areas the following measures or similar measures can be used:

• for areas which have become compacted during the project, break up the soil surface to a depth that is suitable for establishing vegetation;

• spread stockpiled topsoil over disturbed areas to a depth that is suitable as a rooting medium for the revegetation process;

• provide suitable nutrient conditions for planting by using fertiliser if necessary; and

• collect and store native seeds to be used in rehabilitation.

Note 50 - When revegetating disturbed areas, the holder of the environmental authority should plant native species endemic to the area and location in the landscape (e.g. if clearing has occurred in a riverine area, revegetate the disturbed area using local riverine species).

Note 51 - Vegetation used to stabilise disturbed areas in the short term should be comprised of sterile, short-lived species (e.g. a cover crop). However, the long term aim of revegetating any disturbed area is to establish a stable vegetation community that is similar to that of the surrounding undisturbed landscape.

Macmines failure to adopt adequate measures for revegetation will have real and significant impacts on the Land, including but not limited to:

• adverse impacts on soil structure;

• natural grasses will not regenerate as fast as other species which will result in a reduced carrying capacity on the Land;

• destruction of various vegetation species;

• irreversible damage to ecosystems.

The proposed revegetation is consistent with established rehabilitation methods and is considered to be adequate.

Submitter Issue Number 38.022

Subsidence

Section 8.2.2 of the EIS details Macmines proposed mitigation for tension cracking and buckling, in particular:

• A survey of potential subsidence cracking areas will be undertaken within six (6) months of subsidence to locate individual cracks and assess the level of treatment required to rehabilitate each crack. Six (6) months will allow sufficient time for the full effects of subsidence to take place…

• Subsidence crack treatment will involve:

o Ripping or ploughing minor cracks using a small tractor or dozer. These areas will be allowed to

regenerate naturally through inherent seed resources, vegetation propagation from rootstock and recruitment from adjoining undisturbed edges;
o Stripping large cracks of topsoil, excavating and backfilling the cracks…
• The subsidence crack rehabilitation work area will be clearly delineated in order to limit disturbance to the minimum area necessary and prevent unnecessary encroachment of disturbance.
Corbett considers Macmines proposed mitigation measures for subsidence is not adequate. Macmines has not considered the time of year, during wet or dry seasons the surveying will be undertaken.

The surveying will occur within six months of subsidence, regardless of the time of year.

Submitter Issue Number 38.023
Further, surveying potential subsidence cracks within six (6) months will not adequately assess the level of treatment required to rehabilitate each crack, accordingly Corbett questions the accuracy of any surveying results undertaken only within a six (6) month period. In failing to accurately assess the "before" state of the Land, Macmines are unable to demonstrate that the Land will be restored correctly after the completion of the Project.

Effective crack rehabilitation does not require an assessment of the land prior to subsidence, as suggested.

Submitter Issue Number 38.024
In relation to subsidence crack treatment, Macmines has not addressed / considered:
• Condition 35 of the Code of Environmental Compliance for Mining Lease Projects, in particular Note 49 to 51 (detailed above);

The proposed revegetation methods for crack rehabilitation are based on experience with effective crack rehabilitation from operating mines.

Submitter Issue Number 38.025
• The extent of vegetation clearing operations and identifying same on a plan to ensure clearing is avoided where necessary;

Clearing control procedures are described in Section 24.4.3 of the draft EIS.

Submitter Issue Number 38.026
• The impacts of Corbett's cattle and grazing operations on the Land, following the stripping of large cracks of topsoil and ripping or ploughing minor cracks using a small tractor or dozer;

Refer to response to issue 38.003.

Submitter Issue Number 38.027

• Vegetation clearing being undertaken in a sequential manner to allow more mobile fauna species the opportunity to disperse from cleared areas and clearing activities. Furthermore clearing within areas of high ecological value, must be undertaken with care and rehabilitated to restore connectivity to the highest realistic extent following the clearing.

The impacts of clearing, and proposed mitigation and management measures are discussed in Section 9 of the draft EIS.

Submitter Issue Number 38.028

Tailings

Section 8.2.3 of the draft EIS refers to Section 7 – Tailings and power station waste storage facilities.

In accordance with Section 7.4.5 of the draft EIS, Macmines provided:

… no special management measures or rehabilitation techniques are required for the tailings and power station waste material.

Corbett rejects this position.

Corbett notes Macmines geochemical assessment concluded the risk of potential environmental impacts are expected to be low. Notwithstanding, Macmines must have in place management measures / rehabilitation techniques to ensure no environmental impacts are caused should tailings / waste storage have unforeseen risks. The failure to adequately rehabilitate the Land presents a threat of serious and irreversible environmental damage.

The conclusions of the geochemical assessment of the mine waste materials are based on detailed geochemical testing conducted by a specialist geochemist. The rehabilitation methods proposed for the TSF and PSWSF are suitable for these types of facilities.

Submitter Issue Number 38.029

Decommissioning and Mine Closure

Section 8.2.5 of the draft EIS considers decommissioning and mine closure.

As the Project / coal production is proposed is unknown and will continue for a fifty (50) year operational mine life, the Draft EIS has not addressed:

• how Macmines rehabilitation and decommissioning strategies / plans and the like will updated;
• changing significance of impacts and hazards associated with the mining activity;
• changes in legal and other obligations; and
• learnings and corrective actions from monitoring activities.

Macmines must reconsider its decommissioning strategies and amend to include (*inter alia*) the foregoing concerns of Corbett.

Decommissioning and mine closure are required to be conducted in accordance with the Environmental Authority and to the satisfaction of the Department of Environment and Heritage Protection.

Submitter Issue Number 38.030

Post Mining Land Suitability

Section 8.4.1 of the draft EIS in relation underground mine areas provides:

Following underground mining surface subsidence effects will result in the development of a series of shallow troughs relative to natural topography with gentle slopes.

The Draft EIS fails to address fundamental rehabilitation criteria necessary for the type of activity and impact on the Land rehabilitation, specifically in relation to:

• impacts to Corbett and grazing operations in relation to timing of rehabilitation to restore the pre-mine land being suitable for grazing;

• restoring the surface level of the Land to its original condition;

• reinstating the natural contours and channel of every watercourse;

• shaping the area so that it conforms as far as reasonably practicable with the surrounding topography;

• reforming all drainage lines, waterways and creek beds to stable contours and as near as reasonably practicable to the situation existing prior to mining; and

• achieving a post mining land use capability across the lease area equal with that pre-existing the Lease, where this is technically feasible.

Refer to response to issue 38.003. The management of drainage in subsidence areas is addressed in Section 13.4.1 of the draft EIS. The impacts of subsidence on land suitability is addressed in Section 8.4 of the draft EIS.

Submitter Issue Number 38.031

Section 8.4.1 of the draft EIS provides:

Following open cut mining the overburden emplacement areas and final voids will not be able to be restored to their pre-mining land suitability for grazing.

In relation to Section 8.4.1, Macmines have not addressed the conflict of Land uses. The Project represents a conflict between competing land uses of agriculture, livestock grazing and other traditional land uses. The Project requires large amounts of land that could otherwise be used for agricultural production. This sets up a direct competition with small-scale agriculture for control and use of land.

As indicated in Section 8.3.3 of the draft EIS, the project site is low quality grazing and agricultural land. There is no small scale agriculture in the area and once landholder compensation agreements are in place, there is not likely to be any conflict of land use associated with the project.

Submitter Issue Number 38.032

Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

It is in the Qld Government, Macmines and Corbett's benefit to ensure rehabilitation is completed successfully and to proper standards that ensure the long term sustainability to the traditional use of the Land, grazing. Poorly rehabilitated mines provide long term issues for governments,

communities and companies, and ultimately tarnish the reputation of the mining industry as a whole. Poor planning invariably increases the costs of rehabilitation and mine closure and decrease overall profitability.
A rehabilitation strategy should be reviewed annually throughout the life of the Project. As any operational plan changes or rehabilitation activities are completed, the strategy should be updated to reflect any changes.

Refer to response to issue 38.003. Rehabilitation is required to be conducted in accordance with the Environmental Authority conditions and to the satisfaction of the Department of Environment and Heritage Protection.

Submitter Issue Number 38.033
Macmines have not demonstrated how the Project will (*inter alia*):
• avoid and minimise future environmental harm;
• reinstate the original natural ecosystem; and
• reinstate previous land use (e.g. grazing).
In light of Corbett's concerns, Corbett submits:
• Macmines must further consider its proposed rehabilitation and decommissioning strategies for the Project;
• Macmines must ensure its proposed rehabilitation strategies are in accordance and promote the objectives and requirements of the Code of Environmental Compliance for Mining Lease Projects;
• the CG should adhere to the principle of preservation of Land and importance of rehabilitation unless the loss is deemed unavoidable in which case the landholder (Corbett) must be properly and adequately compensated as a result.

Rehabilitation and impacts on land suitability and ecology are adequately addressed in the draft EIS.

Submitter Issue Number 38.034
Project China Stone – Terrestrial Ecology Chapter 9.
Section 9.5.4 and the Terrestrial Ecology Report (Appendix F) of the EIS identifies threatened species listed under the *Nature Conservation Act* 1992 recorded during the field surveys to include:
• Squatter Pigeon;
• Black-throated Finch;
• Koala; and
• Short-beaked Echidna.

Noted.

Submitter Issue Number 38.035

Should the Project be approved, suitable high value habitat for these species within the Project area will be reduced, effecting the conservation of these species. The impact of the proposed activities on the terrestrial ecology within the Project area is detailed in the EIS to include impacts of:

• Vegetation clearing for the open cut mine and construction of mine infrastructure; and

• Disturbance from noise and vibration, lighting, dust, erosion and the introduction of invasive species; and

• Disturbance and removal of habitat features providing foraging, shelter and breeding opportunities.

Accordingly the proposed Project, if approved, will add further pressure on the threatened species within the Galilee Basin.

It is neither adequate nor sufficient for a Project of the scale proposed by Macmines to state with respect to the proposed clearing footprint of the mine at Section 9.6.2:

". . . it was not possible to design a layout that avoided significant vegetation clearing because of the numerous technical and environmental constraints of the project design".

The Project should be refused on this ground as the entire Project area is well vegetated with remnant vegetation comprising Eucalyptus and Acacia open woodland. There is no alternative Project layout that would avoid clearing remnant vegetation. A considerable percentage of high valuable habitat for the species listed in the NC Act will be removed and disturbed by the proposed activities which will cause irreversible and unavoidable impacts on the terrestrial ecology within the Project area.

Mitigation measures for the impacts of the project on ecological values are provided in Section 9 of the draft EIS.

Submitter Issue Number 38.036

Project China Stone – Groundwater Chapter 12 The EIS outlines in section 12.4.2 two distinct areas within which the groundwater regime will be affected by the proposed mining activities as follows:

• The Northern Underground where dual seam underground mining is proposed below the elevated ridgeline of Darkies Range, and subsidence cracking will potentially result in hydraulic connection between the underground mines and the overlying Clematis Sandstone; and

• The lower lying area in the south of the Project area where the open cut mining area and single seam Southern Underground are proposed, and the Clematis Sandstone is essentially absent.

Noted.

Submitter Issue Number 38.037

The impact of the proposed activities on the groundwater regime is detailed in the EIS to include:

• Dewatering by extracting coal by longwall mining and open cut mining and in so doing, lowering surrounding groundwater levels;

• Subsurface subsidence cracking of strava overlying the proposed longwall mines, changing the permeability of the overlying units and influencing surrounding groundwater levels;

• Construction of tailings storage facility and power station waste storage facility, which have the potential to generate leachate and give rise to groundwater contamination;

• Use of hydrocarbons and chemicals which have the potential to give rise to groundwater contamination; and

• Formation of a residual void in the final mine landform, that has the potential to influence surrounding groundwater levels and quality.

The proposed activity will cause groundwater contamination as a result of seepage from:

• Tailings storage facility;

• Power station waste storage facility;

• Overburden emplacement areas and the final void lake; and

• Hydrocarbon and chemical storage.

The groundwater modelling conducted for the EIS is insufficient to establish the true extent of associated subsidence cracking and is not an effective or accurate prediction of depressurisation and the associated impacts on groundwater. Consequently, the EIS does not address the magnitude of direct impacts on the groundwater levels and flow directions within the Project area.

The operation of the proposed Project must maintain, preserve and protect current groundwater values.

All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current groundwater values.

The draft EIS Groundwater Report (Appendix I) includes a comprehensive groundwater assessment that describes the extent of groundwater impacts from the project and the proposed impact management measures.

Submitter Issue Number 38.038

Project China Stone – Surface Water Chapter 13

At 13.2.4, page 13-4 of the EIS Chapter in respect of surface water quality Macmines states:

". . . the project site is remote and is located at the head of the catchments. It has highly ephemeral, short duration, surface water flows. These factors severely limit the ability for any regular sampling of surface water flows from the project site. Site surface water quality was sampled from remnant surface water during the aquatic ecology field surveys in May and October/November 2012. . . As these water quality results are from remnant ponded surface water they are not representative of the quality of site surface water flows and therefore not presented in this section".

At 13.2.4, page 13-5 of the EIS Chapter in respect of baseline water quality assessment Macmines states:

"Natural background concentrations of aluminium, copper and zinc exceed the most conservative

of the quoted guidelines at all monitoring locations. Iron is also present in the Belyando and Sutton Rivers at concentrations above the most conservative quoted guidelines".
At 13.5.5, page 13-19 of the EIS Chapter in respect of water management system preformance Macmines states:
"The modelling results show the median water supply demands are variable over the life of the mine and are generally significantly greater than the amount of mine affected water that will be generated by the project. This indicates a significant overall water deficit for the project and the need for a significant external water supply"."

Noted.

Submitter Issue Number 38.039
The Project is located at the head of the catchments and as such all of the run-off, uncontrolled discharge and subsequent contamination and sedimentation caused by the proposed activities will impact on surface water quality as detailed in the EIS to include:
• Sedimentation of downstream waterways during construction and operations due to erosion from disturbed areas on the Project site and increased sediment loads in site drainage water;
• Mining disturbance and mine site drainage changing catchment areas, potentially resulting in downstream catchment yield impacts;
• Mining disturbance and mine site drainage altering downstream drainage, resulting in:
o Changes to flood behaviour including flow paths, flood inundations areas and flow velocities;
o Geomorphic impacts on watercourses and drainage lines including impact on channel bed and bank stability;
• Subsidence of the ground surface and surface drainage features as a result of underground longwall mining, resulting in;
o Surface drainage impacts including ponding of runoff in subsidence depressions; and
o Geomorphic impacts on subsided drain lines including impacts on channel bed and bank stability;
• Controlled discharge of mine-affected water resulting in downstream water quality impacts on environmental values and water users; and
• Impacts of the final landform and final void on surface drainage.

Noted.

Submitter Issue Number 38.040
The EIS did not include the water quality results obtained from the remnant ponded surface water on the basis they were not representative of the quality of site surface water flows. The EIS does not give sufficient weight to the importance of this data set and measures must be implemented to obtain accurate surface water samples during surface water flows to establish reliable surface water quality values within the Project area.

The statement that the water quality of remnant ponds is not representative of surface water flows is correct. Baseline water quality is discussed in Section 13.2.4 of the draft EIS. Further baseline

water quality monitoring is proposed as explained in Attachment E – Additional Information on Surface Water.

Submitter Issue Number 38.041
The Project is located within the Galilee Basin and as such is closely related to other projects currently under investigation or expected to commence investigations in the next five (5) years so the cumulative impact of contamination to surface waters from the proposed and surrounding activities and infrastructure will significantly affect already elevated surface water values as the run-off from mine infrastructure areas will include:
• Elevated levels of suspended solids;
• Hydrocarbons; and
• Elevated levels of metals.

The potential cumulative impacts on surface water are discussed in Section 23.7 of the draft EIS.

Submitter Issue Number 38.042
Should the Project be approved, the supply of water is of great concern as the mine water management system is predicted to have a water deficit over the life of the mine. The EIS modelling shows the annual external water requirement will range from 903 to 12,300ML pa over the life of the mine. At page 13-25 of the Chapter Macmines proposes to gain an allocation to harvest water from the Cape River or the Belyando/Sutton River. The harvesting of water from surrounding watercourses will have a significant impact on the availability and quality of water consumed by Corbett and surrounding users for domestic and recreational use and on the water consumed by Corbett's cattle.

As described in Section 4.13 of the draft EIS, the provision of the raw water supply required for the project is not within the scope of this EIS. It will be subject to separate environmental impact assessment and approval.

Submitter Issue Number 38.043
The proposed Project will impact on flood levels as a result of the redistribution of water and changes to flow velocities. The determination of the flood afflux in the EIS is insufficient to establish the true extent of flooding that will arise from the proposed mining activities. The EIS does not give sufficient weight to the importance of the determination of the flood afflux.
As such, the magnitude of any afflux and its impacts on the Project area have not been sufficiently investigated or established.
Reliable and representative baseline studies must be conducted to establish accurate surface water quality values within the Project area.
Further investigation needs to be undertaken in order to consider the true flood impacts. The Project must not proceed until known flooding potential and risk have been established using a reliable method of determination so that Corbett can understand the impacts of the Project in terms of flooding on Corbett's grazing business and domestic and recreational use.
All necessary and required mitigation measures must be put in place to eliminate all adverse

hydrological impacts of the Project on surface water values. Failure to do so will result in cumulative contamination of surface waters and result in cumulative losses to Corbett's cattle grazing and watering and surrounding irrigated agriculture.

Flood afflux and its impacts are discussed in Section 13.6.3 of the draft EIS. The assessment of flood afflux is based on a flood modelling assessment.

Submitter Issue Number 38.044
Project China Stone - Air Quality Section 15.
The TOR required Macmines to describe the existing air quality that may be affected by the Project, and detail the best practice mitigation measures together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate the impacts of the predicted air quality.

Noted.

Submitter Issue Number 38.045
The EIS does not appropriately identify the existing air quality in the area of the Project.
The EIS states at section 15.6 that there are no DEHP air quality monitoring stations operating in the vicinity of the Project, and data has therefore been sourced from:
• Air quality assessments from other coal mines in the region; and
• Monitoring data from DEHP's monitoring stations at Toowoomba and Townsville.
The assumption made by Macmines that the data sourced with respect to existing air quality in the region of the Project is similar, or identical to, that at other projects, or to that at Toowoomba or Townsville, is flawed.
To be clear, the potential sources and types of dust in the region of the Project are highly likely to differ significantly from both Toowoomba and Townsville, as both areas are significantly larger, heavily populated centres, with limited farming and/ or grazing land located at their centre.

As indicated in Section 15.6 of the draft EIS, monitored levels of NO_2, CO and SO_2 in Toowoomba and Townsville have been used to characterise baseline levels for the project. Given the remote location of the project site and the lack of any significant sources of NO_2, CO and SO_2 in the project area, these levels are likely to be conservative.

Submitter Issue Number 38.046
The EIS's prediction methodology to determine whether any potential adverse impacts on health or amenity may occur is also flawed.
The EIS states at section 15.7.2 that "off-site project-generated traffic will access the project site via sealed roads and is therefore not a potentially significant dust emission source." The traffic from vehicles accessing the Project has not been included in the list of key mining activities that could contribute to dust generation.
To be clear, transport and traffic accessing the Project is likely to be considerable given the significant workforce (estimated at 3,300 employees at peak employment). Both the Moray-

Carmichael Road and the Elgin-Moray Road are unsealed roads which provide direct access to the Project from larger sealed roads.
Each of the five (5) key roads to be utilised by the Project traffic allow B-triples, Type 1 and 2 Road trains and B-Double vehicles, all guaranteeing significant traffic dust emissions onto the land adjacent to the roads.
Given the above, it is therefore clear that Macmines assessment that the predicted levels of each pollutant are below the relevant air quality objectives at all sensitive receptors is flawed.

The reference to sealed roads in Section 15.7.1 of the draft EIS relates to the status of the roads at the time the mine is operating rather than the current status, as suggested.

Submitter Issue Number 38.047
Further, Macmines have failed to describe existing air quality levels in areas other than sensitive receptors (such as grazing pasture, water points etc.). The Corbett's run a successful grazing operation, whereby the necessity of palatable grazing pasture and clean water for cattle is of significant importance. If, as a result in an increase in dust particles and an decrease in air quality results in a decrease in the quality of water or palatable grazing pasture, Corbett's farming operation will certainly be adversely affected by:
• Stock being less inclined to feed on the pasture available, thereby not increasing in weight and being less profitable for sale;
• Stock being less inclined to water at the available water resources, thereby not increasing in weight and potentially suffering health impacts, thereby being less profitable for sale;
• Corbett being required to cart in (at Corbett's additional time and expense) supplementary feed for stock to ensure usual weight increases and supplements gained; and
• Corbett being required to cart in (at Corbett's additional time and expense) clean quality drinking water for stock.

The potential for dust impacts on grazing are discussed in Section 2.2 of the draft EIS Air Quality Report (Appendix L).

Submitter Issue Number 38.048
The mitigation measures provided in section 15.8.12 of the EIS are insufficient in that they:
• Fail to detail the specific requirements for watering haul roads such as the number of times per day watering will be required and the location that the water will be resourced from;

The number of times per day a haul road needs to be watered will vary considerably dependent on the amount of traffic using the road and the weather conditions. The dust suppression water will be supplied from the mine water management system and the water truck fill point will also vary dependent on a range of factors.

Submitter Issue Number 38.049

• Fail to detail within what period the rehabilitation of inactive disturbed areas must be undertaken;

The progressive rehabilitation of the mine is illustrated in the conceptual staged mine layout plans (Figures 4-12 to 4-15 of the draft EIS).

Submitter Issue Number 38.050

• Fail to describe proactive and predictive operational and maintenance strategies that could be used by Macmines to prevent and mitigate the impacts to air quality.

Accordingly Corbett submits:

• The CG should require correct baseline monitoring to determine existing air quality levels.

• That Macmines must be required to include all mining proposed activities into its assessment in the establishment of estimated levels of air pollutants to determine whether any potential adverse impacts may occur.

• The CG should adhere to the principle of preservation of, or minimisation of impact on, Corbett's grazing land as a result of increased particulate matter, unless the adverse impacts is unavoidable in which case the landholder (Corbett) must be properly and adequately compensated as a result.

• Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarding in considering the merits of the Project.

Refer to responses to issues 38.045, 38.046 and 38.047.

Submitter Issue Number 38.051

Project China Stone – Air Quality Section 15.

Section 15.9 of the EIS provides that greenhouse gases will be produced by the Project as a result of the:

• combustion of coal for power generation;

• fuel consumption; and

• fugitive emission of coal seam gas.

Noted.

Submitter Issue Number 38.052

The EIS does not give sufficient weight to the importance of current land use and the potential for adverse impacts as a result of increased greenhouse gas emissions.

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, and significant greenhouse gas emissions in the surrounding area increase, the following adverse impacts will be seen:

• An increase in health risks to surrounding landholders;

• An increase in health risks to grazing stock;

• An increase in pollution;

• Terrestrial and aquatic ecology; and

• Changes to plant growth and nutrition levels.

The proposed Project must adequately take into consideration the current greenhouse gas emissions and the current and anticipated land use. All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current greenhouse gas emission levels. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural land.

The assessment of greenhouse gas emissions in the draft EIS has been conducted in accordance with the requirements of the EIS Terms of Reference.

Submitter Issue Number 38.053

Project China Coal – Noise and Vibration Section 16.

Section 16.3 of the EIS states that data is obtained from environmental noise monitors at two (2) monitoring locations.

In obtaining data from only two (2) monitoring locations, the EIS inadequately assesses the existing noise environment and fails to take into consideration the current land use in the Project area.

The two (2) monitoring locations are both located to the south west of the Project. No monitoring data has been obtained from any other direction from the Project.

Clearly noise data is likely to differ depending on:

- Terrain between the Project and the monitoring location;
- Wind directions;
- Proximity to different Project infrastructure; and
- Proximity to roads connecting to the Project

Noise monitoring conducted for the draft EIS confirmed that background noise levels are very low in the surrounding areas. Consequently, the noise criteria for the project are the most stringent possible. Any further noise monitoring at other locations would therefore have no effect on the outcomes and conclusions of the draft EIS noise assessment.

Submitter Issue Number 38.054

Further, the noise assessments which have been undertaken do not give sufficient weight to the current land use and the potential impact of noise on the land use.

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:

- Accessibility of grazing stock to dense, well vegetated land; and
- Reproduction, growth and behaviour of grazing stock.

The proposed Project will significantly alter the existing noise environment and must be compatible with the current surrounding land uses, including residential and grazing.

It is imperative that Macmines provides, and implements noise mitigation measures to eliminate the potential for adverse impacts of the Project on both sensitive receptors and current farming operations. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

Mine noise is not known to have an adverse impact on grazing properties. There are numerous examples of mines that have active cattle grazing on fenced areas within operating mine sites.

Submitter Issue Number 38.055
Project China Coal – Noise and Vibration Section 16.
Section 16.6.8 of the EIS states that "Predicted ground vibration and blast overpressure levels are well within the criteria at the closest receptor for this MIC (Maximum Instantaneous Charge).
The EIS inadequately assesses the predicted ground vibration and blast overpressure and fails to take into consideration the current land use in the Project area.
Whilst the predicted levels are within the criteria at the closest receptor for this MIC, there is no certainty that predicted levels are within the criteria at other receptors.
Clearly ground vibration and blast overpressure data is likely to differ depending on:
• Terrain between the Project and the receptor;
• Infrastructure and/ or vegetation between the Project and the receptor.

The majority of Queensland coal mines are location in proximity to grazing properties. Ground vibration and overpressure are not proven to have any adverse impacts on neighbouring grazing properties. The assessment of impacts on receptors considered the worst case closest receptor. The impacts on any more distant receptors would be less than the closest receptor.

Submitter Issue Number 38.056
Further, the predicted ground vibration and blast overpressure assessments which have been undertaken do not give sufficient weight to the current land use and the potential impact of vibration and blasting on the land use. The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:
• Accessibility of grazing stock to dense, well vegetated land; and
• Reproduction, growth and behaviour of grazing stock.
The proposed Project will significantly alter the existing environment and must be compatible with the current surrounding land uses, including residential and grazing. It is imperative that Macmines provides, and implements vibration and blasting mitigation measures to eliminate the potential for adverse impacts of the Project on both sensitive receptors and current farming operations. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

Refer to response to issue 38.055.

Submitter Issue Number 38.057
Project China Stone – Visual Amenity Section 17.
Section 17.3.2 of the EIS states that "Visual receptors in the vicinity of the project site are limited to isolated rural residences and unsealed local government roads. The three closest residences were selected for the purposes of the visual impact assessment."
The EIS does not adequately assess the visual receptors in the vicinity of the project site by merely assessing the three (3) closest residences.

There are sixteen (16) residences within fifty (50) kilometres of the Project, located in all directions of the Project. The Three (3) residences which were assessed failed to provide an assessment of the visual impact on residences to the north, north-west, north-east and south east of the Project.
Two of the three (3) residences assessed have visual settings which are impeded by the Darkies Range. All residences in differing directions to the Project do not have visual settings which are impeded by the Darkies Range, thereby increasing the likelihood of a high visual impact at those residences.
Merely two (2) lines of sight were drawn for each receptor, failing to sufficiently address the whole impact on the receptors.

As discussed in Section 17.3.2 of the draft EIS, visual effects and impacts on areas beyond the closest residences will generally be less than those at the closest residences. The visual impact on the closest receptors was assessed as low. The visual assessment was based on worst case line of sight locations.

Submitter Issue Number 38.058
The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the farming operations of the surrounding landholders by:
• Cattle shying away from new, and abnormal, visual infrastructures in their surroundings; and
• Thereby altering the usual grazing and watering patterns of the stock (thereby impacting on reproduction, growth and behaviour of grazing stock).
The proposed Project will change the rural character and visual amenity of the region and must be limited so as to refrain from impacting on residences and the current surrounding land uses.
All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on nearby residences and current land use. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences.

Coal mines are not known to create visual impacts that adversely impact cattle grazing. Visual impact mitigation measures are discussed in Section 17.4 of the draft EIS.

Submitter Issue Number 38.059
Project China Stone – Traffic and Transport Section 19.
Section 19.2 of the EIS identifies traffic and transport impacts as a result of the Project to include:
• Impacts on intersections;
• Impacts on road pavements;
• Impacts on road safety;
• Impacts on public transport; and
• Impacts on other modes of transportation.

Noted.

Submitter Issue Number 38.060

Should the Project be approved, suitable and necessary road networks within the Project area will be limited, affecting the safety of both drivers and the surrounding environment.

The proposed Project activities will impact on the current road network within and surrounding the Project including by:

• Considerably increasing traffic numbers during the construction and operation phases;

• Considerably altering vehicle types utilising the road network, ranging from standard vehicles up to multi-combination vehicles;

• Increasing disturbance to the current road networks and surrounding land as a result of the above, including disturbance to residences and grazing land from:

o noise and vibration;

o lighting and dust;

o erosion and subsidence; and

o the potential introduction of weed species.

A Road Impact Assessment (Appendix O) is presented in the draft EIS. Refer to responses to issues 38.047, 38.054, 38.055 and 38.058.

The mine is not predicted to impact neighbouring grazing properties due to erosion or subsidence. Proposed controls for the spread of weeds is discussed in Section 9.7.3 of the draft EIS.

Submitter Issue Number 38.061

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the farming operations of the surrounding landholders by:

• Cattle shying away from new, and abnormal, increased traffic and vehicle types in their surroundings; and

• Thereby altering the usual grazing and watering patterns of the stock (thereby impacting on reproduction, growth and behaviour of grazing stock).

The proposed Project will change the rural character and rural road network currently seen in the region and must be restricted so as to ensure no adverse impacts are felt by residences and the current surrounding land uses (grazing).

All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on nearby residences and current land use. Failure to do so will result in losses to Corbett's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences.

There are many major roads in Queensland adjacent to cattle grazing properties and cattle are not known to be adversely impacted by road traffic.

Submitter Issue Number 38.062

Project China Stone – Cultural Heritage Section 20.

Section 20.2.2 provides that the Wangan and Jagalingou People "have been identified as the Aboriginal parties for the project, in accordance with the ACH Act. The proponent has put in place with its consultant, the process to initiate a CHMP with the Wangan ad Jagalingou People, in accordance with the ACH Act. The CHMP is required to be finalised prior to the commencement of construction.

The EIS fails to provide or require appropriate assessment of the potential impacts of a project on Aboriginal heritage prior to approval of the Project. By simply requiring that the CHMP be finalised prior to the commencement of construction, the potential impacts of the Project on Aboriginal heritage will possibly be missed, and or not given sufficient weight and their importance considered.

It is necessary that the CHMP be required to be finalised earlier in the approval stage for the Project to adequately assess the potential impacts of the Project on Aboriginal heritage and to enable appropriate mitigation measures to be investigated and put into place.

As explained in Section 20.2.2 of the draft EIS, the proposed management of Aboriginal cultural heritage is in accordance with the requirements of the *Aboriginal Cultural Heritage Act*.

Submitter Issue Number 38.063

Project China Stone – Non-Mining Waste Management Section 21.

Section 21.2.2 of the EIS identifies the legislative requirements for a waste management hierarchy where waste management options are considered in a structured order as follows:

- Waste avoidance (most preferred) (1);
- Waste reduction (2);
- Waste reuse (3);
- Waste recycling (4);
- Recover waste resources (5);
- Treat waste (6); and
- Waste disposal (least preferred) (7).

The EIS assesses each type of waste proposed by the Project taking into consideration the waste management hierarchy.

Not one (1) of the management strategies proposed by Macmines are assessed as a (1) in the waste management hierarchy (waste avoidance) or a two (2) in the waste management strategy (waste reduction). Conversely, numerous management strategies are assessed as a (7) in the waste management hierarchy (Waste disposal).

Should the Project be approved, significant waste will be generated within the Project area, and the removal and/ or disposal of that waste will fail to be dealt with in accordance with best practice management strategies, affecting the Project area.

The proposed management of waste is in accordance with the relevant regulatory requirements.

Submitter Issue Number 38.064
The limited waste management strategies for the Project activities will impact on the Project area, the surrounding land and the surrounding land by:
• Adversely impacting on the life, health and well-being of people in the vicinity of the Project and the surrounding lands;

Refer to response to issue 38.063.

Submitter Issue Number 38.065
• Adversely impacting on the life, health and well-being of livestock in the vicinity of the Project and the surrounding lands;

Refer to response to issue 38.063.

Submitter Issue Number 38.066
• Adversely impacting the ecological processes and associated ecosystems in the Project area and the surrounding area; and

Refer to response to issue 38.063.

Submitter Issue Number 38.067
• Adversely impacting the current land use and land use capability having regard to economic considerations.

Refer to response to issue 38.063.

Submitter Issue Number 38.068
Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.
It is in the Qld Government, Macmines and Corbett's benefit to ensure waste removal and/ or waste disposal is completed cleanly, effectively and in accordance with best management practices that ensure the long term sustainability to the traditional use of the Land, grazing.
The management of waste should be reviewed prior to the Project's approval, and thereafter annually throughout the life of the Project. As any planned activity is altered or activities are completed, the strategy should be updated to reflect any changes.

Refer to response to issue 38.063.

Submitter Issue Number 38.069

Macmines have not demonstrated how the Project will (*inter alia*):

• avoid and minimise current and future environmental harm; and

• minimise impacts on current and previous land use (e.g. grazing).

In light of Corbett's concerns, Corbett submits:

• Macmines must further consider its proposed waste management strategies for the Project;

• Macmines must ensure its proposed waste management strategies are in accordance with, and promote the environmental values as set out in section 21.2.3 of the EIS.

Refer to response to issue 38.063.

Submitter Issue Number 38.070

Project China Stone – Hazard and Risk Section 22.

Section 22.6 of the EIS states that the key potential hazards of the Projects are:

• Storage of mine-affected water in various mine water dams which could potentially be hazardous in the event of an unplanned or unmanaged release;

• Storage of tailings and other mine wastes which could potentially be hazardous in the event of an unplanned or unmanaged release;

• Operation of a coal-fired power station to provide electricity for the operation of the mine. The power station could be potentially hazardous in the event of an explosion;

• Operation of a private airstrip for the transport of mine workers;

• Transport, storage and use of a range of hazardous materials, including explosives that can create hazardous conditions if not appropriately managed.

Additionally, section 22.6 of the EIS also highlights potential hazards associated with:

• Natural events such as bushfires, floods and climate change;

• Malicious acts and terrorism;

• Incidents with the treatment of potable water or sewage; and

• Disease vectors including mosquitoes and communicable diseases.

The EIS states that:

"As far as practicable, project infrastructure has been located to maximise separate between potentially hazardous facilities and activities in order to minimise potentially hazardous conditions for workers, sensitive receptors and to address community safety values. The remoteness of the site from populated areas also limits the potential risks from the project. This remoteness also addresses the potential cumulative risks of the project interacting with off-site hazards."

Noted.

Submitter Issue Number 38.071

The EIS does not give sufficient weight to the dangers and risks posed by the Project, nor does the EIS provide sufficient detail and provision of management strategies to mitigate and limit the potential hazards raised.

To be clear, the Project area and surrounding land is primarily used by landholders for their farming operations – their businesses and their homes.

The grazing operations which take place on the Project area and on the surrounding lands are highly successful and valued land uses.
The EIS does not address, nor does it consider, the significance of a loss of, or significant impact to the current land use (whether on a long term or temporary basis) as a result of a hazardous outcome, as to impacts on the business of landholders who currently use the Land (or who may use the Land in the future).
Macmines has not established that it has taken the necessary steps to minimise the very real risks of hazards as a result of the Project and accordingly in the absence of such cannot reasonably have assessed the potential impacts in the same.
Corbett's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

Section 22.5 of the draft EIS identifies the surrounding land use and sensitive receptors in proximity to the project site. A preliminary hazard analysis is presented in Table 22-5 of the draft EIS and Section 22.4 of the draft EIS explains that a more detailed re-appraisal of project hazards will be undertaken as part of the development of the project Safety and Health Management System, prior to the commencement of construction.

Submitter Issue Number 38.072
Macmines have not demonstrated how the Project will (*inter alia*):
• avoid and minimise current and future environmental harm; and
• minimise impacts on current and previous land use (e.g. grazing).
In light of Corbett's concerns, Corbett submits:
• Macmines must further consider its proposed hazard and risk management strategies for the Project;
• Macmines must ensure its proposed hazard and risk management strategies are in accordance with, and promote the safety and health management system that is put in place in accordance with section 22.3.2 of the EIS.

Refer to response to issue 38.071.

Submitter Issue Number 38.073
Project China Stone – Cumulative Impacts Section 23.
The TOR required Macmines to provide a summary of the Project's cumulative impacts and describe these cumulative impacts in combination with those of existing or proposed projects publicly known or advised by the Office of the Coordinator-General to be in the region.
Importantly, the CG required that cumulative impacts be assess with respect to:
• Both geographic location and environmental values.
• Address cumulative impacts in sensitive environmental areas.
• Explain the methodology used to determine the cumulative impacts of the Project, detailing the range of variables considered (including relevant baseline or other criteria upon which the cumulative aspects of the Project have been assessed).
Section 23 of the EIS details the cumulative impact assessments and the mitigation and

management measures for each of the relevant environmental aspects addressed in the EIS. Section 23.3 of the EIS states that: "The cumulative impact assessments have considered the impacts from the CCM& RP and the MPP, where relevant, with those predicted for the project."

Noted.

Submitter Issue Number 38.074

The EIS does not give sufficient weight to the mining industry (and proposed future mining industry) in the area of the Project. Whilst there are currently no operating coal mines in the Galilee Basin, the following six (6) projects are currently seeking approval or have recently gained approval:

- Carmichael Coal Mine and Rail Project (CCM&RP);
- Project China Stone;
- Alpha Coal;
- Galilee Coal;
- Kevin's Corner; and
- South Galilee Coal.

In addition, the Moray Powerlink Project (MPP) is also currently in the approval phase, for the construction and operation of a thermal and diesel power station with a generating capacity of 150 Mega Watts.

In merely considering the impacts from the CCM&RP and the MPP, where relevant, with those predicted for the Project, Macmines has failed to adequately consider the cumulative impacts with respect to geographic location.

As indicated in Section 23.2 of the draft EIS, the projects listed in this submission are not in the vicinity of the project site and are too far away to have any significant cumulative impacts.

Submitter Issue Number 38.075

Examples of biodiversity and environmental value loss are the potential significant impacts to both Commonwealth and State listed flora and fauna from the Project, including:

- Clearing of approximately 11,000 ha of remnant vegetation, including 24 ha of one of concern Regional Ecosystem.
- Clearing of habitat for the following species which were confirmed to be present in the Project site during field surveys:
  - o Squatter Pigeon (southern subspecies)(listed as vulnerable under the EPBC Act and NC Act);
  - o Black-throated Finch (white-rumped subspecies)(listed as endangered under the EPBC Act and NC Act);
  - o Koala (listed as vulnerable under the EPBC Act and special least concern under the NC Act); and
  - o Short-beaked Echidna (listed as special least concern under the NC Act).
- Clearing of habitat for the Australian Painted Snipe (listed as endangered under the EPBC Act and vulnerable under the NC Act), which was considered to have a moderate potential of occurring within the Project site.

An additional potential significant impact of the Project on flora and fauna is habitat fragmentation.
At section 23.5.2 of the EIS, Macmines states "The impacts of clearing of habitat on the project site will be mitigated through the provision of biodiversity offsets."
Further, Macmines states "As the clearing of vegetation is only in the southern portion of the project site, full east to west connectivity will remain in the northern portion of the project site…The open cut mining/ infrastructure footprints between the project and the CCM&RP are approximately 10km apart, leaving a large corridor of remnant vegetation between the cleared areas."
Accordingly, the present Project, if approved, would add to further pressure on endangered and vulnerable species of the Galilee Basin and habitations will be split. It is neither adequate nor sufficient for a Project the scale proposed by Macmines to not provide an alternative solution in respect of loss of environmental values and biodiversity other than providing that the Project will be required to provide biodiversity offsets. No reasonable measure has been provided in the EIS to address this fundamental issue.

The provision of biodiversity offsets for significant residual impacts on biodiversity values is a regulatory requirement for mining projects that is enforced by both the Queensland and Federal Governments.

Submitter Issue Number 38.076
The EIS should be refused on the grounds stated herein as the EIS has not had proper regard to the object as set out in section 3 of the EPA, as:
• The Project fails to protect Queensland's environment whilst simultaneously permitting development seeking to improve the quality of life now and into the future which would maintain ecological processes on which life depends.
• The Project is not consistent with the principles of ecologically sustainable development as:
o Long and short term economic, environmental, social and equity considerations must be effectively integrated in the decision making process.
o Threats of serious or irreversible environmental damage or a deficient outcome in respect of an environmental investigation is insufficient grounds to delay measures to prevent environmental degradation.
o The mine will cause serious environmental harm (i.e. dust, noise and vibration) to the character and values of the Land as a result of inter alia coal dust. This is not in the public interest.
The employment, royalties and other benefits that the mine will generate must be balanced against the impact on Corbett's Land and cattle grazing operations together with the impact on the biodiversity and environment. The outcome must be balanced in favour of public interest or consistent with the EPA.

The submitters view on the draft EIS is noted. The relevant Government will determine the adequacy of the draft EIS.

Submitter Issue Number 38.077

Project China Stone – Environmental Management Section 24.

Corbett is not satisfied of Macmines proposed environmental management measures to be developed and implemented to address the potential environmental impacts associated with the Project, detailed at Section 24.

Corbett submits that, in respect of environmental management, the Draft EIS fails to:

• adequately assess the Project's environmental impacts;

• adequately propose measures to avoid or minimise any adverse impacts; and

• propose environmental protection commitments to protect or enhance environmental values.

Refer to response to issue 38.076.

Submitter Issue Number 38.078

Corbett notes the EIS is intended to (*inter alia*):

• ensure Macmines assume primary responsibility for protection of any environmental values that may be affected by the Project;

• address environmental management for the expected life of the Project;

• contribute to statutory decisions on whether a proposal should proceed, and if so, decide what environmental management and monitoring conditions should apply; and

• where legislation allows, incorporate community and stakeholder views in assessment and decision-making processes.

In accordance with the EPA, Macmines has a general environmental duty and is responsible for the action that affect the environment. Macmines has not demonstrated all reasonable and practicable measures have been taken to prevent or minimise the harm caused by the proposed Project.

Refer to response to issue 38.076.

Submitter Issue Number 38.079

Macmines have a corporate and social responsibility to (inter alia):

• self-regulate and ensure its active compliance with the spirit of the law and ethical standards;

• engage in actions that further some social good, beyond the interests of Macmines;

• encourage a positive impact through its activities on the environment and all other members of the public; and

• co-exist with Landowners, including Corbett and operating in a spirit of mutual cooperation and trust.

Noted.

Submitter Issue Number 38.080

The Project and impacts will be long term and intergenerational. Corbett and Corbett's family (past and present) continues to improve the Land for following generations, whereas mining is extractive. The Project has long-term and unaddressed serious environmental impacts on (inter alia) the quality of the agricultural land, salinity, contamination, biosecurity and pest and weeds.

Where the Project is not properly or adequately managed (as is the present circumstances), real consequences to the environment will result, particularly where the Project does not protect the environment and surrounds.

Corbett has genuine concerns in relation to the environmental impacts of the Project on the Land, including but not limited to:

• there will be adverse impacts on soil structure (including erosion and soil compaction due to overuse);

• noise, air and odour impacts have not been appropriately investigated or conditioned in a way that would demonstrate or provide comfort that no environmental harm will arise as a result of the Project;

• destruction of various vegetation species;

• irreversible damage to ecosystems;

• contamination.

A legacy of inadequate environmental measures should not be carried forward given the scale and intensity of the disturbance on the Land which will cause profound environmental impacts.

In light of Corbett's concerns, Corbett submits:

• Macmines must further consider its proposed measures / strategies for tailings and power station waste storage facilities for the Project; and

• the CG should adhere to the principle of preservation of Land unless the loss is deemed unavoidable in which case the landholder (Corbett) must be properly and adequately compensated as a result.

Refer to response to issue 38.003.

Submitter Issue Number 38.081

Corbett has a statutory right under the SDPWO Act as an affected party to object to the Project and has made a 'properly made' submission, being;

• A submission made to the Coordinator-General in writing.

• Received on or before the last day of the submission period 7 September 2015

• Signed and stating the name and address of each person making the submission.

• States the grounds of the submission and facts and circumstances relied on.

Corbett will be adversely affected by the Project directly covering the Land namely through:

• Loss of Vegetation/Good Quality Agricultural Land;

• Loss of Stock Routes/Increased Management Costs;

• Flooding and Hydraulics Impacts; and

• Unacceptable Cumulative Impacts including adverse impacts on threatened Biodiversity.

Corbett's position is that Macmines have proposed an open-cut and underground coal mine that in its present form has unacceptable impacts for landowners and communities because of the

disruption it causes to cattle operations and the local environs.
Due to the long term and irreversible impacts that the Project will have on Corbett, Corbett's business and the environment the application for the Project should be refused.

Noted.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 39 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

39 SUBMISSION

Submitter Issue Number 39.001
Submission made by Emanate Legal on behalf of Coovin - Dooyne Station: Lot 3978 on Crown Plan PH772, County of Albany Parish of Dooyne. Refer to submission attachments for location maps and direction and authority form.
Note: the cover letter, TOC, executive summary and dictionary submitted has been excluded from this register.

Noted. Detailed responses are provided to the specific issues as follows.

Submitter Issue Number 39.002
The adverse impacts which arise as a result of the Project are considered by Coovin to be detrimental to Coovin and Coovin's cattle grazing operation which are unacceptable. Greater emphasis, investigation and, where necessary, compensation to Coovin must be researched, considered and addressed.
The environmental, hydrological and economic/social impacts (amongst others) that Coovin will ensure as a result of the Project will lead to impacts which adversely and directly affect their livelihood.

The location of the landholder's property in relation to the project site (defined by the project Mining Lease Application (MLA) Areas) is shown in Figure 5-4 of the draft Environmental Impact Statement (EIS). Lot 3978 on Crown Plan PH772 covers the eastern portion of the project site and extends to the north and east of the project site. As indicated in Section 4.3.3 of the draft EIS, the proponent has commenced discussions with the landholder in relation to gaining access to the land within the proposed MLA areas. Appropriate compensation for the landholder will be addressed in the ongoing land access discussions.

Submitter Issue Number 39.003
Project China Stone - Land Use Section 5.
Section 5.3.2 of the EIS details the surrounding land use to include:
• Cattle grazing;
• A number of rural residences;
• Recreation facilities:
o Lake Buchanan located approximately twenty kilometres (20km) to the North-West of the Project;
o Wilandspey Conservation Park located approximately twenty five kilometres (25km) to the East of the Project;
o The Blackwood National Park and Nairana National Park located more than fifty kilometres

(50km) to the East of the Project; and
• Commercial facilities:
o Belyando Crossing;
o Caravan park;
o Roadhouse; and
o Hotel.
The EIS does not give sufficient weight to the importance of current land use. The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:
• Accessibility of grazing stock to dense, well vegetated land; and
• Reproduction, growth and behaviour of grazing stock.
There are a number of recreational facilities within close proximity to the proposed Project. Should the Project be approved, it will impact on:
• Water quality values of facilities used for water skiing, camping and picnics; and
• Use and enjoyment of facilities and tourism.
The proposed Project will change the rural character of the region and must be compatible with the current surrounding land uses.
All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current land use. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

As indicated in Section 4.3.3 of the draft EIS, the proponent has commenced discussions with the landholder in relation to gaining access to the land within the proposed MLA areas. Appropriate compensation for the landholder will be addressed in the ongoing land access discussions. The land access agreement will address the impact of the granting of the mining leases over the landholder's property and the associated effects on the landholder's cattle grazing business.

The project is not predicted to adversely impact on the water quality of any regional recreational or tourism areas or facilities.

The potential impacts of the project on the rural character of the region and associated mitigation measures are discussed in Section 6.6 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N).

Submitter Issue Number 39.004
Project China Stone – Land Use Section 5.
Section 5.4.4 Current Land Use: Stock Route
The proposed Project will affect one (1) stock route on the Land:
• Stock Route U398BELY01, which traverses the Southern part of the Project site from South-West to North-East.
The EIS states in section 5.4.4 that:
Macmines will liaise with DNRM, the Isaac Regional Council and affected landowners in relation to

the management and possible realignment of the sock route, as necessary.
The EIS does not give sufficient weight to the importance of the SRN nor does the EIS provide sufficient detail as to whether it is likely that the stock route will be impacted, and if so, to what extent and in what capacity.
Macmines fails to state whether, in the event that the stock route is impacted as a result of the Project, alternatives will be investigated, and Macmines will seek to modify its mine plan.
To be clear, the SRN is primarily used by the pastoral industry as an alternative to transporting stock by rail or road, and for pasture for emergency agistment and long-term grazing. It is used by utility companies to provide power lines, pipelines and telecommunications; and by the community generally for road transport, and recreational and other purposes such as beekeeping.
The Queensland SRN is a highly valued land management tool in respect of its environmental and iconic cultural heritage values, which are recognised nationally as being of significance.
Recent (and continuing) droughts have also established the importance of management arrangements for the SRN as the stock route network during times of drought has accrued greater significance, for example in 2002-03.
The pattern of stock route use remains one of periodic grazing; relatively short, infrequent periods of intense grazing interspersed with long periods of light or no grazing. Stock cannot walk the stock routes unless both pasture and water are present.

The value of the stock route is understood. The Department of Natural Resources and Mines (DNRM) is responsible for the management of stock routes. The stock route is within the proposed open cut mining area and may require realignment, as indicated in Section 5.4.4 of the draft EIS. The proponent will be required to address the impacts of the project on the stock route, including any realignment, to the satisfaction of the DNRM and the Isaac Regional Council (IRC), as indicated in the draft EIS.

Submitter Issue Number 39.005
The EIS does not address nor does it consider the significance of a loss of the SRN (whether on a long term or temporary basis) as to impacts on the business of landholders who use the stock routes (or may in the future) including:
• Cultural and historical values associated with SRN activities such as sites of stock route facilities; family and personal connections to certain stock routes for both indigenous and non-indigenous peoples; and intrinsic cultural values associated with the simple existence of the stock route network and its linkage to exploration and settlement.

There were no significant historical values associated with the stock route identified in the draft EIS Non-Indigenous Cultural Heritage Report (Appendix P). Similarly, stock routes are not typically considered to have any significant indigenous cultural heritage value. If relevant, these issues would be addressed as part of the DNRM approval process for any realignment of the stock route.

Submitter Issue Number 39.006

• Economic values associated with providing employment to drovers and providing more economical alternatives for moving stock. The increased costs as a result of having to relocate stock routes including increased management costs to Coovin. Environmental values associated with the benefits to the environment from walking stock routes as opposed to trucking or transporting by rail (e.g. reduced emissions).

Refer to responses to issues 39.003 and 39.004.

Submitter Issue Number 39.007

• Social values associated with employment opportunities in the droving and pastoral industries as well as local governments.

Refer to responses to issues 39.003 and 39.004.

Submitter Issue Number 39.008

Macmines has not established that it has taken the necessary steps to establish the present use of the SRN and accordingly in the absence of such cannot reasonably have assessed the potential impacts in the same.

Accordingly Coovin submits:

• The CG should adhere to the principle of preservation of stock route in terms of access as part of the Project unless the loss is deemed unavoidable in which case the landholder must be properly and adequately compensated as a result.

• In the circumstances, should the loss of SRN be unavoidable, the mine plan must be relevantly conditioned such that affected stock routes are not to be closed until a suitable realignment of the stock route has been approved by DNRM to minimise delays and disruption to stock route use and the business operations of users of stock routes.

• Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

Refer responses to issues 39.003 and 39.004.

Submitter Issue Number 39.009

Project China Stone – Tailings and Power Station Waste Storage Facilities Section 7.

The following Sections of the EIS are of concern to Coovin and addressed below:

• Section 7.3.5 management and monitoring;

• Section 7.4 conceptual design;

• Section 7.4.5 rehabilitation and decommissioning.

Coovin submits that, in respect of Tailings and Power Station Waste Storage Facilities, the EIS fails to:

• adequately assess the Project's environmental impacts;

• adequately propose measures to avoid or minimise any adverse impacts;

• propose environmental protection commitments to protect or enhance environmental values.

The environmental impacts of the Tailings Storage Facility (TSF) and Power Station Waste Storage Facility (PSWSF), including surface water, groundwater and ecology, are addressed in each of the relevant sections of the draft EIS.

Submitter Issue Number 39.010
Management and Monitoring
Section 7.3.5 relates to management and monitoring of tailings and power station waste.
Coovin submits Section 7.3.5 of the EIS does not give adequate consideration to:
• minimising the impact to the environment, safety and health and the steps to be taken to ensure harm will not be caused;
• control measures for routine operations to minimise likelihood of environmental harm.
• contingency plans and emergency procedures for non-routine situations.

Section 7.3 of the draft EIS relates only to the geochemistry of the tailings and power station waste material. Management and monitoring of other aspects of the TSF and PSWSF are addressed in the other sub sections of Section 7 of the draft EIS.

Submitter Issue Number 39.011
Macmines has not demonstrated procedures / processes to ensure tailings / power station waste is managed to:
• minimise waste generation;
• minimise environmental pollution;
• minimise the production of tailings and waste rock wherever possible
• prevent waste rock and tailings from contaminating the surrounding environment;
• manage and control disposal of all tailings and waste rock.

Refer to response to issue 39.010.

Submitter Issue Number 39.012
Macmines has not demonstrated adequate procedures in relation to potential hazards of tailings / power station waste facilities, including but not limited to:
• inadequate site security;
• structural failure;
• operational failure;
• equipment failure; and
• unforeseen circumstances or consequences.

Refer to response to issue 39.010. Hazards associated with mine waste storage are addressed in Section 22.6.2 of the draft EIS.

Submitter Issue Number 39.013

Conceptual Design of the Tailings and Power Station Waste

Section 7.4 relates to the conceptual design of tailings and power station waste storage facilities.

Coovin submits Section 7.4 of the EIS does not adequately address / consider the design of power station waste facilities to ensure:

• the safe and stable containment of tailings;
• the minimisation or control of seepage;
• a cost effective storage system; and
• a planned system for effective closure.

The design should be adequate for the proposed use, meet contemporary standards and have identified and addressed all the likely risks associated with the site, the nature of the containment materials, the nature, quantity and treatment of the tailings, construction process and closure.

The design of the TSF has been prepared by a leading geotechnical engineering consultancy in accordance with relevant standards. The environmental impacts of the TSF, including surface water, groundwater and ecology, are addressed in each of the relevant sections of the draft EIS.

Submitter Issue Number 39.014

Further, it is important for Macmines to demonstrate that the immediate and long-term risks associated with tailings handling and storage are acceptable and to justify the design and operational decisions using conventional risk management techniques.

Hazards associated with mine waste storage are addressed in Section 22.6.2 of the draft EIS.

Submitter Issue Number 39.015

Rehabilitation and Decommissioning

Section 7.4.5 relates to rehabilitation and decommissioning.

Coovin submits Macmines have not adequately considered / addressed:

• optimising the use of waste rock during rehabilitation;
• the views of landowners, surrounding community and interested stakeholders for rehabilitation;
• waste minimisation and reuse opportunities.

Coovin submits:

• Macmines should consult with landowners, surrounding community and interested stakeholders to exchange information and views in relation to the Project and its potential hazards and approaches to address them during rehabilitation.
• consultation before and during the design and operation of the tailings and power station waste facilities and further rehabilitation of same is an integral part of risk management and can provide benefits to all affected parties.

The design of the TSF has been prepared by a leading geotechnical engineering consultancy in accordance with relevant standards. Consultation was conducted with neighbouring landholders during the preparation of the draft EIS. Landholders did not raise any concerns with the TSF during consultation.

Submitter Issue Number 39.016

Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project. Deficiencies in design of power station waste facilities, management and monitoring, inadequate controls and the like will have serious impacts on the Land and Coovin. Macmines failure to adopt adequate measures for tailings and power station waste will have real and significant impacts on the Land, including but not limited to:

• threat to human life, health or infrastructure;
• short-term and long-term pollution of ground and/or surface waters;
• raised groundwater levels resulting in salinisation of the surface and streams;
• the release of a large volume of water and semi-fluid tailings which smother vegetation, blanket the land surface and restrict stream flow with sediment;
• threat to health or life of wildlife, livestock or domestic animals;
• loss of significant native vegetation; and
• generation of dust or odour.

In light of Coovin's concerns, Coovin submits:

• Macmines must further consider its proposed measures / strategies for tailings and power station waste storage facilities for the Project; and
• the CG should adhere to the principle of preservation of Land unless the loss is deemed unavoidable in which case the landholder (Coovin) must be properly and adequately compensated as a result.

Refer to responses to issues 39.003, 39.013 and 39.014.

Submitter Issue Number 39.017

Project China Stone – Rehabilitation Section 8.

The following Sections of the EIS are of concern to Coovin and addressed below:

• Section 8.2.1 Open cut mine overburden emplacements;
• Section 8.2.2 Underground mine subsidence areas;
• Section 8.2.3 Tailings and power station waste storage facilities;
• Section 8.2.5 Decommissioning and mine closure;
• Section 8.4.1 Post mining land suitability.

Coovin submits that, in respect of rehabilitation, the Draft EIS fails to:

• adequately assess the Project's environmental impacts;
• adequately propose measures to avoid or minimise any adverse impacts;
• address relevant requirements under the Code of Environmental Compliance for Mining Lease Projects;
• propose environmental protection commitments to protect or enhance environmental values.

The submitters concerns are noted. The proponent respectfully does not agree that the draft EIS does not adequately address issues associated with rehabilitation.

Submitter Issue Number 39.018

Open Cut Mine Overburden

Section 8.2.1 relates to open cut mine overburden. Coovin submits Section 8.2.1 of the EIS does not give adequate consideration to:

• the serious adverse long term effects of open cut mine overburden and potential for:

o impacts to water quality and proposed rehabilitation strategies; and

o acid mine drainage and proposed rehabilitation strategies;

Refer to response to issue 39.017.

Submitter Issue Number 39.019

• the quality and use of the Land after Macmines has proposed to have rehabilitated same;

Any impact on the Land, use of the Land, soil and grazing will have substantial impacts on Coovin's grazing operations by:

• lessening the palatability of the grazing Land, resulting in livestock losing weight thereby decreasing productivity and income to Coovin; and

• decreasing the quality of soil, meaning a decreased quality and quantity of grazing land.

Refer to response to issue 39.003.

Submitter Issue Number 39.020

Open Cut Mine Overburden

Project activities at ground level will have significant long term impacts to not only Coovin and Coovin's quiet peace and enjoyment of the Land, but also to cattle, wildlife areas and the like.

The draft EIS addresses potential impacts on ecology and land use. Refer to response to issue 39.003.

Submitter Issue Number 39.021

Whilst Section 8.2.1 of the draft EIS does provide some measures in relation to revegetation, Coovin submits Macmines proposals do not adequately address the requirements imposed under the Code of Environmental Compliance.

In accordance with the Code of Environmental Compliance, Condition 35 provides:

The holder of the environmental authority must spread seeds or plant species that will promote vegetation of a similar species and Density of Cover to that of the surrounding undisturbed areas or vegetation that is appropriate for providing erosion control and stabilisation of the disturbed areas.

Note 49 - To revegetate disturbed areas the following measures or similar measures can be used:

• for areas which have become compacted during the project, break up the soil surface to a depth that is suitable for establishing vegetation;

• spread stockpiled topsoil over disturbed areas to a depth that is suitable as a rooting medium for the revegetation process;

• provide suitable nutrient conditions for planting by using fertiliser if necessary; and

• collect and store native seeds to be used in rehabilitation.
Note 50 - When revegetating disturbed areas, the holder of the environmental authority should plant native species endemic to the area and location in the landscape (e.g. if clearing has occurred in a riverine area, revegetate the disturbed area using local riverine species).
Note 51 - Vegetation used to stabilise disturbed areas in the short term should be comprised of sterile, short-lived species (e.g. a cover crop). However, the long term aim of revegetating any disturbed area is to establish a stable vegetation community that is similar to that of the surrounding undisturbed landscape.
Macmines failure to adopt adequate measures for revegetation will have real and significant impacts on the Land, including but not limited to:
• adverse impacts on soil structure;
• natural grasses will not regenerate as fast as other species which will result in a reduced carrying capacity on the Land;
• destruction of various vegetation species;
• irreversible damage to ecosystems.

The proposed revegetation is consistent with established rehabilitation methods and is considered to be adequate.

Submitter Issue Number 39.022
Subsidence
Section 8.2.2 of the EIS details Macmines proposed mitigation for tension cracking and buckling, in particular:
• A survey of potential subsidence cracking areas will be undertaken within six (6) months of subsidence to locate individual cracks and assess the level of treatment required to rehabilitate each crack. Six (6) months will allow sufficient time for the full effects of subsidence to take place…
• Subsidence crack treatment will involve:
o Ripping or ploughing minor cracks using a small tractor or dozer. These areas will be allowed to regenerate naturally through inherent seed resources, vegetation propagation from rootstock and recruitment from adjoining undisturbed edges;
o Stripping large cracks of topsoil, excavating and backfilling the cracks…
• The subsidence crack rehabilitation work area will be clearly delineated in order to limit disturbance to the minimum area necessary and prevent unnecessary encroachment of disturbance.
Coovin considers Macmines proposed mitigation measures for subsidence is not adequate. Macmines has not considered the time of year, during wet or dry seasons the surveying will be undertaken.

The surveying will occur within six months of subsidence, regardless of the time of year.

Submitter Issue Number 39.023
Further, surveying potential subsidence cracks within six (6) months will not adequately assess the level of treatment required to rehabilitate each crack, accordingly Coovin questions the accuracy of any surveying results undertaken only within a six (6) month period. In failing to accurately assess the "before" state of the Land, Macmines are unable to demonstrate that the Land will be restored correctly after the completion of the Project.

Effective crack rehabilitation does not require an assessment of the land prior to subsidence, as suggested.

Submitter Issue Number 39.024
In relation to subsidence crack treatment, Macmines has not addressed / considered:
• Condition 35 of the Code of Environmental Compliance for Mining Lease Projects, in particular Note 49 to 51 (detailed above);

The proposed revegetation methods for crack rehabilitation are based on experience with effective crack rehabilitation from operating mines.

Submitter Issue Number 39.025
• The extent of vegetation clearing operations and identifying same on a plan to ensure clearing is avoided where necessary;

Clearing control procedures are described in Section 24.4.3 of the draft EIS.

Submitter Issue Number 39.026
• The impacts of Coovin's cattle and grazing operations on the Land, following the stripping of large cracks of topsoil and ripping or ploughing minor cracks using a small tractor or dozer;

Refer to response to issue 39.003

Submitter Issue Number 39.027
• Vegetation clearing being undertaken in a sequential manner to allow more mobile fauna species the opportunity to disperse from cleared areas and clearing activities. Furthermore clearing within areas of high ecological value, must be undertaken with care and rehabilitated to restore connectivity to the highest realistic extent following the clearing.

The impacts of clearing, and proposed mitigation and management measures are discussed in Section 9 of the draft EIS.

Submitter Issue Number 39.028

Tailings

Section 8.2.3 of the draft EIS refers to Section 7 – Tailings and power station waste storage facilities.

In accordance with Section 7.4.5 of the draft EIS, Macmines provided:

… no special management measures or rehabilitation techniques are required for the tailings and power station waste material.

Coovin rejects this position.

Coovin notes Macmines geochemical assessment concluded the risk of potential environmental impacts are expected to be low. Notwithstanding, Macmines must have in place management measures / rehabilitation techniques to ensure no environmental impacts are caused should tailings / waste storage have unforeseen risks. The failure to adequately rehabilitate the Land presents a threat of serious and irreversible environmental damage.

The conclusions of the geochemical assessment of the mine waste materials are based on detailed geochemical testing conducted by a specialist geochemist. The rehabilitation methods proposed for the TSF and PSWSF are suitable for these types of facilities.

Submitter Issue Number 39.029

Decommissioning and Mine Closure

Section 8.2.5 of the draft EIS considers decommissioning and mine closure.

As the Project / coal production is proposed is unknown and will continue for a fifty (50) year operational mine life, the Draft EIS has not addressed:

- how Macmines rehabilitation and decommissioning strategies / plans and the like will updated;
- changing significance of impacts and hazards associated with the mining activity;
- changes in legal and other obligations; and
- learnings and corrective actions from monitoring activities.

Macmines must reconsider its decommissioning strategies and amend to include (*inter alia*) the foregoing concerns of Coovin.

Decommissioning and mine closure are required to be conducted in accordance with the Environmental Authority and to the satisfaction of the Department of Environment and Heritage Protection.

Submitter Issue Number 39.030

Post Mining Land Suitability

Section 8.4.1 of the draft EIS in relation underground mine areas provides:

Following underground mining surface subsidence effects will result in the development of a series of shallow troughs relative to natural topography with gentle slopes.

The Draft EIS fails to address fundamental rehabilitation criteria necessary for the type of activity and impact on the Land rehabilitation, specifically in relation to:

- impacts to Coovin and grazing operations in relation to timing of rehabilitation to restore the pre-mine land being suitable for grazing;

• restoring the surface level of the Land to its original condition;
• reinstating the natural contours and channel of every watercourse;
• shaping the area so that it conforms as far as reasonably practicable with the surrounding topography;
• reforming all drainage lines, waterways and creek beds to stable contours and as near as reasonably practicable to the situation existing prior to mining; and
• achieving a post mining land use capability across the lease area equal with that pre-existing the Lease, where this is technically feasible.

Refer to response to issue 39.003. The management of drainage in subsidence areas is addressed in Section 13.4.1 of the draft EIS. The impacts of subsidence on land suitability is addressed in Section 8.4 of the draft EIS.

Submitter Issue Number 39.031
Section 8.4.1 of the draft EIS provides:
Following open cut mining the overburden emplacement areas and final voids will not be able to be restored to their pre-mining land suitability for grazing.
In relation to Section 8.4.1, Macmines have not addressed the conflict of Land uses. The Project represents a conflict between competing land uses of agriculture, livestock grazing and other traditional land uses. The Project requires large amounts of land that could otherwise be used for agricultural production. This sets up a direct competition with small-scale agriculture for control and use of land.

As indicated in Section 8.3.3 of the draft EIS, the project site is low quality grazing and agricultural land. There is no small scale agriculture in the area and once landholder compensation agreements are in place, there is not likely to be any conflict of land use associated with the project.

Submitter Issue Number 39.032
Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.
It is in the Qld Government, Macmines and Coovin's benefit to ensure rehabilitation is completed successfully and to proper standards that ensure the long term sustainability to the traditional use of the Land, grazing. Poorly rehabilitated mines provide long term issues for governments, communities and companies, and ultimately tarnish the reputation of the mining industry as a whole. Poor planning invariably increases the costs of rehabilitation and mine closure and decrease overall profitability.
A rehabilitation strategy should be reviewed annually throughout the life of the Project. As any operational plan changes or rehabilitation activities are completed, the strategy should be updated to reflect any changes.

Refer to response to issue 39.003. Rehabilitation is required to be conducted in accordance with the Environmental Authority conditions and to the satisfaction of the Department of Environment and Heritage Protection.

Submitter Issue Number 39.033
Macmines have not demonstrated how the Project will (*inter alia*):
• avoid and minimise future environmental harm;
• reinstate the original natural ecosystem; and
• reinstate previous land use (e.g. grazing).
In light of Coovin's concerns, Coovin submits:
• Macmines must further consider its proposed rehabilitation and decommissioning strategies for the Project;
• Macmines must ensure its proposed rehabilitation strategies are in accordance and promote the objectives and requirements of the Code of Environmental Compliance for Mining Lease Projects;
• the CG should adhere to the principle of preservation of Land and importance of rehabilitation unless the loss is deemed unavoidable in which case the landholder (Coovin) must be properly and adequately compensated as a result.

Rehabilitation and impacts on land suitability and ecology are adequately addressed in the draft EIS.

Submitter Issue Number 39.034
Project China Stone – Terrestrial Ecology Chapter 9.
Section 9.5.4 and the Terrestrial Ecology Report (Appendix F) of the EIS identifies threatened species listed under the Nature Conservation Act 1992 recorded during the field surveys to include:
• Squatter Pigeon;
• Black-throated Finch;
• Koala; and
• Short-beaked Echidna.

Noted.

Submitter Issue Number 39.035
Should the Project be approved, suitable high value habitat for these species within the Project area will be reduced, effecting the conservation of these species. The impact of the proposed activities on the terrestrial ecology within the Project area is detailed in the EIS to include impacts of:
• Vegetation clearing for the open cut mine and construction of mine infrastructure; and
• Disturbance from noise and vibration, lighting, dust, erosion and the introduction of invasive species; and
• Disturbance and removal of habitat features providing foraging, shelter and breeding opportunities.
Accordingly the proposed Project, if approved, will add further pressure on the threatened species

within the Galilee Basin.
It is neither adequate nor sufficient for a Project of the scale proposed by Macmines to state with respect to the proposed clearing footprint of the mine at Section 9.6.2:
". . . it was not possible to design a layout that avoided significant vegetation clearing because of the numerous technical and environmental constraints of the project design".
The Project should be refused on this ground as the entire Project area is well vegetated with remnant vegetation comprising Eucalyptus and Acacia open woodland. There is no alternative Project layout that would avoid clearing remnant vegetation. A considerable percentage of high valuable habitat for the species listed in the NC Act will be removed and disturbed by the proposed activities which will cause irreversible and unavoidable impacts on the terrestrial ecology within the Project area.

Mitigation measures for the impacts of the project on ecological values are provided in Section 9 of the draft EIS.

Submitter Issue Number 39.036
Project China Stone – Groundwater Chapter 12 The EIS outlines in section 12.4.2 two distinct areas within which the groundwater regime will be affected by the proposed mining activities as follows:
• The Northern Underground where dual seam underground mining is proposed below the elevated ridgeline of Darkies Range, and subsidence cracking will potentially result in hydraulic connection between the underground mines and the overlying Clematis Sandstone; and
• The lower lying area in the south of the Project area where the open cut mining area and single seam Southern Underground are proposed, and the Clematis Sandstone is essentially absent.

Noted.

Submitter Issue Number 39.037
The impact of the proposed activities on the groundwater regime is detailed in the EIS to include:
• Dewatering by extracting coal by longwall mining and open cut mining and in so doing, lowering surrounding groundwater levels;
• Subsurface subsidence cracking of strava overlying the proposed longwall mines, changing the permeability of the overlying units and influencing surrounding groundwater levels;
• Construction of tailings storage facility and power station waste storage facility, which have the potential to generate leachate and give rise to groundwater contamination;
• Use of hydrocarbons and chemicals which have the potential to give rise to groundwater contamination; and
• Formation of a residual void in the final mine landform, that has the potential to influence surrounding groundwater levels and quality.
The proposed activity will cause groundwater contamination as a result of seepage from:
• Tailings storage facility;
• Power station waste storage facility;
• Overburden emplacement areas and the final void lake; and

• Hydrocarbon and chemical storage.
The groundwater modelling conducted for the EIS is insufficient to establish the true extent of associated subsidence cracking and is not an effective or accurate prediction of depressurisation and the associated impacts on groundwater. Consequently, the EIS does not address the magnitude of direct impacts on the groundwater levels and flow directions within the Project area.
The operation of the proposed Project must maintain, preserve and protect current groundwater values.
All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current groundwater values.

The draft EIS Groundwater Report (Appendix I) includes a comprehensive groundwater assessment that describes the extent of groundwater impacts from the project and the proposed impact management measures.

Submitter Issue Number 39.038
Project China Stone – Surface Water Chapter 13
At 13.2.4, page 13-4 of the EIS Chapter in respect of surface water quality Macmines states:
". . . the project site is remote and is located at the head of the catchments. It has highly ephemeral, short duration, surface water flows. These factors severely limit the ability for any regular sampling of surface water flows from the project site. Site surface water quality was sampled from remnant surface water during the aquatic ecology field surveys in May and October/November 2012. . . As these water quality results are from remnant ponded surface water they are not representative of the quality of site surface water flows and therefore not presented in this section".
At 13.2.4, page 13-5 of the EIS Chapter in respect of baseline water quality assessment Macmines states:
"Natural background concentrations of aluminium, copper and zinc exceed the most conservative of the quoted guidelines at all monitoring locations. Iron is also present in the Belyando and Sutton Rivers at concentrations above the most conservative quoted guidelines".
At 13.5.5, page 13-19 of the EIS Chapter in respect of water management system preformance Macmines states:
"The modelling results show the median water supply demands are variable over the life of the mine and are generally significantly greater than the amount of mine affected water that will be generated by the project. This indicates a significant overall water deficit for the project and the need for a significant external water supply"."

Noted.

Submitter Issue Number 39.039
The Project is located at the head of the catchments and as such all of the run-off, uncontrolled discharge and subsequent contamination and sedimentation caused by the proposed activities will impact on surface water quality as detailed in the EIS to include:
• Sedimentation of downstream waterways during construction and operations due to erosion from

disturbed areas on the Project site and increased sediment loads in site drainage water;
• Mining disturbance and mine site drainage changing catchment areas, potentially resulting in downstream catchment yield impacts;
• Mining disturbance and mine site drainage altering downstream drainage, resulting in:
o Changes to flood behaviour including flow paths, flood inundations areas and flow velocities;
o Geomorphic impacts on watercourses and drainage lines including impact on channel bed and bank stability;
• Subsidence of the ground surface and surface drainage features as a result of underground longwall mining, resulting in;
o Surface drainage impacts including ponding of runoff in subsidence depressions; and
o Geomorphic impacts on subsided drain lines including impacts on channel bed and bank stability;
• Controlled discharge of mine-affected water resulting in downstream water quality impacts on environmental values and water users; and
• Impacts of the final landform and final void on surface drainage.

Noted.

Submitter Issue Number 39.040
The EIS did not include the water quality results obtained from the remnant ponded surface water on the basis they were not representative of the quality of site surface water flows. The EIS does not give sufficient weight to the importance of this data set and measures must be implemented to obtain accurate surface water samples during surface water flows to establish reliable surface water quality values within the Project area.

The statement that the water quality of remnant ponds is not representative of surface water flows is correct. Baseline water quality is discussed in Section 13.2.4 of the draft EIS. Further baseline water quality monitoring is proposed as explained in Attachment E – Additional Information on Surface Water.

Submitter Issue Number 39.041
The Project is located within the Galilee Basin and as such is closely related to other projects currently under investigation or expected to commence investigations in the next five (5) years so the cumulative impact of contamination to surface waters from the proposed and surrounding activities and infrastructure will significantly affect already elevated surface water values as the run-off from mine infrastructure areas will include:
• Elevated levels of suspended solids;
• Hydrocarbons; and
• Elevated levels of metals.

The potential cumulative impacts on surface water are discussed in Section 23.7 of the draft EIS.

Submitter Issue Number 39.042

Should the Project be approved, the supply of water is of great concern as the mine water management system is predicted to have a water deficit over the life of the mine. The EIS modelling shows the annual external water requirement will range from 903 to 12,300ML pa over the life of the mine. At page 13-25 of the Chapter Macmines proposes to gain an allocation to harvest water from the Cape River or the Belyando/Sutton River. The harvesting of water from surrounding watercourses will have a significant impact on the availability and quality of water consumed by Corbett and surrounding users for domestic and recreational use and on the water consumed by Corbett's cattle.

As described in Section 4.13 of the draft EIS, the provision of the raw water supply required for the project is not within the scope of this EIS. It will be subject to separate environmental impact assessment and approval.

Submitter Issue Number 39.043

The proposed Project will impact on flood levels as a result of the redistribution of water and changes to flow velocities. The determination of the flood afflux in the EIS is insufficient to establish the true extent of flooding that will arise from the proposed mining activities. The EIS does not give sufficient weight to the importance of the determination of the flood afflux.

As such, the magnitude of any afflux and its impacts on the Project area have not been sufficiently investigated or established.

Reliable and representative baseline studies must be conducted to establish accurate surface water quality values within the Project area.

Further investigation needs to be undertaken in order to consider the true flood impacts. The Project must not proceed until known flooding potential and risk have been established using a reliable method of determination so that Coovin can understand the impacts of the Project in terms of flooding on Coovin's grazing business and domestic and recreational use.

All necessary and required mitigation measures must be put in place to eliminate all adverse hydrological impacts of the Project on surface water values. Failure to do so will result in cumulative contamination of surface waters and result in cumulative losses to Coovin's cattle grazing and watering and surrounding irrigated agriculture.

Flood afflux and its impacts are discussed in Section 13.6.3 of the draft EIS. The assessment of flood afflux is based on a flood modelling assessment.

Submitter Issue Number 39.044

Project China Stone - Air Quality Section 15.

The TOR required Macmines to describe the existing air quality that may be affected by the Project, and detail the best practice mitigation measures together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate the impacts of the predicted air quality.

Noted.

Submitter Issue Number 39.045

The EIS does not appropriately identify the existing air quality in the area of the Project.

The EIS states at section 15.6 that there are no DEHP air quality monitoring stations operating in the vicinity of the Project, and data has therefore been sourced from:

• Air quality assessments from other coal mines in the region; and

• Monitoring data from DEHP's monitoring stations at Toowoomba and Townsville.

The assumption made by Macmines that the data sourced with respect to existing air quality in the region of the Project is similar, or identical to, that at other projects, or to that at Toowoomba or Townsville, is flawed.

To be clear, the potential sources and types of dust in the region of the Project are highly likely to differ significantly from both Toowoomba and Townsville, as both areas are significantly larger, heavily populated centres, with limited farming and/ or grazing land located at their centre.

As indicated in Section 15.6 of the draft EIS, monitored levels of NO_2, CO and SO_2 in Toowoomba and Townsville have been used to characterise baseline levels for the project. Given the remote location of the project site and the lack of any significant sources of NO_2, CO and SO_2 in the project area, these levels are likely to be conservative.

Submitter Issue Number 39.046

The EIS's prediction methodology to determine whether any potential adverse impacts on health or amenity may occur is also flawed.

The EIS states at section 15.7.2 that "off-site project-generated traffic will access the project site via sealed roads and is therefore not a potentially significant dust emission source." The traffic from vehicles accessing the Project has not been included in the list of key mining activities that could contribute to dust generation.

To be clear, transport and traffic accessing the Project is likely to be considerable given the significant workforce (estimated at 3,300 employees at peak employment). Both the Moray-Carmichael Road and the Elgin-Moray Road are unsealed roads which provide direct access to the Project from larger sealed roads.

Each of the five (5) key roads to be utilised by the Project traffic allow B-triples, Type 1 and 2 Road trains and B-Double vehicles, all guaranteeing significant traffic dust emissions onto the land adjacent to the roads.

Given the above, it is therefore clear that Macmines assessment that the predicted levels of each pollutant are below the relevant air quality objectives at all sensitive receptors is flawed.

The reference to sealed roads in Section 15.7.1 of the draft EIS relates to the status of the roads at the time the mine is operating rather than the current status, as suggested.

Submitter Issue Number 39.047

Further, Macmines have failed to describe existing air quality levels in areas other than sensitive receptors (such as grazing pasture, water points etc.). The Coovin's run a successful grazing operation, whereby the necessity of palatable grazing pasture and clean water for cattle is of significant importance. If, as a result in an increase in dust particles and an decrease in air quality

results in a decrease in the quality of water or palatable grazing pasture, Coovin's farming operation will certainly be adversely affected by:
• Stock being less inclined to feed on the pasture available, thereby not increasing in weight and being less profitable for sale;
• Stock being less inclined to water at the available water resources, thereby not increasing in weight and potentially suffering health impacts, thereby being less profitable for sale;
• Coovin being required to cart in (at Coovin's additional time and expense) supplementary feed for stock to ensure usual weight increases and supplements gained; and
• Coovin being required to cart in (at Coovin's additional time and expense) clean quality drinking water for stock.

The potential for dust impacts on grazing are discussed in Section 2.2 of the draft EIS Air Quality Report (Appendix L).

Submitter Issue Number 39.048
The mitigation measures provided in section 15.8.12 of the EIS are insufficient in that they:
• Fail to detail the specific requirements for watering haul roads such as the number of times per day watering will be required and the location that the water will be resourced from;

The number of times per day a haul road needs to be watered will vary considerably dependent on the amount of traffic using the road and the weather conditions. The dust suppression water will be supplied from the mine water management system and the water truck fill point will also vary dependent on a range of factors.

Submitter Issue Number 39.049
• Fail to detail within what period the rehabilitation of inactive disturbed areas must be undertaken;

The progressive rehabilitation of the mine is illustrated in the conceptual staged mine layout plans (Figures 4-12 to 4-15 of the draft EIS)

Submitter Issue Number 39.050
• Fail to describe proactive and predictive operational and maintenance strategies that could be used by Macmines to prevent and mitigate the impacts to air quality.
Accordingly Coovin submits:
The CG should require correct baseline monitoring to determine existing air quality levels.
• That Macmines must be required to include all mining proposed activities into its assessment in the establishment of estimated levels of air pollutants to determine whether any potential adverse impacts may occur. • The CG should adhere to the principle of preservation of, or minimisation of impact on, Coovin's grazing land as a result of increased particulate matter, unless the adverse impacts is unavoidable in which case the landholder (Coovin) must be properly and adequately compensated as a result.
• Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarding in considering the merits of the Project.

Refer to responses to issues 39.045, 39.046 and 39.047.

Submitter Issue Number 39.051

Project China Stone – Air Quality Section 15.

Section 15.9 of the EIS provides that greenhouse gases will be produced by the Project as a result of the:

- combustion of coal for power generation;
- fuel consumption; and
- fugitive emission of coal seam gas.

Noted.

Submitter Issue Number 39.052

The EIS does not give sufficient weight to the importance of current land use and the potential for adverse impacts as a result of increased greenhouse gas emissions.

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, and significant greenhouse gas emissions in the surrounding area increase, the following adverse impacts will be seen:

- An increase in health risks to surrounding landholders;
- An increase in health risks to grazing stock;
- An increase in pollution;
- Terrestrial and aquatic ecology; and
- Changes to plant growth and nutrition levels.

The proposed Project must adequately take into consideration the current greenhouse gas emissions and the current and anticipated land use. All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on current greenhouse gas emission levels. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural land.

The assessment of greenhouse gas emissions in the draft EIS has been conducted in accordance with the requirements of the EIS Terms of Reference.

Submitter Issue Number 39.053

Project China Coal – Noise and Vibration Section 16.

Section 16.3 of the EIS states that data is obtained from environmental noise monitors at two (2) monitoring locations.

In obtaining data from only two (2) monitoring locations, the EIS inadequately assesses the existing noise environment and fails to take into consideration the current land use in the Project area.

The two (2) monitoring locations are both located to the south west of the Project. No monitoring data has been obtained from any other direction from the Project.

Clearly noise data is likely to differ depending on:

- Terrain between the Project and the monitoring location;

• Wind directions;
• Proximity to different Project infrastructure; and
• Proximity to roads connecting to the Project

Noise monitoring conducted for the draft EIS confirmed that background noise levels are very low in the surrounding areas. Consequently the noise criteria for the project are the most stringent possible. Any further noise monitoring at other locations would therefore have no effect on the outcomes and conclusions of the draft EIS noise assessment.

Submitter Issue Number 39.054
Further, the noise assessments which have been undertaken do not give sufficient weight to the current land use and the potential impact of noise on the land use.
The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:
• Accessibility of grazing stock to dense, well vegetated land; and
• Reproduction, growth and behaviour of grazing stock.
The proposed Project will significantly alter the existing noise environment and must be compatible with the current surrounding land uses, including residential and grazing.
It is imperative that Macmines provides, and implements noise mitigation measures to eliminate the potential for adverse impacts of the Project on both sensitive receptors and current farming operations. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

Mine noise is not known to have an adverse impact on grazing properties. There are numerous examples of mines that have active cattle grazing on fenced areas within operating mine sites.

Submitter Issue Number 39.055
Project China Coal – Noise and Vibration Section 16.
Section 16.6.8 of the EIS states that "Predicted ground vibration and blast overpressure levels are well within the criteria at the closest receptor for this MIC (Maximum Instantaneous Charge).
The EIS inadequately assesses the predicted ground vibration and blast overpressure and fails to take into consideration the current land use in the Project area.
Whilst the predicted levels are within the criteria at the closest receptor for this MIC, there is no certainty that predicted levels are within the criteria at other receptors.
Clearly ground vibration and blast overpressure data is likely to differ depending on:
• Terrain between the Project and the receptor;
• Infrastructure and/ or vegetation between the Project and the receptor.

The majority of Queensland coal mines are location in proximity to grazing properties. Ground vibration and overpressure are not proven to have any adverse impacts on neighbouring grazing properties. The assessment of impacts on receptors considered the worst case closest receptor. The impacts on any more distant receptors would be less than the closest receptor.

Submitter Issue Number 39.056

Further, the predicted ground vibration and blast overpressure assessments which have been undertaken do not give sufficient weight to the current land use and the potential impact of vibration and blasting on the land use. The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the:

• Accessibility of grazing stock to dense, well vegetated land; and

• Reproduction, growth and behaviour of grazing stock.

The proposed Project will significantly alter the existing environment and must be compatible with the current surrounding land uses, including residential and grazing. It is imperative that Macmines provides, and implements vibration and blasting mitigation measures to eliminate the potential for adverse impacts of the Project on both sensitive receptors and current farming operations. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences and recreation areas.

Refer to response to issue 39.055.

Submitter Issue Number 39.057

Project China Stone – Visual Amenity Section 17.

Section 17.3.2 of the EIS states that "Visual receptors in the vicinity of the project site are limited to isolated rural residences and unsealed local government roads. The three closest residences were selected for the purposes of the visual impact assessment."

The EIS does not adequately assess the visual receptors in the vicinity of the project site by merely assessing the three (3) closest residences.

There are sixteen (16) residences within fifty (50) kilometres of the Project, located in all directions of the Project. The Three (3) residences which were assessed failed to provide an assessment of the visual impact on residences to the north, north-west, north-east and south east of the Project.

Two of the three (3) residences assessed have visual settings which are impeded by the Darkies Range. All residences in differing directions to the Project do not have visual settings which are impeded by the Darkies Range, thereby increasing the likelihood of a high visual impact at those residences.

Merely two (2) lines of sight were drawn for each receptor, failing to sufficiently address the whole impact on the receptors.

As discussed in Section 17.3.2 of the draft EIS, visual effects and impacts on areas beyond the closest residences will generally be less than those at the closest residences. The visual impact on the closest receptors was assessed as low. The visual assessment was based on worst case line of sight locations.

Submitter Issue Number 39.058

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the farming operations of the surrounding landholders by:

• Cattle shying away from new, and abnormal, visual infrastructures in their surroundings; and

• Thereby altering the usual grazing and watering patterns of the stock (thereby impacting on

reproduction, growth and behaviour of grazing stock).
The proposed Project will change the rural character and visual amenity of the region and must be limited so as to refrain from impacting on residences and the current surrounding land uses.
All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on nearby residences and current land use. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences.

Coal mines are not known to create visual impacts that adversely impact cattle grazing. Visual impact mitigation measures are discussed in Section 17.4 of the draft EIS.

Submitter Issue Number 39.059
Project China Stone – Traffic and Transport Section 19.
Section 19.2 of the EIS identifies traffic and transport impacts as a result of the Project to include:
• Impacts on intersections;
• Impacts on road pavements;
• Impacts on road safety;
• Impacts on public transport; and
• Impacts on other modes of transportation.

Noted.

Submitter Issue Number 39.060
Should the Project be approved, suitable and necessary road networks within the Project area will be limited, affecting the safety of both drivers and the surrounding environment.
The proposed Project activities will impact on the current road network within and surrounding the Project including by:
• Considerably increasing traffic numbers during the construction and operation phases;
• Considerably altering vehicle types utilising the road network, ranging from standard vehicles up to multi-combination vehicles;
• Increasing disturbance to the current road networks and surrounding land as a result of the above, including disturbance to residences and grazing land from:
o noise and vibration;
o lighting and dust;
o erosion and subsidence; and
o the potential introduction of weed species.

A Road Impact Assessment (Appendix O) is presented in the draft EIS. Refer to responses to issues 39.047, 39.054, 39.055 and 39.058.

The mine is not predicted to impact neighbouring grazing properties due to erosion or subsidence. Proposed controls for the spread of weeds is discussed in Section 9.7.3 of the draft EIS.

Submitter Issue Number 39.061

The primary land use within the Project site and surrounding area is cattle grazing. Should the Project be approved, it will impact on the farming operations of the surrounding landholders by:

• Cattle shying away from new, and abnormal, increased traffic and vehicle types in their surroundings; and

• Thereby altering the usual grazing and watering patterns of the stock (thereby impacting on reproduction, growth and behaviour of grazing stock).

The proposed Project will change the rural character and rural road network currently seen in the region and must be restricted so as to ensure no adverse impacts are felt by residences and the current surrounding land uses (grazing).

All necessary and required mitigation measures must be put in place to eliminate all adverse impacts of the Project on nearby residences and current land use. Failure to do so will result in losses to Coovin's cattle grazing business and to the livelihood and enjoyment of surrounding rural residences.

There are many major roads in Queensland adjacent to cattle grazing properties and cattle are not known to be adversely impacted by road traffic.

Submitter Issue Number 39.062

Project China Stone – Cultural Heritage Section 20.

Section 20.2.2 provides that the Wangan and Jagalingou People "have been identified as the Aboriginal parties for the project, in accordance with the ACH Act. The proponent has put in place with its consultant, the process to initiate a CHMP with the Wangan ad Jagalingou People, in accordance with the ACH Act. The CHMP is required to be finalised prior to the commencement of construction.

The EIS fails to provide or require appropriate assessment of the potential impacts of a project on Aboriginal heritage prior to approval of the Project. By simply requiring that the CHMP be finalised prior to the commencement of construction, the potential impacts of the Project on Aboriginal heritage will possibly be missed, and or not given sufficient weight and their importance considered.

It is necessary that the CHMP be required to be finalised earlier in the approval stage for the Project to adequately assess the potential impacts of the Project on Aboriginal heritage and to enable appropriate mitigation measures to be investigated and put into place.

As explained in Section 20.2.2 of the draft EIS, the proposed management of Aboriginal cultural heritage is in accordance with the requirements of the *Aboriginal Cultural Heritage Act*.

Submitter Issue Number 39.063

Project China Stone – Non-Mining Waste Management Section 21.

Section 21.2.2 of the EIS identifies the legislative requirements for a waste management hierarchy where waste management options are considered in a structured order as follows:

• Waste avoidance (most preferred) (1);

• Waste reduction (2);

• Waste reuse (3);
• Waste recycling (4);
• Recover waste resources (5);
• Treat waste (6); and
• Waste disposal (least preferred) (7).

The EIS assesses each type of waste proposed by the Project taking into consideration the waste management hierarchy.

Not one (1) of the management strategies proposed by Macmines are assessed as a (1) in the waste management hierarchy (waste avoidance) or a two (2) in the waste management strategy (waste reduction). Conversely, numerous management strategies are assessed as a (7) in the waste management hierarchy (Waste disposal).

Should the Project be approved, significant waste will be generated within the Project area, and the removal and/ or disposal of that waste will fail to be dealt with in accordance with best practice management strategies, affecting the Project area.

The proposed management of waste is in accordance with the relevant regulatory requirements.

Submitter Issue Number 39.064

The limited waste management strategies for the Project activities will impact on the Project area, the surrounding land and the surrounding land by:

• Adversely impacting on the life, health and well-being of people in the vicinity of the Project and the surrounding lands;

Refer to response to issue 39.063

Submitter Issue Number 39.065

• Adversely impacting on the life, health and well-being of livestock in the vicinity of the Project and the surrounding lands;

Refer to response to issue 39.063.

Submitter Issue Number 39.066

• Adversely impacting the ecological processes and associated ecosystems in the Project area and the surrounding area; and

Refer to response to issue 39.063.

Submitter Issue Number 39.067

• Adversely impacting the current land use and land use capability having regard to economic considerations.

Refer to response to issue 39.063.

Submitter Issue Number 39.068

Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

It is in the Qld Government, Macmines and Coovin's benefit to ensure waste removal and/ or waste disposal is completed cleanly, effectively and in accordance with best management practices that ensure the long term sustainability to the traditional use of the Land, grazing.

The management of waste should be reviewed prior to the Project's approval, and thereafter annually throughout the life of the Project. As any planned activity is altered or activities are completed, the strategy should be updated to reflect any changes.

Refer to response to issue 39.063.

Submitter Issue Number 39.069

Macmines have not demonstrated how the Project will (*inter alia*):

• avoid and minimise current and future environmental harm; and

• minimise impacts on current and previous land use (e.g. grazing).

In light of Coovin's concerns, Coovin submits:

• Macmines must further consider its proposed waste management strategies for the Project;

• Macmines must ensure its proposed waste management strategies are in accordance with, and promote the environmental values as set out in section 21.2.3 of the EIS.

Refer to response to issue 39.063.

Submitter Issue Number 39.070

Project China Stone – Hazard and Risk Section 22.

Section 22.6 of the EIS states that the key potential hazards of the Projects are:

• Storage of mine-affected water in various mine water dams which could potentially be hazardous in the event of an unplanned or unmanaged release;

• Storage of tailings and other mine wastes which could potentially be hazardous in the event of an unplanned or unmanaged release;

• Operation of a coal-fired power station to provide electricity for the operation of the mine. The power station could be potentially hazardous in the event of an explosion;

• Operation of a private airstrip for the transport of mine workers;

• Transport, storage and use of a range of hazardous materials, including explosives that can create hazardous conditions if not appropriately managed.

Additionally, section 22.6 of the EIS also highlights potential hazards associated with:

• Natural events such as bushfires, floods and climate change;

• Malicious acts and terrorism;

• Incidents with the treatment of potable water or sewage; and

• Disease vectors including mosquitoes and communicable diseases.

The EIS states that:

"As far as practicable, project infrastructure has been located to maximise separate between potentially hazardous facilities and activities in order to minimise potentially hazardous conditions

for workers, sensitive receptors and to address community safety values. The remoteness of the site from populated areas also limits the potential risks from the project. This remoteness also addresses the potential cumulative risks of the project interacting with off-site hazards."

Noted.

Submitter Issue Number 39.071

The EIS does not give sufficient weight to the dangers and risks posed by the Project, nor does the EIS provide sufficient detail and provision of management strategies to mitigate and limit the potential hazards raised.

To be clear, the Project area and surrounding land is primarily used by landholders for their farming operations – their businesses and their homes.

The grazing operations which take place on the Project area and on the surrounding lands are highly successful and valued land uses.

The EIS does not address, nor does it consider, the significance of a loss of, or significant impact to the current land use (whether on a long term or temporary basis) as a result of a hazardous outcome, as to impacts on the business of landholders who currently use the Land (or who may use the Land in the future).

Macmines has not established that it has taken the necessary steps to minimise the very real risks of hazards as a result of the Project and accordingly in the absence of such cannot reasonably have assessed the potential impacts in the same.

Coovin's livelihood (cattle grazing operations) will be detrimentally impacted and must not be disregarded in considering the merits of the Project.

Section 22.5 of the draft EIS identifies the surrounding land use and sensitive receptors in proximity to the project site. A preliminary hazard analysis is presented in Table 22-5 of the draft EIS and Section 22.4 of the draft EIS explains that a more detailed re-appraisal of project hazards will be undertaken as part of the development of the project Safety and Health Management System, prior to the commencement of construction.

Submitter Issue Number 39.072

Macmines have not demonstrated how the Project will (*inter alia*):

• avoid and minimise current and future environmental harm; and

• minimise impacts on current and previous land use (e.g. grazing).

In light of Coovin's concerns, Coovin submits:

• Macmines must further consider its proposed hazard and risk management strategies for the Project;

• Macmines must ensure its proposed hazard and risk management strategies are in accordance with, and promote the safety and health management system that is put in place in accordance with section 22.3.2 of the EIS.

Refer to response to issue 39.071.

Submitter Issue Number 39.073

Project China Stone – Cumulative Impacts Section 23.

The TOR required Macmines to provide a summary of the Project's cumulative impacts and describe these cumulative impacts in combination with those of existing or proposed projects publicly known or advised by the Office of the Coordinator-General to be in the region.

Importantly, the CG required that cumulative impacts be assess with respect to:

• Both geographic location and environmental values.

• Address cumulative impacts in sensitive environmental areas.

• Explain the methodology used to determine the cumulative impacts of the Project, detailing the range of variables considered (including relevant baseline or other criteria upon which the cumulative aspects of the Project have been assessed).

Section 23 of the EIS details the cumulative impact assessments and the mitigation and management measures for each of the relevant environmental aspects addressed in the EIS.

Section 23.3 of the EIS states that: "The cumulative impact assessments have considered the impacts from the CCM& RP and the MPP, where relevant, with those predicted for the project."

Noted.

Submitter Issue Number 39.074

The EIS does not give sufficient weight to the mining industry (and proposed future mining industry) in the area of the Project. Whilst there are currently no operating coal mines in the Galilee Basin, the following six (6) projects are currently seeking approval or have recently gained approval:

• Carmichael Coal Mine and Rail Project (CCM&RP);

• Project China Stone;

• Alpha Coal;

• Galilee Coal;

• Kevin's Corner; and

• South Galilee Coal.

In addition, the Moray Powerlink Project (MPP) is also currently in the approval phase, for the construction and operation of a thermal and diesel power station with a generating capacity of 150 Mega Watts.

In merely considering the impacts from the CCM&RP and the MPP, where relevant, with those predicted for the Project, Macmines has failed to adequately consider the cumulative impacts with respect to geographic location.

As indicated in Section 23.2 of the draft EIS, the projects listed in this submission are not in the vicinity of the project site and are too far away to have any significant cumulative impacts.

Submitter Issue Number 39.075

Examples of biodiversity and environmental value loss are the potential significant impacts to both Commonwealth and State listed flora and fauna from the Project, including:

• Clearing of approximately 11,000 ha of remnant vegetation, including 24 ha of one of concern

Regional Ecosystem.
• Clearing of habitat for the following species which were confirmed to be present in the Project site during field surveys:
o Squatter Pigeon (southern subspecies)(listed as vulnerable under the EPBC Act and NC Act);
o Black-throated Finch (white-rumped subspecies)(listed as endangered under the EPBC Act and NC Act);
o Koala (listed as vulnerable under the EPBC Act and special least concern under the NC Act); and
o Short-beaked Echidna (listed as special least concern under the NC Act).
• Clearing of habitat for the Australian Painted Snipe (listed as endangered under the EPBC Act and vulnerable under the NC Act), which was considered to have a moderate potential of occurring within the Project site.
An additional potential significant impact of the Project on flora and fauna is habitat fragmentation.
At section 23.5.2 of the EIS, Macmines states "The impacts of clearing of habitat on the project site will be mitigated through the provision of biodiversity offsets."
Further, Macmines states "As the clearing of vegetation is only in the southern portion of the project site, full east to west connectivity will remain in the northern portion of the project site…The open cut mining/ infrastructure footprints between the project and the CCM&RP are approximately 10km apart, leaving a large corridor of remnant vegetation between the cleared areas."
Accordingly, the present Project, if approved, would add to further pressure on endangered and vulnerable species of the Galilee Basin and habitations will be split. It is neither adequate nor sufficient for a Project the scale proposed by Macmines to not provide an alternative solution in respect of loss of environmental values and biodiversity other than providing that the Project will be required to provide biodiversity offsets. No reasonable measure has been provided in the EIS to address this fundamental issue.

The provision of biodiversity offsets for significant residual impacts on biodiversity values is a regulatory requirement for mining projects that is enforced by both the Queensland and Federal Governments.

Submitter Issue Number 39.076
The EIS should be refused on the grounds stated herein as the EIS has not had proper regard to the object as set out in section 3 of the EPA, as:
• The Project fails to protect Queensland's environment whilst simultaneously permitting development seeking to improve the quality of life now and into the future which would maintain ecological processes on which life depends.
• The Project is not consistent with the principles of ecologically sustainable development as:
o Long and short term economic, environmental, social and equity considerations must be effectively integrated in the decision making process.
o Threats of serious or irreversible environmental damage or a deficient outcome in respect of an environmental investigation is insufficient grounds to delay measures to prevent environmental degradation.
o The mine will cause serious environmental harm (i.e. dust, noise and vibration) to the character

and values of the Land as a result of inter alia coal dust. This is not in the public interest.
The employment, royalties and other benefits that the mine will generate must be balanced against the impact on Coovin's Land and cattle grazing operations together with the impact on the biodiversity and environment. The outcome must be balanced in favour of public interest or consistent with the EPA.

The submitters view on the draft EIS is noted. The relevant Government will determine the adequacy of the draft EIS.

Submitter Issue Number 39.077
Project China Stone – Environmental Management Section 24.
Coovin is not satisfied of Macmines proposed environmental management measures to be developed and implemented to address the potential environmental impacts associated with the Project, detailed at Section 24.
Coovin submits that, in respect of environmental management, the Draft EIS fails to:
• adequately assess the Project's environmental impacts;
• adequately propose measures to avoid or minimise any adverse impacts; and
• propose environmental protection commitments to protect or enhance environmental values.

Refer to response to issue 39.076.

Submitter Issue Number 39.078
Coovin notes the EIS is intended to (*inter alia*):
• ensure Macmines assume primary responsibility for protection of any environmental values that may be affected by the Project;
• address environmental management for the expected life of the Project;
• contribute to statutory decisions on whether a proposal should proceed, and if so, decide what environmental management and monitoring conditions should apply; and
• where legislation allows, incorporate community and stakeholder views in assessment and decision-making processes.
In accordance with the EPA, Macmines has a general environmental duty and is responsible for the action that affect the environment. Macmines has not demonstrated all reasonable and practicable measures have been taken to prevent or minimise the harm caused by the proposed Project.

Refer to response to issue 39.076.

Submitter Issue Number 39.079
Macmines have a corporate and social responsibility to (inter alia):
• self-regulate and ensure its active compliance with the spirit of the law and ethical standards;
• engage in actions that further some social good, beyond the interests of Macmines;
• encourage a positive impact through its activities on the environment and all other members of the public; and

• co-exist with Landowners, including Coovin and operating in a spirit of mutual cooperation and trust.

Noted.

Submitter Issue Number 39.080

The Project and impacts will be long term and intergenerational. Coovin and Coovin's family (past and present) continues to improve the Land for following generations, whereas mining is extractive. The Project has long-term and unaddressed serious environmental impacts on (inter alia) the quality of the agricultural land, salinity, contamination, biosecurity and pest and weeds.

Where the Project is not properly or adequately managed (as is the present circumstances), real consequences to the environment will result, particularly where the Project does not protect the environment and surrounds.

Coovin has genuine concerns in relation to the environmental impacts of the Project on the Land, including but not limited to:

• there will be adverse impacts on soil structure (including erosion and soil compaction due to overuse);

• noise, air and odour impacts have not been appropriately investigated or conditioned in a way that would demonstrate or provide comfort that no environmental harm will arise as a result of the Project;

• destruction of various vegetation species;

• irreversible damage to ecosystems;

• contamination.

A legacy of inadequate environmental measures should not be carried forward given the scale and intensity of the disturbance on the Land which will cause profound environmental impacts.

In light of Coovin's concerns, Coovin submits:

• Macmines must further consider its proposed measures / strategies for tailings and power station waste storage facilities for the Project; and

• the CG should adhere to the principle of preservation of Land unless the loss is deemed unavoidable in which case the landholder (Coovin) must be properly and adequately compensated as a result.

Refer to response to issue 39.003.

Submitter Issue Number 39.081

Coovin has a statutory right under the SDPWO Act as an affected party to object to the Project and has made a 'properly made' submission, being;

• A submission made to the Coordinator-General in writing.

• Received on or before the last day of the submission period 7 September 2015

• Signed and stating the name and address of each person making the submission.

• States the grounds of the submission and facts and circumstances relied on.

Coovin will be adversely affected by the Project directly covering the Land namely through:

• Loss of Vegetation/Good Quality Agricultural Land;

• Loss of Stock Routes/Increased Management Costs;
• Flooding and Hydraulics Impacts; and
• Unacceptable Cumulative Impacts including adverse impacts on threatened Biodiversity.

Coovin's position is that Macmines have proposed an open-cut and underground coal mine that in its present form has unacceptable impacts for landowners and communities because of the disruption it causes to cattle operations and the local environs.

Due to the long term and irreversible impacts that the Project will have on Coovin, Coovin's business and the environment the application for the Project should be refused.

Noted.

PROJECT CHINA STONE
RESPONSE TO ADANI MINING SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

40 ADANI MINING SUBMISSION

Submitter Issue Number 40.001
Stakeholder engagement
Adani Mining Pty Ltd (Adani) has held the Moray Downs Pastoral Lease (Lot 662 on PH1491) since 2010. The China Stone project is proposed to be undertaken on parts of the Moray Downs property. Adani notes that MacMines Austasia Pty Ltd (MacMines) is required under the *Mineral Resources Act 1989* process to obtain written agreement from Adani, as the holder of Moray Downs, for the mining lease.
Adani and MacMines entered into an agreement which provided MacMines access to the portion of Moray Downs that overlapped with their exploration permit for coal to carry out exploration activities. The agreement included conditions of access.
The China Stone project is highly dependent on the Adani Carmichael Coal Mine and Rail Project, North Galilee Basin Rail Project (NGBR) and the development of Terminal 0 at Abbot Point Port.
Adani requests the Coordinator General ensure that MacMines are required to continue to meet their land access obligations, and engage with Adani regarding the project and potential changes, including agreements with respect to a future Mining Lease.
To date there has been limited stakeholder engagement with Adani regarding the proposed China Stone project with respect to baseline impact assessment matters such as the potential impacts to groundwater and surface water infrastructure which supports Adani's ongoing management of the Moray Downs Property.

Noted. The proponent will continue to comply with the legal requirements under the *Mineral Resources Act 1989* in relation to exploration and obtaining a mining lease over the Moray Downs property. The proponent will continue to consult with Adani, as the owner of the Moray Downs property, as necessary.

Submitter Issue Number 40.002
Cumulative impact assessment
Adani notes the requirement for the baseline impact assessment for the China Stone project is undertaken based on existing land use and infrastructure, exclusive of proposed and/or approved projects where these projects are yet to commence.
Additionally, Adani notes the requirement for cumulative impact assessment processes to describe additive impacts from separate baseline impact assessments.
The China Stone EIS has included the proposed and approved Carmichael Coal Mine and Rail Project within the baseline impact assessment rather than in the cumulative impact assessment. It is important that material from other project EIS's such as the Carmichael Coal Mine and Rail Project is not misused or misrepresented in baseline impact assessments. In the case of the

Carmichael Coal Mine and Rail Project, the EIS, SEIS and AEIS documentation was prepared specifically for this project. It is only appropriate that this material is used in the context of cumulative impact assessment.

The draft Environmental Impact Statement (EIS) supports an application for the approval of the China Stone Project regardless of whether the Carmichael Coal Mine and Rail Project (CCM&RP) proceeds. The claim in the submission that the CCM&RP has been considered as part of the baseline for the project is not correct. Where relevant, the draft EIS has addressed the cumulative impacts of the project with the CCM&RP, as required by the EIS Terms of Reference. Where relevant, the draft EIS also considers the impacts of Project China Stone on its own.

Submitter Issue Number 40.003

Project Description

The China Stone EIS would benefit from fully describing project description details related to enabling infrastructure. These include:

• location of the rail connection from the proposed mining lease to the proposed Carmichael Rail Network;

• location of the road connection from the proposed mining lease to existing road network (including the Moray-Carmichael Road);

• the source and type of quarry material required for , rail and road construction; and

• water supply for the construction and operation of the project.

In order to understand the potential impact of the project and its supporting infrastructure on Adani projects, Adani requests that these project elements be fully described through the EIS process, consistent with the requirements for similar recent projects. This is particularly important given the context and challenges for the development of the Galilee Basin and its supporting infrastructure.

As described in Section 4.13 of the draft EIS, these aspects of the project are off-lease infrastructure and approval for these aspects are not currently being sought as part of this EIS process. The current preferred options and status of the off-lease infrastructure components and interactions with other Galilee Basin Developments, including the CCM&RP, are discussed in Section 4.13.

Submitter Issue Number 40.004

Rail

The proposed China Stone EIS project description describes a rail corridor wholly within the Mining Lease area with an exit point in the most southern and eastern corner. It is highly likely with this location that the rail would continue through the Moray Downs Pastoral Lease. This has the potential to impact on areas of the property, including the area proposed to be legally secured under the Carmichael Project Biodiversity Offset Strategy. As a landholder and project proponent, Adani would welcome the opportunity to contribute to the location selection of the proposed rail corridor through the EIS process.

Noted. Refer to response to Issue 40.003.

Submitter Issue Number 40.005

Rail

Adani also notes that it is important to understand how a proposed rail corridor would align with the Galilee Basin State Development Area (SDA) and whether future amendments of the SDA may be required, inclusive of consultation processes.

Noted. Refer to response to Issue 40.003.

Submitter Issue Number 40.006

Road and traffic impacts

The proposed location of new road infrastructure linking the Moray-Carmichael Road to the proposed China Stone mining lease indicates travel through the Moray Downs pastoral lease and a proposed offset area.

The additional impacts from the new road and the existing network have not been assessed. Further, Adani is concerned there has been a lack of consultation with Adani who are currently negotiating an infrastructure agreement with Isaac Regional Council. The terms of the agreement also cover the upgrade of the Moray-Carmichael and Elgin-Moray Roads, and maintenance of said roads. The project would benefit from the engagement of Adani and Isaac Regional Council on these matters.

Please refer to response to Issue 40.003 regarding the assessment of off-lease infrastructure required for the project. The proponent is required to engage with the Isaac Regional Council (IRC) in relation to any works associated with the mine access road and would also engage with Adani during detailed project planning in relation to the joint use of IRC roads.

Submitter Issue Number 40.007

The China Stone Project relies on the Carmichael Coal Mine and Rail Project for the upgrade of the Moray-Carmichael Road, the Elgin-Moray Road and the upgrade of the intersection of the mine access road with the Gregory Developmental Road. Adani requests MacMines commence commercial negotiations about their financial contribution to these works.

The project does not rely on the CCM&RP for the upgrade of roads as suggested. The draft EIS merely explains that the upgrades are required for the CCM&RP which is anticipated to be developed some years ahead of the project.

Submitter Issue Number 40.008

Also, the China Stone EIS does not consider the NGBR project. Given that the traffic impact assessment considers the use of the Gregory Development Road North, the EIS should consider NGBR in assessing the cumulative traffic and road impacts of all projects.

The draft EIS Road Impact Assessment (Appendix O) considers the cumulative traffic impacts with the CCM&RP which includes the off-lease rail connection that was proposed at the time of the CCM&RP EIS. The NGBR project involves an alternative rail alignment, however it is noted that

the section of the off-lease rail line in the vicinity of the project site and Gregory Developmental Road is a similar alignment to the off-lease rail connection proposed in the CCM&RP EIS. Hence the road traffic generated by the construction of the NGBR on the Gregory Developmental Road will therefore be similar to the rail construction traffic in the CCM&RP EIS. In addition, the significant traffic generation from the NGBR project is limited to the two year construction phase and the timing of the NGBR project is currently uncertain. The NGBR EIS indicates that construction will start in late 2014 and we understand that construction has not commenced to date. Hence it is not possible to determine whether there will be any overlap in the timing of the NGBR project with Project China Stone or whether any potential cumulative traffic impacts will occur. However, as agreed with the TMR, the proponent has already committed to update the Road Impact Assessment (RIA) six months prior to the commencement of construction in order to address the current uncertainties in relation to the relative timing of Project China Stone and the CCM&RP, and the potential cumulative traffic impacts. At this time, any potential cumulative traffic impacts with the NGBR project could be confirmed and, if necessary, addressed in the updated RIA.

Submitter Issue Number 40.009

Water supply

Both the Carmichael Coal Mine and Rail and China Stone Projects require water for the construction and operation of mines. The China Stone EIS notes that water is critical to the project, however conceding that this will be assessed under another process, cumulative water demand and impacts should be included in the EIS process.

Refer to response to Issue 40.003.

Submitter Issue Number 40.010

Technical matters

Adani provides the following comments regarding the China Stone EIS methodology, particularly concerning consistency with the Carmichael Coal Mine and Rail Project work to date.

Groundwater

The China Stone EIS groundwater assessment (including monitoring and modelling) differs from the assessment completed for the Carmichael Coal Mine and Rail Project.

To ensure that the cumulative impacts to groundwater are understood, Adani requests that the all projects are assessed using similar criteria and conditioned accordingly. This approach will benefit the ongoing regional and cumulative studies being undertaken and/or proposed by Commonwealth and Queensland Governments.

The groundwater assessment in the draft EIS (Groundwater Report (Appendix I)) utilised all relevant groundwater bore information available from the CCM&RP EIS/SEIS/AEIS in addition to the project site groundwater field investigation data. The draft EIS groundwater assessment is based on a robust calibrated numerical groundwater model. The draft EIS groundwater assessment includes a cumulative impact assessment based on the CCM&RP groundwater drawdown predictions.

It is not the responsibility of the proponent, nor is it possible based on publically available information, to conduct a detailed comparative assessment with the CCM&RP groundwater assessment. However, it should be noted that the Project China Stone site and the Carmichael Mine site are located in distinctly different groundwater settings. The Project China Stone site is dominated by Darkies Range that is formed by an elevated and unsaturated outcrop of the Clematis sandstone. The site is also located at the top of the surface water catchment and has highly ephemeral drainage lines with no significant creeks or watercourses traversing the site. In contrast, the Carmichael Mine site is located in lower lying topography and is traversed by a major river and its floodplain. It is therefore not surprising that there are some differences in the groundwater impacts between the two projects. It is noted that this submission does not provide any specific areas of difference to enable a specific response.

Submitter Issue Number 40.011

Ecology

Black-throated Finch

Adani notes that the methodology used for determining high and low value habitat for the Black-throated Finch (BTF) differs from that of the Carmichael Coal Mine and Rail Project. As the projects are directly adjacent to another, it is critical that the ecological assessment is consistent.

To ensure that the cumulative impacts to BTF are understood, Adani requests that the all projects are assessed using similar criteria and conditioned accordingly. This approach will benefit in the ongoing regional and cumulative studies being undertaken and/or proposed by Commonwealth and Queensland Governments.

The submitter's intention to seek a similar approach to the assessment of Black-throated Finch (BTF) habitat is noted. The CCM&RP EIS definition of BTF habitat was reviewed, along with other Galilee Basin project habitat definitions available at the time, as part of the development of the BTF habitat definition adopted in the draft EIS Terrestrial Ecology Report (Appendix F). This review found the BTF habitat definition adopted for the CCM&RP to be highly specific to the CCM&RP site and was not able to be readily adopted for the project.

As discussed in Section 4.2 – Response to Common Issues, the BTF habitat modelling for the project site has been revised in response to submission on the draft EIS, in consultation with the Federal Department of the Environment and Energy (DoEE) and the Queensland Department of Environment and Heritage Protection (EHP). The agreed definition has been adopted from definitions used in two other Galilee Basin project approvals, which provide a readily transferable definition of BTF habitat.

Submitter Issue Number 40.012

Biodiversity Offsets Strategy

Adani lodged its Biodiversity Offset Strategy for the Carmichael Coal Mine and Rail Project with the Queensland Government in October 2014. It should be noted that Adani has since amended its proposed Biodiversity Offset Area to exclude the area where the proposed China Stone Project would overlap with Moray Downs. Adani had mapped this area as predominantly high quality BTF

habitat.
Adani's review of the EIS would benefit from the ability to review a non-confidential version of the MacMines Biodiversity Offset Strategy to fully understand how and where offsets are proposed. Adani notes the MacMines Biodiversity Offset Strategy was not available with the EIS and respectfully requests the Coordinator-General provide a copy of the MacMines Biodiversity Offset Strategy for review so feedback can be provided.

The proponent does not currently own any land nor currently have any agreements with any landowners regarding offset properties. The Biodiversity Offset Strategy is therefore not able to be released publicly in full as it contains commercially sensitive information. A redacted version of the draft EIS Biodiversity Offset Strategy (Appendix H) is provided in Attachment J.

Submitter Issue Number 40.013
Hazard and risk
The China Stone EIS shows a proposed Ammonium Nitrate Storage on the South Eastern Boundary (or Northern boundary of Carmichael Coal Mine). The safety buffer around this facility would potentially impact on Adani's management of the Moray Downs property and the Carmichael Coal Mine. Adani requests the EIS process includes risk assessment that consider impacts to stakeholders including adjacent landholders. Risk assessments should include measures to avoid or mitigate risks.

The ammonium nitrate storage area is located approximately 1.5 km from the Carmichael Mine site at the closest point and is adjacent to the project site boundary adjoining the Moray Downs cattle grazing property. It should be noted that the ammonium nitrate would be stored in a non-activated (non-explosive) form and would only be activated in the field prior to loading the blast holes.

The storage of explosives on the project site was identified as a key hazard in Section 22.6 of the draft EIS. The storage of explosives on mine sites is regulated under the *Explosives Act 1999* and the *Coal Mining Safety and Health Act 1999*. The storage areas are required to be located, designed, constructed and operated in accordance with all applicable legislative requirements. These requirements are designed to identify and manage any risks to neighbouring properties and land use.

Submitter Issue Number 40.014
Drainage and flood protection
The EIS describes, at a high level, the drainage and flood protection proposed for the China Stone project. Adani considers the EIS would benefit from further detail regarding the impacts of subsidence in underground mining areas on existing surface water values.

The draft EIS provides a detailed assessment of the subsidence of underground mining areas and the potential for subsidence impacts on surface water values in the following sections of the draft EIS: Section 6, Section 13.6.4, the Subsidence Report (Appendix A) and the Draft Subsidence Management Plan (Appendix B).

Submitter Issue Number 40.015
Further, with regards to surface water values, Adani notes a proposed mine affected water discharge location that is inconsistent with guidelines pertaining to the discharge to receiving environments.

As discussed in Section 4.2 – Response to Common Issues, the receiving waters for the discharge of mine affected water have been revised, in consultation with the EHP.

Submitter Issue Number 40.016
Adani notes the China Stone EIS is required to provide baseline and cumulative impact assessment with regards to potential impacts to downstream environmental values and water users. Adani was unable to locate this information in the EIS.

Refer draft EIS Section 13.2.3 that describes downstream water use and environmental values, Section 13.6 that describes surface water impacts, and Section 10.6.4 for assessment of the downstream aquatic ecology values, potential impacts and potential for cumulative impacts on aquatic ecology.

Submitter Issue Number 40.017
Air quality, noise and vibration
Adani notes that the China Stone EIS is required to assess impacts to sensitive receptors with respect to air quality, noise and vibration.
The EIS would be improved through the consistent inclusion of sensitive receptors across these areas and the application of relevant guidelines.

The draft EIS has assessed air quality and noise and vibration impacts consistently with regard to sensitive receptors. Table 15-1 of the draft EIS shows the receptors used in the air quality assessment which include receptors located as far as 51 km from the project site. Table 16-1 of the draft EIS shows the receptors used in the noise and vibration assessment which is a subset of the three closest receptors to the project site used in the air quality assessment. A subset of receptors was used for the noise and vibration assessment as, due to the remote, rural setting the three closest receptors are located up to 11.8 km from the project site. It should be noted that achieving compliance at the closest receptors would mean that compliance would also be achieved at more distant receptors and specific assessment of all receptors is therefore not necessary.

Submitter Issue Number 40.018
Adani notes that the China Stone EIS is required to assess impacts to sensitive receptors with respect to air quality, noise and vibration.
The EIS would be improved through the consistent inclusion of sensitive receptors across these areas and the application of relevant guidelines.

This is a duplication of issue 40.017. Refer to response to 40.017.

Submitter Issue Number 40.019

Aviation

Adani seeks additional assessment of the impacts from the proposed China Stone Airport on the Carmichael Coal Mine and Rail Airport, particularly in the following areas:

The impacts of a further proposed 40 flights per week the impact of a further proposed 40 flights per week (737, A320 and Bombardiers)

As stated in Attachment 24-2 of the draft EIS, the private airstrip will be designed, constructed and operated in accordance with all relevant Civil Aviation Safety Authority (CASA) regulations and guidelines. All necessary approvals will be obtained for the airstrip, as required by law.

It is unclear what specific additional assessment of impacts from the airstrip are being requested by the submitter. However, all relevant impacts will be addressed during the detailed planning phase. This process will involve consultation with Adani, as necessary.

Submitter Issue Number 40.020

increased dust from the China Stone project on the Adani airfield and operations

Section 15 of the draft EIS includes assessment of the potential air quality impacts from the project, including assessment of dust deposition and visibility issues which are relevant to the submitter's issue. As stated in Section 15.4 of the draft EIS, compliance with the air quality objectives (which are designed for health and amenity) will also protect against problems associated with visible dust because, at levels equivalent to the air quality objectives, dust is essentially not visible. As indicated in Table 15-10 of the draft EIS, the contribution of Total Suspended Particulates (TSP) to the total dust levels in the vicinity of the CCM&RP airstrip are relatively minor, in comparison to the air quality goals and the dust levels attributed to the CCM&RP. It is therefore not expected the project will lead to any significant dust impacts that would affect the operation of the CCM&RP airstrip.

Submitter Issue Number 40.021

additional air traffic from the China Stone project, where air safety must be carefully considered

As stated in Section 19 of the draft EIS, air traffic control at the project site will be coordinated with the CCM&RP airstrip and will be conducted in accordance with all CASA requirements.

PROJECT CHINA STONE
RESPONSE TO NRM SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

41 NRM SUBMISSION

The proponent, Hansen Bailey and the Office of the Coordinator General (OCG) met with the Department of Natural Resources and Mines (DNRM) on 10 November 2016, 29 November 2016 and 21 June 2017 to discuss the DNRM submission issues and the proponents proposed approach to responding to key issues.

Submitter Issue Number 41.001
Volume 1A, Chapter 2 – regulatory Framework Attachment 2-1: Other commonwealth and Queensland legislation; and Chapter 9 – Terrestrial Ecology Section 9.3 – Vegetation Management Act (page 9-1): Clearing of regulated vegetation in areas of the project which are not covered by a Mining Lease, and for activities that do not meet the definition of a "resource activity" as defined under the *Sustainable Planning Regulation 2009*, will be subject to assessment under the *Vegetation Management Act 1999* (VMA).

Until a Mining Lease is obtained, clearing of category B vegetation will not be permitted without a development approval under the *Sustainable Planning Act 2009* or an exemption listed under schedule 24 of the *Sustainable Planning Regulation 2009*. The EIS States: *"The VM Act does not apply to mining activities undertaken on Mining Leases (ML)"* This statement is incorrect.

General information for the applicant: The applicant should determine whether the clearing of native vegetation associated with the development is exempt under Schedule 24 of the *Sustainable Planning Regulation 2009*. Schedule 24 Part 1 states that clearing is not assessable for a resource activity, which is further defined under s107 of the *Environmental Protection Act 1994* as a geothermal activity, a GHG storage activity, a mining activity or a petroleum activity. Section 10 of the *Environmental Protection Act 1994* further states that a mining activity must be authorised under the *Mineral Resources Act 1989*. The department notes that a number of ancillary uses such as Accommodation village, power station, rail loop, train load out and airstrip are proposed on the mining lease area. It is understood that these are associated with the mining activity however unless they are specifically authorised under the Mineral Resources Act they will not meet the definition of a "mining activity" and therefore would not meet the exemption. Under Chapter 5, Section 110 of the *Environmental Protection Act 1994* A mining activity is defined as -
(a) an activity that is an authorised activity for a mining tenement under the Mineral Resources Act; or (b) another activity that is authorised under an approval under the Mineral Resources Act that grants rights over land. For areas that are not subject to an exemption under Schedule 24 of the *Sustainable Planning Regulation 2009* a Development Approval for the clearing of native vegetation will be required under the *Vegetation Management Act 1999* (VMA). A development approval will require an assessment against Module 8 of the State Development Assessment

Provisions. As part of assessment against Module 8 Table 8.1.4 of the SDAP, environmental offsets may be required for the following performance outcomes - PO2 Wetlands, PO5 connectivity, PO8 Conserving endangered and of concern regional ecosystems, PO9 Essential Habitat
Applications for development should identify whether there is likely to be a significant residual impact and a need for an environmental offset having regard for the relevant *Queensland Environmental Offsets Policy.*

The clearing of native vegetation, as described in the draft Environmental Impact Statement (EIS), is exempt under Schedule 24 of the *Sustainable Planning Regulation 2009*, based on the following:

- The mine and all associated mining activities, as described in the draft EIS, are wholly contained within the boundaries of the Mining Lease Application area (MLA). The project does not require clearing of vegetation beyond these boundaries.
- Ancillary infrastructure that is discussed in the draft EIS (i.e. accommodation village, power station, rail loop, train load out and airstrip that are located within the MLA boundaries) are all required for the operation of the mine and will not be used for any other purpose nor operated in isolation of the mine. Therefore, this infrastructure satisfies the definition of mining activity under the *Mineral Resources Act 1989* (MR Act).
- The proponent does not intend to commence clearing ahead of obtaining a mining lease.

Section 5.3 – Editorial Corrections includes clarification that the project is not subject to assessment under the *Vegetation Management Act 1999* (VM Act) as clearing of remnant vegetation for the project is exempt from approval under Part 1, Schedule 24 of the *Sustainable Planning Regulation 2009*.

Submitter Issue Number 41.002
Volume 4, Appendix I – Groundwater Report Section 4.2.5 Tertiary and Quaternary Sediments (page - 12); And Volume 3, Appendix f – Terrestrial Ecology Report Section 4.3 Regional Ecosystems (page 4.18): The Groundwater Report states that alluvium in the area is too shallow to support GDEs. The Terrestrial Ecology Impact Assessment identifies Regional Ecosystem 10.3.14d (conservation status: 'of concern'), with *Eucalyptus camaldulensis* as one of the dominant species. The Qld Government's "Groundwater Dependent Ecosystem Mapping and Classification Method" identifies the presence of *Acacia omalophylla* and/or *Eucalyptus camaldulensis* as indicative of terrestrial vegetation being to some degree dependent on groundwater and as a mapping rule for identifying GDEs associated with groundwater in alluvia. http://wetlandinfo.ehp.qld.gov.au/resources/static/pdf/facts-maps/gde/gde-mapping-classificationmethodology. pdf
E. camaldulensis is also a primary food tree of the koala, which is listed as 'vulnerable' under the Listed Threatened Species of the Matters of National Environmental Significance.
General Information for the applicant The applicant should be aware that clearing is defined by the *Vegetation Management Act 1999* as "remove, cut down, ringbark, push over, poison or destroy in

any way including by burning, flooding or draining;".
Dewatering GDEs constitutes 'draining'.
For areas that are not subject to an exemption under Schedule 24 of the *Sustainable Planning Regulation 2009* a Development Approval for the clearing of native vegetation will be required under the *Vegetation Management Act 1999* (VMA). A development approval will require an assessment against Module 8 of the State Development Assessment Provisions.
As part of assessment against Module 8 of the SDAP, environmental offsets may be required as per the Queensland Environmental offsets Policy.

The Qld Government's "*Groundwater Dependent Ecosystem Mapping and Classification Method*" ("GDE Guideline") does not indicate that the presence of *Acacia omalophylla* and/or *Eucalyptus camaldulensis* on its own is sufficient to confirm that vegetation is a GDE. Rather, it uses the presence of *Acacia omalophylla* and/or *Eucalyptus camaldulensis* as examples of "decision rules to identify GDEs". The GDE Guideline provides a number of other decision rules and a GDE is considered to be present if all of the decision rules are met. Other decision rules quoted in the example include vegetation being located on alluvia "where the groundwater table is less than five meters from the surface". As detailed in the draft EIS Groundwater Report (Appendix I), the depth to groundwater is more than 50 m from the surface within the areas of RE 10.3.14d within the project site. This groundwater level data is based on groundwater drilling, within and adjacent to the REs, that was conducted as part of the EIS groundwater study.

Please refer to the response to Issue 41.001 in relation to any requirement for approvals under the *Sustainable Planning Act 2009*.

Submitter Issue Number 41.003
Chapter 5 – Land Use Section 5.4.4 – Current Land Use – Stock Route (page 5-6) Stock route U398BRELY01) traverses the southern part of the project area. The EIS States: *"The proponent will liaise with the Department of Natural Resources and Mines, the Isaac Regional Council and affected landowners in relation to the management and possible realignment of the stock route, as necessary."* There is no time frame associated with this statement.
The Department understands that the China Stone Coal Project may impact the Queensland Stock Route network, administered by the Department of Natural Resources and Mines (DNRM) under the *Land Protection (Pest and Stock Route Management) Act 2002* (Land Protection Act).
All identified stock route impacts or realignment options must be negotiated, prior to the occupation, development or construction on any stock route, and before any operational works begin, with DNRM. It is recommended as a priority that the proponent arrange pre-lodgement discussions with DNRM (Isaac Regional Council) to develop a strategy to resolve all associated stock route issues.

The draft EIS included the proponent's commitment to consult with the DNRM and Isaac Regional Council regarding suitable arrangements for the management and realignment of the stock route. Section 5.3 – Editorial Corrections clarifies that this consultation will occur prior to the commencement of construction.

Submitter Issue Number 41.004 Chapter 3 – Consultation Section 3.8 - Future Consultation; and Volume 1A, Chapter 5 – Land Use Section 5.4.3 Land Ownership (page 5-6);
Access to state land parcels administered by the Department of Natural Resources and Mines. The Department understands the China Stone Coal Project may impact state land parcels administered by DNRM under the *Land Act 1994* (Land Act). The proponent is not entitled to undertake any activities or occupy any lands owned or managed by DNRM until such time as all land tenure requirements have been addressed.
It is recommended the proponent identify all land parcels administered by DNRM impacted by the project, and engage with DNRM to develop a strategy to resolve all associated tenure requirements. State land dealings may take an extended amount of time to resolve and early engagement is recommended to minimise the risk of any delays to the project.

The proponent acknowledges the need to address land tenure requirements within the Mining Lease Application (MLA) area with DNRM. The proponent is proposing to engage with the DNRM to resolve associated tenure requirements prior to the public notification of the MLA.

Submitter Issue Number 41.005
Chapter 5 – Land Use Section 5.4.5 Native Title (page 5-7)
Consideration must also be given to the resolution of native title over all the relevant lands
Native title must be addressed prior to alternative tenure being issued, which may require the proponent to resolve native title by way of a registered Indigenous Land Use Agreement (ILUA) or other method as required by the Land Act and *Native Title Act 1993* (Commonwealth).

Noted. As stated in Section 5.4.5 of the draft EIS, the proponent will negotiate with the Wangan and Jagalingou People, the registered Native Title claimants, in accordance with the requirements of the *Native Title Act 1993*.

Submitter Issue Number 41.006
Section 4.5.2 Exploration History (page 4-5) No historical petroleum boreholes have been identified. Petroleum boreholes located close to the proposed underground mine site may introduce oxygen into the coals and start fires.
Locate legacy petroleum holes on tenement so can assess impacts and risks

A search of historical petroleum and coal exploration boreholes will be conducted to identify and seal boreholes prior to the construction of the underground mines. This additional commitment has been included in the proponent's commitments list in Attachment I – Additional Commitments.

Submitter Issue Number 41.007
Section 4.5.2 Exploration History (page 4-5) None of the location data for the coal exploration boreholes drilled between 2008 and 2014 have been submitted to the Queensland Government (DNRM).
Submit borehole data

The proponent will supply any missing information in accordance with the requirements of the Exploration Licence. It is noted this issue is not related to the draft EIS.

Submitter Issue Number 41.008
Section 4.4 Coal, Mineral and Petroleum tenements (page 4-2) This section of the EIS does not discuss any testing of raw coal samples for Relative Ignition Temperature (Crossing Point Temperature determinations). This discussion should be included as coal of the Galilee Basin has a propensity to spontaneously combust. Include results from testing (and discuss what they mean) so propensity of coal to ignite is known and quantified

The EIS Terms of Reference (TOR) do not include testing of raw coal samples for Relative Ignition Temperature. It is also noted that most coal material has some propensity for spontaneous combustion and the potential for spontaneous combustion of coal cannot be confirmed categorically based on the properties of the coal alone. The potential for spontaneous combustion outbreaks is based on a range of factors including mine management procedures, and coal handling and storage methods. However, the proponent is intending to undertake coal testing in the future as part of detailed project development planning. An additional commitment to conduct coal spontaneous combustion propensity testing as part of the development of the Safety and Health Management System has been included in the proponent's commitments list in Attachment I – Additional Commitments.

The potential for spontaneous combustion is a key safety issue in all underground coal mines. The Principal Hazard Management Plan developed for the project under the site Safety and Health Management System (discussed in Section 22.3.2 of the draft EIS), and in accordance with mine safety regulations (refer Section 22.2 of the draft EIS), will be required to specifically address the risk of spontaneous combustion in the underground mines.

Similarly, management measures to address the potential for spontaneous combustion in surface activities including handling systems, and coal stockpiles in particular, are well established in the coal mining industry. As indicated in Table 22-5 of the draft EIS, the project operating procedures for coal stockpiling will include established management measures including methods to minimise the potential for outbreaks, monitoring for outbreaks and management procedures to extinguish any outbreaks.

Submitter Issue Number 41.009
Figure 21-1 (Page 569 (17 of 17)) Storage of petroleum and oil in close vicinity to raw coal stockpiles.
As Galilee Basin coal has a propensity to spontaneously combust, storage of combustible products near the stock piles may need further consideration.

Figure 21-1 of the draft EIS erroneously showed the storage of petroleum product or oil (NA 29) in the raw stockpile area and the product coal stockpile area. This should be considered to be

deleted from these areas and this clarification has been included in Section 5.3 – Editorial Corrections.

To clarify, petroleum products and oil will be stored at a number of locations on the project site including each of the Mine Industrial Areas (Northern Underground MIA, Southern Underground MIA and the Open Cut MIA), the Coal Handling and Preparation Plant and the power station. Figure 21-1 of the draft EIS shows the closest storage area to the raw coal stockpiles will be the Open Cut MIA which is located approximately 600 m away. Considering the proponent's commitment to managing the potential for spontaneous combustion of coal stockpiles (outlined in Table 22-5 of the draft EIS), it is unlikely that at this distance, the storage of combustible products would be affected by any potential spontaneous combustion of coal in the raw coal stockpiles.

Submitter Issue Number 41.010
Section 22.6 Hazard identification (page 22-8) This section of the EIS does not identify coal combustion fire as either a key potential hazard or as a key hazard from project activities.
Modify the EIS to take this into account

The preliminary hazard analysis for the project is presented in Table 22-5 of the draft EIS. Table 22-5 clearly identifies spontaneous combustion in coal stockpiles as a potential hazard, identifies fire as a possible consequence, and presents proposed risk control measures.

Section 5.3 – Editorial Corrections includes insertion of the outbreak of fire due to spontaneous combustion of coal in the list of key potential hazards in Section 22.6 of the draft EIS.

Submitter Issue Number 41.011
Table 22-5 Preliminary Hazard Analysis (page 22-28) The EIS mentions the risk of a spontaneous combustion coal fire in the ROM (run of mine) or in product stockpiles on page 22-28, but a spontaneous combustion or thermal ignition coal fire may also occur at any stage during mining, handling, processing or transporting.
Modify the EIS to show this has been taken into account.
Other potential issues related to spontaneous combustion coal fires that should be considered are:
• The location of legacy (abandoned) boreholes (from coal, petroleum and mineral exploration) on ML applications 70515, 70516, 70517 and 70518. Any of these boreholes may have been poorly completed or due to their age have started rusting and decomposing. This may allow oxygen to enter the coal seams in the underground mining areas or the open pit area.
• No mention of potential spontaneous combustion propensity in longwall or open cut mine, in trucks, in stock piles or on conveyors. Blending of this coal may increase or decrease its propensity to combust, depending on the seam characteristics being blended and the desired properties of the export contract.

Section 5.3 – Editorial Corrections includes clarification that the risk of spontaneous combustion of coal relates to any stage during mining, handling, processing or transporting coal and is not limited to stockpiling. A commitment to developing operating procedures for any surface activities that

have a significant risk of spontaneous combustion outbreaks is also included in Attachment I – Additional Commitments.

Refer to the response to issue 41.006 in relation to the proposed management of any legacy bore holes.

As discussed in the response to issue 41.008, potential for spontaneous combustion in the underground longwall mines is a key mine safety issue that is required to be managed in accordance with the mine safety regulations.

As discussed above, the proponent will develop operating procedures to manage any risks associated with spontaneous combustion in surface activities including open cut mining and coal handling. As discussed in Section 22.4 of the draft EIS, the hazards associated with the project will be subject to more detailed re-appraisal prior to the commencement of construction, as part of the development of the Safety Health Management System and based on detailed design and operating plans.

Submitter Issue Number 41.012
The terms of reference for this project required the assessment of potential impacts of subsidence on sediment load within watercourses and on any Quarry Material Allocation notice (QMAN) holders downstream of the subsidence areas and mitigation measures for any impacts.
The proponent needs to provide an assessment of the impacts of subsidence on the supply of sediment load to watercourses downstream of the project area and on any Quarry Material Allocation Notice (QMAN) holders downstream of the subsidence areas. This requirement is about the impacts, if any, that panels (created due to subsidence) can cause by trapping sediment and impacting on downstream entitlements to extract quarry material in a watercourse. A search of QMANs can be performed by contacting DNRM. If any impacts are evident, mitigation measures should be proposed to address these impacts.

The project site is located at the headwaters of the North Creek and Tomahawk Creek catchments. There are no watercourses traversing the project site. The closest watercourse is Pigeonhole Creek which is located approximately 10 km downstream of the project site. As discussed in Section 13.4.1 and 13.6.4 of the draft EIS and Section 5.2.2 of the draft EIS Subsidence Management Plan (Appendix B), remedial drains will be installed at any residual ponding areas due to mine subsidence to re-establish free drainage. Consequently, there will be no loss of mobile sediment from the surface drainage system due to subsidence on the project site and no potential loss of sediment from any downstream QMAN resources in the North Creek and Tomahawk Creek catchments. Any QMAN resources further downstream of the project site on the Belyando River would not potentially be affected by the project as the project site forms a very small proportion (0.09%) of the total contributing catchment in these areas.

Submitter Issue Number 41.013

Executive Summary Section 6 – Subsidence (page 19) The executive summary states: *"minor remedial drainage earthworks will be installed to re-establish free drainage in any ponding areas" and there will be "no significant residual ponding impacts and no significant changes to the existing surface drainage regime."*

No information is provided in the EIS to support this statement.

The Executive Summary estimates that 4950Ha will experience subsidence to some extent.

1.The EIS should provide estimates of the volumes of surface water that will be collected in each panel and the total volume collected by subsided panels for the project.

2.The EIS should also estimate the effectiveness of the proposed drainage works to mitigate impacts (especially whether any surface water collected in the panels can be completely drained using minor remedial drainage earthworks to re-establish free drainage at the eastern boundary of the northern underground mining section).

3.The volume of water that would be remaining in panels after drainage has been re-established should also be estimated.

4.The proponent should note that any capture of overland flow in the panels must be accordance with the provisions of the Water Resource (Burdekin Basin) Plan 2007.

Section 13.4.1 of the draft EIS provides an explanation of the potential for subsidence ponding and proposed remedial drainage. This section also refers to Figure 13-8 of the draft EIS that shows the location of potential ponding areas based on surface subsidence predictions. This figure also shows the indicative locations of remedial drainage channels. Section 13.4.1 also refers to the draft EIS Draft Subsidence Management Plan (Appendix B) for further details of the remedial works. Section 5.2.3 of the draft EIS Draft Subsidence Management Plan (Appendix B) explains the management approach for the identification of ponding areas and installation of remedial drains.

As explained in Section 13.4.1 of the draft EIS, following installation of remedial drainage works, there will be no surface water collected above the longwall panels. A conceptual remedial drainage plan is presented in Figure 13-8 of the draft EIS. The plan addresses all subsidence areas including the eastern boundary of the northern underground mining area. Due to the simple nature of the remedial drains, there is a high level of confidence in the effectiveness of the remedial drainage plan.

Submitter Issue Number 41.014

Section 4.13.4 – Raw Water Supply (page 4- 20)The proponent states that the preferred raw water supply option is from either of two proposed schemes but does not provide any alternative sources should the proposed schemes not be available when water is required.

The proponent should contact DNRM as a priority to indicate interest in Unallocated Water in the Burdekin Basin available from the Strategic Reserve and to discuss the process to make an application if the water to be sourced for the project is not currently accounted for. For example, unallocated water will not need to be accessed if the water is going to be sourced from either a managed water supply scheme (operated by a water manager such as SunWater) or through the purchasing of existing water allocations through water trading.

Noted. The proponent will consult with DNRM in relation to water allocation, if necessary.

Submitter Issue Number 41.015

Section 13.5.5 Water Management System Performance (page 13-24) Water Supply Reliability – The proponent states the need to secure an annual external water supply of 12.5GL for the project. However, the proponent has only identified proposed water supply schemes as the source for this supply.

The proponent should provide more detail about prospective schemes and also other alternative sources of raw water supply including consideration of the timeliness of these schemes in meeting project water demands. The proponent should identify any likely water requirements that are subject to water reservation provisions of the Water Resource (Burdekin Basin) Plan 2007

As explained in Section 4.13.4 of the draft EIS, the proponent is proposing to access the external raw water supply for the project from a water supply scheme to be developed by others. The proponent is therefore not in a position to provide additional detail on the potential water supply schemes that are being developed by other parties within a public EIS process.

The proponent will ensure that a suitable water supply is available for the project and will obviously consider the timing of the development of the water supply, as well as other off-lease infrastructure components, as part of future project development scheduling.

As discussed above, the proponent will conduct further consultation with DNRM in relation to water supply matters, as necessary.

Submitter Issue Number 41.016

Section 7.3.3 – Clematis Recharge, flow and discharge (Page 24 & 27) This section and the conceptual model state that *"Lake Buchanan is an inferred discharge zone for the Clematis Sandstone via the Moolayember Formation."* This has been based on the peiziometric levels in bores surrounding the Lake. No additional information has been provided to substantiate actual discharge via this mechanism. Discussion at the Advisory Agency Briefing on 21 August 2015 indicated that the conceptual discharge represents a conservative stance in identifying any potential impacts to Lake Buchanan, rather than being based on detailed evidence.

As little information has been presented which verifies the discharge conceptualisation, the EIS should be re-worded outlining these limitations, and also outline that the assumption provides a conservative stance in relation to potential impacts.

As discussed in Section 13.2.3 of the draft EIS, Lake Buchanan is a shallow semi-arid lake located approximately 17 km west of the project site. Lake Buchanan lies within an elevated, internally draining catchment that is bounded to the east by Darkies Range and elevated ridgelines to the north, west and south.

As discussed in Section 12 of the draft EIS, the elevated ridgelines in the vicinity of Lake Buchanan represent groundwater recharge zones. Groundwater flow will follow hydraulic gradients from these recharge zones to discharge zones. Groundwater discharge zones are likely to form in low-lying areas that intersect the groundwater table, including rivers or other low lying areas. Secondary recharge may occur within the Lake Buchanan catchment during highly ephemeral surface water flow events that temporarily inundate the lake bed following sustained rainfall.

The conceptualisation of Lake Buchanan as a groundwater discharge zone presented in the draft EIS is supported by:

- Groundwater levels within bores adjacent to Lake Buchanan (Figure B1 of Attachment D – Additional Information on Groundwater) which show that the groundwater table is typically located 2 to 11 m above the lake bed elevation to the west of the lake and within 2 to 5 m below the lake bed to the east of the lake. This data supports the draft EIS conceptualisation of Lake Buchanan.
- The elevation of the lake bed is approximately 290 m AHD and is at least 50 to 100 m below Darkies Range and the surrounding ridgelines. Lake Buchanan is the lowest topographic feature within a radius of approximately 50 km. This elevation difference promotes groundwater connection.
- Historical imagery (Google Earth Engine, 2016) which indicates that water is present in the lake during prolonged dry periods and drought conditions when no surface water runoff occurs.
- The Bureau of Meteorology Groundwater Dependent Ecosystem (GDE) Atlas which indicates that:
  - Previous studies have confirmed that the western part of the lake contains ecosystems that are reliant on the surface expression of groundwater;
  - Ecosystems in the eastern part of the lake have a high potential for interaction with surface expression of groundwater; and
  - Ecosystems in the lake have a high potential for interaction with subsurface groundwater.
- Published studies including Lorimer (2005) and DIWA (undated) state that Lake Buchanan is a discharge zone.

- Published Queensland GDE mapping which indicates that 'expert knowledge' has concluded there is a high confidence in the prediction that ecosystems in 80 to 100% of Lake Buchanan have some degree of groundwater dependence.
- Published limnology (Timms, 1987) and aerial photography (1984 to present) which indicates that salts tend to accumulate at the surface (as is typical of groundwater discharge zones) rather than being flushed through the superficial materials to the underlying bedrock (as is typical of recharge zones).

The conceptualisation of Lake Buchanan as a likely groundwater discharge zone is therefore consistent with available desktop information and field data.

As noted in the submission, by adopting this conceptualisation any drawdown on the regional groundwater regime would result in impacts on Lake Buchanan. This conceptualisation therefore represents a conservative approach to impact assessment. Despite this conservative approach, the project is not predicted to result in any significant adverse impacts on Lake Buchanan.

Alternative conceptualisations would involve Lake Buchanan being perched above the regional groundwater table or functioning as a source of sustained groundwater recharge. These conceptualisations are poorly supported by the available information. In addition, these alternative conceptualisations would result in a less conservative impact assessment for the following reasons:

- A perched lake would be hydraulically disconnected from the underlying groundwater regime and any associated effects from the project.
- Modelling Lake Buchanan as a recharge zone would necessarily involve increasing the amount of recharge entering the model cells used to represent Lake Buchanan. This would have the effect of buffering any groundwater drawdown associated with the project in the vicinity of Lake Buchanan.

On this basis, adopting an alternative conceptualisation for Lake Buchanan would further reduce the potential for the project to impact Lake Buchanan.

The information provided indicates with a high level of confidence that Lake Buchanan is a discharge zone (rather than an 'inferred discharge zone'). Section 5.3 – Editorial Corrections includes clarification that representing Lake Buchanan as a discharge zone in the groundwater model provides a conservative basis for the assessment of potential impacts on Lake Buchanan due to groundwater drawdown.

Submitter Issue Number 41.017

Section 12.4.3 Impact on the Great Artesian Basin (page 12-9) Take of groundwater from the GAB. The GAB represents an important source of water for many users and supports multi billion dollar agricultural and mining industries.

A commitment to offsetting impacts on the GAB should be given.

It is noted that this issue was not included in the DNRM submission.

Regardless, the take of groundwater from the GAB is fully regulated under the Queensland *Environmental Protection Act 1994* and Queensland *Water Act 2000*. The proponent will be required to obtain an associated water licence under the Queensland *Water Act 2000* for the take of groundwater from the GAB. In order to obtain an associated water licence, the proponent will be required to demonstrate that the impacts of groundwater take from the GAB have been fully assessed and adequate management measures are proposed. The associated water licence will include conditions that specifically regulate the impacts of groundwater take on the GAB and ensure that any potential impacts are appropriately managed in accordance with the licence.

The suggested requirement for an offset for impacts on the GAB is therefore inconsistent with the existing regulations and unjustified given the existing regulatory requirements.

Submitter Issue Number 41.018

Appendix I – Groundwater Report: Section 8.6 – Cumulative mining and coal seam gas impacts (page 39-40); and Volume 1A, Chapter 12 Groundwater Section 12.4.11 Cumulative impacts (page 12-14, 12-15)

In response to DNRMs comment on the draft EIS (March 2015), MacMines advised that *"As discussed in EIS Section 12 – Groundwater, the Project China Stone proponent proposes to make good all landholder bore impacts arising from the project alone. Where the project is predicted to contribute to cumulative bore impacts, the proponent will liaise with Carmichael Coal Mine to negotiate make good requirements, proportionate to the predicted project contribution to these impacts"*. The second part of this statement is not included in the EIS.

As per the draft-EIS (March 2015) comments, the report does not identify what water sources may be available to a landholder as an alternative supply.

The EIS should be updated to include the proponents undertaking that: *Where the project is predicted to contribute to cumulative bore impacts, the proponent will liaise with Carmichael Coal Mine to negotiate make good requirements, proportionate to the predicted project contribution to these impacts.* The EIS should provide discussion on mitigation measures and potential alternative water sources for those potentially impacted by dewatering.

Section 5.3 – Editorial Corrections includes clarification that where the project is predicted to contribute to cumulative water supply bore impacts, the proponent will liaise with Carmichael Coal Mine to negotiate make good requirements, proportionate to the predicted project contribution to these impacts.

Section 5.3 – Editorial Corrections includes further clarification that potential options for alternative landholder water supplies may include modifying or deepening existing bores or the installation of new bores.

Submitter Issue Number 41.019
Volume 4, Appendix I –Groundwater Report Section 9 – Groundwater monitoring and management plan (page 43); Also Volume 1A, Chapter 12 Groundwater Section 12.5 - Monitoring (page 12-15)
Given the extent of predicted drawdowns, DNRM have concerns that the existing network does not monitor the
• Betts Creek in the north or the south of the lease area.
• Clematis Sandstone (Fig 29) and Betts Creek Beds, off lease to the west, and
• Tertiary Formations (Fig 27) off lease to the east of the lease.
Additional monitoring sites should be considered in the areas discussed.

As discussed in the draft EIS Attachment 24-4, the proponent has proposed a groundwater monitoring network that comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area.

Contrary to the submission, the groundwater monitoring network specifically includes:

- Eight monitoring locations east of the project site in the Tertiary sediments; and
- Two monitoring locations west of the project site in the Clematis Sandstone.

As noted in the submission, the proposed monitoring network does not include bores targeting the Betts Creek Beds in the north or south of the project site, or west of the project site.

In the north of the project site and offsite to the west, the Betts Creek Beds are located at significant depths below the Tertiary sediments (where present), the Rewan Formation and the Clematis Sandstone (and the Moolayember Formation further west). The depth to the top of the Betts Creek Beds is typically 200 to 450 m at the western boundary of the project site and the Betts Creek Beds dip steeply to the west. The Betts Creek Beds are typically 350 m deep in the north of the project site. The target coal seams (which form the aquifers within the Betts Creek Beds) are located at greater depths. Due to the significant depth of these strata and presence of a groundwater table in the overlying sediments there are currently no groundwater supply bores targeting the Betts Creek Beds or the target coal seams in these areas. Groundwater monitoring bores targeting these overlying formations are proposed at five locations in the north of the project site and offsite to the west. These bores will provide sufficient information on the groundwater regime in these areas and the potential impacts of the project.

Similarly, in the south of the project site the Betts Creek Beds are located below the Tertiary sediments and typically also the Rewan Formation. The groundwater table is located in the Tertiary sediments. The proponent has therefore proposed four groundwater monitoring bores

targeting these overlying formations within the south of the project site. In addition, the proponent has proposed a further four groundwater monitoring bores within the Betts Creek Beds and overlying formations to the south and east of the project site to provide additional monitoring of the potential impacts of project activities in the south of the project site and the surrounding groundwater regime in the vicinity of the Carmichael Mine.

Overall the groundwater monitoring program described in the draft EIS is considered adequate to monitor the impacts of the project and additional monitoring bores are not considered to be necessary.

Submitter Issue Number 41.020
Appendix B Section B1.3.1 – Calibration heads (page 15)
DNRMs comment on the draft-EIS (March 2015) was: *In Figure B-7 there are heads of 310 – 320 m AHD in the Clematis Sandstone and AU seam on the middle of the western boundary of the model. It is not clear how this is conceptualised. It is not clear why heads are higher in this area than in surrounding areas given the depths of these geologic units below ground level at this location, and the impacts that would have on potential recharge. DNRM is not aware of any data that supports these heads."*
MacMines response was that *"the elevated heads at the western extent of the model domain coincide with the elevated ridgelines and outcropping basement units that form the southwest Lake Buchanan catchment divide."*
Noting that the top of the Clematis Sandstones are about 600m below ground level in that area, is the conceptual model suggesting that recharge is occurring through all the overlying formations down to the Clematis Sandstone in just that area? The response from MacMines appears to be incorrect in that the basement units do not outcrop in that area, rather more likely the Ronlow Beds.
Clarification is required in regard to the high heads on the western boundary of the model in Figure B-7 and conceptualised processes.

The conceptual groundwater model presented in Section 12 of the draft EIS considers the elevated ridgelines located to the west of the project site represent groundwater recharge zones. Groundwater flow will follow hydraulic gradients from these recharge zones to discharge zones. Groundwater discharge zones are likely to form in low-lying areas that intersect the groundwater table, including rivers and other low lying areas.

It is acknowledged that the geological units dip to the west, however groundwater flow is ultimately from areas of high pressure to low pressure, and catchment properties therefore play a significant role in influencing groundwater pressures. This concept is consistent with Darcy's Law and the well-established pattern of regional groundwater flow (Toth, 1963). It is also consistent with the conceptualisation of groundwater flow presented in the Carmichael Coal Mine Project EIS, and the findings of the subsequent reviews conducted by URS (2013), Dr Noel Merrick (2014) and DNRM (2014) as part of the approval process for the Carmichael Coal Mine Project.

These reviews specifically confirmed that:

- Elevated ridgelines west of the Carmichael Coal Mine Project site and the Project China Stone site are groundwater recharge zones that form a regional groundwater divide in the Colinlea Sandstone (equivalent to the Betts Creek Beds); and
- Groundwater levels in shallow bores and groundwater flow in the Clematis Sandstone are both strongly influenced by local topographical high and low points.

The submission refers specifically to an area located approximately 40 km west of the project site at the south-western extent of the Lake Buchanan catchment divide. In this area, the Moolayember Formation dips beneath the Ronlow Beds. The Tertiary sediments are also absent at this location and the outcropping Ronlow Beds form an elevated ridgeline at the surface. This is part of the elevated ridgeline that forms a regional groundwater divide below the coal seams in the Betts Creek Beds (Merrick, 2014; DNRM, 2014).

At the time the draft EIS was prepared, several groundwater bores were screened within the outcropping bedrock and the surrounding area in the western part of the model domain. These groundwater bores and the recorded groundwater elevations are shown in Appendix B of the draft EIS Groundwater Report (Appendix I). Data collected from these bores shows that:

- The groundwater elevation in bore RN32980 is approximately 50 m above the surrounding groundwater regime and is therefore an outlier that most likely reflects an erroneous measurement or a localised perched groundwater table at this location.
- The groundwater elevation in bore RN16371 is 315 m AHD and this represents a local highpoint in the groundwater regime that coincides with an elevated area of outcropping bedrock and known groundwater divide.
- The groundwater elevation decreases by 11 m along the western extent of the model between bores RN16371 and RN153632 consistent with the local topography.
- The groundwater elevation also decreases to the east of bore RN16371 consistent with local topography.

This information confirms that there is a high groundwater head in the regional groundwater regime in the vicinity of bore RN32980 as presented in the draft EIS.

Bore RN54627 is located east of this highpoint. This bore is in excess of 400 m deep and is screened within the Clematis Sandstone. This bore is adjacent to Bore 118213 which is screened in the overlying formations. The groundwater elevations in the adjacent bores RN54627 and 118213 show comparable levels indicating that there is negligible vertical gradient between the shallower and deeper aquifers at this location. This indicates that there is no significant difference in heads between these aquifers and further supports the conceptualisation of a high head in the

deeper formations based upon the high recorded head in the shallower formations (such as in the vicinity of RN32980).

The draft EIS groundwater model produced calibrated groundwater heads for the shallow bedrock and deeper formations that are consistent with these measured levels (Figure B6 to B8 of the draft EIS Groundwater Report (Appendix I)). The data and modelled heads also indicate that there is a local hydraulic gradient in the shallow bedrock from the catchment boundary (at RN16371) towards the Carmichael River in the south-east and Lake Buchanan to the north-east (Figure B6 to B8 of the draft EIS Groundwater Report (Appendix I)). This is consistent with Merrick (2014) and DNRM (2014) which confirm that local groundwater flow reflects catchment boundaries and topography.

The conceptualisation of the groundwater regime to the west of the project site is therefore considered to be robust and justifiable based upon the best available data, and is supported by the robust model calibration results.

Submitter Issue Number 41.021

Appendix I – Groundwater Report Appendix B Section B1.3.4 – Hydraulic Parameters (page 20-21)
DNRMs comment on the draft-EIS (March 2015) noted that clarification was required for the range of hydraulic conductivity values in table B5 for some layers in the model (e.g. layer 10 K_{xy} = $4.20x10^{-4}$ - $4.21x10^{-2}$). Macmines advised that this range was varied spatially as the coal seams decreased with depth. At the recent Advice Agency Briefing, the proponent agreed to supply information/mapping showing where these variable parameters were applied in the model. Such maps have since been supplied to DNRM.
It appears from the mapping that the horizontal hydraulic conductivities decrease to the minimum of between 2.7×10^{-4} and 5×10^{-5}, depending on the seams, immediately west of the mines. This is presumably because of the increased depth. It is also noted that the field testing, and in particular packer tests, tested seams as deep as 400 metres and returned a minimum horizontal hydraulic conductivity of 2×10^{-3} m/day. It is also noted in the sensitivity analysis of the Clematis that increasing the horizontal K value increases the drawdown zone to the west.
Unfortunately a similar sensitivity analysis has not been carried out for the Betts Creek Beds including the seams but it would be assumed that similar increases in the drawdown zone would be noted. Given that the value for the minimum horizontal hydraulic conductivities used in the seams is not supported by field data adequate sensitivity analysis of the impacts to the Betts Creek seams should be carried out.
The proponent should further address the low horizontal hydraulic conductivity values used to represent the Betts Creek coal seams to the immediate west of the mine and provide a sensitivity analysis of the impacts of increasing these values.

This submission on the draft EIS has raised a number of issues broadly related to the permeability of the coal seams, including:

- The conceptualisation of coal seam permeability;

- The supporting data and modelled values for coal seam permeability; and
- Sensitivity analysis of coal seam permeability.

These issues are addressed under the following sub-headings.

Conceptualisation

Extensive studies of coal seam hydrogeology (including the peer reviewed OGIA, 2016 and Mackie, 2009) have demonstrated a strong correlation between hydraulic conductivity and depth. These studies have shown that horizontal groundwater movement in coal seams is dominated by fractures and cleats. They have also shown that the horizontal hydraulic conductivity of coal seams reduces with depth as the fractures and cleats are closed by the increasing weight of overlying material. Mackie (2009) reported a log linear relationship between depth and hydraulic conductivity based upon extensive test data. The empirical trend reported that hydraulic conductivity decreases by an order of magnitude for each increase of 55 to 180 m of depth.

This relationship was reflected in the conceptual and numerical groundwater models developed for the project. The coal seams subcrop within the project site at relatively shallow depths and dip steeply to the west reaching depths in excess of 1,000 m at the western boundary of the model. Conceptually, the coal seams at the project site would therefore be relatively permeable and become less permeable as they dip to the west.

As noted in the submission, the maps provided following the Advice Agency Briefing reflect this relationship and illustrate a decrease in hydraulic conductivity as the depth of the coal seams increases to the west of the project site. The figures illustrate this decrease occurring over lateral distances of up to 35 km as the coal seam depths increase. Additional figures are provided in Attachment D – Additional Information on Groundwater (Appendix C – Figures C1 to C4) that show the modelled hydraulic conductivity of the coal seams in relation to the depth of cover.

Supporting Data and Modelled Values

On the basis of this conceptualisation, a log linear relationship between depth and hydraulic conductivity has been applied to the model layers representing the coal seams (i.e. A to D seams) in the draft EIS groundwater model. The applied ranges of hydraulic conductivity values are shown in Table B5 of the draft EIS Groundwater Report (Appendix I).

An extensive dataset of hydraulic conductivity values was collected from the A to D seams at the project site and Carmichael Coal Mine site. The collected dataset is described in Section 6.2 of the draft EIS Groundwater Report (Appendix I) and includes 154 rising/falling head and packer tests conducted between depths of approximately 100 and 400 m at the project site and the Carmichael Coal Mine site. The hydraulic conductivity values range from 2 m/day at less than 100 m depth to approximately 1×10^{-4} m/day at a depth of 400 m in the Carmichael Coal Mine site. This dataset shows that coal seam hydraulic conductivity varies by almost four orders of magnitude over this depth range.

Hydraulic conductivity data collected from coal seam gas wells within the wider Galilee Basin indicates that permeability within deeper coal seams is commonly as low as 1 x 10^{-6} at depths between 500 and 1,300 m. In some cases the permeability has been recorded as 'low' or 'tight' and the investigators could not derive an actual permeability, which is assumed to be in the order of 1 x 10^{-6} m/day or lower.

A log linear relationship between depth and hydraulic conductivity was developed from Mackie (2009) using the extensive dataset. This relationship was extrapolated to estimate hydraulic conductivity at the significant depths that occur down dip and west of the project site. A lower bound hydraulic conductivity of 7 x 10^{-5} was conservatively adopted for the draft EIS groundwater model. This lower bound is within the bounds of regionally measured hydraulic conductivity values and is high enough to allow some movement of groundwater. A more detailed description of the modelled relationship between coal seam hydraulic conductivity and depth is provided in Appendix C2 of Attachment D – Additional Information on Groundwater.

The model results provided to DNRM in January 2016 as part of the draft EIS adequacy assessment show a relatively high permeability within the project site where the coal seams subcrop and are relatively shallow. This high permeability is consistent with the field dataset presented in the draft EIS Groundwater Report (Appendix I) and the permeability of coal seams within coal project sites in the southern Galilee Basin (e.g. the Alpha Coal Project, the Kevin's Corner Coal Project) which are typically located at shallow depths (typically less than 100 to 200 m).

Sensitivity Analysis

As discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), the sensitivity of the modelled drawdown predictions to changes in model parameters was investigated.

The sensitivity analysis investigated the effect of changing:

- The horizontal and vertical hydraulic conductivities by +1 order of magnitude across all model layers; and
- The horizontal and vertical hydraulic conductivities by -1 order of magnitude across all model layers.

The purpose of these scenarios was to determine the sensitivity of the predictions to changes in key parameters. The changes have been applied to all layers simultaneously in order to determine the sensitivity of the overall model to these parameters. The sensitivity analysis therefore included changes to the hydraulic conductivity of the coal seams.

Due to the depth and hydraulic conductivity relationship applied to the model layers, the lower seams (B to D seams) actually experienced up to +1.5 orders of magnitude increase in hydraulic conductivity during the sensitivity analysis.

As discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), as expected, each of these scenarios increased the overall model error and reduced the ability of the model to match measured groundwater levels showing that they are less appropriate than the range of values adopted in the model. Nonetheless, as discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), the combined effect of each of these two extreme scenarios was marginal in terms of the model predictions. Figures illustrating this point are shown in Section B3 of the draft EIS Groundwater Report (Appendix I).

Adequate sensitivity analysis has therefore been conducted on each layer of the groundwater model, including the coal seams.

It is not the purpose of sensitivity analysis to provide alternative depressurisation predictions upon which to base an impact assessment. The impact assessment presented in the draft EIS is based on the best available data and robust modelling. Nonetheless, the draft EIS Groundwater Report (Appendix I) presented figures showing the effect of the sensitivity analysis on groundwater levels in the Tertiary sediments, as this is the key resource for groundwater users to the east of the project site, and the Clematis Sandstone, as this is the key aquifer of interest in relation to sensitive environmental receptors (i.e. GAB springs).

There are no specific impacts associated with depressurisation of the coal seams (i.e. no groundwater supply bores target the coal seams, no springs are fed directly by the expression of artesian coal seam groundwater and there is no surface water connectivity with the coal seams. Additional figures showing changes in coal seam groundwater levels arising from the sensitivity analyses were therefore not presented.

Figures showing the effect of the sensitivity analysis on groundwater levels in the coal seams have been provided in Attachment D – Additional Information on Groundwater. As noted in the submission, these figures show that increasing and decreasing the hydraulic conductivity of all model layers increases and decreases the depressurisation extents in the coal seams. The response observed is similar to that of the overlying model layers.

In order to address the specific request provided in this submission, an additional sensitivity analysis has been undertaken to consider the effects of increasing only the coal seam hydraulic conductivity values on groundwater levels in the coal seams. The results are also presented in Attachment D – Additional Information on Groundwater. These results are consistent with the results of the broader sensitivity analysis presented in the draft EIS (i.e. increasing the hydraulic conductivity of the coal seams increases the depressurisation extents in the coal seams and surrounding geology) and the sensitivity response in each model layer is similar to that of the draft EIS sensitivity analysis. The results do not show any additional risk of depressurisation extending to sensitive environmental receptors.

Within the proposed open cut mine the coal seams will only form a small proportion of the strata exposed within the pit. This means the coal seams contribute only a portion of the ability to

transmit groundwater and generate depressurisation. Therefore whilst it is important to assign appropriate values of hydraulic conductivity to the coal seams, the effect of varying this value is limited.

At the request of DNRM, further sensitivity analysis of the hydraulic conductivity of the coal seams and the relationship between decreasing conductivity and depth has also been conducted (refer Appendix C2 and Appendix D of Attachment D – Additional Information on Groundwater). The results indicate that the model is not sensitive to more conservative representations of the relationship between coal seam hydraulic conductivity and depth, and do not indicate any significant risk of depressurisation extending to sensitive environmental receptors.

In conclusion, the modelled horizontal hydraulic conductivity values presented in the draft EIS reflect the known characteristics of coal seams in relation to depth and are supported by an extensive local and regional dataset. These values are therefore considered appropriate and justified. Nonetheless, a detailed sensitivity analysis of the effects of increased horizontal hydraulic conductivity and a more conservative hydraulic conductivity versus depth relationship have been provided as requested in the submission and associated DNRM consultation, and these sensitivity analysis results reinforce the conclusions presented in the draft EIS.

Submitter Issue Number 41.022
Appendix B Section B1.3.4 – Hydraulic Parameters (page 20)
DNRM's comment on the draft-EIS (March 2015) regarding the horizontal hydraulic conductivity value of 5 x 10^{-2} for layer 5 (Clematis) appearing to be low in comparison to known values for the Clematis has not been addressed. Discussion should include the initial range in which the model calibrated.
Discuss how the hydraulic conductivity values (and initial calibration range) was decided upon including that for the Clematis Sandstone.

The range of horizontal hydraulic conductivity values measured in the Clematis Sandstone at the project site is between 5x10^{-3} and 9x10^{-2} m/d. This range reflects the weathered and clay-bound characteristics of the Clematis Sandstone encountered at the project site.

In addition, hydraulic conductivity data was collected from the Clematis Sandstone within the surrounding area as part of the Carmichael Coal Mine Project EIS. This conductivity data was therefore considered in setting the initial calibration range.

The initial calibration range adopted for the hydraulic conductivity of the Clematis Sandstone was as follows:

- -1 order of magnitude on the lowest recorded value; and
- +2 orders of magnitude on the highest recorded value (this reflects the high permeability of these sediments within surrounding areas).

The calibrated horizontal hydraulic conductivity value (i.e. $5x10^{-2}$) is:

- In the middle of the measured range from the project site;
- Within the middle quartiles from all collated field data and well within the maximum and minimum measured values; and
- Well within the calibration bounds.

The modelled values adopted are therefore appropriate given the range of measured values and within the context of the local geological setting. The Clematis Sandstone can be up to 200 m in thickness and when the moderate hydraulic conductivity of 5 x 10^{-2} m/day is applied to this thickness is results in a significant ability to transmit groundwater.

As discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), a sensitivity analysis was undertaken that included increasing the hydraulic conductivity of all model layers (including the Clematis Sandstone) by an order of magnitude. This sensitivity analysis therefore considered a hydraulic conductivity of up to 0.5 m/d in the Clematis Sandstone, which is equivalent to a transmissivity of 100 m^2/day where the formation is 200 m in thickness. This represents a hydraulic conductivity that is significantly higher than the highest measured value at the project site and is higher than both the median and geometric mean of all measured values. The results of the sensitivity are presented in Section B3 of the draft EIS Groundwater Report (Appendix I).

Figure B16 of the draft EIS Groundwater Report (Appendix I) shows the effect of the sensitivity analysis on groundwater levels in the Clematis Sandstone. Figure B16 shows that, even in a scenario where the hydraulic conductivity of the Clematis Sandstone and all other layers are simultaneously increased by an order of magnitude, the predicted zone of depressurisation within the Clematis Sandstone does not extend to any sensitive environmental features (including Lake Buchanan or any GAB springs).

A sensitivity scenario that involved increasing the hydraulic conductivity of only the Clematis Sandstone would have a significantly smaller effect on depressurisation in the model and would therefore produce a smaller zone of depressurisation than the sensitivity analysis presented in the draft EIS (as shown on Figure B16).

Submitter Issue Number 41.023
Appendix B Section B1.3.8 – Model Confidence Level Classification (page-24)
The groundwater model has not been reviewed.
In line with previous pre-EIS comments, it is recommended that a peer review be undertaken on the model.

There is no requirement for a peer review of the groundwater model in the EIS TOR nor is it standard practice for mining EISs. The draft TOR for the project prepared by the OCG did not include a requirement for a groundwater model peer review. The draft TOR were publicly exhibited

and EHP, DNRM and DoEE were provided an opportunity to comment on the draft TOR prior to its finalisation. EHP, DNRM and DoEE's submissions on the draft TOR did not request the need for a peer review of the groundwater model for the project. In addition, all specific submission issues that were raised in relation to the draft EIS groundwater model have been responded to as part of the preparation of the Supplement. This has included discussions with the key regulatory agencies, including EHP, DNRM and DoEE. It is not reasonable to now require a peer review of the groundwater model at this stage, given that it is not a requirement of the TOR, the groundwater study has addressed the project's TOR and all specific groundwater issues that were raised by regulatory agencies have been addressed, in consultation with the agencies.

Submitter Issue Number 41.024
Appendix B Section B2.2 – Underground Mining (page-26)
Table B8 has some differing base Kz values to Table B5. Some fall outside of the calibrated range given in Table B5.
• Kz for layer 10 in Table B8 ($5.00x10^{-5}$) is outside of the range given for layer 10 in Table B5 ($4.20 \times 10^{-4} – 4.21 \times 10^{-2}$)
• Kz for layer 12 in Table B8 ($8.72x10^{-5}$) is outside of the range given for layer 12 in Table B5 ($2.38 \times 10^{-4} – 2.00 \times 10^{-2}$)
DNRM's comment on the draft-EIS (March 2015) noted that the factors applied to differing layers to model fracturing appeared out of sync. The model Layer 9 (interburden) fractured factors (x1000, x5000) appear to be out of sync compared to the underlying A seam (x50, x500) and overlying Rewan (x10, x50). At the Agency advice briefing on 21 August 2015, the proponent advised that this was to produce an overly conservative scenario that would allow drainage.
Clarification to be provided on the differing base Kz values used in Table B5 and B8 the model.
The EIS documentation should discuss the rationale as described at the Agency Briefing regarding the use of multiplying factors to model fracturing.

This submission on the draft EIS raises a number of issues broadly related to vertical hydraulic conductivity, including:

- Clarification of the vertical hydraulic conductivity values presented in Appendix B of the draft EIS Groundwater Report (Appendix I); and
- The rationale for the modelled approach to subsurface subsidence cracking.

These issues are addressed under the following sub-headings.

Clarification of Vertical Hydraulic Conductivity Values
The modelled vertical hydraulic conductivity is discussed in Tables B5 and B8 of the draft EIS Groundwater Report (Appendix I).

Table B5 shows the calibrated vertical hydraulic conductivity of each model layer within the project site. The non-coal seam model layers are represented by a single calibrated vertical hydraulic

conductivity value. The coal seam layers (i.e. layers 10, 12, 14 and 16) are represented by a range of calibrated vertical hydraulic conductivity values.

The purpose of Table B8 of the draft EIS Groundwater Report (Appendix I) is to show how the calibrated vertical hydraulic conductivity has been changed to reflect sub-surface subsidence cracking in each model layer. Table B8 shows a base vertical hydraulic conductivity, the changes to the base value and the final value to give an indication of the magnitude of the modelled change due to subsidence. For the examples shown in Table B8, the base vertical hydraulic conductivity is represented by a vertical hydraulic conductivity selected from a nominal location within the model domain (in this instance the centre point of the model domain).

All base vertical hydraulic conductivity values presented in Table B8 are within the calibrated range.

Rationale for the Modelled Approach to Subsurface Subsidence Fracturing

As discussed in Section 6 of the draft EIS, longwall mining results in subsidence as the roof strata above the coal seam progressively collapse to fill the void created by the extraction of coal in the area behind the longwall. Subsurface fracturing occurs in the strata overlying the area from which the coal has been extracted (i.e. the goaf).

Fracturing increases the vertical hydraulic conductivity of strata within the fractured zone, and therefore the vertical hydraulic conductivity of strata within the fractured zone is typically higher than the corresponding undisturbed strata located beyond or above the fractured zone.

Within the fractured zone, the fracture density and connectivity is greatest immediately above the goaf and decreases with increasing height above the goaf. A corresponding decrease in the effects of fracturing on vertical hydraulic conductivity occurs with increasing height above the goaf.

As discussed in Section 12.4.2 of the draft EIS, the prediction of subsurface subsidence cracking effects on vertical hydraulic conductivity carries inherent uncertainties. In order to address this uncertainty, the groundwater model was designed to create a fully drainable fracture network within each of the predicted fractured zones.

Conceptually, the vertical hydraulic conductivity of fractured rock must be between that of the undisturbed rock and the permeability of a fully drainable open fracture. The vertical hydraulic conductivity of an open fracture has been determined through geotechnical modelling to be approximately 1×10^{-1} m/day (SCT, 2003). The actual vertical hydraulic conductivity of fully drainable fractured strata is necessarily lower than this value because a portion of groundwater movement will occur as non-fracture flow towards the fracture network.

The model was developed from this conceptual understanding, as follows:

- The vertical hydraulic conductivity of each model layer in the fractured zone was calculated to remain between the vertical hydraulic conductivity of the undisturbed rock and the hydraulic conductivity of a fully drainable open fracture. The adopted value was weighted towards the permeability of an open fracture to ensure the predictions from the model were conservative.
- The vertical hydraulic conductivity of each model layer in the fractured zone was reduced with height above the goaf while still maintaining a fully drainable fracture network.
- The model results were reviewed to confirm that all model layers in the fracture zone were essentially desaturated using this approach.

Table B8 of the draft EIS Groundwater Report (Appendix I) provides an example of the undisturbed vertical hydraulic conductivity of each model layer, the fully drainable fractured vertical hydraulic permeability of that model layer and the ratio of these values (shown as a multiplication factor). Attachment D – Additional Information on Groundwater, illustrates this example. As shown in this example, the factor applied to each layer is determined by the undisturbed vertical hydraulic conductivity of each model layer. A large multiplication factor is applied to low permeability strata close to the goaf (i.e. interburden within the coal measures), while a smaller multiplication factor is applied to higher permeability strata and strata located in the upper fractured zone. The multiplication factors presented in Table B8 are therefore correct for each model layer in the example location provided.

This modelling approach creates a highly permeable fracture zone that does not unduly restrict drainage to the mine workings or the propagation of groundwater depressurisation. This provides a conservative basis for the assessment of the project's groundwater impacts.

In addition, the model has been designed to extend the fracture zone to include the full thickness of all model layers that are within the predicted height of subsidence cracking. This modelling approach is intended to ensure that the predicted groundwater depressurisation effects and groundwater impacts of the project are not reliant on the mitigating effects of either the aquitard properties of the Rewan Formation or the partial fracturing of an aquifer. This modelling approach provides an additional level of conservatism to the predicted groundwater depressurisation effects and groundwater impacts of the project. Section 12.4.1 and B2.2 of the draft EIS provides an example of how this approach has been applied. In this example, the lower 20 to 65 m of the Clematis Sandstone is within the predicted 180 m high fracture zone associated with the Northern Underground. The fracture zone has therefore been extended to the full thickness of the Clematis Sandstone (i.e. approximately 150 m). This means that the fractured zone characteristics extend to a height of more than 265 m above the Northern Underground.

A review of groundwater studies for other mining projects in the Galilee Basin and other coal mining regions was undertaken as part of the scoping phase of the draft EIS groundwater study.

The review showed that subsidence effects on permeability changes are typically modelled by applying a uniform factor to all layers or a series of factors relating to the height of cracking above the goaf, for example:

- The Carmichael Coal Project EIS adopted a uniform factor of x50 permeability up to 75 m above the goaf and a uniform factor of x10 above this height.
- The China First Coal Project EIS adopted a uniform factor of $x10^6$ for a height of 2 m (i.e. the caved goaf) and a uniform factor of x10 above this height.

This approach provides a straightforward modelling approach but maintains the presence of low and high permeability layers within the fractured zone. The presence of low permeability layers may have the effect of impeding groundwater drainage from relatively high permeability formations to the mine workings. This can result in buffering of the drawdown effects of mining in the overlying formations.

In conclusion, the vertical hydraulic conductivity values and subsidence factors presented in Appendix B of the draft EIS Groundwater Report (Appendix I) are correct and the rationale for the modelled approach to subsurface subsidence cracking represents a suitably conservative scenario for the assessment of project impacts on groundwater.

Submitter Issue Number 41.025
Appendix B Section B3.2 – Zone of depressurisation (page-30) T
DNRM's comment on the draft-EIS (March 2015) noted that there are no figures showing the sensitivity of the coal seams to changes in parameters (similar to B14- B17).
MacMines responded in that *"The sensitivity of the extent of depressurisation associated with the coal seams does not materially affect the assessment of impacts or proposed mitigation measures outlined in the EIS. No additional figures are therefore proposed in response to this recommendation".*
Given that the coal seams are the main source of water extraction; these formations are of significant interest. Additionally it is important to understand the potential area of impact to these layers as they indirectly underlie the Clematis Sandstone and potentially can draw water from that GAB aquifer via the Rewan. DNRM consider the extent of dewatering in the Betts Creek to be very important.
As the coal seams are the source aquifer for dewatering, and given the need to understand the impacts to the coal seams and any associated impacts with overlying GAB sediments, it is recommended additional figures representing sensitivity for the coal seams be included.

The draft EIS acknowledges that groundwater take from the coal seams forms the bulk of the total groundwater take from the project and is therefore of interest. The draft EIS Groundwater Report (Appendix I) therefore provides a detailed breakdown of groundwater extraction rates in each of the proposed mining areas and a further breakdown of groundwater extraction rates from the GAB and non-GAB aquifers. As discussed in Section B3.1 of the draft EIS Groundwater Report (Appendix I), analysis of the sensitivity of groundwater inflow rates to changes in the modelling

parameters has been completed. The results of the sensitivity analysis are presented in Figures B12 to B14 of the draft EIS Groundwater Report (Appendix I).

The draft EIS Groundwater Report (Appendix I) also provides a detailed assessment of the 'potential area of impact' associated with the coal seams. Figures 31 to 33, Figures 39 to 41 and 46 to 49 of the draft EIS provide mapping that clearly show the predicted extent of depressurisation within the Betts Creek Beds and coal seams during mining, post closure and cumulatively with the Carmichael Mine. The draft EIS Groundwater Report (Appendix I) therefore provides a clear understanding of the potential area of depressurisation in the Betts Creek Beds and coal seams.
In addition, the draft EIS Groundwater Report (Appendix I) provides a detailed assessment of the potential for depressurisation of the coal seams to induce depressurisation in the overlying strata including the Clematis Sandstone. These effects are included in the predictions of Clematis Sandstone depressurisation presented in Figures 29 and 37 of the draft EIS Groundwater Report (Appendix I).

As noted in the response to issue 41.021, it is not the purpose of sensitivity analysis to provide alternative depressurisation predictions upon which to base an impact assessment. Interpretation of the sensitivity analysis in this way is technically incorrect and unsupported by the available data or the model verification process. The impact assessment presented in the draft EIS is based on the best available data and robust modelling and provides a justified basis for the assessment of project impacts on groundwater.

The draft EIS Groundwater Report (Appendix I) provides figures (Figures B14 - B17) showing the response of the zone of depressurisation in the Tertiary Sediments and Clematis Sandstone to the sensitivity analyses described in Section B3 of the draft EIS Groundwater Report (Appendix I). Nonetheless, the Tertiary sediments and the Clematis Sandstone are shown as these are the key resource for groundwater users to the east of the project site and the key aquifer of interest in relation to sensitive environmental receptors (i.e. GAB springs), respectively. There are no specific direct impacts associated with depressurisation of the coal seams (i.e. no groundwater supply bores target the coal seams, no springs are fed directly by the expression of artesian coal seam groundwater and there is no surface water connectivity with the coal seams. Additional figures showing changes in coal seam groundwater levels arising from the sensitivity analyses were therefore not presented in the draft EIS.

New figures showing the effect of the sensitivity analysis on groundwater levels in the coal seams have been provided in Attachment D – Additional Information on Groundwater. The sensitivity analysis is fully described in Appendix B3 of the draft EIS Groundwater Report (Appendix I) and with additional clarification provided in the response to issue 41.021. These figures show that increasing and decreasing the hydraulic parameters in the model (to the extent that the model falls out of calibration) increases and decreases the depressurisation extents in the coal seams. The extent of depressurisation in the coal seams is most sensitive to changes in aquifer storage. This response is consistent with the sensitivity analysis results for the overlying Tertiary Sediments and Clematis Sandstone (as presented in Figures B14 – B17 of the draft EIS Groundwater Report

(Appendix I)). The sensitivity analysis shows that the predicted zone of depressurisation within the coal seams is typically within zone of depressurisation of the overlying formations and does not extend to any sensitive environmental features (including Lake Buchanan or any GAB springs).

As discussed in the response to issue 41.021, the new figures also show an additional sensitivity analysis that considers the effects of increasing only the coal seam hydraulic conductivity values on groundwater levels in the coal seams. The results are also presented in Attachment D – Additional Information on Groundwater. These results are consistent with the results of the broader sensitivity analysis presented in the draft EIS (i.e. increasing the hydraulic conductivity of the coal seams increases the depressurisation extents in the coal seams and surrounding geology) and the sensitivity response in each model layer is similar to that of the draft EIS sensitivity analysis. The results do not indicate any additional risk of depressurisation extending to sensitive environmental receptors.

Submitter Issue Number 41.026

Chapter 12 Groundwater and; Volume 4, Appendix I - Groundwater Report:

The EIS makes the assumption that groundwater recharge rates are very low. Groundwater recharge rates are an important driver of the groundwater model which is used to determine impacts of dewatering on other users and the environment. There are a number of assertions in Chapter 12 about low recharge rates, but no quantification of recharge. The mine will have major impacts on the recharge zone of the GAB which will be underlain by the proponents long wall mines. The proponent should therefore make proper quantitative calculations of pre-mining groundwater recharge.

The assertion in section 12.3.3 that because watertables are at 100 m in the Clematis Sandstone means that recharge rates are low, is invalid. The watertables could be at that level purely because of the elevated topography of the Darkies Range. Higher rates of groundwater flow away from an area will also result in lower watertable levels.

There is no quantification of recharge rates in the Clematis sandstone GAB intake zone, around Darkies Range. This needs to be undertaken (probably through chloride mass balance). Recharge rates used in the model appear to be 0.3% for the Clematis Sandstone (CS) (1.8 mm/y). However, the CS has good quality groundwater (as stated by the proponent) and this is indicative of higher rates of recharge than those assumed by the proponent. For example, in some bores in the CS a groundwater chloride concentration of 40 mg/l is quoted by the proponent. If a chloride mass balance is used to calculate recharge from this value, a recharge value of 16 mm/y results. This would represent a good recharge estimate at the site of that bore and it is almost an order of magnitude higher than the value of 1.8 mm/y used by the proponent. If a groundwater concentration of 100 mg/l is seen to be closer to a median concentration (as indicated in the proponents data) then this would imply a recharge rate of 6 mm/y results. The proponent's values of 1.8 mm/y are inconsistent with work by Kellett et al. and inconsistent with modelling by Merrick at the Galilee Coal Project (Warratah) and inconsistent with recent Galilee Basin modelling undertaken by Merrick.

It is notable that the proponent in the Groundwater Report uses modelled recharge rates from between 0.1-0.000056 mm/y in Appendix 1, B3. The full range should include such values as

suggested above. Recharge values adopted for the tertiary also appear to be too low.

This submission on the draft EIS has raised a number of issues broadly related to groundwater recharge, including:

- Clarification of the conceptualised low recharge conditions, specifically associated with Darkies Range;
- The approach to quantification of recharge rates;
- Comparison with previously reported recharge rates; and
- The impacts on the 'recharge zone' of the GAB.

These issues are addressed under the following sub-headings.

Clarification of the conceptualised low recharge conditions, specifically associated with Darkies Range

Section 12.3.3 of the draft EIS states that the relatively deep localised water table in the vicinity of Darkies Range is indicative of a low rate of recharge in this area.

The groundwater levels remain at depth in the low lying areas in the project site adjacent to Darkies Range (up to a depth of approximately 70 m). Groundwater discharge does not occur in the vicinity of Darkies Range. Therefore, the significant depth of groundwater in the vicinity of Darkies Range is attributable to either a low rate of recharge or rapid dissipation of high recharge via lateral groundwater flow.

Data presented in Section 6 of the draft EIS Groundwater Report (Appendix I) shows that Darkies Range comprises relatively low to moderate permeability bedrock and hence the rate of lateral groundwater flow or vertical dissipation of recharge in the vicinity of Darkies Range is also low.

Section 5.3 – Editorial Corrections includes clarification that the relatively deep localised water table in the vicinity of Darkies Range, together with the low permeability and lack of groundwater discharge, are indicative of a low rate of recharge in this area.

Quantification of Recharge

Recharge is not directly measurable and must be inferred from available data. Common methods of inference include modelling, water fluctuation method, and chloride mass balance.

The draft EIS groundwater assessment calculated recharge using the modelling approach as described in Section B1.2 of the draft EIS Groundwater Report (Appendix I). The diffuse (background) recharge rates have been calculated by applying the calibrated recharge percentage by the adjusted annual rainfall. The calculated diffuse recharge rate has been refined by the inclusion of enhanced recharge zones based on surface geology and topography.

This approach was used as it provides a robust calibration result that reflected the available monitoring data. The modelling approach is commonly used in groundwater studies for coal mining projects and has been used to calculate the rate of recharge in groundwater studies undertaken for previous Galilee Basin mining projects.

Section 5.3 – Editorial Corrections includes the following clarifications in relation to the description of recharge presented in Section B1.2 of the draft EIS Groundwater Report (Appendix I):

- Figure B3 of the draft EIS Groundwater Report (Appendix I) shows the variation in modelled recharge rates applied in the groundwater model. The figure legend has been amended to correctly reflect the content of the figure in mm/year.
- Table B2 has been amended to align with Figure B3 and correctly reflect the applied recharge rates in mm per year.
- The description of the recharge calculation method presented in Section B1.2 has been clarified.

Figure B3 and Table B2 of the draft EIS Groundwater Report (Appendix I) show that the calculated rate of diffuse (background) recharge is between approximately 0.1 to 1.8 mm/year, with enhanced recharge of up to approximately 19 mm/year in the vicinity of Darkies Range.

In order to provide a further level of confidence in the recharge rate, rainfall and groundwater monitoring data has been analysed to identify potential recharge events and calculate the rate of recharge.

Groundwater level data collected over the period of 37 months between December 2012 and January 2016 is presented in Attachment D – Additional Information on Groundwater. Rainfall data over this period has been analysed to identify potential recharge events. The rate of recharge over the monitoring period has been estimated using the water table fluctuation method. This method provides an estimate of recharge based upon detailed measurements of site-specific changes in the groundwater levels. In this instance, due to the high frequency of the groundwater monitoring data (i.e. 6 hourly intervals), this method is considered likely to provide a reasonably accurate estimate of recharge.

This data shows that, despite several significant rainfall events with the potential to generate recharge, groundwater levels remain relatively uniform with no significant seasonal recharge response. This data therefore provides supporting evidence for the low recharge rate conceptualised within the draft EIS groundwater assessment.

The data show minor groundwater level increases in the order of 0.1 m following rainfall events. The rate of recharge calculated from these responses is approximately 2 mm over the monitoring period, corresponding to less than 1 mm/year. The groundwater monitoring data presented in

Attachment D – Additional Information on Groundwater therefore supports the diffuse recharge rates presented in the draft EIS.

The application of chloride mass balance (as discussed in the submission) is an alternative approach to estimating recharge. Due to the high variability of water quality within the project site, recharge rates calculated using this approach range from less than 1 mm/year to approximately 31 mm/year.

For clarity, the chloride concentrations in bores screened over the Clematis Sandstone and Rewan Formation at the project site range between 46 mg/L and 124 mg/L. Recharge rates calculated using this approach range from approximately 9 to 23 mm/year. This range is significantly larger than previously reported values (see below), is inconsistent with the weathered, claybound nature of the Clematis Sandstone at the project site and is an order of magnitude greater than the rate calculated from modelling and water table fluctuations. These values may represent zones of higher recharge at the base of Darkies Range where runoff collects and enhances recharge. These zones are represented within the model.

Section B3 of the draft EIS Groundwater Report (Appendix I) presents a sensitivity analysis that considered an increase in the model recharge rate by an order of magnitude. This corresponded to recharge rates of up to 180 mm/year being considered, and therefore encompassed the range of recharge rates calculated from chloride mass balance. The results presented in Section B3 confirm that the model is relatively insensitive to changes in recharge rate. Furthermore, the maximum predicted extent of depressurisation associated with the sensitivity analysis of recharge rates does not extend to any springs or other groundwater dependent features. It can therefore be concluded with a high degree of confidence that changes in recharge in the order of those assessed will not give rise to any significant impacts at these features.

Comparison with Previously Reported Values

A review of recharge rates presented in other relevant groundwater studies shows that:

- A recharge rate of 1 to 5 mm/year was calculated as part of the Carmichael Coal Mine Project EIS based upon water level and quality data.
- A recharge rate of less than 1 mm/year to 10 mm/year was derived from transient modelling undertaken by Dr N. Merrick as part of EIS groundwater studies in the Galilee Coal Project. This provided recharge rates of approximately 0.1 to 1.8% of average annual rainfall.
- A recharge rate of less 2 and 4 mm/year was inferred by Kellet et. al. (2003) for the GAB intake beds (comprising the Hooray Sandstone) west of Lake Buchanan. This rate does not include the Clematis Sandstone in the vicinity of the project site. Kellet et. al. (2003) indicates that the recharge rate is likely to be lower further east (i.e. in the vicinity of the project site).

The recharge rates presented in previous groundwater studies are therefore consistent with the diffuse recharge rates presented in the Project China Stone draft EIS. On this basis, the rates adopted in the Project China Stone draft EIS are considered a reasonable basis for modelling predictions.

Recharge Rates in the Tertiary Sediments

The modelled rate of recharge in the Tertiary sediments is less than 1 mm/year. This low rate of recharge reflects the highly weathered claystone characteristics of this formation and the arid setting of the project. This value is comparable to the recharge rates presented in previous groundwater studies (as discussed above) and on this basis, the rates adopted in the draft EIS are considered a reasonable basis for modelling predictions.

As discussed above, Section B3 of the draft EIS Groundwater Report (Appendix I) presents a sensitivity analysis that considered an increase in the model recharge rate by an order of magnitude and confirmed that the model is relatively insensitive to changes in the rate of recharge to the Tertiary sediments.

Impacts on GAB Recharge Zone

The GAB recharge zone extends for several thousand kilometres and covers a significant area. The project will occupy a minor proportion of the GAB recharge zone and is predicted to result in localised depressurisation of the GAB sediments. On this basis, there is no evidence to support the conclusion that the project is likely to result in significant impacts on the GAB recharge zone.

Conclusion

In conclusion, the conceptualised low recharge conditions and the adopted recharge rates are well supported by available data and are consistent with previously reported groundwater studies in the Galilee Basin. Furthermore, it has been demonstrated that the project is not likely to result in significant impacts on the GAB recharge zone.

Submitter Issue Number 41.027

Chapter 12 Groundwater and Appendix I - Groundwater Report:

The proponent needs to confirm that the groundwater recharge values used are correct, as adopted recharge rates appear to be assumed rather than calculated by the proponent. The model scenario runs need to be undertaken with higher values of recharge to ensure that the plausible range of recharge values have been assessed.

Chloride concentrations are available as presented by the proponent and these need to be used to quantify recharge rates. Model runs can then be undertaken with more realistic recharge values adopted.

Refer to the response to issue 41.026 for clarification on recharge rates adopted in the groundwater model.

Submitter Issue Number 41.028

There is no up-front commitment to reducing post mine impacts on groundwater. Currently the proponent has estimated that the pits will result in a long term take of GAB groundwater of more than 0.5 ML/d (183 ML/y), and an operational take of up to 9 ML/d (3,285 ML/y).

A commitment to reducing post mining impacts on the GAB groundwater needs to be given.

A possible consideration is the partial backfilling of open cut pits to minimize any post mine loss of groundwater through evaporation from final voids.

Partial backfilling of pits would eliminate the mined out pits behaving as a groundwater sink after mine closure because of the evaporation of groundwater from them which occurs in the current mine plan. Given the open cut mining finishes well before longwall mining, partial pit backfilling would also reduce GAB groundwater take during the operational phase.

It is noted that this issue was not included in the DNRM submission.

As discussed in the response to issue 41.017, the take of groundwater from the GAB is fully regulated under the Queensland *Environmental Protection Act 1994* and Queensland *Water Act 2000*. The proponent will be required to obtain an associated water licence under the Queensland *Water Act 2000* for the take of groundwater from the GAB. In order to obtain an associated water licence, the proponent will be required to demonstrate that the impacts of groundwater take from the GAB have been fully assessed and adequate management measures are proposed. The associated water licence will include conditions that specifically regulate the impacts of groundwater take on the GAB and ensure that any potential impacts are appropriately managed in accordance with the licence. This will include operations phase and post mining groundwater take.

Any additional requirement related to groundwater take, over and above the Queensland regulatory framework, are therefore unnecessary and unjustified.

The post mining groundwater take of 183 ML/year represents a minor volume of groundwater within the context of the GAB aquifers and is not a significant proportion of the sustainable yield of the GAB. Post mining groundwater take is therefore not likely to result in any significant adverse effects on the GAB groundwater resource or significant impacts on sensitive environmental features. The proponent will be required to mitigate impacts on water or any associated bores as a condition of its associated water licence.

In order to prevent post mining groundwater take it would be necessary to backfill the final void to a level that is above the pre-mining groundwater level (i.e. a backfilling depth of up to approximately 300 m).

On this basis, it is not economically feasible for this mine (or any other Galilee Basin open cut mine) to backfill the final void to the extent necessary to prevent post mining groundwater take, and a commitment of this nature would be unprecedented for a coal mining project in the Galilee Basin or elsewhere.

In conclusion, the post mining groundwater take and any associated impacts are subject to existing regulations. The suggested additional commitment to backfilling the void in order to manage impact is inconsistent with existing regulations and unjustified. The suggestion is also not economically feasible.

Submitter Issue Number 41.029
Tailings storage facility needs reconsideration. The tailings storage facility is expected to erode back into the system of creek and eventually to the Belyando River over time. The best way to manage this problem is to return all tailings to the Pits. If this is not done, the rate of erosion of the storage facility will determine the environmental impact, so that this should be calculated if tailings are not returned to the pits. The current design is 34 m high with embankment slopes of 6:1. These embankments will erode relatively quickly.

Changes have been made to the conceptual final landform of the TSF and PSWSF in response to the EHP submission (issue 24.016). The changes involve reshaping the plateau area of the TSF final landform, extending the landform to the north and joining the final plateau of the PSWSF with the TSF. A revised conceptual final landform figure for the PSWSF and TSF is included in Attachment E – Additional Information on Surface Water.

These changes will enable the plateau area of the TSF/PSWSF final landform to drain to the natural ground surface via internal drains with gentle slope (maximum of 1%) that can be stabilised from erosion. This change will also mean that the 6:1 external batter slopes of the final landform will not have any contributing catchment area above the slope. Without any contributing catchment area, 6:1 slopes up to 34 m high can be readily rehabilitated and stabilised from erosion.

As discussed in Section 4.16.1 of the draft EIS:

- The option of in-pit storage of tailings and rejects material was not progressed for the purposes of the draft EIS as it is not feasible in the initial years of operations due to a lack of available in-pit storage area; and
- This option may be considered again in the future, subject to the completion of favourable feasibility studies and gaining the necessary approvals.

Submitter Issue Number 41.030
Appendix I – Groundwater Report Section 4.2.5 Tertiary and Quaternary Sediments (page - 12); and Appendix f – Terrestrial Ecology Report Section 4.3 Regional Ecosystems (page 4.18)
DNRM's comment on the Draft EIS (March 2015) noted some inconsistencies with the groundwater and terrestrial ecology reports, in relation to the projects discussion of Groundwater Dependant Ecosystems (GDE). DNRM's recommendation at this time was that the proponent should discuss the presence of GDEs in the project area, using RE 10.3.14d as a proxy for shallow groundwater and GDE mapping, as well as the addition of two monitoring bores in the alluvium.
MacMines responded in that *"the conclusions of the EIS in relation to the presence of GDEs is*

therefore based on appropriate holistic assessment of all relevant factors, including confirmed hydrogeology based on field investigations, rather than just the presence of indicative REs. These investigations confirmed that the extensive, deep alluvial deposits are absent from the project site and surrounding area. Section 12 – Groundwater (subsection 12.3.1) provides a detailed explanation of the project setting in relation to known alluvial groundwater systems".

The proponent has not identified GDEs in the project area. While it may not be the task of the Groundwater Report to identify GDEs, if evidence for the potential GDEs appear in other assessments (the identification of RE 10.3.14d, the presence of *Eucalyptus camaldulensis* and photographic evidence of what appears to be the developed alluvium), the onus is on the proponent to properly investigate, identify and satisfactorily provide detailed supporting evidence for the presence or absence of GDEs.

DNRM recommendations made during the draft-EIS (March 2015) agency consultation period will remain relevant for this issue:

"Discuss the presence of GDEs in the project area, and should use RE 10.3.14d as a proxy for shallow groundwater and GDE mapping.

Monitoring bores should be placed in the alluvium at approximately 413271 m E 7589093 m S and 414001 m E, 7592151 m S."

Groundwater Dependent Ecosystems

The draft EIS includes a detailed assessment of the presence of GDEs as part of the terrestrial ecology study. This GDE assessment is presented in Section 4.4 of the draft EIS Terrestrial Ecology Report (Appendix F). This assessment considered the potential groundwater dependence of ground-truthed ecological communities based upon all available information including (but not limited to) the recorded groundwater levels within the project site. The draft EIS Groundwater Report (Appendix I) provides a cross reference to this assessment.

The submission cites the following as evidence for the potential presence of GDEs:

- The identification of RE 10.3.14d;
- The presence of *Eucalyptus camaldulensis*; and
- Photographic evidence of what appears to be the developed alluvium.

In addition, DNRM has previously requested that RE 10.3.14d is used as a proxy for shallow groundwater and GDE mapping.

These suggested lines of evidence are discussed below.

RE10.3.14d

The distribution of RE10.3.14d is shown on Figure 11 of the draft EIS Terrestrial Ecology Report (Appendix F). RE10.3.14d is present:

- In the northern part of the northern mining area, associated with the headwaters of Pigeonhole Creek; and
- In the southern part of the northern mining area, associated with the headwaters of Tomahawk Creek.

Groundwater drilling has been undertaken at several locations within (i.e. MB13) and immediately adjacent (MB23, MB24, MB25, MB21 and MB33) to the mapped extents of this vegetation community.

MB13 was drilled in March 2013 at the end of the wet season. The groundwater table at MB13 within RE10.3.14d is approximately 67 m below ground level at this location. No shallow groundwater was encountered during drilling. This site-specific data conclusively demonstrates that the presence of RE10.3.14d is not a proxy for shallow groundwater nor is RE10.3.14d representative of vegetation that is groundwater dependent within the project site.

The groundwater table within the adjacent bores was similarly deep, ranging from approximately 90 m to greater than 130 m below ground level. On this basis, groundwater drilling provides further confirmation of the lack of shallow groundwater in the vicinity of mapped RE10.3.14d.

Eucalyptus camaldulensis

The response to issue 41.002 contains a discussion of *Eucalyptus camaldulensis* and explains that, in this instance, the presence of this tree species is not indicative of shallow groundwater or an alluvial aquifer.

Photographic evidence of developed alluvium

As discussed in Section 4.2.5 of the draft EIS Groundwater Report (Appendix I) regional scale geological mapping indicates the inferred presence of Quaternary sediments based upon aerial photography.

A stream geomorphology survey was undertaken to investigate the characteristics of drainage features within the project site and its surrounds, including the presence of alluvial deposits.

As discussed in Section 13 of the draft EIS, the drainage over the plateau of Darkies Range is typically via sheet flow and preferential flowpaths that are incised into the exposed, highly weathered bedrock and Tertiary sediments. Alluvial deposition is highly unlikely under these circumstances. Cascades and steeply sloping gullies have formed on the slopes of Darkies Range. These drainage features exhibit fast, high energy ephemeral flows that are not conducive

to alluvial deposition. Colluvial deposits (i.e. e.g. hillslope sheetwash) are present within these drainage features and at the footslopes of Darkies Range.

Drainage over the low lying areas east of Darkies Range is characterised by minor drainage flowpaths that are locally incised into the Tertiary sediments and exposed bedrock. The surrounding areas exhibit sheet erosion. There is no evidence of a depositional environment and drainage features in this area typically lack riverine characteristics (such as defined bed and banks) and/or a developed floodplain.

The stream geomorphology field survey undertaken as part of the draft EIS therefore concluded that there is no evidence for the presence of alluvium within the project site. In addition, no expression of shallow groundwater within drainage features was recorded.

Additional information on the surface geology within the project site was collected as part of the aquatic ecology survey, terrestrial ecology survey and groundwater drilling program. The information collected includes:

- Bore logs presented in Appendix A of the draft EIS Groundwater Report (Appendix I) which show that no alluvium was encountered within any of the 31 groundwater bores or 4 vibrating wire piezometer drill holes undertaken within the project site.
- Photographs collected from aquatic ecology survey sites,as shown in the draft EIS Aquatic Ecology Report (Appendix G) show that the shallow geological profile typically comprises a thin soil horizon directly overlying weathered bedrock, with occasional colluvial sheetwash deposits comprising cobbles, gravels and occasional sands. No alluvium or shallow groundwater was encountered within these survey locations.
- Photographs collected from terrestrial ecology survey sites,as shown in the draft EIS Terrestrial Ecology Report (Appendix F) show that the shallow geological profile typically comprises a thin soil horizon directly overlying weathered bedrock, with occasional colluvial sheetwash deposits comprising cobbles, gravels and occasional sands. No alluvium or shallow groundwater was encountered within these survey locations.

The information presented in the draft EIS clearly demonstrates that neither developed alluvium nor an alluvial aquifer are present in the vicinity of the project site.

It should be noted that for the purposes of vegetation mapping, the ecological land zone describing recent Quaternary alluvial systems encompasses a diverse range of soil types, and can include thin sandy soils derived from weathered sandstone and incised drainage features in Tertiary sediments. This is not inconsistent with the findings of the other studies presented in the draft EIS nor does it indicate the presence of developed alluvium in geological terms or constitute an alluvial aquifer in a hydrogeological context.

Conclusion

The submission suggests that potential evidence for the presence of GDEs is present at the project site. This potential evidence has been considered and found to support the draft EIS's conclusion that GDEs are not present within the project site.

Groundwater Monitoring Bores

The submission has recommended the installation of alluvial monitoring bores at the following two locations:

- Adjacent to a drainage feature that is part of the headwaters of Tomahawk Creek in the southern part of the project site. Regional geology mapping (at 1:100,000 scale) indicates the inferred presence of Quaternary sediments on this drainage feature.
- Adjacent to a drainage feature that is part of the headwaters of North Creek in the southern part of the project site. Regional geology mapping (at 1:100,000 scale) indicates the inferred presence of Tertiary sediments overlying bedrock at this location.

As discussed above, the studies undertaken as part of the draft EIS found that alluvium is not present within these drainage features.

In addition, a landholder bore (Camp Bore) is located within the extent of inferred Quaternary sediments (as shown on the regional geology mapping) on the headwaters of Tomahawk Creek, in close proximity to the DNRM recommended alluvial bore. Figure 12-6 of the draft EIS shows the location of Camp Bore. The Camp Bore log (available from the DNRM Groundwater Database) indicates that the geology at this location comprises Tertiary sediments overlying the Betts Creek Beds. Groundwater was encountered at 52 m below ground level within the upper Betts Creek Beds. No shallow groundwater was recorded within the upper profile of the Tertiary sediments.

Further monitoring bores (Roo Bore and MB03) are installed within and adjacent to the extent of inferred Quaternary sediments (as shown on the regional geology mapping) associated with the headwaters of North Creek (downstream of the DNRM recommended alluvial bore). The Roo Bore log (available from the DNRM Groundwater Database) and MB03 bore log (presented in the draft EIS Groundwater Report (Appendix I)) show that no alluvium or shallow groundwater was encountered within these bores.

The site-specific data therefore support the draft EIS's conclusions that regional scale mapping of alluvium is an unreliable basis for establishing the presence of shallow groundwater and groundwater dependent ecosystems. On this basis, the installation of additional shallow groundwater monitoring bores at the proposed locations is not justified.

Submitter Issue Number 41.031

Section 3.4.2 Aquatic and Stygofauna Report - Stygofauna investigation (Page - 3.20)

DNRM's comment on the draft-EIS (March 2015) noted that no alluvium was sampled for the

stygofauna report, and suggested that the proponent conduct a second sampling in a different season to meet the requirements of the WA guidance material.
MacMines responded that *"the stygofauna assessment presented in the EIS was conducted in accordance with the recommendations for pilot studies described in the WA Guidelines"*. Alluvium has been identified and confirmed in the RE mapping in Volume 3, Appendix f - Terrestrial Ecology Report as containing RE10.3.14d and the presence of *Eucalyptus camaldulensis*, however no alluvium has been sampled for the Stygofauna assessment as presented in the EIS.
In order to meet the Western Australian guidance sampling of the alluvium must occur. A second round of sampling of stygofauna is recommended to provide enough supporting evidence for any conclusions in the stygofauna report.

Refer to response to issue 41.030 in relation to the suggestion that either RE 10.3.14d or *Eucalyptus camaldulensis* confirm the presence of alluvium on the project site, contrary to the findings of the draft EIS.

The conclusions of the draft EIS remain valid, in that there is no shallow groundwater on the project site and sampling of superficial sediments for stygofauna is not feasible and not justified in accordance with the WA Guidelines.

PROJECT CHINA STONE
RESPONSE TO THE DEPARTMENT OF THE ENVIRONMENT AND ENERGY SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

42 DoEE SUBMISSION

The proponent, Hansen Bailey and the Office of the Coordinator General (OCG) met with representatives from the Department of Environment and Energy (DoEE) on 21 December 2015, 29 November 2016 and 21 June 2017 to discuss their submission issues and the proponents proposed approach to resolving their issues.

Submitter Issue Number 42.001
Sections 6 - Subsidence, 12 Groundwater and 13 - Surface Water :
Please note that a request for advice regarding this project has been sent to the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) for their consideration at their October 2015 meeting.
Comments from the IESC will need to be addressed as part of the Supplementary Environmental Impact Statement in regards to impacts on water resources (including impacts on the Great Artesian Basin).

Noted. IESC comments are responded to in Attachment C – Response to IESC Advice.

Submitter Issue Number 42.002
For your advice, on 30 June 2015, the list of migratory species under section 209 of the EPBC Act was amended to remove the Australian Painted Snipe (*Rostratula australis*, formerly known as *Rostratula benghalensis*) as a migratory species.
The Supplementary Environment Impact Statement will no longer need to discuss the Australian Painted Snipe when considering impacts on listed migratory species, however the Australian Painted Snipe (listed as endangered) will still need to be considered in relation to impacts on threatened species.

Noted. This has been clarified in Section 5.3 – Editorial Corrections.

Submitter Issue Number 42.003
Black-throated Finch (southern) habitat mapping
Further information and justification of 'high value habitat' is required for this species - noting that there are records of this species in the southern/central areas of the project site in proximity to water sources (see figure 11-5, records for May and October 2012 and October 2013). These records indicate that there is potentially habitat critical to the survival of the species which is not accounted for in the EIS. The EPBC Act Significant Impact Guidelines for the species indicate that the character and quality of habitat may be significantly diminished if an action results in a net loss

or degradation of water sources (either permanent or seasonal) and/or the degradation of foraging habitat where known records exist, amongst others. The EPBC Act Significant Impact Guidelines indicate that habitat critical to the survival of the species can include habitat that is necessary for activity such as foraging, breeding, roosting or dispersal. The Department notes that the broader area surrounding the project may potentially support an important population.

The Black-Throated Finch (BTF) habitat modelling for the project site has been revised in consultation with the Federal DoEE and the Queensland Department of Environment and Heritage Protection (EHP). The revised habitat modelling is provided in Attachment F - Additional Information on Ecology.

In response to the specific issues raised in this submission:

- The revised habitat modelling includes habitat around seasonal sources of water (the habitat modelling contained in the draft Environmental Impact Statement (EIS) was based on permanent water sources only); and
- The revised habitat modelling incorporates the south/central areas of the project site. The majority of BTF records that are referred to in this submission fall in an area mapped as BTF habitat (using the revised BTF habitat modelling).

Submitter Issue Number 42.004

"Squatter Pigeon

Further information and justification of 'high value habitat' within 1 km of permanent water is required for this species –

a) noting that there are records of this species in the southern/central areas of the project site in proximity to water sources (see figure 11-5, records for May and October/November 2012 and October 2013). These records indicate that there is potentially habitat critical to the survival of the species which is not accounted for in the EIS.
b) The EPBC Act Species Profile and Threats Database for the species indicates that foraging and breeding habitat is within 3km of a suitable permanent or seasonal waterbody. The EPBC Act Significant Impact Guidelines indicate that habitat critical to the survival of the species can include habitat that is necessary for activities such as foraging, breeding, roosting or dispersal.

The Squatter Pigeon habitat modelling for the project site has been revised in consultation with the DoEE and the EHP. The revised habitat modelling is provided in Attachment F - Additional Information on Ecology. The revised habitat definition is as per the definition provided in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approvals for the Galilee Coal & Rail Project EPBC approval (EPBC 2009/4737), granted in December 2013 and the Red Hill EPBC approval (EPBC 2013/6865), granted in September 2015. This definition has been adopted for Project China Stone because it is a recent definition (September 2015) and the definition relates to general habitat features (e.g. land zones, distances to water etc.) that are applicable to other projects in the same bioregions.

The revised habitat modelling expands the area of habitat in the southern and central part of the project site, and provides a good match with records of the species in this area.

Submitter Issue Number 42.005
Further information is required on the condition/quality of relevant habitat on the offset sites/s.

The condition of the habitat on the potential offset properties is likely to be similar to the condition of the habitat on the project site, given that the offset properties are in the same region and are subject to the same historical land use. Further detail on the condition will be available once habitat condition surveys have been undertaken as part of the development of the Offset Management Plan. The survey work to be undertaken will:

- Address all species Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) that require offsets;
- Include survey of the land proposed to be used for offsets (i.e. offset property/properties); and
- Include survey of the areas that require offsets (i.e. sections of the project site proposed to be cleared).

Sections 4.4 and 4.6 of the draft EIS Biodiversity Offset Strategy (BOS) (Appendix H) explain that the field surveys will be undertaken as part of the development of the Offset Management Plan. These surveys and their timing as part of the development of the Offset Management Plan can be included as an approval condition for the project. The proponent is unable to undertake the surveys at this point in time, given that it is currently undertaking commercially sensitive land access negotiations with the owner of the most prospective property. Surveys of the properties cannot be undertaken until negotiations are concluded.

Submitter Issue Number 42.006
Further discussion is required on the suitability and effectiveness of the offset site/s to compensate for significant residual impacts.

The draft EIS has demonstrated that the potential offset sites have large areas of potential habitat available that will be more than sufficient to account for the offsets that will be required for the project. Further assessment of the suitability and effectiveness of the offset site/s to compensate for significant residual impacts will be undertaken during the development of the project's Offset Management Plan, following the EIS process, once the EPBC Act approval has been obtained for the project. This will include undertaking detailed field surveys of the offset properties and project site and using the EPBC Act Offsets Calculator.

Submitter Issue Number 42.007
Further information is also required about how the offsets meet the EPBC Act Offsets Policy.

The draft EIS BOS (Appendix H) describes the offsets proposed to be provided for the project. It notes that in keeping with the EPBC Act Offsets Policy, the majority of offsets (at least 90%) will be land based. The BOS notes that an Offset Management Plan will be prepared for the project, and will be submitted to the DoEE for approval. The plan will describe the management measures to be adopted for offset properties and a program to monitor and report on the effectiveness of the management measures. As per the requirements of the EPBC Act Offsets Policy and as stated in Section 6 of the draft EIS BOS (Appendix H), these management measures will be designed to ensure that offsets deliver an overall conservation outcome that improves or maintains the viability of the protected matter. In addition, as per the requirements of the EPBC Act Offsets Policy, the Offset Management Plan will describe contingency measures to manage the risks of the offset not succeeding. This additional commitment has been included in Attachment I – Additional Commitments.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 43 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

43 SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent.

Submitter Issue Number 43.004
It is disappointing that this document makes a scanty contribution to a real understanding of the projects impacts.

The submitter's opinions are noted. However, the proponent disagrees with these opinions as the draft Environmental Impact Statement (EIS) was undertaken by appropriately qualified and experienced scientists, in accordance with the project's EIS Terms of Reference (TOR) requirements and in line with accepted environmental assessment standards.

Submitter Issue Number 43.005
Field surveys were inadequate. The proponent describes this area as remote and therefore it might have been assumed that information available would be largely speculative and extensive field surveys would be required and greater effort to consider for instance the spectacled hare wallaby.
Not enough surveys were done and in some sites only one survey was done (May 2013). Ironically the area that was too wet in May 2012 was not surveyed yet surface water even if ephemeral is the time to see birds which like…….pools and water-logged ground and sedges!

Field surveys for the draft EIS were undertaken in accordance with the project's EIS TOR and relevant regulatory guidelines.

Submitter Issue Number 43.011
Workers accommodation appears to be sandwiched between the runway of the airport and the open cut area…and the coal washing area. Obviously the site has been prospectively situated by someone who doesn't expect to occupy this accommodation. Coal dust from the mining activity

Please refer to Section 4.2 – Response to Common Issues.

Submitter Issue Number 43.012
Workers accommodation appears to be sandwiched between the runway of the airport and the open cut area…and the coal washing area. Obviously the site has been prospectively situated by someone who doesn't expect to occupy this accommodation. Noise from the mining activity and runway traffic to pose a further noise problem.

Please refer to Section 4.2 – Response to Common Issues.

Submitter Issue Number 43.013
there doesn't seem to be any assessment of risk posed by aeroplanes landing so close to the village.

Please refer to Section 4.2 – Response to Common Issues.

Submitter Issue Number 43.014
Contamination to groundwater including radionuclides and heavy metals from the proposed power plant is not seriously considered since all this is assessed as low risk. Possibly this is due to the lack of real experience in coal extraction activity because there is no coal mine in Queensland that hasn't had issues with contamination due to unexpected circumstances and this project is considerably larger so it would be reassuring to see proper assessment carried out here.

The draft EIS Groundwater Report (Appendix I) includes an assessment of all potential sources of groundwater contamination.

Submitter Issue Number 43.015
Groundwater includes GAB and is seriously under assessed and risks not only of contamination above but drawdown effects are not covered credibly. IESC has made it clear that a much greater understanding of the groundwater needs to underpin any approvals of projects in the Galilee Basin.

Please refer to Attachment C – Response to IESC Advice.

Submitter Issue Number 43.018
Energy source and demand is changing. Electricity is a convoluted way of achieving cooling; warmth and light. This project seems wasteful.

The submitter's opinions are noted. The proponent respectfully disagrees.

PROJECT CHINA STONE
RESPONSE TO AUSTRALIAN YOUTH CLIMATE COALITION SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

44 AUSTRALIAN YOUTH CLIMATE COALITION SUBMISSION

The following responses are provided for issues that were identified by the Office of the Coordinator General as requiring a response. Other issues raised within the submission were identified by the Office of the Coordinator General as requiring noting by the proponent.

Submitter Issue Number 44.003
4. AYCC strongly opposes the approval and development of another coal mine in Australia because of the contribution that it will make to climate change, which already threatens the natural environment, young people and future generations.

Noted.

Submitter Issue Number 44.006
7. The EIS for the Project states that "anticipated initiatives that may mitigate, reduce, control or manage greenhouse gas emissions through energy efficiency include:
A. regular assessment, review and evaluation of greenhouse gas reduction opportunities;
B. procurement policies that require the selection of energy efficient equipment and vehicles;
C. monitoring and maintenance of equipment in accordance with manufacturer recommendations;
D. optimisation of diesel consumption through logisitics analysis and planning; and
E. progressive rehabilitation of land areas to manage and limit the cumulative loss of carbon storage associated with land clearing." (emphasis added).
8. The Project does not commit to implementing these measures, and simply lists them as anticipated mitigation measures to adopt to reduce energy consumption and increase financial incentive for the Project. This lack of commitment is not sufficient for the purposes of section 2.5.2 of the *Galilee Basin State Development Area Development Scheme*, which requires that development is "designed to avoid or otherwise minimise emissions that will adversely affect the health and safety, wellbeing, and amenity of communities and individuals.

Section 5.3 – Editorial Corrections confirms the proponent will implement these measures.

Submitter Issue Number 44.011
13. The EIS states the emissions of particulate matter, nitrogen dioxide, sulfur dioxide and carbon monoxide are "well below" or "comply with" the Air EPP. However, the EIS does not consider the overall impact from emissions from this Project and the eight other coal mine projects planned for the Galilee Basin.

Refer to Section 23 of the draft Environmental Impact Statement which explains the projects potential for cumulative impacts.

Submitter Issue Number 44.013
14. The EIS recognises that subsidence from the longwall mining will cause "connective cracking" the Clematis Sandstone, an aquifer of the Great Artesian Basin (GAB), leading to permanent 'take' of groundwater from the GAB, yet the impacts on the GAB are dismissed as "inconsequential" or "negligible".

Please refer to Attachment B – Response to Non-specific Submissions which addresses this issue.

Submitter Issue Number 44.017
15. (part)No Biodiversity Offset Strategy is provided in the EIS, and where assessments of the impact on threatened species have been conducted they have demonstrated that impacts will be unacceptably adverse.

Please refer to Attachment B – Response to Non-specific Submissions which addresses this issue.

PROJECT CHINA STONE
RESPONSE TO TRADITIONAL OWNERS SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

45 TRADITIONAL OWNERS SUBMISSION

Submitter Issue Number 45.001

We Wangan & Jagalingou people are the Indigenous traditional owners of the land on which the China Stone Mine is proposed to be built, and we have a registered native title claim over the area. Our land and everything on it has significance to us and a place in our culture, law and custom. Indeed, our land and waters are our culture, and we exist as people of our land; our lands and waters are who we are, and show us how to be and how to belong. Our ancestral homelands are the starting point of our lives and are inseparable from our culture, and we maintain a deep connection to our lands, where our ancestors dwell indefinitely and to where we return when we die. The sacred beliefs of our culture are based on where our songlines run through our country, and these songlines connect us to Mother Earth. Each member of our people has a specific plant or animal dreaming totem. Our totems protect us and maintain our social order: we cannot kill our totems, and they inform our land interests and associated decision-making and ceremonial responsibilities. When we die, we return to the spirit dreaming and our connection to our totems remains.

We want to continue practising our culture, and to preserve it and our lands and waters for future generations. We are stewards of our lands and waters: we have a sacred responsibility to protect them. Consequently, we are deeply concerned about the development of this mine, and its impacts on our land, waters and culture. This mine will tear huge chunks out of our land, forever destroying vast swathes of it. The project will involve the development of coal handling and preparation plants, stockpiles, conveyors, a rail loop, dams, and a tailings storage facility, among other things, on our land. This will render our land unrecognisable, destroying our songlines and the animals and plants that are so special to us.

We are also deeply concerned about the cumulative impacts of this mine and the other mines proposed on our lands, including the Carmichael mine, the Alpha mine, the Galilee Coal Project, Kevin's Corner, and the South Galilee Coal Project.

(Submission issue continued in next row)

As discussed in Section 5.4.5 of the draft Environmental Impact Statement (EIS), the proponent will negotiate with the Wangan and Jagalingou People, as the registered Native Title claimants, in accordance with the requirements of the *Native Title Act 1993*.

As discussed in Section 20.2.2 of the draft EIS, the proponent is required to prepare a Cultural Heritage Management Plan (CHMP) for the project in accordance with the *Aboriginal Cultural Heritage Act 2003*. The CHMP will be developed in consultation with the relevant Aboriginal parties for the project and will address the management of Aboriginal cultural heritage on the project site.

In relation to consultation for the draft EIS, the legal representatives of the Wangan and Jagalingou People were contacted on 30 July 2015 in relation to an offer to meet and discuss the draft EIS. The offer of a meeting was declined. Consultation with Indigenous training organisation, Jenagar Training, was also undertaken during preparation of the draft EIS Socio-Economic Impact Assessment Report (Appendix N).

Submitter Issue Number 45.002

(Issue continued from previous row)

Our culture and the direct and cumulative impacts of this project on our culture have not been addressed in the Draft EIS, despite these matters falling squarely within the matters that the EIS should address. For example, the Terms of Reference ("ToR") requires the EIS to address indigenous cultural heritage, land use, nature conservation, water resources, and impacts on social values (among other matters). In particular, the Draft EIS does not address the Indigenous social and cultural values of the area and our cultural heritage, how the project will impact those values and heritage, and how such impacts can be avoided or mitigated. The failure to address these matters must result, at least partly, from the failure of the proponent to consult with us about the project's impacts on our people. Our specific concerns with the Draft EIS are identified below (in the submission)."

To comply with both the ToR and good practice, prior to the finalisation of the EIS, the proponent must consult and engage with us to inform its EIS, particularly in relation to identification of the Indigenous social and cultural values of the region and cultural heritage, the project's impacts on these matters, how they may be avoided or mitigated, and the cumulative impacts of so many coal mines on our traditional lands.

Please refer to response to issue 45.001.

Submitter Issue Number 45.003

Section 6 of the ToR requires the preparation of a social impact assessment ("SIA") that describes existing social values, identifies social impacts, and presents mitigation measures and management strategies. Section 6 contains a number of requirements specific to Indigenous peoples.

For the reasons set out below, the proponent has completely failed to fulfil these requirements in relation to our people.

Our people were not consulted or engaged by the proponent in the preparing of the SIA and we are invisible in the Draft EIS. This is despite the requirements in section 6.1.2 of the ToR that the proponent undertake a "community engagement strategy to engage at the earliest practicable stage" with affected parties to "explain the project, and to identify and respond to issues and concerns regarding social impacts." This engagement should be "[c]onsistent with national and international good practice, be "open and transparent," and "consider social and cultural factors, customs and values, and, where relevant, linkages between environmental, economic, and social impact issues.

Instead of consulting with us as directly affected Indigenous peoples, the proponent's representative consulted only with non-Indigenous landowners in the area and used this

consultation to conclude that our people do not use the project area: "The findings of consultation conducted with landowners for the EIS suggests that there is no contemporary use of the project site or the surrounding area by Indigenous people. The project site is not actively utilised by Indigenous people for the collection of flora and/or fauna." (See Socio-Economic Impact Assessment Report (Appendix N to the Draft EIS), page 46; see also pages 18, 101, 102). The Socio-Economic Impact Assessment Report then concluded that, based on the findings of consultation with the non- Indigenous landowners, "[t]he project therefore has a low risk of impacting Indigenous use of the project site" (page 102).
(Submission issue continued in next row)

Please refer to response to issue 45.001.

Submitter Issue Number 45.004
(Issue continued from previous row)
These conclusions are wrong and misguided for a number of reasons. First, our people remain connected to our lands and everything on and in them at all times, and our native title claim is to ensure that our right to use the land to use the project area for cultural and ceremonial purposes is recognised. The presentation of the project area as "located in a remote area, with limited direct impacts" presents the project area as a blank canvas, but this is incorrect (see Appendix N, page 134).
Second, we are extremely concerned that the conclusions are based on the observations of a very small number of non-Indigenous landowners who do not, and cannot speak for us. There are only three landowners in the project area, of whom only one resides on the directly affected land, and an additional two landowners adjoining the project area. This is a blatant failure to engage at all with affected Indigenous peoples. The failure to consult with us as the recognised traditional owners of the land is inconsistent with state, national and international law and best practice, and represents a failure to understand that we retain a strong cultural connection to our lands, despite being forcibly removed from them in the preceding decades as a result of discriminatory policies.
Third, the conclusions address only the direct use of land by Indigenous peoples; they do not address our social and cultural factors, customs and values more generally, as required by the ToR, nor our native title rights and interests. This demonstrates a fatally flawed understanding of our culture and our relationship to our lands: our land and everything on and in it is our culture and has value to us, whether or not we are currently directly using the land. It also demonstrates a failure to recognise to us as Indigenous peoples, there is a "strong linkage between environment, economic and social impact issues" because harms to our lands and the environment are harms to our culture (see section 6.1.2 of the ToR).
(Submission issue continued in next row)

Please refer to response to issue 45.001.

Submitter Issue Number 45.005
(Issue continued from previous row)
The proponent's failure to consult and engage with us renders its description of existing social

values and its social baseline study (required by sections 6.1.1 and 6.1.3 of the ToR) invalid. Section 6.1.1 requires the proponent to "[d]efine the project's social and cultural area of influence, … taking into account the …potential for social and cultural impacts to occur," "location of other relevant proposals or projects," "social values that might be affected by the project," and "Indigenous social and cultural characteristics such as native title rights and interests, and cultural heritage." Section 6.1.3 requires a "targeted baseline study" that must take account of "the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities," "land use and land ownership patterns … including the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families," and the "Indigenous cultural use of flora and fauna." None of these matters has been addressed in the Socio-Economic Impact Assessment Report in relation to our people.

Furthermore, the proponent has failed to fulfil the requirements of section 6.2 of the ToR in relation to our people. Section 6.2 requires the proponent to "[a]ssess and describe the … project's social impacts … based on outcomes of community engagement processes," to "describe the outcomes of community engagement processes including the likely response of affected Indigenous communities," to address the direct and cumulative impacts of the project in relation to Indigenous peoples "including cultural property issues." In particular, the Socio-Economic Impact Report proceeds on the assumption that the Carmichael project will have already caused impacts, thereby lowering the impacts that this mine will cause (see for example Appendix N, pages 99, 134). The failure to fulfil the requirements of section 6.2 results from the proponent's failure to consult and engage with us as required by section 6.1 of the ToR. The proponent has also failed to fulfil the requirements of section 6.3 of the ToR, which requires identification of social impact mitigation strategies and preparation of a social impact management plan. Given that the proponent failed to consider impacts upon our people, it cannot identify mitigation strategies. Finally, our people are not identified in the Stakeholder Communication Strategy outlined in the Socio-Economic Impact Assessment Report as stakeholders to be engaged with as the project progresses (pages 124-128).

Prior to finalisation of the EIS, to comply with the ToR and best practice the proponent must overcome the serious and significant limits in the methods by which knowledge of our people was gathered. It must also overcome the failure to consider our culture and the impacts of the project on our culture.

Accordingly, the proponent must consult with us to identify, among other things, our cultural and social values, the direct and cumulative impacts of the project on our cultural and social values, and strategies to avoid, minimise or mitigate these impacts. In so doing, the proponent must take into account the very strong linkage in our culture between environmental, economic, social and cultural impacts. The proponent must also ensure that it respects our internal systems of representation and decision-making when consulting with us.

The proponent must revise the Draft EIS to take into account the results of this consultation.

In addition, the proponent must commit to ongoing consultation with our people, including by ensuring we are identified in the Stakeholder Communication Strategy.

Please refer to response to issue 45.001.

Submitter Issue Number 45.006

Section 3.7 of the Terms of Reference sets out requirements for consultation, which include preparation of a Public Consultation Report. This report is to include a list of stakeholders. Stakeholders are to include the affected parties (as defined by the Environmental Protection Act 1994). Section 38 of the Environmental Protection Act 1994 lists both registered native title claimants and representatives Aboriginal/Torres Strait Islander bodies as affected parties. This indicates that the coordinator-general intended that we be consulted in relation to this project's impacts. This has not occurred. Furthermore, under international law, States have a duty to consult with Indigenous peoples in good faith about resource exploitation on their traditional lands, and Indigenous peoples have the right to be consulted in good faith. This consultation obligation is expressed in the United Nations Declaration on the Rights of Indigenous Peoples (see especially Article 32), to which Australia has given its support:

States should consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.

The consultation obligation is also grounded in core human rights treaties of the United Nations, including the International Covenant on Civil and Political Rights, the International Covenant on Economic, Social and Cultural Rights, and the Convention on the Elimination of All Forms of Racial Discrimination (all of which Australia is party to).

(Submission issue continued in next row)

Please refer to response to issue 45.001.

Submitter Issue Number 45.007

(Issue continued from previous row)

There are many factors to contribute to proper consultation. Among other matters, where a measure will affect a particular Indigenous community, such as resource extraction on their traditional lands, consultation procedures that focus on the interests of, and engagement with, those affected communities is required. Effective consultation must respect the systems of representation and decision-making of Indigenous peoples, and allow Indigenous peoples sufficient time to engage in their own decision-making processes and participate in decision-making in a manner consistent with their cultural and social practices. A State cannot avoid its duty to consult with affected indigenous peoples through delegation to a private company; it remains responsible for ensuring adequate consultation has been carried out. Direct negotiations between companies and indigenous peoples must meet the same standards governing State consultations.

As described above, the proponent has failed to engage in consultations with our people in relation to this project. Instead, the findings in the Socio-Economic Impact Assessment Report (Appendix N to the Draft EIS) rely on consultations with the small number of landowners in the area to conclude that there is no Indigenous use of the project area. There has been no consultation that focuses on engagement with us as affected Indigenous peoples, and we have been denied the opportunity to participate in the assessment of the impacts of this project. Accordingly, the proponent has denied us our right to be consulted in (wording missing from submission received- submittor notified by

OCG and offered to resubmit)
Prior to finalisation of the EIS, the proponent must engage in good faith consultation with us that complies with the requirements of international law in relation to the direct and cumulative impacts of the project on our culture, society, lands, and waters. The proponent must use the results of this consultation to revise the Draft EIS.

Please refer to response to issue 45.001.

Submitter Issue Number 45.008
As indigenous peoples, under international law we have the right to enjoy our culture, to maintain and strengthen our relationship with our traditional lands and waters, to uphold our responsibilities to future generations in this regard, and to have our culture protected. These rights are recognised by the United Nations Declaration on the Rights of Indigenous Peoples (Articles 8, 11, 12, 13, 31), the Universal Declaration on Human Rights (Article 27(1)), the International Covenant on Civil and Political Rights (Article 27(1)), and the International Covenant on Economic, Social and Cultural Rights (Article 15(1)(a)). These rights have been recognised by the UN Committed on Economic, Social and Cultural Rights and other international human rights bodies as an integral part of the human rights of Indigenous peoples.
The direct and cumulative impacts of this project will destroy our culture, in violation of our right to culture protected under international law. As described above, our land and everything on and in it has significance to us, is sacred to us, and we are connected to it. Our lands and waters are our culture. If this mine proceeds, it will cut huge open pits in our land, and include significant associated infrastructure. It will forever destroy vast swathes of our land, and is likely to devastate sites, objects, plants and animals that are of particular significance to us.
The impacts of the mine on our culture, and the potential violation of our internationally protected right to culture, are not addressed in the Draft EIS. This is despite the ToR requiring assessment of the project's impacts on Indigenous peoples and our cultural heritage (sections 5.11, 6), and requiring identification of species of cultural significance and involvement of Indigenous peoples in surveys to identify such species (section 5.3).
Prior to finalisation of the EIS, the proponent must consult with us to identify how the direct and cumulative impacts of the project will impact our culture and our internationally protected cultural rights, and must propose strategies to avoid, minimise or mitigate the impacts of the project on our culture. It must also involve us in surveys of our lands to identify animals, plants, sites and objects and landscape connections of cultural significance. It must use the resulting findings to revise the Draft EIS.

Please refer to response to issue 45.001.

Submitter Issue Number 45.009
Section 5.11.1 of the ToR requires preparation of a Cultural Heritage Management Plan ("CHMP"), which should be initiated during the EIS process. If the CHMP has not been approved when the EIS is submitted to the Coordinator-General, "details of the proposed steps and timeframes for finalising the CHMP must be provided.

Although the Draft EIS refers to the need for a CHMP and states that "the proponent has put in place with its consultant the process to initiate a CHMP," it does not provide any further details or identify the proposed steps and timeframes for finalising the CHMP (see Section 20, pages 1-2). In addition, our people have not yet been contacted through any proper channel by the proponent or the proponent's representative in relation to a CHMP" or other wording as relevant and accurate.
The proponent must commence preparation of a CHMP, including by formally negotiating with us about the development of the CHMP, and must amend the EIS to identify any issues in the negotiations and include details of proposed steps and timeframes for finalising the CHMP.

Please refer to response to issue 45.001.

Submitter Issue Number 45.010
Section 5.11.2 of the ToR requires that the EIS "identify areas covered by applications for native title claims…, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist. The EIS must also "identify the potential for native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes." The Draft EIS fails to address this requirement. At Section 5, page 7, it simply states that the project site includes land that may be subject to native title and is within our registered native title claim, and that "[t]he proponent will negotiate with the Wangan and Jagalingou People … in accordance with the requirements of the Native Title Act 1993." It does not even identify how much of the project will fall within our native title claim.
Accordingly, the Draft EIS fails to identify the potential for our native title rights and interests to be impacted, and does not address whether those impacts can be managed through the native title processes.
Prior to finalisation of the EIS, to comply with the specific requirements of the ToR, the proponent must revise the Draft EIS, including by identifying how our native title rights and interests will be impacted by the project and whether those impacts can be managed through the native title processes. In so doing, the proponent should consult with us to identify our views on the potential for managing the project's impacts on our native title rights and interests through native title processes.

Please refer to response to issue 45.001.

Submitter Issue Number 45.011
Section 5.2.1 of the ToR requires the EIS to describe the existing land uses in the area, the potential changes to those land uses that will result from the project including the impact on human activities in the area, and strategies to mitigate such impacts.
The Draft EIS fails to comply with these requirements of the ToR, because it does not address Indigenous use of the area, does not identify how the project will impact Indigenous use of the area, and does not identify strategies to mitigate such impacts (see Section 5).
Instead, Appendix N to the Draft EIS (Socio-Economic Impact Assessment Report) relies on

statements of a very small number of non-Indigenous landowners, most of whom do not reside at the project area, to conclude that "there is no contemporary use of the project site" by Indigenous peoples (pages 18, 46, 101, 102). These landowners cannot and do not speak for us, and we were never consulted about our use of the project area or the impacts that the project will cause to our use of the area. In any event, such a conclusion represents a failure to understand that, as Indigenous peoples, we use our traditional lands as the focal point of our spiritual and cultural lives – our lands are where we come from and they teach us who we are and how we should live– even when we are not present on the land.

While contemporary land use has been limited by tenure exclusion and historical dispersal of our people, our connection to country remains and we intend to exercise our rights in the future as our native title claim comes to fruition. The outcome of this EIS process and any mine approval will affect the ability of current and future Wangan & Jagalingou people to have an ongoing relationship with our ancestral lands arising from our intrinsic rights in country.

The project will harm this use. In our culture, the land and everything on and in it has a place and is connected to our law and culture, and we use our traditional lands to practice our culture. If this mine proceeds, it will destroy vast swathes of our land and everything on it, and we will be unable to use our land to practice our culture. By cutting open pits in our traditional lands, the project will change the topography, and in so doing will destroy our songlines, which describe the path through the landscape of our Dreaming totems and tell us how to move through our lands. We will never again be able to use the land to practice our culture. This matter should have been assessed in the Draft EIS.

Prior to finalisation of the EIS, to comply with the specific requirements of the ToR, the proponent must revise the Draft EIS including by identifying how our people intend to use the project area, how the project will impact that use, and how those impacts will be mitigated. In making this revision, the proponent must consult with and engage us to understand our use of the project area.

Please refer to response to issue 45.001.

Submitter Issue Number 45.012

Section 5.3 of the ToR requires a description of the nature conservation values that may be affected by the project and requires the proponent to, "[w]herever possible, seek the involvement of the local Indigenous community in conducting field observations and survey activities, to identify the traditional and contemporary Indigenous uses of species." In addition, section 5.3.1 of the ToR requires identification of sites that contain populations of "species of special cultural significance," and section 5.3.2 requires identification of any plant communities of cultural significance. The Draft EIS must identify measures to avoid, minimise or mitigate the impact of the project of such species.

The Draft EIS does not comply with these requirements of the ToR. First, our people were not involved in any field observations or survey activities or in identifying our use of species. Second, the Draft EIS states that "[n]o plant communities of cultural … significance" have been recorded on the project site (Section 9, page 7). Instead, the Draft EIS simply states that there "are no local Indigenous communities located near the project site" but that "extensive consultation will be undertaken with Indigenous stakeholders as part of the development of the Cultural Heritage Management Plan" (Section 30, page 37).

It is completely inaccurate to state that there is no flora or fauna of cultural significance on the project area. In our culture, the land and everything on and in it has a special place and is connected to our law and customs. Each member of our people has a specific animal and plant totem, which represent the original form of an animal or plant as it was in the dreaming period, and many places on our lands are associated with our dreaming totems. We cannot overstate the significance of our totems to us: they protect and maintain our social order, we cannot kill them, and they inform our land interests and decision-making.
(Submission issue continued on next row)

Please refer to response to issue 45.001.

Submitter Issue Number 45.013
(Issue continued from previous row)
The project involves clearing large amounts of native vegetation, which means it is likely to affect some matters of cultural significance. In addition, we note that the species listed under the EPBC Act that may be affected by the project include –
Lizards -- Yakka Skink; Ornamental Snake
Birds -- Magpie Goose; Fork-tailed Swift ; Cattle Egret ; Eastern Great Egret ; Red Goshawk : Latham's Snipe ; Squatter Pigeon (southern subspecies) ; Whitebellied Sea-Eagle ; Rainbow Bee-eater ; Star Finch (eastern) ; Black-throated Finch (white-rumped subspecies) : Australian Painted Snipe
Mammals -- Greater Bilby ; Koala
The threatened Flora Species on the Queensland Wildlife Online Database include – Salt Pipwort ; Blue Devil ; Waxy Cabbage Palm
It is also incorrect to state that there is no Indigenous community located near the project site. Members of our people, who are the Indigenous traditional owners of the project area, reside in the region including Emerald and Clermont.
In any event, such a statement represents a failure to understand that, as Indigenous peoples, our land and everything on and in it has significance to us, whether or not we reside locally. Further, as the proponent is aware that we are the traditional owners and registered native title claimants, it should have complied with section 5.3 of the ToR and involved us in identification of species that we use and/or that have cultural significance to us.
To comply with the specific requirements of the ToR, prior to finalisation of the EIS the proponent must conduct field observations and survey activities with our involvement to identify our use of species, it must engage with us to identify species of special cultural significance, and it must identify measures to avoid, minimise or mitigate the impact of the project on such species.

Please refer to response to issue 45.001.

Submitter Issue Number 45.014
Section 5.4 of the ToR requires the EIS to describe the existing environmental values of water that may be affected by the project, and assess the project's potential impacts on water resource environmental values. This must include an assessment of how the project will change the site and

regional water balances, including the usage of the surface water and aquifers. The EIS must also assess the cumulative impacts of this project with other existing and planned developments in the region, and propose avoidance, mitigation or remediation measures.
Our people use water in the area of the proposed project for a number of purposes, including for ceremonial purposes and to practise our culture. We are very concerned about the impact of this project on water resources in the region. One of our most sacred places is Doongmabulla Springs, located only 22 kilometres south of the mining area. We hold Doongmabulla Springs sacred as the starting point of our life. It is here that our dreaming totem, the *Mundunjudra* (also known as the Rainbow Serpent) travelled to form the shape of our land.
The Draft EIS has failed to acknowledge the vital cultural importance of Doongmabulla Springs, stating instead that the springs "could support significant cultural and environmental values" (Section 12, page 11).
(submission issue continued next row)

Please refer to response to issue 45.001.

Submitter Issue Number 45.015
(Issue continued from previous row)
In addition, we are particularly concerned that the Draft EIS has not accurately characterised and assessed the impacts of this project on water resources, and has instead taken only a very cursory look at impacts to water resources. For example, although the EIS concludes predicts that the mine will not impact the Doongmabulla Springs, this is based on the statement that Clematis Sandstone is the source aquifer for the springs (see Appendix I to Draft EIS, page 38).
However, the source of the Doongmabulla Springs was a matter of significant dispute in the expert evidence adduced under oath in the recent Carmichael litigation in the Land Court of Queensland *(Adani Mining Pty Ltd v Land Services of Coast and Country Inc.).*
In relation to cumulative impacts, the Draft EIS indicates that this mine could add between 1 metre to 50 metre to the drawdown of water predicted for the Carmichael mine (Appendix I, page 40). Given that the expert evidence presented in the Carmichael litigation in the Land Court indicated that the Carmichael mine could result in the Doongmabulla Springs drying up, it is particularly troubling that the Draft EIS dismisses concerns about cumulative impacts on the springs by simply stating that "the springs are beyond any zone of cumulative influence," without adequately justifying this conclusion (Appendix I, page 40).
To comply with the requirements of the ToR, prior to the finalisation of the EIS, the proponent must revise the Draft EIS to adequately justify its conclusion whether or not there will be direct or cumulative impacts on the Doongmabulla Springs and other water resources in the area, taking into account the significant disputes between the experts in the Carmichael litigation about the source of the Doongmabulla Springs and taking into account the vital cultural significance to us of the Springs and other water resources in the region. In so doing, the proponent should consult with us in relation to water resources of significance to us.

Please refer to response to issue 45.001.

Submitter Issue Number 45.016

Section 5.2.2 of the ToR requires the EIS to detail the scenic and landscape values of the area, the potential impacts of the project on landscape character and visual qualities of the area, and measures to mitigate adverse impacts.

As described throughout this submission, the project area overlays our traditional lands and waters. Our lands and waters are our culture and despoiling them ruins our relationship to our lands – we are connected to them – and we use our lands and waters for cultural purposes. However, the visual assessment in Section 17 of the Draft EIS does not consider our people and our use of the land, and the impacts that the mine will have on our landscape values. It takes no account of an Indigenous perspective.

To comply with the specific requirements of section 5.2.2 of the ToR, prior to the finalisation of the EIS the proponent must revise Section 17 of the Draft EIS to consider the landscape and scenic value of the project area to our people as traditional owners, the cultural value we place on visual amenity, how the project will harm our visual amenity, and measures that may mitigate those adverse impacts. In making such a revision, the proponent should consult with us to identify our views on these matters.

Please refer to response to issue 45.001.

PROJECT CHINA STONE
RESPONSE TO DATSIP SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

63 DATSIP SUBMISSION

Submitter Issue Number 63.001
DATSIMA has reviewed the Draft Environmental Impact Statement (EIS) for the China Stone Coal project and offers the following comments in relation to the source of the workforce and employment opportunities in particular for Aboriginal and Torres Strait Islander peoples.
It is our understanding that the intention of the Stone Coal Project was to utilise a FIFO business model to resourcing staff. This position was derived in a time when the operating on a business model was to source the workforce from SE Queensland - Brisbane, Sunshine Coast, Gold Coast and Cairns on a Fly In, Fly Out (FIFO) basis and this was reflected in the previous EIS.
DATSIP requests that this position be reviewed and the EIS amended to reflect the shift in the labour market away from the 'boom' period in the Townsville and Mackay regions in favour of targeting employment opportunities for local Aboriginal and Torres Strait Islanders.

The proponent proposes to utilise a non-resident, long-distance commuting workforce due to the remote location of the project site, the condition of the surrounding regional road network and the size of the workforce required for the project. These workforce travel arrangements are necessary, predominantly due to the remote location of the project site. There is no 'local' host community, in contrast to many southern Galilee Basin and Bowen Basin mines and/or mining projects which are located within proximity of established communities such as Moranbah, Blackwater and Emerald. The nearest sizeable population base to the project is Charters Towers which is located approximately 285 km by road (approximately 3-4 hours) from the project site. It is, therefore, not feasible for workers to commute to work at the project site via road on a daily basis, and thus it is necessary for the project to have a non-resident, long-distance commuting workforce.

The Labour Market Study undertaken for the draft EIS assessed a worst case labour market scenario i.e. a tight labour market in the 'boom' period. To clarify, the draft EIS assessed potential home base locations not only from the SEQ and Cairns Regions, but also from Townsville, Mackay, Fitzroy and Wide Bay Regions. As stated in Section 4.4.1 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), it was acknowledged that there had been a significant downturn in the coal mining industry since the Labour Market Study was completed and labour (particularly with mining experience) was now more available. In order to account for these and any future changing labour market conditions, the proponent has committed to reviewing the project's Labour Market Study prior to the commencement of construction of the project. It is considered unnecessary to conduct further evaluation of recent changes in the labour market as part of the draft EIS as any softening of the labour market will have the effect of reducing potential impacts i.e. labour draw, real wage increases etc.

As stated in Section 4.4.1 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), the proponent is committed to considering recruitment from the nearest regional centres including Clermont and Charters Towers. This recruitment would consider any suitably, qualified and experienced candidates including Aboriginal and Torres Strait Islanders. The proponent has also committed to developing an Indigenous Participation Plan in consultation with DATSIP and a broader Training and Skilling Program which will include strategies aimed at increasing Indigenous participation on the project and training initiatives targeting Indigenous people (Section 7.2.2 and 7.2.4 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N)).

Submitter Issue Number 63.002
DATSIP understands that the local Industry peak body is making representation to the company operating China Stone regarding the capacity for a local workforce to meet the workforce needs for project and is seeking to ensure an appropriate level of local housing be available to support an influx of workers.

Noted.

PROJECT CHINA STONE
RESPONSE TO SUBMITTER NUMBER 64 SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

64 SUBMISSION

Submitter Issue Number 64.001

My name is Neil Angus from Dawson Vale Station and I am writing this letter to you in regards to The China Stone Project currently underway on Hyde Park Station, South of Charters Towers.

Firstly I would like to say it is not my intention to stop the mine; however I have some concerns in relation to the underground water supply on our property Bingeringo, which joins the eastern side of Hyde Park.

Bingeringo relies on underground stream water for the majority of its water supply. I am concerned that as the mine progresses, the quantity of water will slowly diminish, putting our business at great risk and under unnecessary stress. It is for the above reasons I ask your company for some sort of security such as a 'make good agreement' to be put in place in the off chance of the underground water supply being affected by the operating mine in the coming future.

I would very much appreciate if you could either get into contact with myself, or provide me with the relevant contact details in order to discuss a strategy that we could work collaboratively on.

MacMines will have a general make-good requirement for any bores that are impacted by the mine. This requirement will come from the Water Licence that Macmines will need to obtain once the project is approved and prior to the commencement of any mining. In addition to this general requirement, based on the approval requirements for the Carmichael Project, they will also be required to enter into make-good agreements with the owners of all potentially unduly affected water bores. These agreements are required to include the specific monitoring and make-good requirements for a specific bore or other arrangements agreed with the bore owner. The agreements are required to be in place at least 5 years prior to the time a bore is predicted to be impacted by the mine (by the latest version of the groundwater model at the time). Based on the draft Environmental Impact Statement assessment there are no bores predicted to be significantly impacted during the 50 year mine life and based on a conservative assessment there are a number of bores that could be impacted post mining after the mine is decommissioned. This would mean that make good agreements for these bores would need to be in place prior to mine closure, assuming the bores are still expected to be impacted at that time, considering the 50 years of monitoring data that would be available to update the draw down predictions at that time.

In addition to formal make good agreements, mining companies typically monitor the closest private bores to the mine site as part of the mine groundwater monitoring program, with the agreement of the landholder. This monitoring also provides a mechanism to detect any adverse impacts on bores during mining operations and triggering of the make-good requirement.

PROJECT CHINA STONE
RESPONSE TO DEPARTMENT OF COMMUNITIES SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

65 DEPARTMENT OF COMMUNITIES SUBMISSION

Submitter Issue Number 65.001
DCCSDS commends the proponent on its commitment to making employment opportunities accessible to those groups traditionally under-represented in mining workforces; e.g. women, Aboriginal and Torres Strait Islander people and people with disability (p.18-16). The Proponent may also need to consider transport options within BIBO and FIFO to enable people with disability to access transport options en-route to the accommodation village and work facilities.

Noted. The proponent is an equal opportunity employer and recognises the issue raised in relation to ensuring appropriate transport options for people with a disability.

Submitter Issue Number 65.002
The Proponent is expecting to employ predominantly a non-resident long distance commuting workforce, and will re-evaluate the feasibility of bus-in/bus-out from Clermont and Charters Towers in order to increase the employment opportunities for residents in the Local Area. This is to be encouraged: there is definite interest in Mackay, Clermont and Charters Towers in being local/regional sources for labour, mining services, training of staff, procurement and infrastructure to support the development (pages 18-13 to 18-15).

Noted.

Submitter Issue Number 65.003
Peak operations employment at the China Stone Coal mine will be 3,391 workers. With the Carmichael Coal Mine which is intended to proceed in a similar timeframe but slightly ahead of China Stone, the combined non-residential workforce at peak will be 7,191 workers. With the South Galilee projects, the combined non-residential workforces number in excess of 14,000 workers. This is a lot of people – with families, they represent a probable population of some 30,000 to 40,000, spread across various communities from Cairns to South East Queensland. The possibility exists for a substantive percentage of these workers/families to be living in one location – e.g. Cairns or Wide Bay which currently have higher numbers of unemployed people, or Mackay/Townsville/Rockhampton if the current mining downturn persists until the commencement of these mines.

Noted.

Submitter Issue Number 65.004

The EIS is cognisant of this possible social impact (page 18-17): "Where significant project induced permanent resident population growth is identified, the Proponent will support the affected local government in responding to any demand generated by the population." The EIS does not state how to differentiate the impact of China Stone separate from other projects, nor how the support will be provided – which is understandable at the present time. The Coordinator-General may need to write into its report some way to substantiate and enforce this undertaking, and to share the provision of support to local government, given its cumulative nature across numerous projects.

It is anticipated the proponent will be able to determine potential project induced population growth in home base locations from human resources records of employee residential addresses. This will assist in informing impact management, where appropriate.

As the submitter correctly confirms, it is not currently possible to predict the impact of the project in home base locations or the way in which support will be provided, as this will be driven by the level and type of impacts. However, as stated in Section 6.2.4 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), the proponent has committed to monitoring potential impacts and engaging with local governments in the home base locations regarding project labour sourcing strategies in order to address potential impacts, should they arise.



PROJECT CHINA STONE

Attachment B Responses to Non-specific Submissions

PROJECT CHINA STONE
RESPONSE TO NON-SPECIFIC SUBMISSIONS ON THE DRAFT EIS
for
MacMines Austasia Pty Ltd

1. INTRODUCTION

This attachment to the Supplement to the draft Environmental Impact Statement (EIS) provides the proponent's response to non-specific submissions that were received for Project China Stone. Submissions were considered to be non-specific if they did not raise any specific issues or questions directly related to the draft EIS or were pro-forma submissions. Pro-forma submissions typically raised generic issues and discussed the personal opinions of stakeholders who are philosophically opposed to coal mining.

1.1 RESPONSE TO NON-SPECIFIC SUBMISSIONS

A number of submissions were received on the project that did not raise any specific issues or questions directly related to the project or the draft EIS. These were from Government agencies and individuals.

Submissions from the following submitters did not raise any specific issues or, in some cases, confirmed they did not have any comments on the project:

- Mackay Regional Council (Submitter 26);
- Department of Education and Training (Submitter 30);
- Department of State Development – Business Solutions and Partnerships (Submitter 3a);
- Department of State Development – Major Projects Office (Submitter 3b);
- Department of Housing and Public Works – Government Employee Housing (Submitter 5);
- Department of Housing and Public Works – Housing Services (Submitter 15);
- Department of Tourism, Major Events, Small Business and the Commonwealth Games (Submitter 10);
- Department of Energy and Water Supply (Submitter 62); and
- Sunwater (Submitter 34).

The proponent appreciates the submitter lodging a submission to confirm they have no comments on the project.

Submissions from the following individuals also did not raise any specific issues about the project or the draft EIS:

- Private submitter (Submitter 1);
- Private submitter (Submitter 4);

- Private submitter (Submitter 6);
- Private submitter (Submitter 19);
- Private submitter (Submitter 53);
- Private submitter (Submitter 55);
- Private submitter (Submitter 56); and
- Private submitter (Submitter 57).

The proponent takes note of these submitter's opinions and recognises that the approval of coal mining development in Queensland is the responsibility of the State and Federal Governments.

1.2 RESPONSE TO PRO-FORMA SUBMISSIONS

A number of other submissions were received on the project that were considered to be pro-forma or replica submissions. These submissions raised the same issues about the project, using the very similar wording. These included submissions from the following organisations and individuals:

- North Queensland Conservation Council (Submitter 21);
- Correct Planning and Consultation for Mayfield Group (Submitter 22);
- Queensland Conservation Council (Submitter 31);
- Australian Marine Conservation Society (Submitter 32);
- Greenpeace Australia Pacific (Submitter 33);
- Private submitter (Submitter 13);
- Private submitter (Submitter 14);
- Private submitter (Submitter 47);
- Private submitter (Submitter 48);
- Private submitter (Submitter 49);
- Private submitter (Submitter 50);
- Private submitter (Submitter 51);
- Private submitter (Submitter 52);
- Private submitter (Submitter 54);
- Private submitter (Submitter 58);
- Private submitter (Submitter 60); and
- Private submitter (Submitter 61).

While some pro-forma submissions provided more detail than others, they all state there has been "*inadequate assessment of, and will be unacceptable impacts, on the following:*

- *Groundwater;*
- *Biodiversity;*
- *Climate change;*
- *Great Barrier Reef;*

- *Economics;*
- *Social values;*
- *Cumulative impacts; and*
- *Public interest".*

The following collective responses have been provided to the issues raised in the pro-forma submissions. The submitter issues presented in the boxes are the most extensive provided in any of the individual pro-forma submissions. In summary, the proponent takes note of these submitter's opinions and recognises that the approval of coal mining development in Queensland is the responsibility of the State and Federal Governments.

Pro-forma Submitter Issue: Groundwater

1) *The groundwater modelling and assessment of impacts in the EIS is inadequate and does not allow for a proper consideration of the likely and potential impacts of the Project on groundwater, and related surface water features and biota.*
2) *To extent the groundwater impacts have been adequately assessed they represent unacceptable adverse impacts. Examples of the inadequacy of assessment and unacceptability of impacts include, but are not limited to, the following:*
   a) *There are a number of concerns with the numerical modelling on which the groundwater assessment is based, such as:*
      i) *the calibration and sensitivity analysis undertaken;*
      ii) *the parameters applied in the model;*
      iii) *low recharge rates; and*
      iv) *an inaccurate conceptual model,*
   b) *The EIS recognises that subsidence from the longwall mining will cause "connective cracking" the Clematis Sandstone, an aquifer of the Great Artesian Basin (GAB), leading to permanent 'take' of groundwater from the GAB, yet the impacts on the GAB are dismissed as "inconsequential" or "negligible";*
   c) *There is no reliable or reasonable basis for the assertion that the Project will have "no impacts on the [Doongmabulla] springs".*

The submitter's opinions on the assessment of groundwater impacts are noted. The proponent disagrees with these opinions as the assessments were undertaken by appropriately qualified and experienced hydrogeologists, in accordance with the EIS Terms of Reference (TOR) requirements and in line with best practice environmental assessment.

The submitter's generic issues relate to the project's groundwater model, the project's potential for impacts on the Great Artesian Basin and the project's potential for impacts on the Doongmabulla Springs. Additional information has been provided in the following sections of the Supplement regarding related, more specific issues:

- Section 4.2 – Response to Common Issues.

- Attachment A – Individual Responses to Submissions – refer to Department of Natural Resources and Mines (Submitter 41) response.
- Attachment C – Response to Independent Expert Scientific Committee (IESC) Advice.
- Attachment D – Additional Information on Groundwater.

Pro-forma Submitter Issue: Biodiversity

1) *The EIS does not include an adequate assessment of the impact on threatened species and, where those assessments are conducted, demonstrates an unacceptable adverse impact on those species. For example:*
   a) *The EIS identifies the site as providing habitat for the threatened Black-throated Finch and Squatter Pigeon but does not undertake sufficient targeted survey effort to accurately determine the abundance of these species, and therefore the extent of any likely impacts;*
   b) *The limited survey periods have been insufficient to identify the full range of terrestrial and aquatic species that may be impacted by the Project;*
   c) *The EIS does not include the Biodiversity Offset Strategy which makes it impossible to consider the adequacy of likely offset locations, appropriateness of any management actions or sufficiency of any monitoring.*

The submitter's opinions on the assessment of threatened species are noted. The proponent disagrees with these opinions as the assessments were undertaken by appropriately qualified and experienced ecologists, in accordance with the EIS TOR requirements and in line with appropriate survey methodologies. In instances where significant, residual impacts on threatened species are predicted, biodiversity offsets are proposed to be provided. This is a standard approach, consistent with the requirements of Queensland and Commonwealth legislation.

A response is also provided to the submitter's specific issues, as follows:

a) Surveys undertaken for the draft EIS confirmed the presence of Black-throated Finch and Squatter Pigeon on the site and were undertaken in accordance with relevant Government guidelines. The submitter correctly advises that the draft EIS has also confirmed that the site provides habitat for these species. As such, the proponent has proposed mitigation and management measures, including the provision of biodiversity offsets, in accordance with the Department of the Environment and Energy (DoEE) and the Department of Environment and Heritage Protection (EHP) offset requirements, to address the projects potential impacts on both of these species. Additional surveys of the abundance of these species would not alter the conclusions of the impact assessment or change the management measures proposed to be adopted. Attachment F – Additional Information on Ecology also provides a revised assessment of the project's predicted disturbance of Black-throated Finch and Squatter Pigeon habitat. This revised assessment was conducted in consultation with DoEE and EHP.

b) Ecological field surveys were undertaken for the draft EIS over multiple seasons. Surveys were undertaken in accordance with the EIS TOR for the project and relevant Government guidelines that were available at the time the surveys were undertaken. This is discussed in Sections 3.2.5, 3.2.6 and 3.2.7 of the draft EIS Terrestrial Ecology Report (Appendix F). Surveys were also supplemented by results from the desktop assessment which included searches of relevant Government mapping and databases, and utilised results from the Carmichael Coal Mine & Rail Project (CCM&RP). This approach provides a high degree of confidence in the mapping of vegetation communities and fauna habitats. In addition, a precautionary approach has been applied to assume the presence of some threatened fauna species where the presence of suitable habitat was recorded but the species itself was not recorded. The Australian Painted Snipe is an example of a species that was assessed in this way.

c) The Biodiversity Offset Strategy contains commercial-in-confidence information regarding potential offset properties that is not suitable to be publicly distributed. However, this information has been made available to the relevant regulators who have responsibility for the review, assessment and approval of the strategy. A redacted version of the draft EIS Biodiversity Offset Strategy (Appendix H) is also provided in Attachment J.

Additional information has also been provided in the following sections of the Supplement regarding these issues:

- Section 4.2 – Response to Common Issues.
- Attachment A – Individual Responses to Submissions – refer to DoEE (Submitter 42), EHP (Submitter 24) and Black-throated Finch Recovery Team (Submitter 12) responses.
- Attachment C – Response to IESC Advice.
- Attachment F – Additional Information on Ecology.

Pro-forma Submitter Issue: Climate Change

a) *The EIS does not include an adequate assessment of the climate change impacts of the Project. A proper assessment of the Project's true contribution to climate change would provide strong grounds for refusal. For example, the EIS does not assess the emissions from the transport and burning of the coal produced by the Project. The 38 million tonnes per annum (mpta) of product coal will produce approximately 90 mtpa in CO2-e once burnt which will cumulatively total about 4.5 billion tonnes CO2-e over the 50 year mine life. These emissions are equivalent to about 18 million cars annually and, over the life of the mine, would consume approximately 0.7% of the remaining carbon budget for the world to likely stay below 2°C warming.*

b) *The Queensland Government has said "Climate change threatens to undermine Queensland and Australia's food security. Production from primary industries is projected to decline by 2030 over much of eastern Australia due to increased drought, reduced water resources and higher temperatures". The Climate Commission also predicts reduced water availability and increased frequency of droughts, affecting agricultural production as a result of climate change.*

c) *Climate change is also a threatening process in many species recovery plans, such as for the Painted Snipe, but the EIS fails to consider the Project's contribution to that threatening process for those species.*

1) The EIS TOR do not require an "*assessment of the climate change impacts of the project*" as suggested to be required by the submitter. In accordance with the relevant climate aspects of the EIS TOR, the draft EIS has provided an assessment of climatic conditions that may affect the management of the project (Section 14.8 of the draft EIS) and has provided an annualised inventory of greenhouse gas emissions over the life of the mine (Section 15.9 of the draft EIS). The submitter also refers to the EIS lacking an assessment of the "*emissions from the transport and burning of the coal produced by the Project".* These emissions are known as Scope 3 emissions. The EIS TOR does not require Scope 3 emissions to be assessed. Furthermore, precedent has been set by the Queensland Supreme Court and Queensland Land Court that Scope 3 emissions do not fall within the operations carried out on a mining lease and should not be taken into account as impacting the public right and interest (refer to rulings on the judicial review of the Alpha Coal Mine (Coast and Country Association of Queensland v Smith & Anor; Coast and Country Association of Queensland Inc v Minister for Environment and Heritage Protection & ORs [2015] QSC 260) and the Land Court hearings for the Wandoan Coal Project (Xstrata Coal Queensland Pty Ltd & Ors v. Friends of the Earth - Brisbane Co-Op Ltd (No 2) [2012] QLC 67).
2) The submitter's quote regarding climate change impacts on agricultural production is noted.
3) It is noted a recovery plan has not been published for the Australian Painted Snipe, although the SPRAT profile acknowledges the need for one. The conservation advice for the species raises climate change as a potential threat. However, the threat is in the context of potential reduced rainfall and runoff in the Murray Darling Basin in the future. It should be noted that the project is not in proximity to the Murray Darling Basin. Please refer to issue 1 in relation to the assessment of climate change impacts of the project.

Pro-forma Submitter Issue: Great Barrier Reef

The EIS does not adequately consider the impacts of the Project on the Great Barrier Reef either from port development and shipping, or from contributions to climate change. The World Heritage Committee recently stated that "climate change, poor water quality and impacts from coastal development are major threats to the [Reef's] health," and indicated concerns about new port development and capital dredging for the expansion of existing port facilities. The Project presents a significant risk to the values of the Great Barrier Reef and these impacts need to be fully quantified and considered.

The Great Barrier Reef World Heritage Area (GBRWHA) is located approximately 280 km from the project site by direct line, and approximately 410 km downstream of the project site, following the line of the downstream waterways. Due to the distance from the project site to the GBRWHA, it is not feasible that the project could have a direct impact on the GBRWHA. Potential project impacts on the GBRWHA were considered and assessed as part of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral. The referral decision from DoEE did not

include the GBRWHA as one of the controlling provisions for the project. This means, the DoEE did not consider that the project would have a potential significant impact on the GBRWHA.

As outlined in Section 4.13 of the draft EIS, the scope of the draft EIS is limited to the mine site activities and does not include off-lease infrastructure that will be required for the project, such as port capacity. These aspects will be subject to separate environmental impact assessment and approval which will include assessment of potential impacts on the Great Barrier Reef from port development and shipping.

Pro-forma Submitter Issue: Economics

The economic assessment which forms part of the EIS is not suitable to properly inform assessment of the true costs and benefits of the project. The deficiencies of the economic assessment include, but are not limited to, the following:

a) An assumed valued of coal at over $93 per tonne well above the Federal Treasury's long term forecast of $80 per tonne. The current value of thermal coal is around $50 per tonne and unlikely to rise in the foreseeable future.

b) No attempt to conduct uncertainty analysis or risk assessment in the face of a rapidly changing energy market and policy environment.

c) No attempt to value environmental or social costs, such as greenhouse gas emissions, in a manner that can be compared with economic benefits.

d) No attempt to value economic impacts associated with the contribution of the coal from the project to further depress coal prices by selling into an already oversupplied market.

e) *No attempt to assess the viability of the project to ensure economic utilisation of the coal resource and avoidance of a stranded asset.*

The submitter's opinions on the assessment of economic impacts are noted. The proponent disagrees with these opinions as the assessment was undertaken by an appropriately qualified and experienced economist, in accordance with the EIS TOR requirements and in line with sound economic impact assessment methodology. The economic assessment completed is suitable to describe the economic impacts and benefits of the project, as required by the EIS TOR.

A response is also provided to the submitter's specific queries, as follows:

a) There are a wide range of complex factors that can influence the global coal market, which make long term forecasting of cyclical pricing (and demand) difficult to accurately predict. For this reason, the draft EIS assessment assumed a value for the income from the sale of coal that was considered to be representative of the fluctuations in the coal price that would be expected to occur over the 50 year life of the mine. As such, the assumed value was not related to the price of coal in the year the modelling was conducted, nor was it intended to be representative of the value of coal at the time the draft EIS was publicly exhibited. As an example of this fluctuation, over the past 5 years, the thermal coal monthly spot price has varied from AUD$126 (per metric ton) in October 2011 to AUD$131 in October 2016, with a low of AUD$71 in April 2016 (IndexMundi, 2016). This is notably higher than the submitters quoted

thermal coal price of '$50 per tonne' which is inaccurately predicted by the submitter as "unlikely to rise in the foreseeable future". This typical variation and the recent return to prices above AUD$100 per ton, supports the basis for the economic assessment in the draft EIS to select a representative coal price over the life of the project, rather than using the coal price that was current at a particular point in time.

b) The proponent has undertaken rigorous internal analysis associated with the feasibility of the project which included analysis of long-term need for the project and risk assessments. The proponent is confident in the future demand for thermal coal.

c) The submitter suggests that an assessment known as a cost-benefit analysis should have been included as part of the draft EIS. This type of analysis is not required by the EIS TOR and precedent set in recent court cases for Galilee Basin projects has confirmed that this type of analysis is not a statutory requirement under either the *Mineral Resources Act 1989* or *Environmental Protection Act 1994* (refer to rulings on the judicial review of the Alpha Coal Mine (Coast and Country Association of Queensland v Smith & Anor; Coast and Country Association of Queensland Inc v Minister for Environment and Heritage Protection & ORs [2015] QSC 260).

d) An assessment of the coal market is not a requirement of the EIS TOR, nor is it appropriate to be included in an environmental assessment. As discussed in response to point a) the status of the coal market has changed significantly in 2016.

e) An assessment of the economic viability of the project is not a requirement of the EIS TOR, nor is it appropriate to be included in an environmental assessment. The Office of the Coordinator General has advised that:

- The Coordinator-General assesses the proponent of a project to determine if they have the ability to undertake the project when making a declaration as a Coordinated Project.
- The government will also assess the proponent prior to issuing an Environmental Authority to ensure the proponent has the financial ability (through a financial assurance and guarantee) to undertake the mitigation measures to avoid environmental harm and to rehabilitate the site.
- The government will also assess the proponent prior to issuing a Mining Lease to ensure they have the ability to undertake the project and develop the resource.
- The Mining Lease can be cancelled if the proponent does not utilise the coal resource in the timeframe proposed in the EIS and conditioned in the government approvals.

Pro-forma Submitter Issue: Social Impacts

The EIS does not adequately consider the social impact from the proposed project. For example:

a) The EIS fails to comply with the terms of reference requirement to consider labour supply issues and strategies for international labour markets.

b) The Social Impact Assessment (SIA) fails to consider impacts beyond the mine site including the effect of mine closure on local communities;

c) The SIA does not sufficiently engage with indigenous cultural values due to the small number of landholders consulted regarding cultural values of the area;

d) The SIA assumes the construction of the Carmichael project and therefore does not

adequately consider the impacts of the Project in isolation.

e) *The SIA acknowledges the FIFO employment model but does not provide recommendations to manage the problems that will create.*

The submitter's opinions on the assessment of social impacts are noted. The proponent disagrees with these opinions as the assessments were undertaken by an appropriately qualified and experienced social planner, in accordance with the EIS TOR requirements and in line with appropriate social impact assessment methodologies.

A response is also provided to the submitter's generic queries, as follows:

a) The draft EIS includes a comprehensive Labour Market Study. As stated in Section 4.4.1 of the draft EIS Socio-Economic Impact Assessment (SIA) Report (Appendix N), the proponent intends to recruit available domestic labour for the project workforce. Alternative sources of the required workforce, such as personnel from overseas, will be considered only where the Australian labour market cannot meet the needs of the project and it is not possible to address shortages through training programs. The proponent does not currently intend on recruiting overseas labour.
b) Consistent with advice from the Department of State Development (DSD), the SIA considers the impacts associated with the first 20 years of operation, acknowledging the limitations associated with predicting social impacts beyond this period. Although mine closure was not considered in detail in the SIA, the social aspects of mine closure will be addressed in social impact management planning conducted during the 50 year mine life and as part of standard progressive mine closure planning over that time.
c) As documented in Section 3 of the draft EIS, <u>all</u> landholders on properties within and adjacent to the project site were consulted as part of the preparation of the draft EIS. As noted in Section 3.3 of the draft EIS SIA Report (Appendix N) this consultation included discussion of the potential cultural use of the area by Aboriginal and Torres Strait Islander (ATSI) people. Section 2 of the Supplement also includes a summary of the consultation that was conducted to communicate the results of the draft EIS to stakeholders. This included an offer to consult with the legal representatives of the Traditional Owners, which was declined.
d) Due to the remote location of the CCM&RP and Project China Stone and the considerable off-lease infrastructure that is required for both projects (such as the rail line to the Port of Abbot Point), there are inter-dependencies between the projects which are financially attractive. For the purposes of the assessment of cumulative impacts, the SIA has, therefore, assumed the CCM&RP would be operating at the same time as Project China Stone and has recognised the commitments of the CCM&RP proponent in the discussion of management of social impacts that are common to both projects. However, the proponent recognises that there are significant external factors that create uncertainty for the timing of the development of both projects. In the event Project China Stone proceeds in the absence of the CCM&RP, the proponent will continue to implement the commitments made in the draft EIS and would be solely responsible for the delivery of mitigation and management measures to address the environmental impacts of the project that are identified in the draft EIS.

e) The draft EIS SIA Report (Appendix N) includes management measures that are specifically designed to address potential social impacts arising from a long-distance commuting workforce. These measures are discussed throughout Sections 6 and 7 of the draft EIS SIA Report (Appendix N), and include, but are not limited to, the Employee Wellbeing Plan, Project Servicing Strategy and the Stakeholder Communication Strategy.

Pro-forma Submitter Issue: Cumulative Impacts
The EIS does not adequately consider the cumulative impacts of the Project, together with other projects proposed in the region, including, but not limited to, impacts on groundwater, climate change, the Great Barrier Reef, or threatened species such as the Painted Snipe.

Cumulative impacts for the project are described in Section 23 of the draft EIS. Due to the remote location of the project site, there are no significant industrial developments that currently exist in the region that have the potential to have cumulatively interacted with the predicted impacts of the project. The assessment of cumulative impacts undertaken for the draft EIS was, therefore, limited to potential impacts with the CCM&RP and the associated Moray Power Project. Both of these projects are approved, but yet to commence construction.

In response to the submitter's specific queries, cumulative impacts are described in the draft EIS in relation to groundwater in Section 23.6, and threatened species specifically including the Painted Snipe in Section 23.5.2. The EIS TOR do not require an assessment of the project's impacts (and therefore any subsequent cumulative impacts) on the Great Barrier Reef and climate change, or an assessment of cumulative impacts of the climate aspects that are provided in the draft EIS. Please also refer to the response to the submitter's previous issues in relation to the Great Barrier Reef and climate change.

Pro-forma Submitter Issue: Public Interest
The consideration of public interest requires the weighing of pros and cons for the Project. In my submission the extent of the demonstrated and potential impacts outweighs the potential benefits of the project and warrant refusal in this instance.

The submitter's opinions regarding the public interest are noted. The draft EIS has described the environmental impacts along with the economic and social benefits that are predicted from the project. These factors will be considered by the Federal and State Governments in their assessment of the draft EIS



PROJECT CHINA STONE

Attachment C Responses to IESC Advice

PROJECT CHINA STONE
RESPONSE TO IESC SUBMISSION ON DRAFT EIS
for
MacMines Austasia Pty Ltd

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67 IESC SUBMISSION

Context

The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the IESC) was requested by the Australian Government Department of the Environment and the Queensland Office of the Coordinator-General to provide advice on the MacMines Austasia's China Stone Coal project in Queensland.

This advice draws upon aspects of information in the draft Environmental Impact Statement (EIS) together with the expert deliberations of the IESC. The project documentation and information accessed by the IESC are listed in the source documentation at the end of this advice.

The China Stone Coal Project is a new open cut and underground coal mine, located in Central Queensland, approximately 270 km southwest of Townsville and 300 km west of Mackay, in the northern Galilee Basin. The project will target the A, B, C and D coal seams of the Permian Betts Creek Beds. The proposed project will cover an area of approximately 20,000 ha and extract up to 38 million tonnes per year of product (thermal) coal, over the 50-year life of the project. Associated proposed infrastructure includes: workshop/buildings; coal covered storage areas and access roads; dragline and equipment laydown areas; coal handling and preparation plants; tailings dam; waste and water management infrastructure, dams and treatment facilities; conveyors, rail loop and train-loading facilities; and a power station.

Key potential impacts

Key potential impacts include drawdown of groundwater and reduced pressure and flow within Great Artesian Basin (GAB) aquifers (i.e. the Clematis Sandstone), and subsequent reduced supply to the Doongmabulla Springs Complex and private bores. Potential subsidence impacts include alteration of surface features including development of ground surface depressions, enhancement of inter-aquifer connectivity, and cracking of the bed of the Northern Seasonal Wetland. Potential hydrological and ecological impacts may arise from mine water discharges. There is uncertainty regarding the potential impacts both from this mine and cumulatively from the adjacent Carmichael Coal Mine (CCM) project to groundwater dependent ecosystems (GDEs) including the Doongmabulla Springs Complex. The proposed project and the CCM project both require a large external water supply (up to approximately 12 GL/year each) however the potential impacts of sourcing this supply on surface water or groundwater resources have not been assessed.

The IESC recognises the proposed project is a greenfield site with a lack of representative spatial, temporal and hydrostratigraphic variation in data available for the area. This lack of data results in uncertainty in the hydrogeological conceptualisation and subsequent numerical groundwater modelling predictions. This uncertainty leads to low confidence in the potential impacts predicted by the proponent, and makes tenous any comment on the appropriateness of mitigation and management measures. The advice, therefore, necessarily identifies further information and data that is needed to address the questions raised.

Assessment against information guidelines

The IESC, consistent with its Information Guidelines (IESC, 2014), has considered whether the proposed project assessment has used the following:

Relevant data and information: key conclusions

The proponent's groundwater monitoring data was collected over a limited timeframe, does not provide a regional context for, and is inadequate to assess spatial and temporal variability of groundwater flows,. The data provided is insufficient to confirm the presence and hydrogeological influences of a posited fault in the proposed Northern underground mining area. Available data from shallow bores indicate that the majority of the Clematis Sandstone is dry or unsaturated in much of the project area, which limits prediction of impacts. Ecological attributes onsite and offsite were inadequately assessed, with survey locations only visited on one occasion, or surveys only being undertaken at the beginning and end of the dry season. Baseline surface water quality and quantity data is insufficient to establish environmental management objectives for the project.

Application of appropriate methodologies: key conclusions

The groundwater model is classified as Class 1 (Barnett, et al., 2012), which is inappropriate for an impact and assessment model at the project scale. There was no transient calibration, uncertainty analysis or peer review undertaken. Sensitivity analyses were undertaken on the numerical groundwater model to determine the influence of the fault and potential subsidence impacts. However, an uncertainty analysis was not undertaken on the numerical groundwater model predictions. Subsidence modelling used an acceptable empirical method. The fault was not considered as part of predicting subsidence impacts and no justification of the extent of connective cracking above the dual seam longwall mining area was provided. A simplistic cumulative impact assessment of the CCM project and China Stone project was undertaken by superimposing maximum predicted groundwater drawdown contours for each project on a map and not through appropriate calculations. Other reasonably foreseeable coal projects, such as Hyde Park Coal Project, were not considered. The full extent of potential cumulative impacts has not been considered, including to the Doongmabulla Springs Complex and to sources of water supply for the mines.

Reasonable values and parameters in calculations: key conclusions

Modelled hydrograph data presented provides consistently poor matches to observed head levels. For surface flows, the Australian Water Balance Model runoff modelling parameters were appropriately selected based on experience and a review of comparable mining operations in central Queensland and the Galilee Basin. Water quality guidelines (ANZECC & ARMCANZ, 2000) are incorrectly quoted as mg/L rather than µg/L (EIS Appendix G, Table D1), leading to incorrect conclusions about potential exceedences within the project site.

67.1 QUESTION 1

What are the key uncertainties, risks and potential impacts on water resources? Are there additional measures and commitments required to adequately mitigate, monitor and manage potential risks and impacts to water resources?

IESC Response

1. There are numerous uncertainties associated with this project due to insufficient hydrogeological, hydrological and ecological data presented both within and surrounding the project area. This lack of data results in uncertainty in the hydrogeological conceptualisation and subsequent numerical groundwater modelling predictions. This uncertainty leads to a lack of confidence in the potential impacts predicted by the proponent, and makes tenuous any comment on the appropriateness of mitigation and management measures.

The draft EIS presents a comprehensive assessment of the potential impacts on water resources. This assessment is based upon extensive bodies of hydrogeological, hydrological and ecological data. This data is presented in the draft EIS relevant studies draws upon exhaustive desk study and field investigations.

In addition, the draft EIS groundwater study specifically incorporated all relevant geological and groundwater information collected as part of the Carmichael Coal Project EIS, SEIS and AEIS groundwater studies. The compiled groundwater dataset is discussed in Section 6 of the draft EIS Groundwater Report (Appendix I). The draft EIS groundwater study therefore presents the most comprehensive groundwater dataset yet compiled in this part of the Galilee Basin.

This dataset represents a substantial body of data upon which to develop a conceptual understanding of the groundwater regime that captures the key behaviour and characteristics of the real-world groundwater regime. The submission does not provide any specific uncertainties or any details that would further the conceptual understanding of the groundwater regime developed from the available data.

This conceptual understanding was used to inform the numerical modelling approach. The groundwater modelling predictions presented in the draft EIS have been made following a rigorous calibration process. The numerical modelling predictions therefore provide a suitable basis for assessment of potential impacts associated with the project.

The proponent has also collected an additional 23 months of 6 hourly groundwater monitoring data from dataloggers installed at the project site. This additional data is presented in Attachment D – Additional Information on Groundwater. The proponent has therefore collected 37 months of groundwater monitoring data from the site over the period December 2012 and January 2016.

The additional groundwater monitoring data is consistent with the data presented in the draft EIS Groundwater Report (Appendix I), and therefore provides further support to the conceptual and

numerical groundwater models presented in the draft EIS and validates the draft EIS groundwater impact assessment.

The extensive body of ecological and hydrological data available does not contribute to any material level of uncertainty in the groundwater modelling predictions.

2. The key uncertainties arise from the lack of monitoring data to provide any meaningful interpretation of baseline conditions. These impact on:

a. the appropriateness of the hydrogeological conceptualisation (including the fault and associated strata in the Northern underground mining area and the relationship between surface water and groundwater systems, such as the Doongmabulla Springs Complex and Lake Buchanan); and
b. the reliability of the numerical groundwater model and its predicted impacts.

Please refer to the response to IESC Response 1.

3. No environmental risk assessment was undertaken for water resources or water-related assets. The key uncertainties above lead to the risk that the potential impacts on water resources have not been identified. For example, there is the risk that cumulative depressurisation effects may extend to key water-related assets, such as the Doongmabulla Springs Complex.

A detailed environmental risk assessment was undertaken in relation to the potential environmental impacts of the project on water resources and water related assets. These are presented in the draft EIS as follows:

- Section 12.4 presents the assessment of groundwater resources and groundwater water-related assets;
- Section 13.6 presents the assessment of surface water resources and surface water-related assets; and
- Sections 9 and 10 present the assessment of terrestrial and aquatic ecological impacts related to water resources and water-related assets.

The draft EIS specifically considered the risks of cumulative groundwater depressurisation on all relevant water-related assets, including the Doongmabulla Springs Complex. The findings are presented in Section 12.4.11 of the draft EIS and Section 8.6 of the draft EIS Groundwater Report (Appendix I). The Doongmabulla Springs Complex lies 22 km from the project site and the project is not predicted to contribute to cumulative groundwater depressurisation or associated impacts at this location.

As discussed in the response to IESC Response 1, the additional groundwater monitoring data presented in Attachment D – Additional Information on Groundwater is consistent with the data presented in the draft EIS Groundwater Report (Appendix I), provides further support to the

conceptual and numerical groundwater models presented in the draft EIS and validates the draft EIS groundwater impact assessment.

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The submission does not identify any other specific impacts that have not been comprehensively addressed in the draft EIS.

4. As a consequence a number of key potential impacts are identified but are not sufficiently quantified. These include:

a. drawdown of groundwater and reduced pressure and flow within GAB aquifers (i.e. the Clematis Sandstone) and reduced supply to private bores;

b. alteration of surface features including development of ground surface depressions, expansion of inter-aquifer connectivity, and cracking of the bed of the Northern Seasonal Wetland from subsidence;

c. changes to the flow regime in Tomahawk Creek and North Creek catchments;

d. mine water releases with contaminants potentially exceeding guidelines for the protection of aquatic ecosystems across large floodplain areas downstream of the project area; and

e. potential cumulative impacts to the Belyando River catchment and GDEs including the Doongmabulla Springs Complex.

A complete assessment of the potential impacts has been presented in the draft EIS. In relation to the key potential impacts listed:

4a) The extent and magnitude of depressurisation of the relevant GAB aquifers (including the Clematis Sandstone) has been quantified using a numerical groundwater model. The results are presented in Section 8 of the draft EIS Groundwater Report (Appendix I). The potential for impacts to water supply bores due to groundwater drawdown are discussed in Section 8 of the draft EIS Groundwater Report (Appendix I) and quantified in Table 6 of the draft EIS Groundwater Report (Appendix I). The additional groundwater monitoring data presented in Attachment D – Additional Information on Groundwater validates this assessment.

4b) The potential impacts of subsidence including alteration of surface water features are addressed in Sections 10 and 13 of the draft EIS.

The potential effects of connective subsidence cracking have been accounted for in the groundwater modelling predictions presented in the draft EIS Groundwater Report (Appendix I).

Section 10 of the draft EIS addresses the potential impacts on the Northern Seasonal Wetland, including cracking of the bed of the wetland. Refer to the response to IESC Response 16b for additional discussion on this issue.

4c) Hydraulic modelling has been undertaken to quantify the effects of mining on the flow regime of North Creek and Tomahawk Creek during the operations phase and post mining. These results are presented in the draft EIS Open Cut Mine Drainage Report (Appendix J).

This modelling assessment considered the potential changes to drainage and flooding in these creeks during a range of flow events.

As discussed in Section 13.6.3 of the draft EIS, the modelling results show that with the application of erosion management measures the predicted changes in the flow regime are unlikely to result in significant flood or drainage impacts.

4d) The potential effects of mine-affected water discharge are discussed in Section 13 of the draft EIS. Refer to the response to IESC Response 10 which discusses the revised draft discharge conditions presented in Attachment E – Additional Information on Surface Water.

4e) The potential for cumulative effects on the Belyando River, the Doongmabulla Springs Complex and GDEs are addressed in Sections 13, 12 and 9 of the draft EIS, respectively.

Refer to the response to IESC Responses 78 and 79 for additional discussion on the Belyando River catchment.

Refer to the response to IESC Response 77 for additional discussion on the Doongmabulla Springs Complex.

5. Further baseline and time-series monitoring data needs to be collected from within and beyond the project area on surface water and groundwater quantity and quality, especially groundwater levels within the Clematis Sandstone and Moolayember Formation. Data should be collected to ensure that seasonal variability and the relationship between surface water and groundwater systems are captured. This data should be utilised to further assess potential impacts to water resources and water-related assets. An appropriate monitoring programme should be designed to reduce uncertainty associated with predictions and quantify potential impacts. This should be used to inform the design of a follow-up monitoring programme to assess impacts and the effectiveness of mitigation or management strategies during and after mining.

As discussed in Section 12.5.1 of the draft EIS, baseline groundwater level monitoring has been ongoing since December 2012 and will continue until the commencement of project construction in order to enable natural water fluctuations to be distinguished from the potential effects of mining.

As discussed in the response to IESC Response 1, a total of 37 months of baseline groundwater monitoring data has now been collected from the groundwater monitoring network installed by the proponent. Data collected between January 2013 and January 2016 has been recorded using dataloggers at 6 hour intervals. This available data therefore comprises a detailed time-series collected over an extended timeframe.

The data reinforces the draft EIS conclusions that the groundwater regime is relatively consistent and exhibits no significant seasonal response to recharge. The data also supports the calibrated groundwater levels presented in the draft EIS, including those in the Clematis Sandstone.

The Moolayember Formation subcrops 7 km west of the project site and the project will not directly impact this formation. Indirect depressurisation of the Moolayember Formation could potentially occur via the underlying Clematis Sandstone and underlying formations. The additional groundwater monitoring data collected from the project site is consistent with the data presented in the draft EIS. The groundwater modelling predictions presented in the draft EIS Groundwater Report (Appendix I) are therefore supported by the additional data. The baseline data therefore supports the draft EIS groundwater assessment of the Moolayember Formation.

Explanation

Groundwater

6. The Clematis Sandstone is reported as being unsaturated or dry in the project area based on the bore data presented. However, this same unit is considered to be the source aquifer for the Doongmabulla Springs Complex (e.g. Bradley, 2015).

The conceptual groundwater model and impact assessment presented in the draft EIS are entirely consistent with the content of this submission.

The draft EIS conceptual groundwater model shows that the Clematis Sandstone is typically located above the regional groundwater table where it forms the elevated western slopes of Darkies Range. The Clematis Sandstone is therefore dry and unsaturated in these elevated areas. This is supported by 37 months of baseline groundwater monitoring data collected from the project site and its surrounds which shows that bores targeting the Clematis Sandstone have been continuously dry, with the groundwater table in the vicinity of Darkies Range typically located in the underlying Rewan Formation. This collated data is presented in Attachment D – Additional Information on Groundwater.

The draft EIS conceptual groundwater model also shows that the Clematis Sandstone becomes saturated where the base of this formation extends below the elevation of the regional groundwater table. This is predicted to occur in areas where the Clematis Sandstone is located at depth (e.g. down-dip to the west of the project site) and in areas where the groundwater table and Clematis Sandstone are shallow (e.g. in topographically low lying areas such as the Doongmabulla Springs Complex).

The Doongmabulla Springs Complex is located in a low lying area of the Carmichael River floodplain 22 km south of the project site. The surface elevation at the Doongmabulla Springs Complex is approximately 245 m Australian Height Datum (AHD). This is up to 245 m lower than the surface elevation of Darkies Range within the project site. It is also lower than the base of the Clematis Sandstone within the project site.

Consistent with a range of sources (including Bradley, 2015 and the Carmichael Coal Mine EIS), the draft EIS shows that that the shallow Clematis Sandstone at this location is saturated and the groundwater table intersects the ground surface, creating artesian (spring) conditions.

The potential impacts of groundwater depressurisation on the Doongmabulla Springs Complex have been assessed in Section 8 of the draft EIS Groundwater Report (Appendix I).

7. Given the inconsistency between project site and other regional information, it is unclear how depressurisation from the proposed project would impact on the Clematis Sandstone.

Beyond the natural hydrogeological variation and supporting explanations presented in the draft EIS, this submission does not provide examples of any specific inconsistencies that would materially affect the modelling results or the conclusions of the draft EIS groundwater impact assessment.

Please refer to the response to IESC Response 1 which explains how all relevant site-specific and regional information has been incorporated into the draft EIS groundwater study and used to develop conceptual and numerical groundwater models that reflect the range of hydrogeological characteristics exhibited within the vicinity of the project site. On this basis, the draft EIS groundwater impact assessment is suitable for the purposes of the draft EIS.

The predicted depressurisation of the Clematis Sandstone due to the project is shown on Figures 29 and 37 of the draft EIS Groundwater Report (Appendix I). A clear assessment of the potential impacts of this depressurisation on groundwater users and other features (including the Doongmabulla Springs Complex) is provided in Section 8 of the draft EIS Groundwater Report (Appendix I).

Surface Water

8. Potential impacts to the surface water flow regime include:

a. Projected reductions in catchment area of Tomahawk and North creeks by approximately 2% and 7% over the life of the project (and reductions of 2% for both catchments post mining).

b. Subsidence impacts resulting in surface cracking, ponding, impacts to residual pools and subsequent loss of catchment yield.

c. Change in the inundation regime for floodplain habitat, ephemeral drainages and creeks downstream of the project area, and drainage corridors onsite.

These surface water drainage and flooding effects are addressed in Section 13 of the draft EIS.

9. Investigation and assessment into surface water flow regimes should be undertaken for creeks downstream of the project area, such as Pigeonhole Creek, North Creek and the “major waterway” identified (under the Department of Agriculture Forestry and Fisheries’ mapping system) in the Tomahawk Creek catchment.

These surface water drainage and flooding effects are addressed in Section 13 of the draft EIS. The project is not predicted to result in significant changes to the drainage and flooding characteristics of these highly ephemeral drainage features.

10. The release of large volumes of mine-affected water from mining pits across a 64 km length of relatively flat ground with small drainage lines. Mine water releases can be expected to have increased turbidity, salinity, contaminants (e.g. metals) that are likely to exceed aquatic ecosystem protection limits. Subsidence may also increase erosion leading to water quality impacts in downstream areas.

As discussed in Section 13.6.5 of the draft EIS, any release of mine-affected water from the project site will be conducted in accordance with the Queensland Department of Environment and Heritage Protection (EHP) model Environmental Authority (EA) discharge conditions.

The model EA discharge conditions include limits on the volume and quality of discharged mine-affected water. These limits are specifically designed to protect downstream water quality and environmental values, including the protections of aquatic ecosystems.

The draft EA discharge conditions presented in Attachment 24-4 of the draft EIS have been revised in order to address submissions from the Queensland EHP. The revised draft discharge conditions have been provided in Attachment E – Additional Information on Surface Water, and include more stringent limits for mine-affected water release than presented in the draft EIS.

In addition, the proponent is required to develop and maintain a Receiving Environment Monitoring Program (REMP). The REMP is discussed in Attachment E – Additional Information on Surface Water.

Surface water-groundwater interaction

11. There is a lack of monitoring data to inform the understanding and assessment of potential impacts to sites with groundwater-surface water interaction, which include the Doongmabulla Springs Complex and Lake Buchanan and smaller scale GDEs on drainage lines or seasonal perched aquifers.

Please refer to the response to IESC Response 1.

12. A monitoring programme should be developed that allows for the assessment of groundwater-surface water systems. This programme could include an early warning methodology to ensure mine-induced depressurisation does not impact the Doongmabulla Springs Complex, Lake Buchanan and the Caukingburra Swamp

Refer to the response to IESC Response 47 which confirms that the groundwater monitoring network presented in the draft EIS Attachment 24-4 comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area, including in the vicinity of drainage features located east of the project site.

As discussed in Section 12.5 of the draft EIS the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS

groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features such as Lake Buchanan, Caukingburra Swamp and the Doongmabulla Springs Complex.

The proponent will implement any necessary changes to the groundwater monitoring network to ensure that it remains fit for purpose, in accordance with the Queensland EA requirements for groundwater monitoring. The commitments provided in the draft EIS therefore address the intent of this submission.

On this basis, no additional monitoring at Lake Buchanan, Caukingburra Swamp or the Doongmabulla Springs Complex is required to ensure that the project will not result in significant adverse impacts to the hydrology of these features.

Ecology

13. Ecological impacts are uncertain as there is no mapping of ecological attributes and no ecological survey effort outside the project boundary. Surveys are expected to extend to (at least) the predicted extent of groundwater drawdown (IESC, 2014).

Ecological field surveys and assessment of ecological attributes beyond the project site boundary are not typically undertaken as part of an EIS for a mining project in Queensland.

As discussed in Sections 12.4.5 and 12.4.7 of the draft EIS, the groundwater table is at least 15 m, and more typically at least 20 m, below the ground surface within the predicted extents of drawdown. Hence there is no potential for groundwater dependent ecosystems to present within the predicted extent of groundwater drawdown.

Further assessment of ecological attributes beyond the site boundary is not considered to be warranted.

14. Aquatic surveying was inadequate with locations visited on one occasion or only undertaken at the beginning and end of the dry season. For example, only one round of sampling for stygofauna was undertaken within the project area, with only two Tertiary bores sampled. Best practice guidelines (WA EPA, 2007) state that sampling should be done across the zone of impact and at least twice. Dr Grant Hose, the expert who examined the samples, mentioned the need for multiple sampling events in his letter attached to the EIS assessment documentation (EIS, Appendix E of Appendix G).

In accordance with the Terms of Reference (TOR) for the project, the draft EIS included a desktop assessment and pilot study field investigation to assess the potential for stygofauna to occur within the project site. The assessment and pilot study field investigation was conducted in accordance with best practice guidelines, being the *Guidance for the Assessment of Environmental Factors – Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia No*

54a (Western Australia EPA, 2007). These best practice guidelines state that in cases where a desktop assessment confirms there is little likelihood of subterranean fauna occurring in a project area but further evidence is required, a pilot study can be used "*to determine whether a project area has significant faunal values, which can be achieved with low sampling effort".* The guidelines further state that *"It is expected that 6 – 10 stygofauna samples or 10 - 15 troglofaunal samples will be collected in pilot studies".* The draft EIS pilot study included samples collected from 15 bores, which exceeds the expectations of a pilot study design, as described in the best practice guidelines. Samples were collected from bores within the key water-bearing units on the site (being the Tertiary Sediments and Clematis Sandstone), in addition to the Rewan Formation and Betts Creek Beds.

It is noted that Dr Grant Hose, the expert who examined the samples, mentioned the need for multiple sampling events in his letter attached to the draft EIS assessment documentation (draft EIS, Appendix E of Appendix G). However, multi-season sampling is not required for a pilot study, according to the best practice guidelines. In addition, Dr Grant Hose also noted he was unaware of the sampling location or setting and as such couldn't provide further comment on the results. He was therefore unaware of the results of the desktop assessment that concluded there is limited potential for significant stygofauna habitat or assemblages to occur within the project site.

Due to the nature of the groundwater setting and the results of the pilot study field investigation, there is little evidence to suggest the project site supports a significant stygofauna assemblage or habitat. On this basis, and in accordance with the best practice guidelines, further investigation of stygofauna values (including additional sampling) is not warranted.

15. The proponent considers there is no shallow groundwater onsite to support GDEs. Water levels in the Tertiary sediments below North Creek are 15-20 metres below ground level suggesting that potential GDEs should be considered in the assessment.

As discussed in Sections 12.4.5 and 12.4.7 of the draft EIS, the groundwater table is at least 15 m, and more typically at least 20 m, below the ground surface within the predicted extents of drawdown. Hence there is no potential for groundwater dependent ecosystems to present within the extent of groundwater drawdown.

16. The project area contains two seasonal wetlands, and a series of residual pools within the drainage lines which are generally considered of less value by the proponent due to the non-permanence of their water supply. The Southern Seasonal Wetland will be removed by open cut mining, and the Northern Seasonal Wetland will be undermined by longwall mining.

a. The proponent's claim that these wetlands do not provide important habitat for a number of waterbirds (including migratory species) due to their seasonal nature is not supported by sufficient evidence, due to the lack of survey effort.
b. The proponent considers the Northern Seasonal Wetland is not dependent on, nor interacts with, groundwater due to the large depth to groundwater in this area. The potential for dependence on the role of perched groundwater was not considered.

c. Subsidence may result in potential impacts to the Northern Seasonal Wetland including:
   i. a loss in storage capacity as perched groundwater and surface water are lost to the fracture zone, particularly if impacts occur during the period the wetland holds water;
   ii. ponding and increased areas of inundation; and
   iii. habitat disturbance during surface subsidence remediation activities.

16 a) The draft EIS does not *"claim that these wetlands do not provide important habitat for a number of waterbirds".* In fact, as shown in Figure 11-10 of the draft EIS, both the Northern Seasonal Wetland and Southern Seasonal Wetland have been assessed as potentially providing high value habitat for the Australian Painted Snipe, a threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The wetlands were both surveyed during the May 2012 field survey. They were inspected in the October/November 2012 survey but were found to be dry. A lack of water during the dry season confirms their seasonal nature and does not represent a "*lack of survey effort*" by the proponent.

16 b) The Northern Seasonal Wetland is located on the elevated Darkies Range plateau in the northern part of the project site. The regional groundwater table is located approximately 100 m below ground level in this location and is therefore disconnected from the Northern Seasonal Wetland.

In order to investigate the potential presence of shallow groundwater, a total of 11 bores were drilled on elevated Darkies Range plateau as part of the draft EIS groundwater study. This investigation included two bores (MB26 and MB27) in the immediate vicinity of the Northern Seasonal Wetland (as shown on Figure 12 of the draft EIS Groundwater Report [Appendix I]). As shown on the drilling logs presented in Appendix A of the draft EIS Groundwater Report (Appendix I), these bores remained dry during drilling and did not encounter perched water in the unsaturated zone above the regional water table. This site-specific data therefore indicates that a pervasive perched groundwater regime is extremely unlikely to be present below the Northern Seasonal Wetland.

This finding is consistent with the draft EIS surface water assessment which concludes the Northern Seasonal Wetland is an internally draining topographic feature that is supported by seasonal rainfall runoff.

The alternative conceptualisation proposed in the submission (i.e. the Northern Seasonal Wetland being supported by a highly localised, perched groundwater regime located 100 m above the regional groundwater table) is therefore poorly supported by the available information.

16 c) The potential impacts of subsidence on the Northern Season Wetland are discussed in the draft EIS Aquatic Ecology and Stygofauna Report (Appendix G). This section discusses the

various potential impacts listed in the IESC's advice, and describes any necessary management measures.

17. The proponent defined high value habitat for a number of threatened bird species (squatter pigeon and black throated finch) based on distance to permanent water sources. The loss of residual pools, riparian habitat, and the Southern Seasonal Wetland may decrease the suitability of surrounding habitat for species reliant on water. Many species records for the black throated finch are some distance from mapped permanent water sources, and not within high value habitat. The black throated finch may require a greater mosaic of habitat (see DECC NSW, 2007) than the high value habitat identified by the proponent.

The Black-throated Finch (BTF) habitat modelling for the project site has been revised in consultation with the Federal Department of the Environment and Energy (DoEE) and the Queensland EHP. An overview of the revised habitat modelling is provided in Attachment F - Additional Information on Ecology. The revised habitat modelling includes a greater mosaic of habitat, given that it includes habitat around non-permanent sources of water (as well as habitat around permanent water sources).

Water resources

18. The mine water management system is predicted to have a water deficit throughout the proposed operations. The annual external water requirement over the life of the mine is predicted to range from approximately 903 ML/year under wettest modelled conditions to 12,300 ML/year under driest modelled conditions.

a. The proponent is considering options for sourcing external water supplies. However, insufficient information has been provided to enable assessment of the viability of supply and impacts to other water users.

b. Potential impacts on the surface water and groundwater resources from where this water is sourced from should be assessed, particularly when considering the impact of the external water requirements for the adjacent CCM project.

The proponent is currently considering external water supply options including sourcing water from either a managed water supply scheme (operated by a water manager such as SunWater) or through the purchasing of existing water allocations through water trading.

The water supply schemes will be developed and operated by others and would be subject to separate environmental impact assessment and approvals.

Mitigation, monitoring and management

19. A groundwater monitoring programme should be developed to reduce uncertainty associated with the current conceptualisation and associated model predictions (see response to Question 8 below).

Refer to the response to IESC Responses 33 and 47.

20. Assessment of the potential impacts to surface water resources from the proposed project would be improved by:

a. Water quality objectives being established and justified for each relevant receiving water resource.

b. Contextual information about the surface water quality dataset, such as time, frequency and corresponding flow level, being provided to ensure that the data are representative of the existing condition and that the data set spans a suitable period of record, and relevant ANZECC & ARMCANZ (2000) guidelines are applied appropriately.

c. Installing monitoring stations immediately downstream of the project area (and the discharge point) to assess water quality changes to Pigeonhole Creek, North Creek, and downstream of the confluence of North Creek and the "major waterway" identified in the Tomahawk Creek catchment to detect any water quality change to the Belyando River.

The release of mine-affected water based on flows in North Creek and the strict application of the EHP model mine conditions will ensure that sufficient flushing flows occur in North Creek following any discharge events and that there are no adverse impacts on downstream environmental values in North Creek, including aquatic ecosystems.

20a) A baseline water quality and flow monitoring program will be implemented for North Creek. The baseline monitoring program will be undertaken in accordance with the Queensland Water Quality Guidelines, prior to the commencement of the project.

Baseline water quality and flow data collected as part of this monitoring program will also be used to establish locally relevant water quality objectives for North Creek in accordance with the Queensland Water Quality Guidelines.

20b) The details of the proposed baseline water quality and flow monitoring program are provided in Attachment E – Additional Information on Surface Water. Water quality and flow gauging will be undertaken on North Creek downstream of the proposed controlled release point and on the Belyando River.

Contextual information about the baseline surface water quality dataset including time, frequency and corresponding flow level will be collected to ensure that the water quality data are representative of the baseline conditions and that the dataset spans a suitable period of record for the establishment of a robust baseline and the development of locally relevant water quality objectives.

The baseline data will be collected and analysed in accordance with the Queensland Water Quality Guidelines, which are consistent with the ANZECC & ARMCANZ (2000) guidelines.

20c) The proposed baseline water quality and flow monitoring program described in Attachment E – Additional Information on Surface Water comprises ten baseline water quality monitoring sites including sites in the headwaters and lower reaches of North Creek, Eight Mile Creek and the Belyando River upstream and downstream of the confluence with North Creek. This specifically includes a dual purpose water quality and flow monitoring site immediately downstream of the project site (and the proposed release point RP1) and a monitoring site between the North Creek and Tomahawk Creek confluences with the Belyando River.

It is not proposed to discharge mine-affected water to the Tomahawk Creek catchment (including Pigeonhole Creek). No monitoring of Pigeonhole Creek or the 'major waterway' identified in the Tomahawk Creek catchment is therefore proposed.

21. The proponent notes a commitment to monitor ongoing health of flora and fauna retained in the project area, with details to be outlined in the biodiversity management plan which was not available in the assessment documentation, preventing assessment of the suitability of the proposed plan.

a. The provision of fauna watering points beyond the project area to mitigate for the loss of surface water sources should be considered.

b. Aquatic surveys were undertaken in May and October 2012 at 22 sites but not all sites could be resurveyed in October due to a lack of water. These sites should be re-surveyed to assess temporal variability particularly with regard to the wet and dry seasons.

c. Terrestrial surveys were generally undertaken at the beginning and end of the dry season, however it is important to conduct surveys during the wet season. If this is not possible, reasons should be stated and the precautionary principle applied.

d. Stygofauna surveys were limited to a single sampling occasion which is inadequate (see paragraph 13) and should be consistent with the best practice guidelines (WA EPA, 2007).

The Biodiversity Management Plan is an operational management plan and will therefore be developed prior to construction of the project. However, the principles have been outlined in Section 9.7.3 of the draft EIS.

21 a) Section 9.7.2 of the draft EIS includes a commitment to provide fauna watering points within areas of native vegetation beyond the footprint of the open cut mining area and the mine infrastructure. In addition, as discussed in Section 4.7 of the draft EIS Biodiversity Offset Strategy (Appendix H), the provision of fauna watering points within offset sites will be considered as part of the management of offset properties.

21 b) A lack of water during the dry season confirms the seasonal nature of waterways within the site and is considered to represent temporal variability for these aquatic ecosystems. The basis for re-surveying these sites is considered illogical as it fails to acknowledge the highly ephemeral nature of surface water at the project site and the fact that the temporal variability in the site waterbodies typically includes these waterbodies being completely dry in each dry season. It is

highly likely that any attempt to re-survey these waterways in the dry season would result in the same outcome as experienced in the field surveys for the draft EIS i.e. a lack of water.

21 c) Terrestrial field surveys included a survey conducted in May 2012, which was the earliest possible time the site was accessible following a substantial period of rainfall at the end of the wet season in 2012. This rainfall is considered likely to have prolonged the wet season in 2012 and as such, the site was considered likely to have contained more ephemeral water at that time than the site usually would after a normal wet season. Due to these site conditions, the May 2012 field survey is considered to be consistent with a post-wet season ecological survey.

21 d) In accordance with the TOR for the project, the draft EIS included a desktop assessment and pilot study field investigation to assess the potential for stygofauna to occur within the project site. The assessment and pilot study field investigation was conducted in accordance with best practice guidelines, being the *Guidance for the Assessment of Environmental Factors – Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia No 54a* (Western Australia EPA, 2007). This guideline does not require multiple sampling events for the purposes of a pilot study. Please refer to IESC Response 14 for more information.

67.2 QUESTION 2

Does the IESC agree with the proponent's assessment that there is no direct groundwater – surface water interconnection within the predicted extents of groundwater drawdown?

IESC Response

22. No. There are small areas within and outside the project area of potential and known groundwater-surface water interaction, including: seasonal perched aquifers along Bully Creek or drainage lines that support GDEs (e.g. River Red Gum), the Northern Seasonal Wetland, the Doongmabulla Springs Complex and Lake Buchanan.

Refer to the response to IESC Response 13 that addresses the potential for impacts to vegetation associated with drainage features.

Section 12 of the draft EIS provides an assessment of the potential impacts of groundwater depressurisation on environmental features including potential GDEs, drainage features, surface water features (including wetlands and Lake Buchanan) and the Doongmabulla Springs Complex.

The groundwater assessment concludes that depressurisation of the regional groundwater regime is not predicted to extend to any of these features and therefore groundwater-surface water interactions will not be affected.

The response to IESC Response 16 describes the potential impacts on the Northern Seasonal Wetland.

Explanation

23. Groundwater is reported as typically being at depths in excess of 15 m below ground throughout the project area, and locally in excess of 100 m. Local topography in the area is dominated by the Darkies Range which forms an area of groundwater recharge and groundwater flow generally follows the topography to the east and west of the recharge zone.

Section 12 of the draft EIS states that, where present within the project site, the water table is generally deep (25 to 55 m below ground level). Further east, the water table is typically 15 to 20 m below North Creek and 20 to 25 m below Tomahawk Creek. The remainder of the submission is factually correct.

24. Quaternary sediments (mud and gravel) can provide a water source supporting River Red Gum and Forest Red Gum along ephemeral drainage lines. Whilst the proponent found only thin (less than 1 m thick) patches of Quaternary sediments, there is insufficient evidence to confirm the broadscale absence of Quaternary sediments across the project area. As there is the potential for impacts to the water content of these sediments from subsidence or groundwater drawdown, their presence (or otherwise) and hydrology should be further investigated.

As discussed in Section 12.3.1 of the draft EIS, targeted groundwater drilling and stream geomorphology assessments found that extensive, deep alluvial deposits and associated shallow groundwater are absent from the project site and surrounding area. Fluvial sediments present in the vicinity of the project site are limited to thin (less than 1 m) patches of mud and gravel that dry quickly following flow events. As shown in Section 12 of the draft EIS, the regional groundwater table is greater than 25 m below ground level in these locations and is therefore disconnected from these sediments.

The potential presence of a perched groundwater table is not supported by the available information. In the event that a highly localised perched groundwater table is present within these sediments, this would be hydraulically disconnected from the underlying groundwater regime and any associated effects from the project. This would therefore preclude significant impacts on associated vegetation.

On this basis, additional surveys within the thin fluvial sediments would not yield information that would change the conclusions of the impact assessment, and consequently no further investigations are justified.

25. Lake Buchanan, listed on the Directory of Important Wetlands, has been inferred by the proponent as an indirect discharge zone for the Clematis Sandstone via the overlying Moolayember Formation due to the high saline water quality of the lake. There is insufficient groundwater monitoring data for the Clematis Sandstone, Rewan Formation or the underlying Permian Formation to the west of the project area. This limits understanding of Lake Buchanan groundwater-surface water dynamics and any potential future propagation of depressurisation towards Lake Buchanan. The 1 m drawdown contours provided by the proponent suggest that Lake Buchanan will not be impacted. However, it is important to note that given a steady state model has been used, some drawdown impact would be expected at the lake. Higher resolution model predictions, including a transient calibrated model and 0.2 m drawdown contours, would provide stronger evidence of potential drawdown impacts not reaching the lake.

The conceptualisation of Lake Buchanan as a groundwater discharge zone presented in the draft EIS is supported by:

- Groundwater levels within bores adjacent to Lake Buchanan (Figure B1 of Attachment D – Additional Information on Groundwater) which show that the groundwater table is typically located 2 to 11 m above the lake bed elevation to the west of the lake and within 2 to 5 m below the lake bed to the east of the lake. This data supports the EIS conceptualisation of Lake Buchanan.
- The elevation of the lake bed is approximately 290 m AHD and is at least 50 to 100 m below Darkies Range and the surrounding ridgelines. The Lake Buchanan is the lowest topographic feature within a radius of approximately 50 km. This elevation difference promotes groundwater connection.

- Historical imagery (Google Earth Engine, 2016) which indicates that water is present in the lake during prolonged dry periods and drought conditions when no surface water runoff occurs.
- The Bureau of Meteorology Groundwater Dependent Ecosystem (GDE) Atlas which indicates that:
  - Previous studies have confirmed that the western part of the lake contains ecosystems that are reliant on the surface expression of groundwater;
  - Ecosystems in the eastern part of the lake have a high potential for interaction with surface expression of groundwater; and
  - Ecosystems in the lake have a high potential for interaction with subsurface groundwater.
- Published studies including Lorimer (2005) and DIWA (undated) state that Lake Buchanan is a discharge zone.
- Published Queensland GDE mapping which indicates that 'expert knowledge' has concluded there is a high confidence in the prediction that ecosystems in 80 to 100% of Lake Buchanan have some degree of groundwater dependence.
- Published limnology (Timms, 1987) and aerial photography (1984 to present) which indicates that salts tend to accumulate at the surface (as is typical of groundwater discharge zones) rather than being flushed through the superficial materials to the underlying bedrock (as is typical of recharge zones).

The conceptualisation of Lake Buchanan as a likely groundwater discharge zone is therefore consistent with available desktop information and field data.

By adopting this conceptualisation any drawdown on the regional groundwater regime would result in impacts on Lake Buchanan. This conceptualisation therefore represents a conservative approach to impact assessment. Despite this conservative approach, the project is not predicted to result in any significant adverse impacts on Lake Buchanan.

Alternative conceptualisations would involve Lake Buchanan being perched above the regional groundwater table or functioning as a source of sustained groundwater recharge. These conceptualisations are poorly supported by the available information. In addition, these alternative conceptualisations would result in a less conservative impact assessment for the following reasons:

- A perched lake would be hydraulically disconnected from the underlying groundwater regime and any associated effects from the project.
- Modelling Lake Buchanan as a recharge zone would necessarily involve increasing the amount of recharge entering the model cells used to represent Lake Buchanan. This would have the effect of buffering any groundwater drawdown associated with the project in the vicinity of Lake Buchanan.

On this basis, adopting an alternative conceptualisation for Lake Buchanan would further reduce the potential for the project to impact Lake Buchanan. The information provided indicates with a high level of confidence that Lake Buchanan is a discharge zone (rather than an 'inferred discharge zone'). Section 5.3 – Editorial Corrections includes clarification that representing Lake Buchanan as a discharge zone in the groundwater model provides a conservative basis for the assessment of potential impacts on Lake Buchanan due to groundwater drawdown.

Refer to the response to IESC Response 85b which clarifies the limits of accuracy associated with groundwater modelling predictions.

26. The absence of shallow groundwater from the project area conflicts with the Bureau of Meteorology (BoM) GDE Atlas mapping and Queensland Wetland mapping tool. These show potential for groundwater interaction with terrestrial GDEs such as Eucalyptus species associated with the Regional Ecosystem in the north of the project area. Furthermore, the Bingeringo Aggregation (listed on the Directory of Important Wetlands), includes a section of Bully Creek that drains off the escarpment to the north of the project area and a section of Bully Creek is known to hold water at the height of drought (DIWA, undated-a), which indicates likely groundwater input.

The Qld Government's *"Groundwater Dependent Ecosystem Mapping and Classification Method"* ("GDE Guideline") does not indicate the presence of Acacia and/or Eucalyptus species as being sufficient to confirm that vegetation is a GDE. Rather, it uses the presence of Acacia and/or Eucalyptus species as examples of "decision rules to identify GDEs". A number of other decision rules are provided in this example and a GDE is considered to be present if all of the decision rules are met. Other decision rules quoted in the example include vegetation being located on alluvia "where the groundwater table is less than five meters from the surface". As detailed in the draft EIS Groundwater Report (Appendix I), the depth to groundwater is more than 50 m at its shallowest within the northern section of the project site.

The Bingeringo Aggregation is located within the Bully Creek catchment approximately 50 km downstream of the Tomahawk Creek-Bully Creek catchment boundary and 30 km east-north-east of the project site.

As shown on Figure 13-2 and discussed in Section 13.2 of the draft EIS, the project site is located at the head of the North Creek and Tomahawk Creek catchments. The Tomahawk Creek-Bully Creek catchment boundary is aligned with the northern boundary of the project site. The project site is not located in the Bully Creek catchment and the project is therefore unlikely to adversely affect flows in Bully Creek or the Bingeringo Aggregation.

The draft ES Groundwater Report (Appendix I) shows the predicted extent of depressurisation associated with the project. The Bingeringo Aggregation lies a significant distance beyond the predicted extent of groundwater depressurisation associated with the project and is therefore unlikely to be adversely impacted by groundwater depressurisation.

67.3 QUESTION 3

Has the existing conceptual groundwater regime been adequately characterised, including the hydrogeology of each stratigraphic unit? If not, what changes should be made to the conceptual groundwater model?

IESC Response

27. No. More hydrogeological data is needed to support the underpinning conceptualisation and parameterisation of the groundwater model, including: confirmation of the extent of saturation of the Clematis Sandstone, surface water-groundwater interaction at Lake Buchanan, groundwater flow to the north of the project area and the presence of the North-north-west South-south-east trending fault in the Northern underground mining area.

Refer to the response to IESC Response 36 and 62 which address the extent of saturation of the Clematis Sandstone.

Refer to the response to IESC Response 25 which addresses the potential groundwater interactions with surface water at Lake Buchanan.

Refer to the response to IESC Response 76a which addresses the groundwater flow regime to the north of the project site.

Refer to the response to IESC Response 28 which addresses the presence of the fault in the north of the project site.

IESC Explanation

28. The fault in the Northern underground mining area is assessed as penetrating through the Clematis Sandstone and Rewan Formation, being downthrown approximately 100 m to the east, and truncating the Clematis Sandstone against the Rewan Formation. Concerns about the presence and potential influence of this fault include:

a. Bore data provided in the assessment documentation was for groundwater monitoring data only and provides inconclusive evidence for the presence of the fault.

b. There is a lack of evidence on the characteristics of the fault (as it is presented as an isolated feature), or justification of why the fault stops at the northern edge of the project area and just north of the area of the southern open cut mining pit.

Section 12.4.2 of the draft EIS states that the groundwater model was based on the project geological model as well as all published lithological logs within the model extents, including drilling logs from the adjoining Carmichael Coal Mine Project and the Department of Natural Resources and Mines (DNRM) groundwater database.

The project geological model included detailed data from approximately 200 bores drilled as part of exploration programs undertaken at the project site and at adjacent sites, along with data from deep wells in the region outside the proposed mining area. Figure 12-8 of the draft EIS shows the

geological cross-sections that are based upon this data. As shown in section C-C' the available geological data indicates approximately 100 m of vertical displacement in the Permo-triassic geology in the western part of the project site.

As shown in sections A-A' and B-B' the displacement does not extend into the central and southern parts of the project site. In addition, the geological data shows that the displacement does not extend north of the project site.

On the basis of the significant body of geological data, the most likely explanation for this displacement is the presence of a localised fault. Faulting is a relatively common occurrence at the margins of the Galilee Basin and lineaments typically indicative of faults and significant fractures are present in elevated areas in vicinity of Darkies Range and Lake Buchanan.

Folding is not mapped in the vicinity or observed in the project geology model and is therefore unlikely to explain the observed displacement. No other plausible explanations for the observed displacement (of approximately 100 m) in the geological data have been offered in the submission (as requested by the regulator in Question 3).

On the basis of the available geological information and previous mining experience in the same or equivalent formations in extensively faulted areas of the Bowen Basin, the fault is likely to restrict groundwater flow for the following reasons:

- Regionally, fractures associated with faults are typically sealed by mineralisation and precipitation.
- The high clay content of the Permo-Triassic formations means that there is a significant likelihood of clay smearing across the fault plane that is likely to reduce the fault permeability by several orders of magnitude compared to the un-faulted areas.
- The coal seams are thin and represent an extremely small proportion of the overall thickness of the Permo-Triassic sediments (i.e. less than 1%). There is therefore a greater than 99% probability that fault displacement has resulted in a coal seam being juxtaposed with less permeable Permian interburden or Rewan Formation sediments on the other side of the fault.
- Previous mining experience in the Bowen Basin indicates that coal seams are typically highly compartmentalised by faulting.

On this basis the conceptualisation, mapping and characterisation of the fault in the north of the project site is supported by the available information.

In addition, Section 12.4.2 of the draft EIS describes the sensitivity analysis was undertaken to test the influence of the geological fault on the modelling predictions. The sensitivity analysis considered the fault as a low permeability flow barrier and a high permeability flow conduit to capture extremes in the potential behaviour of the fault. The results presented in Section B3 of the

draft EIS Groundwater Report (Appendix I) clearly show that the modelling predictions are relatively insensitive to the permeability of the fault.

29. To the west of the project area, there is limited monitoring of the Clematis Sandstone, Rewan Formation or the underlying Permian Formation (Betts Creek Beds and associated coal seams). This does not allow for adequate understanding of groundwater-surface water dynamics at Lake Buchanan.

Refer to the response to IESC Response 25 which clarifies the basis for conceptualisation of groundwater surface water interactions in the vicinity of Lake Buchanan and confirms the conservatism in the modelling approach and impact assessment presented in the draft EIS.

30. The Rewan Formation was accounted for using two model layers, but it is unclear why two layers were chosen, and what or when parameters differed between the two layers.

Section B1.2.3 of the draft EIS Groundwater Report (Appendix I) explains that the Rewan Formation was represented by two model layers to provide a better representation of the behaviour of the formation, specifically in response to subsurface subsidence cracking. Section B2.2 of the draft EIS Groundwater Report (Appendix I) describes the parameterisation of the Rewan Formation layers in relation to subsurface subsidence cracking.

31. The monitoring network does not provide sufficient information to conceptualise the groundwater regime in the project area. There is only one bore to the north and north east of the project area, which did not fully penetrate the Clematis Sandstone sequence in this location and did not intersect groundwater, limiting understanding of groundwater flows, groundwater-surface water interaction, and potential cumulative (i.e. with the proposed Hyde Park Coal Project) impacts in this area.

Refer to the response to IESC Response 33.

67.4 QUESTION 4

Are the groundwater conceptualisation, groundwater contours and flow direction representative of the aquifer systems based on information available?

IESC Response

32. No. The information available:
a. does not support the conceptualisation of the fault in the Northern underground mining area;
b. could reasonably be interpreted to produce alternate groundwater contour maps and flow directions;
c. does not provide sufficient detail to support the groundwater contour maps and flow direction presented for the Permian and Rewan Formation; and
d. does not provide a regional context for groundwater behaviour within the project area.

32a) Refer to the response to IESC Response 28 which clarifies the information and conceptual basis for the presence of a fault in the northern part of the project site.

32b) The groundwater contours and flow directions presented in the draft EIS Groundwater Report (Appendix I) are based upon a significant dataset and have been verified by calibrated groundwater modelling. On this basis, the groundwater contours and flow directions are considered to be robust. The claim that the data could reasonably be re-interpreted to produce alternative contours and flow directions is not technically supported.

32c) Refer to the response to IESC Response 34.

32d) Refer to the response to IESC Response 1 which explains how all relevant site-specific and regional information has been incorporated into the draft EIS groundwater study and used to develop conceptual and numerical groundwater models that reflect the range of hydrogeological characteristics exhibited within the vicinity of the project site. On this basis, the draft EIS groundwater impact assessment is suitable for the purposes of the draft EIS.

IESC Explanation

33. The monitoring network does not provide sufficient information to conceptualise the groundwater regime, groundwater contours and flow direction within the project area. Additional groundwater level/pressure data should be collected to confirm groundwater flow directions for the Tertiary sequence, Clematis Sandstone, Rewan Formation and the Permian sequence. A broader regional context should also be provided to understand local groundwater processes.

Section 5 of the draft EIS Groundwater Report (Appendix I) confirms that an extensive hydrogeological dataset was compiled from exhaustive desk study and field investigations.

In addition to the groundwater monitoring network installed for the project, the draft EIS groundwater study specifically incorporated all relevant geological and groundwater information

collected as part of the Carmichael Coal Project EIS, SEIS and AEIS groundwater studies and data collected from the Queensland DNRM Groundwater Database.

Groundwater data has therefore been collected from an area of approximately 75 x 85 km and includes in excess of 100 bores. The draft EIS groundwater study therefore presents the most comprehensive groundwater dataset yet compiled in this part of the Galilee Basin.

This dataset represents a substantial body of data that captures the local and regional scale behaviour and characteristics of the groundwater regime, including the groundwater flow directions in the Tertiary sediments, Clematis Sandstone, Rewan Formation and the Permian coal measures.

Additional baseline groundwater monitoring data collected from this network is presented in Attachment D – Additional Information on Groundwater. This extensive dataset supports the conceptualisation of the groundwater regime presented in the draft EIS.

34. The groundwater contours for the Permian stratigraphy demonstrate that groundwater north of the project area flows in both a westerly and easterly direction. It is unclear how the proponent established the groundwater flow direction as there are no bores at this location.

The conceptual groundwater model presented in Section 12 of the draft EIS considers the elevated ridgelines located to the west of the project site represent groundwater recharge zones. Groundwater flow will follow hydraulic gradients from these recharge zones to discharge zones. Groundwater discharge zones are likely to form in low-lying areas that intersect the groundwater table, including rivers and other low lying areas.

It is acknowledged that the geological units dip to the west, however groundwater flow is ultimately from areas of high pressure to low pressure, and catchment properties therefore play a significant role in influencing groundwater pressures. This concept is consistent with Darcy's Law and the well-established pattern of regional groundwater flow (Toth, 1963). It is also consistent with the conceptualisation of groundwater flow presented in the Carmichael Coal Mine Project EIS, and the findings of the subsequent reviews conducted by URS (2013), Dr Noel Merrick (2014) and DNRM (2014) as part of the approval process for the Carmichael Coal Mine Project. These reviews specifically confirmed that:

- Elevated ridgelines west of the Carmichael Coal Mine Project site and the Project China Stone site are groundwater recharge zones that form a regional groundwater divide in the Colinlea Sandstone (equivalent to the Betts Creek Beds); and
- Groundwater levels in shallow bores and groundwater flow in the Clematis Sandstone are both strongly influenced by local topographical high and low points.

The submission refers specifically to the area north of the project site. Figure 12-1 of the draft EIS shows that several groundwater monitoring bores are located to the north of the project site and east and west of the elevated Darkies Range groundwater divide.

The draft EIS groundwater model produced calibrated groundwater heads for the shallow bedrock and deeper formations that are consistent with these measured levels (Figure B6 to B8 of the draft EIS Groundwater Report (Appendix I)). The data and modelled heads indicate that there is a hydraulic gradient in the shallow bedrock from the elevated Darkies Range ridgeline to the east and west. This is consistent with Merrick (2014) and DNRM (2014) which confirm that local groundwater flow reflects catchment boundaries and topography.

The groundwater flow directions to the north of the project site are therefore considered to be robust and justifiable based upon the best available data, and are supported by the robust model calibration results.

35. In the Rewan Formation there are no monitoring bores located to the north and south, or within the south east, of the project area, yet an overall easterly flow direction is inferred. It is unclear how data for the Rewan Formation flow direction was obtained. Based on the presented data from a single bore (MB 24), it is not possible to infer a flow direction at Lake Buchanan.

As shown in Appendix A1 of the draft EIS Groundwater Report (Appendix I) groundwater levels have been collected from the Rewan Formation at several locations in the project site and its surrounds, including 11 monitoring bores and 6 VWPs installed at the project site, two bores immediately south-east of the project site and several other bores within the regional setting.

Calibration results presented in Appendix B of the draft EIS Groundwater Report (Appendix I) show that the modelled groundwater contours and flow directions show good agreement with the monitoring data.

36. No groundwater flow contours were provided for the Clematis Sandstone, due to the Clematis Sandstone being unsaturated and possibly even dry (5 out of 6 monitoring bores were dry – the other bore has a slotted interval encompassing the base of the Clematis Sandstone and the top of the Rewan Formation). The proponent should provide more information on the Clematis Sandstone, including saturation of the formation and groundwater flows by increasing the number of monitoring bores to the south, east, and north and outside of the project area to reduce the level of uncertainty in regards to the level of saturation and consequent modelling predictions.

Section 6 of the draft EIS Groundwater Report (Appendix I) shows that the Clematis Sandstone is typically dry and unsaturated at the project site, with the groundwater table typically located in the underlying formations.

In addition to the five dry bores within the Clematis Sandstone at the project site, groundwater monitoring levels have been collected from the Clematis Sandstone at several locations in the project site and its surrounds, including monitoring bores to the north, south and west of the project site. These monitoring locations are listed in Appendix A1 of the draft EIS Groundwater Report (Appendix I).

Calibrated groundwater head and groundwater flow directions are presented in Appendix B of the draft EIS Groundwater Report (Appendix I). Saturated extents and saturated thickness of the Clematis Sandstone are shown in Figure 22 of the draft EIS Groundwater Report (Appendix I).

67.5 QUESTION 5

Is the numerical groundwater model adequate to identify and quantify potential impacts to groundwater resources? Is the sensitivity analysis conducted by the proponent sufficient to encompass the range of likely uncertainty in key parameters and variability in aquifer parameters? If not, what changes should be made to the numerical groundwater model?

IESC Response

37. No. There are significant uncertainties associated with the numerical groundwater model as the conceptualisation and parameterisation used is not supported by adequate information. The numerical groundwater model is classified as Class 1 (Barnett et al., 2012) as there has been no peer review and no transient calibration, with transient predictions made with steady state calibration.

Refer to the response to IESC Response 1 which addresses the adequacy of the groundwater data presented in the draft EIS.

Section 8 and Appendix B of the draft EIS Groundwater Report (Appendix I) explain that groundwater level responses are negligible and do not provide a meaningful basis for transient calibration. Additional monitoring data presented in Attachment D – Additional Information on Groundwater confirms this assessment. A transient verification of the model was undertaken. This indicates that the groundwater model achieves a suitable level of calibration and predictive reliability.

In order to further assess the impacts of the model conceptualisation and parameterisation, a robust sensitivity analysis was undertaken. The results of the sensitivity analysis are presented in Section B3 of the draft EIS Groundwater Report (Appendix I).

There is no requirement for a peer review of the groundwater model in the EIS TOR nor is it standard practice for mining EISs. The draft TOR for the project prepared by the OCG did not include a requirement for a groundwater model peer review. The draft TOR were publicly exhibited and EHP, DNRM and DoEE were provided an opportunity to comment on the draft TOR prior to its finalisation. EHP, DNRM and DoEE's submissions on the draft TOR did not request the need for a peer review of the groundwater model for the project. In addition, all specific submission issues that were raised in relation to the draft EIS groundwater model have been responded to as part of the preparation of the Supplement. This has included discussions with the key regulatory agencies, including EHP, DNRM and DoEE. It is not reasonable to now require a peer review of the groundwater model at this stage, given that it is not a requirement of the TOR, the groundwater study has addressed the project's TOR and all specific groundwater issues that were raised by regulatory agencies have been addressed, in consultation with the agencies.

On this basis, the groundwater model provides a suitable basis for the assessment of groundwater impacts.

38. No. Sensitivity analysis was undertaken using a range of suitable parameters for the steady state numerical groundwater model. Sensitivity analysis was also undertaken to test the influence of the fault acting as either a high permeability or low permeability layer. However, sensitivity analyses were not conducted on model boundaries and the results of the numerical groundwater model did not undergo an uncertainty analysis, which limits understanding of model behaviour and the reliability of the numerical groundwater model predictions.

The model boundaries have been located at significant distances from the predicted extent of depressurisation associated with the project. The interaction between the predicted depressurisation effects and the model boundaries is therefore negligible and has no material effect on the modelling results or impact assessment.

The sensitivity analysis considered scenarios that encompassed extreme ranges of key hydraulic parameters and conceptualisations. The results presented in Section B3 of the draft EIS Groundwater Report (Appendix I) confirm that the model is relatively insensitive to all but the most extreme changes. Furthermore, the maximum predicted extent of depressurisation associated with the sensitivity analysis scenarios does not extend to any springs, lakes or other groundwater dependent features. It can therefore be concluded with a high degree of confidence that changes in key hydraulic parameters and conceptualisations in the order of those assessed will not give rise to any significant impacts at these features.

39. More monitoring data is needed to calibrate the model and the groundwater model should undergo transient calibration. Boundary conditions should be justified and undergo sensitivity testing, and a robust programme for update and review of the groundwater model should be defined as additional data becomes available.

Refer to the response to IESC Response 1 which confirms that additional monitoring data supports the model conceptualisation, calibration method and results and predictions presented in the draft EIS. Specifically, these data do not show any significant changes in groundwater level due to hydraulic stresses (e.g. diffuse rainfall, runoff etc) and therefore a transient calibration to an effectively static groundwater system would not provide any material benefits. The model calibration presented in the draft EIS Groundwater Report (Appendix I) is therefore suitable for the purposes of the draft EIS.

Section B1.2.3 of the draft EIS Groundwater Report (Appendix I) provides justification for the boundary conditions and confirms that the boundary conditions have been selected to ensure that they have no significant bearing on the model outcomes.

IESC Explanation

40. The proponent suggests that the steady state calibration addresses the long-term groundwater behaviour. Whilst there was no transient calibration, transient verification was undertaken using transient water level records to verify that the model could replicate water levels measured in the monitoring bore network installed for the project. The 26 hydrographs are presented for model verification, but data was only collected for 6-12 months and shows little variability. This may not be representative of long-term groundwater behaviour.

Refer to the response to IESC Response 1 and 39.

41. Northern and southern boundaries of the model are parallel to interpreted groundwater flow directions, but it is unclear how the west and east boundaries were determined. Justification should be provided on the east and west boundaries and why the base of the model was set as a no-flow boundary.

The western boundary of the model was aligned to the western extent of the Lake Buchanan catchment. This catchment boundary is an inferred regional groundwater divide. Positioning the model boundary in this location allows for a robust assessment of the potential impacts on Lake Buchanan and the GAB sediments west of the project site.

The eastern model boundary extends to the eastern margin of the basement formations and includes the Belyando River floodplain. This allows for a robust assessment of any potential impacts on the Betts Creek Beds and the Belyando River alluvium.

The base of the model was set as a no flow boundary as this has no significant bearing on the model outcomes.

67.6 QUESTION 6

Are the hydraulic parameters used for the base case, as well as to simulate fracturing from underground longwall mining, considered appropriate?

IESC Response

42. The appropriateness of base case parameters cannot be determined, due to the lack of data available. The factors applied to simulate the effects of subsidence fracturing (in some cases, producing a free draining system) exceed other reasonable estimates (see Guo et al., 2007). There is a risk that this simulation of fracturing is unduly influencing drawdown predictions.

Baseline data and appropriateness of base case hydraulic parameters

Refer to the response to IESC Response 1 in relation to the available data.

An extensive dataset of hydraulic conductivity values was collected at the project site and Carmichael Coal Mine site. The collected dataset is described in Section 6.2 of the draft EIS Groundwater Report (Appendix I) and includes 154 rising/falling head and packer tests conducted at the project site and the Carmichael Coal Mine site. This provides a suitable body of data from which to determine appropriate hydraulic parameters.

Rationale for the Modelled Approach to Subsurface Subsidence Fracturing

As discussed in Section 12.4.2 of the draft EIS, the prediction of subsurface subsidence cracking effects on vertical hydraulic conductivity carries inherent uncertainties. In order to address this uncertainty, the groundwater model was designed to create a fully drainable fracture network within each of the predicted fractured zones.

Table B8 of the draft EIS Groundwater Report (Appendix I) provides an example of the undisturbed vertical hydraulic conductivity of each model layer, the fully drainable fractured vertical hydraulic permeability of that model layer and the ratio of these values (shown as a multiplication factor). Attachment D – Additional Information on Groundwater, illustrates this example. As shown in this example, the factor applied to each layer is determined by the undisturbed vertical hydraulic conductivity of each model layer. A large multiplication factor is applied to low permeability strata close to the goaf (i.e. interburden within the coal measures), while a smaller multiplication factor is applied to higher permeability strata and strata located in the upper fractured zone. The multiplication factors presented in Table B8 are therefore correct for each model layer in the example location provided.

This modelling approach creates a highly permeable fracture zone that does not unduly restrict drainage to the mine workings or the propagation of groundwater depressurisation. This provides a conservative basis for the assessment of the project's groundwater impacts.

In addition, the model has been designed to extend the fracture zone to include the full thickness of all model layers that are within the predicted height of subsidence cracking. This modelling approach is intended to ensure that the predicted groundwater depressurisation effects and

groundwater impacts of the project are not reliant on the mitigating effects of either the aquitard properties of the Rewan Formation or the partial fracturing of an aquifer. This modelling approach provides an additional level of conservatism to the predicted groundwater depressurisation effects and groundwater impacts of the project.

A review of groundwater studies for other mining projects in the Galilee Basin and other coal mining regions was undertaken as part of the scoping phase of the draft EIS groundwater study. The review showed that subsidence effects on permeability changes are typically modelled by applying a uniform factor to all layers or a series of factors relating to the height of cracking above the goaf, for example:

- The Carmichael Coal Project EIS adopted a uniform factor of x50 permeability up to 75 m above the goaf and a uniform factor of x10 above this height.
- The China First Coal Project EIS adopted a uniform factor of x106 for a height of 2 m (i.e. the caved goaf) and a uniform factor of x10 above this height.

This approach provides a straightforward modelling approach but maintains the presence of low and high permeability layers within the fractured zone. The presence of low permeability layers may have the effect of impeding groundwater drainage from relatively high permeability formations to the mine workings. This can result in buffering of the drawdown effects of mining in the overlying formations.

In conclusion, the vertical hydraulic conductivity values and subsidence factors presented in Appendix B of the draft EIS Groundwater Report (Appendix I) are correct and the rationale for the modelled approach to subsurface subsidence cracking represents a suitably conservative scenario for the assessment of project impacts on groundwater, without unduly increasing drawdown predictions.

IESC Explanation

43. The hydraulic parameters for all major stratigraphic units were established through in-situ permeability testing (18 falling head and 68 in-situ packer tests) and data from permeability testing at the CCM project. There is a paucity of data available to support the base case hydraulic parameters used for the Quaternary sediments, Ronlow Formation and Moolayember Formation. Quaternary sediments and the weathered rock regolith modelled hydraulic parameters fall outside the range of available field data for both the proposed project and CCM project. For the proposed project no data was available for the Moolayember Formation and the Ronlow Formation.

As discussed in Section 6 of the draft EIS Groundwater Report (Appendix I) the hydraulic parameters were determined from 114 packer tests and 40 rising/falling head tests.

This dataset includes 6 rising/falling head tests in Quaternary sediments. Figure B9 of the draft EIS Groundwater Report (Appendix I) shows that the calibrated hydraulic conductivity of the Quaternary sediments (and regolith) was higher than the measured range of hydraulic conductivity. However, the calibrated hydraulic conductivity remained within realistic bounds for a highly permeable alluvium, and is therefore a conservative basis for assessment of project impacts. The calibrated hydraulic conductivity was also consistent with those adopted for the adjacent Carmichael Coal Mine Project EIS.

The Ronlow Formation and Moolayember Formation are not present on the project site and limited hydraulic data is available regionally for these formations. The hydraulic conductivity of these formations was determined through the calibration process. The modelled hydraulic conductivity values are consistent with the lithology of these formations.

The Quaternary alluvium, Ronlow Formation and Moolayember Formation are not present at the project site and are not directly impacted by mining. These formations are therefore not key formations in the calculation of groundwater depressurisation due to the project and the assessment of groundwater impacts.

44. In the numerical groundwater model, the hydraulic conductivity of shallow strata (Rewan Formation and Clematis Sandstone) in the Northern underground mining area was increased to reflect the predicted fracturing associated with subsidence. The high hydraulic conductivity values used to simulate subsidence-induced fracturing may limit the predicted extent of groundwater drawdown in the Betts Creek Beds Units. The proponent should run the model with lower modified hydraulic conductivities for the overlying units to determine the sensitivity of drawdown in the Betts Creek Beds Units to the modified hydraulic conductivity of the Clematis Sandstone and Rewan Formation.

Refer to the response to IESC Response 42 which confirms that the vertical hydraulic conductivity values and subsidence factors presented in Appendix B of the draft EIS Groundwater Report (Appendix I) are correct and the rationale for the modelled approach to subsurface subsidence cracking represents a suitably conservative scenario for the assessment of project impacts on groundwater, without unduly increasing drawdown predictions.

Nonetheless, as discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), the sensitivity of the modelled drawdown predictions to changes in model parameters was investigated. The sensitivity analysis investigated the effect of changing both the horizontal and vertical hydraulic conductivities by +/-1 order of magnitude across all model layers. The purpose of these scenarios was to determine the model sensitivity of the predictions to changes in key parameters. The changes have been applied to all layers simultaneously in order to determine the sensitivity of the overall model to these parameters. The sensitivity analysis therefore included changes to the hydraulic conductivity.

45. Subsidence modelling was undertaken using empirical methods because it is a greenfield project and there is no measured data. Parameters for the subsidence model were reasonable, based on subsidence data from the Bowen Basin presented in the 2012 South Galilee EIS. Once subsidence data from longwall coal projects in the Galilee Basin becomes available, subsidence predictions should be updated.

Section 6 of the draft EIS describes the subsidence monitoring program that will be undertaken throughout longwall mining operations. Monitoring will be used to identify any departures from the subsidence predictions and any such departures will be investigated to determine the likelihood of significant adverse impacts. The merit of undertaking additional subsidence modelling would be considered as part of the investigation outcomes.

67.7 QUESTION 7

Does the groundwater model require a peer review?

IESC Response

46. Yes, a peer review of the groundwater model should be undertaken, as recommended in the IESC Information Guidelines (2014).

There is no requirement for a peer review of the groundwater model in the EIS TOR nor is it standard practice for mining EISs. The draft TOR for the project prepared by the OCG did not include a requirement for a groundwater peer review. The draft TOR were publicly exhibited and EHP, DNRM and DoEE were provided an opportunity to comment on the draft TOR prior to its finalisation. EHP, DNRM and DoEE's submissions on the draft TOR did not request the need for a peer review of the groundwater model for the project. In addition, all specific submission issues that were raised in relation to the draft EIS groundwater model have been responded to as part of the preparation of the Supplement. This has included discussions with the key regulatory agencies, including EHP, DNRM and DoEE. It is not reasonable to now require a peer review of the groundwater model at this stage, given that it is not a requirement of the TOR, the groundwater study has addressed the project's TOR and all specific groundwater issues that were raised by regulatory agencies have been addressed, in consultation with the agencies.

67.8 QUESTION 8

Is the proposed groundwater monitoring program adequate to determine baseline conditions, provide a continued understanding of the groundwater systems, and monitor impacts to groundwater resources as a result of the project such as changes in water levels, both on and off lease, over time from both a spatial and aquifer extent? If not, what changes should be made to the groundwater monitoring program?

IESC Response

47. No. At present the monitoring programme has insufficient spatial and stratigraphic coverage to adequately determine baseline conditions, characterise and enable appropriate assessment of, or monitor potential impacts to water resources.

Section 12.5.1 of the draft EIS describes the proposed baseline groundwater monitoring program. The baseline groundwater monitoring program includes monitoring bores targeting all key formations at the project site including the Tertiary sediments, the Clematis Sandstone, the Rewan Formation and the Betts Creek Beds. The baseline monitoring program therefore provides full stratigraphic coverage of the local groundwater regime.

Section 12.5.2 of the draft EIS describes the proposed operations phase groundwater monitoring program that will be used to monitor the potential impacts of the project. As shown in the draft EIS Attachment 24-4, the proponent has proposed a groundwater monitoring network that comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area.

This includes offsite groundwater monitoring locations to provide additional coverage of the GAB sediments to the north, south and west of the project site and the groundwater regime in the vicinity of the Carmichael Mine.

The proposed groundwater monitoring programs are therefore sufficient to characterise the local baseline conditions and address the full extent of potential project and cumulative impacts.

48. The groundwater monitoring programme should be focused on reducing the uncertainty in the groundwater model conceptualisation and parameterisation and informing quantification of impacts to identified environmental objectives and water-related assets. This will need a greater extent (beyond the project area, more hydrostratigraphic units) and increased resolution (temporal frequency and spatial density) of monitoring stations than is currently proposed by the proponent.

Refer to the response to IESC Response 47.

IESC Explanation

49. The pre-mining groundwater monitoring network consisted of 31 monitoring bores at 24 locations, although 13 monitoring bores have been reported as being dry, and should not be considered part of the ongoing monitoring network. Baseline monitoring results from December 2012 to August 2013 did not record any significant changes in groundwater levels from hydraulic stresses.

Refer to the response to IESC Response 47 in relation to the proposed baseline groundwater monitoring program.

For clarity, it is considered technically incorrect to suggest that bores recorded as dry do not provide useful data on the baseline groundwater conditions at the project site. The proponent is therefore committed to continued monitoring of baseline conditions across all bores within the proposed baseline monitoring program.

Refer to the response to IESC Response 1 which confirms that baseline data collected between December 2012 and January 2016 did not record any significant changes in groundwater levels from hydraulic stresses.

50. Specific issues relating to baseline monitoring include:
a. The distribution of bores does not adequately cover the south east of the project area.
b. There is insufficient monitoring of the Clematis Sandstone, Rewan Formation or the underlying Permian Formation (Betts Creek Beds and associated coal seams).
c. There is uncertainty regarding the screened formations for bores (i.e. 153583, 153582, 8 Mile bore) to the west of the project area.
d. There is only one bore to the north and north east of the project area, which did not intersect groundwater, limiting understanding of groundwater flows, potential groundwater-surface water interaction, and potential cumulative impacts in this area.
e. There is no baseline monitoring of potential shallow perched groundwater in the Northern Seasonal Wetland, which could be drained by cracking associated with subsidence.
f. While there is a model prediction for take from the GAB, there is no described monitoring-based methodology for determining and verifying baseline contribution of recharge to the GAB.

50a) Figure 12 of the draft EIS Groundwater Report (Appendix I) shows that there are currently four baseline monitoring bores located in the southern part of the project site. The geology at these locations is consistent with the geology to the east. These bores therefore provide sufficient understanding of the baseline in the south of the project site.

In addition, the proponent has committed to monitoring several monitoring bores located adjacent to the south and south-east of the project site as discussed in the draft EIS Attachment 24-4. The bores will provide sufficient cover to allow the groundwater regime in the south-east of the project site and the Carmichael Mine to be monitored.

50b) Refer to the response to IESC Response 47.

50c) Figure 12 and Appendix A1 of the draft EIS Groundwater Report (Appendix I) show the screened formations of monitoring bores based upon published bore logs and the geology model. The screened formations are therefore understood with the same degree of certainty.

It is noted that these three bores are not part of the baseline monitoring program and any concerns in relation to screened formations are not material to the quality of the baseline monitoring program.

50d) As discussed in the draft EIS Attachment 24-4, the proponent has proposed a groundwater monitoring network that comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area.

Contrary to the submission, the groundwater monitoring network specifically includes eight monitoring locations east of the project site in the Tertiary sediments.

In the north of the project site and offsite to the north, the Betts Creek Beds are located at significant depths below the Tertiary sediments (where present), the Rewan Formation and the Clematis Sandstone. Due to the significant depth of these strata and presence of a groundwater table in the overlying sediments there are currently no groundwater supply bores targeting the Betts Creek Beds or the target coal seams in these areas. Groundwater monitoring bores targeting these overlying formations are proposed at several locations in the north of the project site and offsite to the north. These bores will provide sufficient information on the groundwater regime in these areas and the potential impacts of the project.

Overall the groundwater monitoring program described in the draft EIS is considered adequate to monitor the impacts of the project and additional monitoring bores are not considered to be necessary.

50e) Refer to the response to IESC Response 16b in relation to the groundwater dependency of the Northern Seasonal Wetland.

50f) Recharge is not directly measurable and must be inferred from available data. Common methods of inference include modelling, water fluctuation method, and chloride mass balance.

The draft EIS groundwater assessment calculated recharge using the modelling approach as described in Section B1.2 of the draft EIS Groundwater Report (Appendix I). The diffuse (background) recharge rates have been calculated by applying the calibrated recharge percentage by the adjusted annual rainfall. The calculated diffuse recharge rate has been refined by the inclusion of enhanced recharge zones based on surface geology and topography.

This approach was used as it provides a robust calibration result that reflected the available monitoring data. The modelling approach is commonly used in groundwater studies for coal mining projects and has been used to calculate the rate of recharge in groundwater studies undertaken for previous Galilee Basin mining projects.

In order to provide a further level of confidence in the recharge rate, rainfall and groundwater monitoring data has been analysed to identify potential recharge events and calculate the rate of recharge.

Groundwater level data collected over the period of 37 months between December 2012 and January 2016 is presented in Attachment D – Additional Information on Groundwater. Rainfall data over this period has been analysed to identify potential recharge events. The rate of recharge over the monitoring period has been estimated using the water table fluctuation method. This method provides an estimate of recharge based upon detailed measurements of site-specific changes in the groundwater levels. In this instance, due to the high frequency of the groundwater monitoring data (i.e. 6 hourly intervals), this method is considered likely to provide a reasonably accurate estimate of recharge.

This data shows that, despite several significant rainfall events with the potential to generate recharge, groundwater levels remain relatively uniform with no significant seasonal recharge response. This data therefore provides supporting evidence for the low recharge rate conceptualised within the draft EIS groundwater assessment.

The monitoring based methodologies have therefore been used to determine and verify recharge rates adopted in the draft EIS groundwater assessment.

51. There is no justification of monitoring bore and screen locations during operations, with only one dedicated offsite monitoring bore proposed. The proposed network does not include monitoring of potential impacts associated with mine subsidence and associated fracturing/cracking, or potential impacts to Lake Buchanan, the Northern Seasonal Wetland and the Doongmabulla Springs Complex.

a. The proponent proposes that the current monitoring network will be maintained throughout the project, and that any monitoring bores removed during the mining process will be replaced where necessary. As well as removal, a number of the existing monitoring bores are dry or at risk of being damaged beyond use due to fracturing associated with subsidence. As most of the monitoring network may need to be replaced, a description should be provided of where replacement bores will be placed.

b. The proposed network does not have capacity to monitor potential water quality issues associated with mine storage waste facilities. Monitoring bores MB20 and MB32 are dry and were finished and screened in the Tertiary sediments above the water table (total bore depth 25 m), limiting their capacity to detect any potential groundwater contamination associated with the tailings dam, or waste storage facilities.

51) Refer to the response to IESC Response 47 which confirms that the groundwater monitoring network presented in the draft EIS Attachment 24-4 comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area.

As discussed in Section 12.5 of the draft EIS the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features such as Lake Buchanan, the Northern Seasonal Wetland and the Doongmabulla Springs Complex.

On this basis, no additional monitoring at Lake Buchanan, the Northern Seasonal Wetland or the Doongmabulla Springs Complex is required to ensure that the project will not result in significant adverse impacts to the hydrology of these features.

51a) As discussed in Section 12.5 of the draft EIS, data collected from the groundwater monitoring network will be reviewed on a quarterly basis. This review process will also identify any issues that may be affecting the optimal performance of the groundwater monitoring network. The proponent will implement any necessary changes to the groundwater monitoring network to ensure that it remains fit for purpose, in accordance with the Queensland EA requirements for groundwater monitoring.

Any replacement bores will be sited in consultation with the Queensland EHP.

51b) Monitoring bores MB20 and MB32 were primarily constructed to characterise the groundwater regime within low-lying areas of the project site and confirm the absence of shallow groundwater within the Tertiary and superficial sediments in the vicinity of the proposed mine waste storage facilities.

The proposed groundwater monitoring network includes bores surrounding the proposed mine waste storage facilities (Figure E1 of Attachment E – Additional Information on Groundwater). These bores are screened within the shallow unconfined groundwater regime that would receive any seepage from the proposed mine waste storage facilities. These bores are therefore suitable for monitoring the potential effects of seepage from the mine waste storage facilities.

In addition, as discussed in Section 8.7 of the draft EIS Groundwater Report (Appendix I), extensive geochemical testing shows that any leachate generated by the mine waste storage facilities is likely to be of better quality than the underlying groundwater regime. In the event of any seepage from the mine waste storage facilities reaching the underlying groundwater regime, degradation of the underlying groundwater quality is unlikely to occur.

52. The proponent indicates that impacts will be managed by investigating bores where the drawdown exceeds 90% of the maximum predicted drawdown and those which return water quality concentrations in excess of the 85th percentile of background data (triggers yet to be determined from data collected prior to mining).

a. Justification should be provided for the selection of the 85th percentile, given the standard use of the 80th percentile by ANZECC & ARMCANZ (2000).

b. While the proponent notes that they will propose groundwater triggers and limits in water management plans post approval, there are no indications of any potential limits or what would be done if a limit were to be exceeded.

52a) The adoption of a 85th percentile was proposed to ensure consistency with the approved limits described in the EA for the adjacent Carmichael Coal Mine.

52b) The proposed groundwater triggers and limits will be developed in consultation with the EHP based upon baseline monitoring data. Triggers and limits will be designed to ensure a suitable level of protection for environmental values.

As discussed in Section 12.5 of the draft EIS, the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions and baseline conditions (as indicated by exceedances of established groundwater triggers and limits). All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features.

53. A monitoring programme should be developed that:

a. Provides justification of monitoring bores and screen locations and a methodology for quantifying impacts.

b. Determines hydrogeological impacts associated with subsidence, including a methodology for assessing impacts to groundwater systems and interactions with surface water.

c. Provides for the assessment of hydrology/hydrogeology of the Northern Seasonal Wetland and its potential contribution to Pigeonhole Creek and North Creek catchments.

d. Includes additional monitoring locations with multi-level wells screened/monitored in all potentially impacted strata to the north and west of the project area to determine potential impacts to Lake Buchanan, and to the west and south of the project area, to determine the proposed project's potential impacts on the Doongmabulla Springs Complex.

e. Provides understanding of the groundwater-surface water interactions at Lake Buchanan and developing an early warning methodology to ensure mine induced depressurisation does not impact on lake hydrology or the hydrology of Caukingburra Swamp.

f. Quantifies and verifies mine induced impacts to GAB recharge.

53a) As discussed in draft EIS Attachment 24-4, the proponent has proposed a groundwater monitoring network that comprises 36 groundwater monitoring points located within the project site

and 20 additional groundwater monitoring locations within the surrounding area. The rationale for the distribution and target strata of monitoring points located within the project site is discussed in the draft EIS Groundwater Report (Appendix I). The offsite monitoring network includes all offsite bores that are predicted to be impacted by project drawdown.

Section 12.5 of the draft EIS describes the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features

The groundwater monitoring program described in Section 12 of the draft EIS is therefore considered adequate to monitor the impacts of the project

53b) The hydrogeological impacts associated with subsidence are fully considered within the draft EIS groundwater model. The proposed groundwater monitoring network is suitable for identification of any departure from these modelling predictions. A methodology for investigating and assessing any departure from these modelling predictions and the impacts assessed in the draft EIS (including impacts to groundwater systems and interactions with surface water) is discussed in Section 12.5 of the draft EIS.

53c) The hydrology/hydrogeology of the Northern Seasonal Wetland is fully assessed in the draft EIS. Additional information is provided in the response to IESC Response 16.

The groundwater monitoring network includes several bores in the vicinity of the Northern Seasonal Wetland which demonstrate that the groundwater table is located at significant depth.

53d) The groundwater monitoring network includes 56 monitoring locations in all potentially impacted strata. This includes several bores containing multi-level VWP sensor arrays within the project site.

The monitoring network includes several monitoring locations north and west of the project site (including two monitoring locations in the Clematis Sandstone in this area). These locations are suitable for monitoring changes to the groundwater regime between the project site and Lake Buchanan. The monitoring network also includes several monitoring locations south of the project site that are suitable for monitoring changes to the groundwater regime between the project site and the Doongmabulla Springs Complex.

As discussed in Section 12 of the draft EIS, the project is not predicted to result in significant adverse impacts on either Lake Buchanan or the Doongmabulla Springs Complex.

53e) The conceptual understanding of the groundwater-surface water interactions at Lake Buchanan are discussed in the response to IESC Response 25.

As discussed in the response to IESC Response 53d, the proposed groundwater monitoring network includes several monitoring locations north and west of the project site (including two monitoring locations in the Clematis Sandstone in this area). These locations are suitable for monitoring changes to the groundwater regime between the project site and Lake Buchanan/Caukingburra Swamp, so as to provide an early indication of any departure from the modelling predictions that would suggest potential for impacts to Lake Buchanan or Caukingburra Swamp.

The installation of additional bores within Lake Buchanan or Caukingburra Swamp to investigate the groundwater-surface water interactions is therefore not necessary or justified.

53f) The GAB recharge zone extends for several thousand kilometres and covers a significant area. The project will occupy a minor proportion of the GAB recharge zone and is predicted to result in localised depressurisation of the GAB sediments. On this basis, there is no evidence to support the conclusion that the project is likely to result in significant impacts on the GAB recharge zone.

54. Commitments for surface water and groundwater monitoring should be presented as part of a water monitoring plan and should be consistent with the National Water Quality Management Strategy.

Specific requirements for the groundwater and surface water monitoring programs will be specified in the Environmental Authority. Proposed Environmental Authority conditions related to groundwater and surface water monitoring are presented in Section 24 of the draft EIS and Attachment E – Additional Information on Surface Water.

67.9 QUESTION 9

Have impacts to the GAB and the Belyando River catchments, including the impacts of long-term water take, been adequately identified and quantified?

IESC Response

55. Impacts to the GAB and the Belyando River catchments have been identified but they have not been quantified consistently. For example:

a. Estimates for the peak take during mining operations and long-term take from the GAB are reliant on the current numerical groundwater modelling predictions, which are uncertain (refer to response to Question 5).

b. Uncertainty exists regarding the potential impacts to the Belyando River catchment as combined water quantity impacts (including loss of catchment area, subsidence, and external water supply) have not been quantified. Sources of water supply and potential cumulative impacts to the Belyando River catchment (given it may supply water to the CCM project), should be identified and assessed.

c. Impacts to surface water quality and downstream ecosystems as a result of mine-water discharges have not been adequately assessed and may be greater than predicted.

55a) Refer to the responses to IESC Response to Question 5.

55b) Refer to the response to IESC Response 74c, 78 and 79.

55c) Refer to the response to IESC Response 10.

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IESC Explanation

56. It is proposed that the surplus water from mine pits will be discharged through the Mine Water Dam to the Belyando River via a tributary drainage pathway in the North Creek catchment. The tributary drainage pathway from the Mine Water Dam to the Belyando River is approximately 64 km in length and comprises ephemeral drainage lines and creek lines within the North Creek catchment, upstream of the Belyando River. However:

a. A map of this discharge point and the tributary drainage pathway in the North Creek catchment was not provided, nor was detailed information about the water quality and flow conditions of the receiving waters, proposed discharge rate, duration and timing.

b. There is a lack of information to assess potential risks to the water resources and ecological communities from discharge within the tributary drainage and in the Belyando River Catchment.

c. Background surface water quality for aluminium, copper, and zinc exceeded ANZECC & ARMCANZ (2000) guideline values at several sites. Mine-affected water discharges could exceed aquatic ecological values for turbidity, salinity, nutrients, contaminants (e.g. metals).

56a) A figure showing the proposed release point and the drainage pathway is provided in Attachment E – Additional Information on Surface Water.

56b) Refer to the response to IESC Response 10 which clarifies that Attachment E – Additional Information on Surface Water provides revised draft discharge conditions that are designed to avoid adverse impacts on the receiving waters of North Creek downstream of the release point.

56c) Refer to the response to IESC Response 56b.

57. The loss of catchment area across the project area has been reported by the proponent although inconsistently. For example, the EIS states that total catchment loss during mining is predicted to peak at 4,226 ha at year 30 (EIS, P13-27), which is less than the sum of the combined maximum catchment impacts reported in the technical report (4,462 ha; Appendix K, P12).

Section 5.3 – Editorial Corrections provides clarification on the maximum contained catchment area.

58. There is no assessment of the impact that this loss of contributing catchment may have on surface flows. The loss of surface flows due to subsidence effects, such as surface cracking and ponding, has not been estimated. Whilst the proponent claims in the EIS "no loss in catchment yield" with the application of subsidence remediation (EIS, P13-29), a quantification of the potential impact on catchment should be provided to account for the risk that remediation is not effective.

Refer to the response to IESC Responses 78 and 79 on the potential effect of the project on catchment yield and surface water flows.

As discussed in Section 13 of the draft EIS, surface cracking is not predicted to result in any significant loss of surface water flows.

The installation of remedial drainage measures in subsided areas will also reinstate free drainage. This approach is well established in Queensland and is a proven technique for the effective management of ponding in subsidence depressions.

Ongoing monitoring of the remediated areas will be undertaken in accordance with the Subsidence Management Plan to ensure that the remedial drainage is effective.

67.10 QUESTION 10

What is the acceptable GAB take long term post mining? (Page 18 Appendix B summarises this)

IESC Response

59. The acceptability of water take is a matter for the regulator.

Noted.

67.11 QUESTION 11

Does the IESC agree with the proponent's assessment that Lake Buchanan is a discharge zone for the Moolayember Formation and the underlying Clematis Sandstone, and that the project will not impact groundwater levels in the Lake Buchanan area?

IESC Response

60. Evidence (Lorimer, 2005; DIWA, undated-b) suggests that Lake Buchanan is a groundwater discharge zone. Limited information was provided by the proponent to confirm the presence, or source, of this groundwater discharge and as such, potential impacts remain uncertain. Additional data, including monitoring to the west of the project area, would increase the understanding of this system and assist in identifying any potential impacts.

Refer to the response to IESC Response 25 which confirms the hydrogeology of Lake Buchanan.

Refer to the response to IESC Response 47 which confirms that the proposed monitoring network includes monitoring locations west of the project site and in the vicinity of Lake Buchanan.

61. Although the numerical groundwater model 1 m drawdown contours suggest that Lake Buchanan will not be impacted by a drawdown of this magnitude, higher resolution model predictions including drawdown contours at the 0.2 m scale would provide greater insight into any potential impacts to Lake Buchanan. However a transient calibrated model is required to quantify the level of impact as small changes may change the nature of the groundwater discharge into the lake.

Refer to the response to IESC Response 85b which clarifies the limits of accuracy associated with groundwater modelling predictions.

Refer to the response to IESC Response 37 which discusses transient calibration.

62. The proponent models some leakage from the Clematis Sandstone to underlying units. If the Clematis Sandstone is dry in parts of the project area, and the numerical groundwater model does not represent it as such, then the overall water balance is likely to be incorrect.

Section 12.3.3 of the draft EIS confirms that the Clematis Sandstone is generally dry within the project site.

In the north of the project site, a normal fault is present in this unit and the underlying strata. To the east of the fault, a thin wedge of Clematis Sandstone has been downthrown by approximately 100 m and is now truncated against the Rewan Formation on the west of the fault. In this area, the deeper Clematis Sandstone lies below the water table. The saturated thickness of this unit reaches 50 m close to the fault and gradually reduces to the east as the base of the unit rises above the water table.

These characteristics are fully captured in the groundwater model. The model water balance is discussed in Appendix B of the draft EIS Groundwater Report (Appendix I).

67.12 QUESTION 12

Is the proponent's subsidence impact assessment and modelling adequate to assess and quantify the potential impacts to water resources? Are the proposed measures to mitigate and manage the potential impacts of subsidence adequate? If not, are there additional measures available to mitigate and manage impacts to water related assets?

IESC Response

63. There is uncertainty regarding the subsidence impact assessment and low confidence in the modelling to quantify potential impacts as:

a. the parameters applied from the Bowen Basin may differ in the Galilee Basin and need to be verified as part of a monitoring programme;

b. fracture height selection was not justified;

c. the full range of potential vertical and horizontal hydraulic conductivities have not been explored;

d. potential connectivity of the subsurface fracture network has not been considered;

e. there is uncertainty in dual seam subsidence effects as the implications for the extraction sequencing in the proposed project are unclear; and

f. the role of the fault was not considered within the subsidence assessment (noting it was included within the groundwater assessment).

63a) Refer to the response to IESC Response 64 which confirms that the subsidence predictions are based on a large dataset of observed subsidence monitoring data from both Queensland and New South Wales, and are consistent with previous studies undertaken in the Galilee Basin.

Section 6 of the draft EIS describes the subsidence monitoring program that will be undertaken throughout longwall mining operations. Monitoring will be used to identify any departures from the subsidence predictions and any such departures will be investigated to determine the likelihood of significant adverse impacts. The merit of undertaking additional subsidence modelling would be considered as part of the investigation outcomes.

63b) Refer to the response to IESC Response 64.

63c) Refer to the response to IESC Response 42 which explains that an extensive dataset of hydraulic conductivity values was collected at the project site and Carmichael Coal Mine site. The collected dataset is described in Section 6.2 of the draft EIS Groundwater Report (Appendix I) and includes 154 rising/falling head and packer tests conducted at the project site and the Carmichael Coal Mine site. This provides a suitable body of data from which to determine appropriate hydraulic parameters.

A review of groundwater studies for other mining projects in the Galilee Basin and other coal mining regions was undertaken as part of the scoping phase of the draft EIS groundwater study and this confirmed that the parameters applied in the draft EIS groundwater model encompass an appropriate range of potential vertical and horizontal hydraulic conductivities.

In addition, sensitivity analysis presented in Appendix B of the draft EIS Groundwater Report (Appendix I) investigated the effect of changing the horizontal and vertical hydraulic conductivities by +/- 1 order of magnitude across all model layers. As discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), as expected, each of these scenarios increased the overall model error and reduced the ability of the model to match measured groundwater levels showing that they are less appropriate than the range of values adopted in the model. Nonetheless, as discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), the combined effect of each of these two extreme scenarios was marginal in terms of the model predictions.

63d) The connectivity and permeability of the subsurface cracking has been addressed in the draft EIS groundwater model. Refer to the response to IESC Response 42.

63e) Refer to the response to IESC Response 68 which confirms that in the dual seam mining areas in the Northern Underground, a more conservative height of 180 m for continuous cracking above the A Seam longwall has been adopted. This 50% increase from the initial predicted continuous cracking height should more than adequately account for the uncertainty associated with the continuous cracking height predictions and therefore provide a conservative basis for the purposes of assessing potential worst case groundwater impacts.

63f) The proposed mining areas do not intersect the fault and therefore the fault is unlikely to have a material effect on vertical subsidence or the height of subsurface subsidence cracking. On this basis the fault is unlikely to affect the potential subsidence effect on water resources.

The effects of the fault on groundwater movement have been fully considered in the draft EIS Groundwater Report (Appendix I).

64. Limited data is available in the Galilee Basin to reduce uncertainty in subsidence predictions. Confidence would be increased by consideration of the variation of impacts and the actual process over time (cracks may develop, then fill with sediment; fracture networks may be flooded, then drain).

The draft EIS Subsidence Report (Appendix A) predicts that connective cracking may occur up to 120 m above areas where single seam extraction is undertaken and 180 m above the upper A seam in areas of the Northern Underground where dual seam mining is proposed.

The subsidence predictions are based on a large dataset of observed subsidence monitoring data from both Queensland and New South Wales, and are consistent with previous studies undertaken in the Galilee Basin. In any areas of uncertainty, conservative assumptions have been applied. The draft EIS Subsidence Report (Appendix A) discusses the limitations of the model and notes that these limitations are considered unlikely to present a material difference to the potential subsidence effects or impacts predicted.

The subsidence predictions therefore provide a suitable basis for the assessment of the project impacts on water resources.

65. The Crack Subsidence Remediation Strategy may prove ineffective in some areas because it assumes that cracks can be remediated but this may not be the case for rocky drainage lines that are present in the area.

Whilst there is surface rock in some areas on Darkies Range the sandstone is highly weathered near the surface and can be excavated with civil earthmoving equipment. The proponent has installed access for exploration drilling in the Darkies Range area and can confirm that these areas can be excavated with an excavator and/or a small bulldozer.

Nonetheless, a monitoring program will be established for areas that have been disturbed as part of the subsidence crack rehabilitation program. The program will initiate crack rehabilitation maintenance work, where necessary, and ensure that the cracks have been successfully rehabilitated and any disturbed vegetation is regenerating.

66. Adaptive management measures such as Trigger Action Response Plans (TARPs) should be considered for management approaches to mitigating impacts to drainage lines and the Northern Seasonal Wetland. Further mitigation options may need to be considered, such as narrower longwalls, or mining methods with lower subsidence impacts. Importantly, the proponent should commit to a programme of periodically revised subsidence prediction following mining commencement.

As discussed in Sections 12 and 13 of the draft EIS, the project is not predicted to result in significant impacts on drainage lines. It is proposed to offset any significant residual Impacts to the Northern Seasonal Wetland based upon detailed mine planning. No TARPs or other management measures beyond those discussed in the draft EIS are therefore warranted.

Section 6 of the draft EIS describes the subsidence monitoring program that will be undertaken throughout longwall mining operations. Monitoring will be used to identify any departures from the subsidence predictions and any such departures will be investigated to determine the likelihood of significant adverse impacts. The merit of undertaking additional subsidence modelling would be considered as part of the investigation outcomes.

IESC Explanation

67. The Surface Deformation Prediction System (SDPS) was used for subsidence modelling, which relies on project data to calibrate the function. As no data is currently available for the proposed project, the accuracy of the outputs will be reduced (Commonwealth of Australia, 2015). This is an intrinsic problem given the lack of longwall mining to date in the Galilee Basin.

The subsidence predictions are based on a large dataset of observed subsidence monitoring data from both Queensland and New South Wales, and are consistent with previous studies undertaken

in the Galilee Basin. In any areas of uncertainty, conservative assumptions have been applied. The draft EIS Subsidence Report (Appendix A) discusses the limitations of the model and notes that these limitations are considered unlikely to present a material difference to the potential subsidence effects or impacts predicted.

The subsidence predictions therefore provide a suitable basis for the assessment of the project impacts on water resources.

68. There is no evidence to suggest that the potential for increased subsidence impacts from settling of multiple goaf strata after longwall extraction has been taken into account. No justification of the length of connective cracking above the dual seam longwall mining area was provided, with only a 50% increase in height of continuous cracking above the A seam applied in dual mining areas. Further, the connective cracking value of 120 m for a single seam is not supported by evidence or methodology. Fracture height estimation should be based on available work (e.g. Ditton and Merrick (2014)).

The draft EIS Subsidence Report (Appendix A) provides a detailed assessment of the potential height of subsurface cracking associated with longwall mining. The subsidence assessment was undertaken by a subsidence expert with more than 20 years of longwall mining and subsidence expertise.

The draft EIS Subsidence Report (Appendix A) draws upon extensive longwall experience from the Australian and overseas coal mining industry including over 25 years of microseismic monitoring and groundwater inflow measurements collected from the Bowen Basin. This data has been verified against empirical models and numerical modelling undertaken at operating longwall mines in the Bowen Basin.

Based on experience in Australia and overseas, continuous subsurface subsidence cracking and resultant unrestricted inflow generally occurs to a height of about 120 m above the active longwall in single seam extraction areas, with inflow rates progressively reducing as the depth of cover increases above 120 m. As such, continuous cracking up to 120 m above the longwall panels extracted in virgin ground can be expected.

Recent physical modelling work by Ghabraie and Ren (2014) was reviewed to provide an understanding of the subsurface strata movement in a dual seam longwall. Published dual seam longwall experience from the Australian and overseas coal mining industry has also been referenced.

In the dual seam mining areas in the Northern Underground, a conservative continuous cracking height of 180 m above the A Seam longwall was adopted. This continuous cracking height more than adequately accounts for the uncertainty associated with the continuous cracking height predictions and therefore provides a conservative basis for the purposes of assessing potential worst case groundwater impacts.

The subsidence height assessment also considered all relevant subsidence cracking assessments presented in previous Galilee Basin EISs. The adopted cracking heights for the project are conservative when compared to these studies.

69. There is uncertainty regarding the hydrogeological conceptualisation of the Northern Seasonal Wetland and a lack of consideration of the potential impacts to this wetland and surrounding drainage lines. The proponent reports that this wetland will not be affected because water and sediment are expected to fill and seal the cracks. However:

a. No supporting evidence is provided to support this assumption.

b. The proponent describes that the project area drainage features include a network of gullies in the steeper topography associated with Darkies Range. These gullies are characterised by steep rocky sides confining narrow rocky channels.

c. There is no assessment of the base of the wetland or if the wetland is sustained by a perched water table, and the effects subsidence may have on the ability of the wetland to retain water.

d. If cracking and fractures do not reach the surface there is still the possibility that fracture networks exist relatively close to the surface which will lead to increased draining from the wetland and less water flowing down the streams into the tributaries.

e. The potential impacts to the ecology reliant on the wetland if the wetland is drained for one or more seasons, or if the wetland drains more rapidly, were not considered.

69a) The draft EIS does not suggest that filling and sealing cracks will prevent any impacts to the Northern Seasonal Wetland. The draft EIS shows that subsidence cracking is unlikely to extend to the Northern Seasonal Wetland due to the significant depth of mining in this area.

69b) The Northern Seasonal Wetland is located on the Darkies Range plateau. Drainage in this area is via overland sheet flow with no defined drainage features. Any surface tension cracking would be localised in extent and of limited depth and further reduced by the saturation of the highly laterised Tertiary clays and claybound Triassic sediments that comprise the geology in this area (as shown in Figure 6 of the draft EIS Groundwater Report, Appendix I).

The steeper topography that forms the slopes of Darkies Range is located beyond the catchment of the Northern Seasonal Wetland. Drainage in these areas are characterised by rocky drainage features.

69c) Refer to the response to IESC Response 16b which describes the characteristics of the wetland and explains why the wetland is not considered to be associated with perched groundwater.

69d) As discussed in Section 10 of the draft EIS, the wetland is a contained catchment on the plateau area of Darkies Range. The wetland catchment does not provide significant contributing flows to the highly ephemeral drainage network in the vicinity of Darkies Range.

The changes to the pond storage and catchment area of the wetland due to subsidence will result in changes to the ponding characteristics of the seasonal wetland. For a particular rainfall event, the water level of the seasonal wetland will be reduced following subsidence, compared to the wetland pre-subsidence. This will also mean that the wetland will dry out more rapidly and more frequently.

However, the hydrology of the wetland does not materially influence the local drainage features and any reduction in catchment of the wetland is therefore unlikely to result in significant reduction in nearby drainage features or associated environmental values.

The influence of potential cracking is addressed in the responses to IESC Responses 69a and 69b.

69e) The potential impacts to the ecology reliant on the wetland are assessed in Section 10 of the draft EIS. As discussed in the response to IESC Response 69, the hydrogeology and hydrology of the wetland is unlikely to be adversely affected by the project. However, monitoring and management measures are proposed and it is proposed to offset any significant, residual impacts on the wetland. The need for offsets will be determined prior to any subsidence of the wetland and based on detailed mine planning and subsidence predictions for the area. Detailed design supported by further exploration work is still to be undertaken and could significantly alter the predicted nature and extent of impacts on the wetland.

70. Further assessment of the Northern Seasonal Wetland, particularly with regard to the base of the wetland and quantitative surface flow modelling of the drainage surrounding the wetland should be undertaken.

Refer to the response to IESC Response 16b which describes the characteristics of the wetland.

Section 10.6.3 of the draft EIS provides a quantitative assessment of the change in the Northern Seasonal Wetland catchment area due to subsidence. The wetland pond catchment will also be potentially affected by subsidence and it is anticipated that the catchment will change in size from 2,711 ha pre-mining to 2,399 ha post-mining, resulting in a 12% reduction in the size of the catchment. The ponding area before mining is approximately 127 ha and it will increase to approximately 199 ha as a result of subsidence.

These changes to the pond storage and catchment area of the wetland will result in changes to the ponding characteristics of the seasonal wetland. For a particular rainfall event, the water level of the seasonal wetland will be reduced following subsidence, compared to the wetland pre-subsidence. This will also mean that the wetland will dry out more rapidly and more frequently.

It is proposed to offset any significant, residual impacts on the wetland. The need for offsets will be determined prior to any subsidence of the wetland and based on detailed mine planning and subsidence predictions for the area. Detailed design supported by further exploration work is still

to be undertaken and could significantly alter the predicted nature and extent of impacts on the wetland. The value of any runoff modelling will be considered as part of the detailed design stage. This work will be described in the Subsidence Management Plan.

Runoff modelling based upon the conceptual mine plan presented in the draft EIS would not result in any change to the proposed management of these impacts and no further action is currently proposed.

71. Mitigation is proposed using the subsidence crack rehabilitation programme, whereby monitoring and remedial action will be undertaken if subsidence effects are observed. However, remediation strategies such as sealing fracture networks of exposed rock in creeks and tributaries have been found to be costly, risky and likely to have a limited lifespan (Commonwealth of Australia, 2014).

The response to IESC Response 65 describes the crack rehabilitation strategy for the project site, including the rocky drainage features and demonstrates that this will be suitable to manage any potential erosion associated with cracking in these drainage features.

72. Adaptive management measures such as Trigger Action Response Plans (TARPs) may be a suitable management approach to mitigating impacts to drainage lines and the Northern Seasonal Wetland. This could include having early warning trigger values, and clear, enforceable response measures capable of mitigating impacts.

As discussed in Sections 12 and 13 of the draft EIS, the project is not predicted to result in significant impacts on drainage lines. It is proposed to offset any significant residual Impacts to the Northern Seasonal Wetland based upon detailed mine planning. No TARPs or other management measures beyond those discussed in the draft EIS are therefore warranted.

73. Once subsidence data is available, subsidence predictions should be reviewed and further modelling should be undertaken, including calibration, verification and validation.

Section 6 of the draft EIS describes the subsidence monitoring program that will be undertaken throughout longwall mining operations. Monitoring will be used to identify any departures from the subsidence predictions and any such departures will be investigated to determine the likelihood of significant adverse impacts. The merit of undertaking additional subsidence modelling would be considered as part of the investigation outcomes.

67.13 QUESTION 13

Does the proponent's water resources assessment give adequate consideration to cumulative impacts between this project and the Carmichael Coal Mine and Rail Project (EPBC 2010/5736)?

a. If both projects operate concurrently have the cumulative groundwater impacts during both the operations phase and post mining phase been appropriately addressed in the EIS documents?

b. If not, what changes should be made to ensure the assessment represents a conservative and risk adverse approach?

c. Does the IESC have any concerns with the project's contribution to cumulative impacts upon the Great Artesian Basin and Belyando River catchment?

IESC Response

74. There has been no formal assessment of the likely magnitude and significance of cumulative impacts either during the operations phase or post mining. The proponent considers cumulative impacts to groundwater, however the full extent of potential direct, indirect, upstream, downstream, and consequential impacts, including to the Doongmabulla Springs Complex, surface water and downstream ecosystems have not been considered.

a. No. The cumulative groundwater impact assessment between the CCM project and China Stone projects was undertaken by superimposing maximum predicted groundwater drawdowns on a map during operations and post mining for each project. No appropriate calculations were undertaken. This is approach is inadequate to estimate the extent of cumulative groundwater drawdown impacts.

b. Appropriate monitoring and adaptive management should be put in place for potential cumulative impacts to Lake Buchanan and Doongmabulla Springs Complex, in conjunction with specific assessment of the risks to these specific assets.

c. There are concerns about potential cumulative impacts to the Belyando River catchment, due to water supply needs, water discharges and loss of contributing catchment. Cumulative impacts to the GAB are more likely to be significant at the local scale rather than the regional scale.

74. The potential for the project to contribute to cumulative impacts on water resources is fully assessed in Sections 12 and 13 of the draft EIS.

Additional clarification on the quantification of cumulative groundwater impacts is presented in the response to IESC Response 74a.

Refer to the response to IESC Response 77 which specifically addresses the potential for cumulative impacts on the Doongmabulla Springs Complex.

74a) Section 12.4 of the draft EIS explains the method of superimposition that has been used to determine the potential cumulative effects of groundwater depressurisation associated with the project and the adjacent Carmichael Coal Mine. This method is widely used to determine the

cumulative effects of multiple coal mining activities. Within the Galilee Basin, the Galilee Coal Project SEIS states that the Coordinator General and DNRM endorsed this approach to cumulative impact assessment (although a lack of published drawdown contours from adjacent mines ultimately prevented its use). This method is therefore considered theoretically sound and suitable for the purposes of undertaking a cumulative impact assessment.

The depressurisation effects of the Carmichael Coal Mine were approved as part of the draft EIS assessment process for that project. There is insufficient publicly available information to accurately recreate the approved depressurisation effects of the Carmichael Coal Mine in the Project China Stone groundwater model. The proponent has therefore used approved maximum depressurisation contours presented in the Carmichael Coal Mine Project EIS as the basis for the cumulative groundwater impact assessment.

The draft EIS Groundwater Report (Appendix I) provides contour plans showing the maximum predicted depressurisation associated with the project and the adjacent Carmichael Coal Mine. The use of maximum predicted depressurisation for the project and the Carmichael Coal Mine represents a worst-case scenario. This ensures that the cumulative impact assessment is conservative.

Section 12.4 of the draft EIS explains that the magnitude of cumulative depressurisation at a given location corresponds to the sum of these contours. No additional calculations are therefore required to determine the magnitude of cumulative depressurisation.

74b) A cumulative impact assessment is presented in Section 12.4 of the draft EIS that specifically addresses potential impacts on Lake Buchanan located 17 km west of the project site and the Doongmabulla Springs Complex located 22 km south of the project site. The project is not predicted to contribute to cumulative impacts on either Lake Buchanan or the Doongmabulla Springs Complex.

Refer to the response to IESC Response 47 which confirms that the groundwater monitoring network presented in the draft EIS Attachment 24-4 comprises 36 groundwater monitoring points located within the project site and 20 additional groundwater monitoring locations within the surrounding area, including in the vicinity of drainage features located east of the project site.

As discussed in Section 12.5 of the draft EIS the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features such as Lake Buchanan, Caukingburra Swamp and the Doongmabulla Springs Complex.

The proponent will implement any necessary changes to the groundwater monitoring network to ensure that it remains fit for purpose, in accordance with the Queensland EA requirements for

groundwater monitoring. The commitments provided in the draft EIS therefore address the intent of this submission.

On this basis, no additional monitoring at Lake Buchanan, Caukingburra Swamp or the Doongmabulla Springs Complex is required to ensure that the project will not result in significant adverse impacts to the hydrology of these features.

74c) The proponent is currently considering external water supply options including sourcing water from either a managed water supply scheme (operated by a water manager such as SunWater) or through the purchasing of existing water allocations through water trading. The water supply schemes will be operated by others and would be subject to separate environmental impact assessment and approvals.

Refer to the response to IESC Responses 78 and 79 which explains that the project is unlikely to result in significant adverse impacts on downstream surface waters due to discharges from the mine water management system, and that project is likely to have a negligible effect on the contributing catchment of the Belyando River.

The potential impacts on the GAB are discussed in Section 12 of the draft EIS.

IESC Explanation

75. Cumulative impacts were considered from the CCM project and Moray Power Project, but did not consider other 'reasonably foreseeable' coal projects such as the Hyde Park Coal Project.

According to the project's TOR, cumulative impacts are required to be considered for "*existing or proposed project(s) publicly known or advised by the office of the Coordinator-General to be in the region*". As the Hyde Park Coal Project has not yet commenced an EIS or submitted a Mining Lease application it is purely speculative to suggest at this stage that this project will proceed and therefore unreasonable to include such a project in the cumulative impact assessment. In addition, there is no information about the project that is currently publicly available that could be used to assess possible cumulative impacts with Project China Stone. The draft EIS cumulative impact assessment is therefore considered to have appropriately considered all reasonably foreseeable projects.

In addition, it is well established practice that if the Hyde Park Coal Project were to proceed in the future, the TOR for the Hyde Park Coal Project would include a requirement to assess the cumulative impacts of the project with other "*existing or proposed projects"* which would include Project China Stone.

76. The proponent presents maps of maximum cumulative groundwater depressurisation contours for the water table in the Tertiary, and A/B and D coal seams. The proponent has considered project stages to some extent—cumulative groundwater drawdowns have been considered for the coal seams at the end of and following mining. On the basis of the proponent's

assessment, the only area of concern for groundwater impacts is that between the CCM project and the China Stone project. However:

a. There is only one bore to the north of the project area, which did not record a groundwater, level limiting identification and quantification of potential cumulative impacts in this area.

b. The drawdown at the end of mining in the D seams appears to be much lower for the proposed project than for the CCM project.

c. The CCM project modelled depressurisation of up to 1 m in the Clematis Sandstone. The proponent states that there will be no cumulative impact on the Clematis Sandstone, but the IESC has low confidence in this statement given uncertainties in the proponent's modelling.

76a) The draft EIS groundwater model is based upon data collected from an extensive network of bores. These bores are listed in Appendix A1 of the draft EIS Groundwater Report (Appendix I), and shown on Figures 10, 11 and 12 of the draft EIS Groundwater Report (Appendix I). This network includes numerous bores located in the northern part of the project site and north of the project site. These bores were included in the model calibration that informed the groundwater depressurisation predictions for the project. The predicted groundwater depressurisation effects within and north of the project site are therefore based upon a significant body of data (i.e. not a single bore) and therefore provide a suitable basis for informing the groundwater impact assessment.

As shown on Figures 44 to 49 of the draft EIS Groundwater Report (Appendix I), publicly available information shows that the Carmichael Coal Mine Project is not anticipated to result in depressurisation in the northern part of the project site or further north. On this basis, there is no potential for cumulative depressurisation or associated cumulative impacts on groundwater users or any other features in this area.

Refer to the response to IESC Response 75 in relation to the Hyde Park Project.

76b) Noted. The proponent is unable to comment on the accuracy or reliability of groundwater depressurisation predictions presented in the Carmichael Coal Mine Project EIS.

The groundwater modelling predictions presented in the draft EIS Groundwater Report (Appendix I) are based upon a robust dataset that includes all relevant groundwater and geological data presented in the Carmichael Coal Mine Project EIS. Full justification for the groundwater modelling predictions is presented in Appendix B of the draft EIS Groundwater Report (Appendix I).

76c) As discussed in the response to IESC Response 76b, the groundwater modelling predictions presented in the draft EIS Groundwater Report (Appendix I) are based upon a robust dataset and are suitable for the purposes of impact assessment.

77. There is the potential for cumulative impacts as a result of groundwater depressurisation on Darkies Range and subsequent impacts to Doongmabulla Springs Complex and associated downstream ecosystems (e.g. Waxy Cabbage Palm). The proponent rules out cumulative

impacts to the springs as the project's predicted post-mining 1 m drawdown contour only extends half the 22 km to these springs. However, impacts remain uncertain as a thorough assessment of cumulative impacts on the springs has not been undertaken and the source of the springs is not certain (see Webb et al., 2015).

The predicted depressurisation of groundwater regime in the vicinity of Darkies Range is described in Section 12.4 of the draft EIS and shown from Figure 27 to 41 of the draft EIS Groundwater Report (Appendix I). The predicted propagation of depressurisation from Darkies Range to the surrounding groundwater regime is also shown on these figures.

As discussed in Section 12.4 of the draft EIS, the groundwater modelling results clearly show that the project is not predicted to result in significant depressurisation of any geological formations within 11 km of the Doongmabulla Springs Complex.

In order for the springs to experience a significant adverse impact due to the cumulative effects of the Carmichael Coal Mine Project and Project China Stone, it would be necessary for cumulative depressurisation from these activities to occur at the springs.

On this basis, the draft EIS has logically concluded that the lack of significant depressurisation at the Doongmabulla Springs Complex due to the project will therefore preclude any potential for cumulative impacts on the Doongmabulla Springs Complex and any downstream ecosystems. This logic is valid for all geological formations and irrespective of the source of the springs.

The suggestion that the assessment cumulative groundwater impact assessment presented in the draft EIS is not sufficiently detailed is therefore not justified.

Refer to the response to IESC Response 85b which addresses the use of a 1 m contour to define the limit of depressurisation.

78. The proponent rules out cumulative impacts to surface water as the mines and their associated discharges are in different sub-catchments, and discharges are subject to the conditioning of the Queensland Government. However:

a. Cumulative impacts to surface water due to water supply needs for the mines may be significant (up to 12.3 GL/year to be taken from the Belyando/Suttor or Cape River catchments for the proposed project and up to 12.5 GL/year from the Belyando River for the CCM project).

b. Cumulative impacts to the Belyando River from loss of contributing catchment (during mining and final landform, from open-cut pits/voids and subsidence) should also be quantified and assessed.

c. Discharges of mine-affected water during and after heavy rainfall events may be required, which may have adverse impacts on downstream water resources, including ecosystems and other water users. These impacts would be amplified with simultaneous discharges from nearby mines.

78a) As discussed in Section 13.5.5 of the draft EIS, the proponent is currently considering water supply options including sourcing water from either a managed water supply scheme (operated by a water manager such as SunWater) or through the purchasing of existing water allocations through water trading.

The water supply schemes will be operated by others and would be subject to separate environmental impact assessment and approvals.

78b) As discussed in Section 13.6.2 of the draft EIS, the post mining contained catchment corresponds to 0.09% of the Belyando River catchment and 0.03% of the Burdekin Falls Dam catchment. This represents a negligible proportion of the overall receiving catchment areas and hence the project will not have a significant impact on the Belyando River, either alone of cumulatively with other projects.

78c) As discussed in Section 13 of the draft EIS, water balance modelling results indicate that modelling of the proposed mine water management system indicates that there would be no uncontrolled discharges of mine-affected water for the 124 years of climate data assessed. This means that the probability that an uncontrolled discharge will occur is less than once in 124 years (i.e. the average recurrence interval of a discharge event is greater than 124 years).

However, during extended wet periods, significant runoff volumes will accumulate in the open cut pit. To ensure that the open cut mine can continue to operate following these extended wet periods, the ability to discharge mine-affected water under controlled conditions is required. The water management system has therefore been designed to allow for the controlled release of stored pit water from the Mine Water Dam to the Belyando River catchment.

Any controlled discharges from the Mine Water Dam would be conducted in accordance with the EHP's model mining conditions. These conditions are designed to prevent any adverse impacts on downstream environmental values and are required to consider potential cumulative impacts with discharges from other approved mines.

79. The project assessment documentation would benefit from identification of:
a. specific measures for monitoring cumulative impacts;
b. relevant programmes to assess or mitigate cumulative impacts, or the proponent's participation in these; and
c. modifications or alternatives to avoid, minimise or mitigate potential cumulative impacts, including opportunities to work with others.

Refer to the response to IESC Response 47 which describes the proposed groundwater monitoring program in relation to cumulative impacts.

Revised draft EA discharge conditions are presented in Attachment E – Additional Information on Surface Water. These conditions are designed to ensure there are no adverse impacts on the

downstream receiving waters including cumulative impacts. These conditions also include monitoring that ensures the cumulative effect of controlled discharges does not result in significant adverse impacts on downstream surface water values or users.

In addition, a REMP will be implemented in accordance with the requirements for the Queensland EA. The REMP is described in Attachment E – Additional Information on Surface Water and includes surface water monitoring locations downstream of the project site and will monitor any potential cumulative effects on the receiving environment.

The project is not predicted to contribute to significant cumulative impacts on groundwater or surface water and therefore no additional cumulative management or mitigation measures are warranted.

80. Appropriate monitoring and adaptive management mechanisms should be developed in consultation with the owners of nearby mines and should be put in place for potential cumulative impacts to the Doongmabulla Springs Complex (similar to the Joint Industry Plan in the Surat Basin), and the Belyando River catchment.

As discussed in Section 12.4 of the draft EIS, the project is not predicted to impact the Doongmabulla Springs Complex.

Section 12.5 of the draft EIS describes the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features such as the Doongmabulla Springs Complex.

No additional monitoring or adaptive management measures are required in relation to the Doongmabulla Springs Complex.

Refer to the response to IESC Responses 78 and 79 in relation to potential cumulative impacts on the Belyando River catchment.

81. The Lake Eyre Basin bioregion, which includes the Galilee Basin subregion, has been identified as a Bioregional Assessment priority region. Data and relevant information from the proposed project should be made accessible to this Bioregional Assessment and related research projects.

The proponent will consider any specific requests for information on a case-by-case basis.

67.14 QUESTION 14

Does the IESC agree with the proponent's assessment that impacts on the Doongmabulla Spring Complex, 22km south of the proposed open cut pit, as a result of the project or as a result of cumulative impacts with the Carmichael Coal Mine and Rail Project are unlikely?

IESC Response

82. Given the proponent's approach to cumulative assessment (refer response to Question 13) and the alternative conceptualisations of the springs (Webb et al., 2015), there is uncertainty with the proponent's assessment that impacts to the Doongmabulla Springs Complex are unlikely.

Refer to the response to IESC Response 77.

83. To enable a rigorous assessment of potential impacts and the development of appropriate mitigation measures, further geochemical data to identify the source aquifer of the Doongmabulla Springs Complex, revision of the numerical groundwater model and further groundwater monitoring is needed. An adaptive management approach with limits and triggers, and a joint industry approach between the proponent and the CCM project should be developed. For example, a limit of 0.2 m of drawdown at the spring would address the uncertainty regarding the spring's source and potential cumulative impacts. This approach is similar to the conditions placed on approvals for coal seam gas projects to protect springs in the Surat Basin.

Refer to the response to IESC Response 77.

IESC Explanation

84. The Doongmabulla Springs Complex, which support an EPBC Act listed endangered ecological community, is located 22 km south of the proposed mining area. There is evidence to support the hypothesis that the Clematis Sandstone, sourced from Darkies Range, is the source aquifer for the Doongmabulla Springs Complex, e.g. Bradley (2015). More data is needed to gain an accurate understanding of the groundwater chemistry and flow directions in the Clematis Sandstone.

Refer to the response to IESC Response 77 which explains that the project is not predicted to result in significant depressurisation of any geological formations within 11 km of the Doongmabulla Springs Complex.

Groundwater levels and flow directions in the Clematis Sandstone are presented in Figure B7 of the draft EIS Groundwater Report (Appendix I). These flow directions are based upon an extensive body of data collected from in excess of 100 bores within the project site, the Carmichael Coal Mine site and the surrounding area, including more than 20 bores targeting the Clematis Sandstone. The groundwater flow directions in the Clematis Sandstone are therefore well understood and suitable for the purposes of informing the groundwater impact assessment.

The groundwater chemistry of the Clematis Sandstone is not material to the conclusions of this assessment.

No further actions are warranted in response to this submission.

85. Drawdown impacts were not predicted to the Doongambulla Springs Complex, however the sensitivity analysis predicts the 1 m contour for the maximum zone of depressurisation in the Clematis Sandstone will be less than 3 km from the Doongmabulla Springs Complex. There is considerable uncertainty with regard to the prediction that these springs will not be impacted given the:

a. uncertainty in the hydrogeological conceptualisation and the numerical groundwater modelling predictions; and

b. uncertainty around the cumulative impact assessment for the Clematis Sandstone presented in the EIS, including the lack of 0.2 m drawdown contours.

85a) It is not the purpose of sensitivity analysis to provide alternative depressurisation predictions upon which to base an impact assessment. The impact assessment presented in the draft EIS is based on conservative predictions derived from the best available data and robust modelling.

The purpose of the sensitivity analysis is to determine the model sensitivity to changes in key parameters. The sensitivity analysis considered several sensitivity scenarios including:

- The effect of changing both the horizontal and vertical hydraulic conductivities by +/- 1 order of magnitude across all model layers simultaneously; and
- The effect of changing the specific storage by +/-1 order of magnitude across all model layers simultaneously.

Crucially, these changes have been applied to all layers simultaneously in order to determine the sensitivity of the overall model to these parameters.

As discussed in Section B3 of the draft EIS Groundwater Report (Appendix I), as expected each of these scenarios increased the overall model error and reduced the ability of the model to match measured groundwater levels. This shows that the values adopted in the sensitivity analysis are unrealistic extreme values. These values are therefore less appropriate for impact assessment than the range of values adopted in the model for the predictions.

The effects of these sensitivity scenarios on the extent of depressurisation in the Clematis Sandstone is shown in Figures B16 and B18 of the draft EIS Groundwater Report (Appendix I). These figures show that despite the use of unrealistic extreme hydraulic parameters, the extent of depressurisation is unlikely to extend to the Doongmabulla Springs Complex. It can therefore be concluded with a high degree of confidence that the project will not affect these springs.

Refer to the response to IESC Response 77 in relation to the conceptualisation of the Clematis Sandstone and the Doongmabulla Springs Complex.

85b) As discussed in Section 12.4 of the draft EIS, the zone of depressurisation includes the area that is predicted to experience a 1 m or greater lowering of the potentiometric groundwater surface due to depressurisation. The 1 m depressurisation contour therefore represents the extent of the zone of depressurisation.

The 1 m depressurisation contour is typically adopted in defining the zone of depressurisation as this represents the reasonable limit of precision that can be inferred from groundwater modelling and is within the likely natural range of groundwater level fluctuations within any potentially impacted aquifers.

Predictions of groundwater depressurisation in the order of 20 centimetres over a distance of 22 km (i.e. the distance between the project site and the Doongmabulla Springs Complex) are there therefore beyond reasonable limit of precision that can be inferred from groundwater modelling. Regardless, the considerable distance between the predicted limit of depressurisation and the springs, defined by the 1 m drawdown contour, i.e. approximately 10 km, provides a high level of confidence that the project will not impact the springs.

Refer to the response to IESC Response 77 for further discussion of the assessment of cumulative impacts on the Doongmabulla Springs Complex.

67.15 QUESTION 15

Has the proponent adequately identified downstream environmental and public use values that could be impacted as a result of the project? Is the proposed monitoring program adequate to establish baseline values and identify and quantify potential impacts as a result of the project?

IESC Response

86. The proponent has identified some downstream recreational uses (Wilandspey, and Burdekin Falls Dam). However potential environmental and public use values on the 64 km length of floodplain to the Belyando River, which may be impacted by discharges were not identified.

As discussed in Section 13 of the draft EIS, the project site is located in the headwaters of North Creek. The North Creek catchment is characterised by cattle grazing use. No significant public use values are present in this area.

The controlled release of mine-affected water will be undertaken in accordance with model EA discharge conditions that are designed to prevent significant impacts to the environmental values of receiving waters. Attachment E – Additional Information on Surface Water provides information in relation to the model discharge conditions that are designed to avoid impacts to the environmental values of North Creek and its headwaters.

87. The proponent claims to have an indicative baseline dataset for surface waters, which is based on Queensland Department of Natural Resources and Mines gauges outside of the project area. At a regional scale, monitoring may be considered adequate but the proposed monitoring onsite is inadequate to establish baseline values and quantify potential impacts. Recommendations on how to improve the surface water monitoring programme have been included in response to Question 16.

The surface water monitoring data presented in the draft EIS was focussed upon the potential impacts to the Belyando River as the receiving waters for releases of mine-affected water from the project site. The draft EIS cited extensive water quality and flow data from which to derive a suitable baseline, locally relevant water quality objectives and EA discharge conditions.

In response to numerous submissions, the proponent has agreed to adopt North Creek as the receiving water for mine-affected water rather than the Belyando River. This change in discharge strategy was not anticipated and consequently the available water quality and flow data relating to North Creek is limited. In addition, the project site is remote and is located at the head of the North Creek catchment and experiences highly ephemeral, short duration, surface water flows which severely limits the ability for any regular sampling of surface water flows from North Creek.

The proponent is proposing to implement a baseline water quality and flow monitoring program for North Creek. The baseline monitoring program will be undertaken in accordance with the Queensland Water Quality Guidelines, prior to the commencement of the project.

Baseline water quality and flow data collected as part of this monitoring program will also be used to establish locally relevant water quality objectives for North Creek in accordance with the Queensland Water Quality Guidelines. The water quality objectives will be used in the development of site-specific EA conditions for the controlled release of mine-affected water to North Creek in accordance with the EHP model mining conditions.

The baseline water quality data (and derived water quality objectives) will also inform the REMP baseline and objectives. The REMP is described in detail in Attachment E – Additional Information on Surface Water.

The details of the proposed baseline water quality and flow monitoring programs are provided in Attachment E – Additional Information on Surface Water. Water quality and flow gauging will be undertaken on North Creek downstream of the proposed controlled release point and on the Belyando River.

67.16 QUESTION 16

Have the potential risks and impacts of contamination to water resources been adequately identified, assessed and quantified? If not, what additional measures could be implemented to adequately mitigate, manage and monitor potential risks and impacts?

IESC Response

88. Impacts to water resources from contamination have been assessed. Additional information on the geochemistry of the target coal seams, particularly to the northern area of the project area, would have been beneficial.

The geochemistry of the target coal seams is assessed in the draft EIS Geochemistry Report (Appendix D).

89. To monitor and manage potential risks, surface water and groundwater monitoring locations around waste storage facilities should be clearly identified and molybdenum, selenium, and aluminium be included in regular surface water quality sampling.

A REMP will be implemented in accordance with the requirements for the Queensland EA. The REMP is described in Attachment E – Additional Information on Surface Water and includes surface water monitoring locations downstream of the project site. Surface water monitoring undertaken in accordance with the REMP will include regular testing for molybdenum, selenium, and aluminium.

Section 12.5.2 of the draft EIS describes the proposed groundwater monitoring program. Details of the proposed groundwater monitoring bores are provided in Attachment 24-4 of the draft EIS. The monitoring program includes bores located in the vicinity of the tailings and power station waste storage facilities. The proposed groundwater monitoring program includes selenium, molybdenum and aluminium.

IESC Explanation

90. Potential impacts to water resources could result from surface runoff or seepage from: overburden emplacement areas; the Tailings Storage Facility and Power Station Waste Storage Facility; and raw coal stockpiles.

The potential groundwater quality impacts associated with the overburden emplacement areas; the Tailings Storage Facility and Power Station Waste Storage Facility are addressed in Section 12.4.9 of the draft EIS.

The water table in the vicinity of the coal stockpiles is relatively deep, and any leachate generated from the stockpiles will be of a similar quality to any groundwater that may be present in the underlying sediments. The coal stockpile bases will be constructed from compacted materials that will minimise leachate generation. However were seepage to occur, a degradation in groundwater quality is unlikely.

Section 13.4.1 of the draft EIS presents a site drainage plan that includes the management of runoff from overburden emplacement areas, the Tailings Storage Facility, the Power Station Waste Storage Facility and the raw coal stockpiles. As discussed in Section 13.4.1, drainage from these areas will be managed to ensure that there are no adverse effects on surface water quality.

91. Raw coal and coal reject material were sourced from the southern mining area only. Furthermore, some coal reject material was gathered from E, F and G seams which is not relevant, as these seams are not being targeted by the project.

A total of 81 coal and coal reject samples were included in the geochemical testing program. The coal reject sample materials were collected from representative geology within the project site.

The EHP model mining EA condition require the regular sampling and geochemical characterisation of coal reject material during the operation phase.

92. Geochemical testing on tailings material indicate that any leachate from the Tailings Storage Facility is likely to be of better quality than the tertiary groundwater so degradation of groundwater quality is improbable should any seepage from the Tailings Storage Facility occur. The proponent states the facility will be designed to minimise leachate generation, but no information was provided on how this will be achieved.

Section 7.4.3 of the draft EIS describes the construction and operation of the Tailings Storage Facility, including the installation of a seepage collection system to collect and contain any water seeping from the Tailings Storage Facility.

93. Based on the benign nature of the materials tested, no special management measures are proposed. The proponent commits to:

a. Quarterly monitoring of pH, EC, TSS, dissolved trace metals/metalloids and major ions for surface runoff and seepage from the overburden emplacement area, tailings storage, raw coal stockpile, feed coal stockpile and power station waste facility. In addition to the analytes proposed, monitoring of selenium, molybdenum, nickel and aluminium is essential where runoff or seepage from overburden or coal material is likely.

b. 'Regular' inspections of storage facilities. The frequency of 'regular' inspections of waste storage facilities should be clarified.

93a) Refer to the response to IESC Response 89 which describes the REMP that will be implemented to monitor receiving surface waters, and the groundwater monitoring program that will be undertaken during the operations phase.

Runoff from contained catchments (including mine wastes and stockpiles) will be captured within the mine water management system. A water management system monitoring program is described in Section 13.5.6 of the draft EIS. Releases from the mine water management system

will be monitored in accordance with the potential contaminants listed in Table 7 of Attachment 24-4 of the draft EIS. This includes selenium, molybdenum, nickel and aluminium.

93b) The frequency of the proposed inspections will be determined as part of the detailed health, safety and environment procedures to be developed prior to commencement of the project. Indicatively, a tiered system of weekly, monthly and quarterly inspections may be undertaken. However, the frequency of the inspections will vary over the life of the mine in response to the progressive development of these structures.

67.17 QUESTION 17

Would backfilling the pits to a level to prevent excessive groundwater intrusion be an effective management option to ameliorate post mining flow rates to the final void (predicted at 0.5ML/day from GAB and 0.5 ML/day from non-GAB management units such as the Greater Western Artesian Area)?

IESC Response

94. Backfilling would be an effective management option to ameliorate flow rates to the final void by reducing excess evaporation and subsequent ongoing groundwater inflow.

In order to prevent post mining groundwater take it would be necessary to backfill the final void to a level that is above the pre-mining groundwater level (i.e. a backfilling depth of up to approximately 300 m).

On this basis, it is not economically feasible for this mine (or any other Galilee Basin open cut mine) to backfill the final void to the extent necessary to prevent post mining groundwater take, and a commitment of this nature would be unprecedented for a coal mining project in the Galilee Basin or elsewhere.

Furthermore, the post mining groundwater take of 183 ML/year represents a minor volume of groundwater within the context of the GAB aquifers and is not a significant proportion of the sustainable yield of the GAB. Post mining groundwater take is therefore not likely to result in any significant adverse effects on the GAB groundwater resource or significant impacts on sensitive environmental features. The proponent will be required to mitigate impacts on water or any associated bores as a condition of its associated water licence under the Queensland *Water Act 2000*.

In conclusion, the suggested additional commitment to backfilling the void in order to manage impact is inconsistent with existing regulations and unjustified. The suggestion is also not economically feasible.

IESC Explanation

95. Post mining, the final voids are predicted to act as a sink to groundwater flow. This will reduce the hydraulic gradient and magnitude of drawdown immediately surrounding the mined areas but also allow the zone of depressurisation to continue to expand as water from the surrounding groundwater systems (Moolayember Formation and Clematis Sandstone) flow into the voids. Considering the voids are positioned at the base of Darkies Range, further evidence should be provided to support the concept that the final voids will act as groundwater sinks, rather than groundwater through-flow systems.

For the purposes of clarity, Section 12.4.2 of the draft EIS states that the final void will fill with water post closure (due to the cessation of active dewatering of mined areas). The hydraulic gradient and magnitude of drawdown around the mined areas is predicted to reduce as this

process occurs. The draft EIS does not state that this process is due to the voids acting as a groundwater sink, nor does it state that the Moolayember Formation and Clematis Sandstone are the surrounding groundwater systems from which water will flow towards the final voids.

Groundwater movement occurs from areas of high hydraulic head to areas of low hydraulic head along a hydraulic gradient. The difference in head between the final void lake and the local groundwater regime and will determine the direction and gradient of groundwater flow, and hence whether the final void will act as a groundwater sink or a flow through system. Conceptually, a groundwater sink will occur where the head in the final void lake is lower than the local groundwater regime (i.e. hydraulic gradient is towards the void). A flow through system may occur where the head in the final void is lower than the local groundwater regime in some areas and is equal to (or higher than) the local groundwater regime in other areas (i.e. hydraulic gradient is towards the void in areas and away from the void in other areas).

The conceptualisation of final void as a permanent groundwater sink is supported by a substantial body of evidence including:

- Final void water balance modelling undertaken to assess the likely final void water levels shows that the long-term final void lake water level is predicted to fluctuate in the range of 249 to 260 m AHD with an average elevation of 255 m AHD. The final void water balance modelling is described in the draft EIS Water Management System Modelling Report (Appendix K).
- Groundwater monitoring data presented in Section 6 of the draft EIS Groundwater Report (Appendix I) which shows that recorded groundwater levels within the Tertiary sediments, Rewan Formation and Permian coal measures are higher than the final void water level from all directions.
- Calibrated groundwater heads presented in Appendix B of the draft EIS Groundwater Report (Appendix I) which show that local groundwater heads are higher than the final void water level from all directions.
- Post mining numerical groundwater modelling predictions which show that the final voids will continue to act as a groundwater discharge zone for the local groundwater regime. On this basis, post mining groundwater modelling shows that the resulting hydraulic gradient will cause groundwater movement towards the final void.

The draft EIS therefore provides sufficient data to support the conceptualisation of the final void as a permanent groundwater sink (as discussed in Section 12.4.2 of the draft EIS). No additional evidence is therefore required to address this submission.

Furthermore, the evidence does not support the conceptualisation of flow through conditions in the vicinity of the final void and therefore further consideration of these conditions is not justified.

96. Further assessment taking into account seasonal and climatic variations (i.e. high rainfall and flooding) would be beneficial to assess final void water levels and the likelihood of the final voids discharging water into surface water and groundwater systems. Given that the final void is predicted to act as a groundwater sink, salt and other potentially harmful constituents will be expected to accumulate in the final voids and these should be modelled to inform adequate mitigation and management measures.

Section 13.6.6 of the draft EIS describes the modelling undertaken to determine water levels in the final voids. Direct rainfall and catchment runoff to the final void has been calculated from 124 years of daily climate data. This climate data includes all seasonal and climatic variations recorded over this period, including periods of high rainfall. On this basis, the draft EIS final void assessment fully accounts for the seasonal and climatic variations raised in this submission.

A final void water balance model was developed as part of the draft EIS to predict the final void water levels and assess the likelihood of overflow of water from the final void. The final void modelling results are discussed in Section 13.6.6 of the draft EIS and the final void water level is shown on Graph 13-3 of the draft EIS. Section 13.6.6 of the draft EIS shows that the long-term final void lake water level is predicted to fluctuate in the range of 249 to 260 m AHD with an average elevation of 255 m AHD. The average final void water level is 50 m below the final void spill point elevation of 305 m AHD. Overflow of water from the final void to downstream drainage is therefore extremely unlikely based upon the final void modelling results. No further assessment is required.

As discussed in Section 12.4.9 of the draft EIS, the final void water level is predicted to be lower than the pre-mining groundwater levels. Post mining groundwater modelling shows that the resulting hydraulic gradient will result in groundwater movement towards the final void. The final void will therefore act as a permanent groundwater sink. As a result of these hydraulic conditions, the surrounding groundwater quality and any associated other environmental values or features, are highly unlikely to be impacted post closure. On this basis, no mitigation or management measures are required to address water quality in the final void.

The assessment of final void impacts is based upon hydraulic conditions and is therefore independent of water quality in the final void. Modelling of water quality therefore amounts to a theoretical exercise that will not materially affect the conclusions of the final void assessment presented in the draft EIS. On this basis, no further assessment is warranted.

97. The management of the voids could be further strengthened by providing a Final Void Management Plan, to be developed prior to completion of mining in the first pit. This plan should consider aspects such as groundwater hydrology, surface water hydrology and include measures to minimise potential impacts associated with the final voids. In the Final Void Management Plan, the proponent should demonstrate that impacts to water resources are mitigated and managed in perpetuity and consider options for the post-mine use.

The requirement for a Final Void Management Plan is a standard EA condition for open cut mines.

67.18 QUESTION 18

Has the EIS definitively shown that groundwater impacts will not affect Caukingburra Swamp north east of Lake Buchanan (which extends for 2km with a northwest-southeast orientation and up to 1km wide located in the same closed drainage depression as Lake Buchanan). If not, what further work should be completed to satisfactorily demonstrate this?

IESC Response

98. The EIS does not assess potential impacts to Caukingburra Swamp. There is uncertainty as to whether the swamp is groundwater fed. However, based on the current modelling predictions due to the distance from the project area, there is a low likelihood of impacts as a result of the project, even if the swamp is a GDE.

Section 12.4 of the draft EIS provides an assessment of the potential impacts to the closest sensitive groundwater users and other relevant environmental features.

Caukingburra Swamp is located at the northern end of Lake Buchanan. Lake Buchanan is located 17 km west of the project site. As explained in Section 12.4.4 of the draft EIS, groundwater modelling shows that the maximum predicted extent of depressurisation associated with the project does not extend to Lake Buchanan. The project is therefore unlikely to result in any impacts on water levels in the lake.

Caukingburra Swamp is located approximately 1 km further from the project site than Lake Buchanan, at the closest point (i.e. the swamp is approximately 18 km from the project site). Hence, the maximum predicted extent of depressurisation associated with the project does not extend to Caukingburra Swamp and the project is unlikely to impact water levels in the swamp.

As noted in this submission, the degree to which Caukingburra Swamp may be groundwater dependent has no bearing on the outcome of this impact assessment.

99. Detailed surveys and monitoring should be undertaken on Lake Buchanan and Caukingburra Swamp to determine water requirements and sources to provide confidence in assessing any potential impacts.

For clarity, it has been assumed that the 'water requirements' discussed in the submission are referring to Lake Buchanan and Caukingburra Swamp. There is no means of directly measuring groundwater discharge into a lake or swamp. The rate of groundwater discharge in the vicinity of Lake Buchanan has therefore been determined by numerical modelling for the purposes of the draft EIS groundwater study. The modelled rate of groundwater recharge provides an optimal calibration result and is consistent with the wider groundwater regime. These results are therefore suitable for the purposes of the draft EIS and no further action is proposed at this time.

Conceptually, the potential sources of water for Lake Buchanan and Caukingburra Swamp could include:

- The regional groundwater table;
- A perched groundwater regime; and/or
- Surface water runoff.

The draft EIS presents a conceptualisation of Lake Buchanan as a likely discharge zone for the regional groundwater regime. Sections 5 to 7 of the draft EIS Groundwater Report (Appendix I) describe the extensive body of desktop information and field data that support this conceptualisation. A hydraulic connection was therefore modelled between water levels in Lake Buchanan and the regional groundwater table. This approach allowed for any potential effects of depressurisation on the regional groundwater regime at Lake Buchanan to affect groundwater discharge to Lake Buchanan. The potential impacts of groundwater depressurisation on the environmental values of the lake were therefore fully considered.

However, as discussed in Section 12.4 of the draft EIS, the project is not predicted to result in significant groundwater depressurisation within 6 km of Lake Buchanan or Caukingburra Swamp. Therefore, despite the modelled hydraulic connection, the project is not predicted to result in adverse impacts to the lake.

The potential alternative water sources (listed above) involve Lake Buchanan being perched above the regional groundwater table or functioning as a source of sustained groundwater recharge. These conceptualisations are not supported by the available information and would result in a less conservative impact assessment for the following reasons:

- A perched lake would be hydraulically disconnected from the underlying groundwater regime and any associated effects from the project.
- Modelling Lake Buchanan as a recharge zone would necessarily involve increasing the amount of recharge entering the model cells used to represent Lake Buchanan. This would have the effect of buffering any groundwater drawdown associated with the project in the vicinity of Lake Buchanan.

On this basis, additional surveys and monitoring of Lake Buchanan and Caukingburra Swamp would not result in a more conservative impact assessment or provide any additional confidence in the conclusions presented in the draft EIS, and consequently no further actions are currently proposed.

IESC Explanation

100. Caukingburra Swamp, listed on the Directory of Important Wetlands (DIWA, undated-c), is a seasonal freshwater swamp adjacent to the north east tip of Lake Buchanan. It is a terminal drainage depression and receives surface inflows from the north and off the Great Dividing Range (north of the project area). It is recognised as an important freshwater refuge in the landscape, including for migratory birds. It retains water for a longer period than similar habitats in the region and water may persist through the dry season (Lorimer, 2005), which indicates a potential groundwater contribution.

Refer to the response to IESC Response 98.

101. The Queensland Government WetlandMaps reports that the swamp is likely a closed alluvial system with fresh, intermittent groundwater connectivity and is a low confidence GDE.

Refer to the response to IESC Response 98.

102. Through increased monitoring, the proponent should improve understanding of the groundwater-surface water interactions at Lake Buchanan to ensure mine-induced depressurisation will not impact on the hydrology of Caukingburra Swamp.

The response to IESC Response 99 provides an overview of the understanding of groundwater interactions with Lake Buchanan that is presented in the draft EIS, and explains that this provides a conservative basis for the assessment of potential impacts on the hydrology of Lake Buchanan and Caukingburra Swamp.

Section 12.5 of the draft EIS describes the operations phase groundwater monitoring program that will be implemented to identify any unexpected departures from the draft EIS groundwater modelling predictions. All unexpected departures will be investigated in accordance with the Queensland EA to allow the early identification of any significant departures that could potentially result in impacts to groundwater users or other sensitive environmental features such as Lake Buchanan or Caukingburra Swamp.

On this basis, no additional monitoring at Lake Buchanan and Caukingburra Swamp is required to ensure that the project will not result in significant adverse impacts to the hydrology of these features.



PROJECT CHINA STONE

Attachment D Additional Information on Groundwater

Australasian
Groundwater
and Environmental
Consultants Pty Ltd
(AGE)



Report on

Project China Stone

Additional Information on Groundwater - For Macmines Austasia Pty Ltd

Prepared for
Hansen Bailey

Project No. G1587F August 2017
www.ageconsultants.com.au ABN 64 080 238 642

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Appendix G Updated model recharge figure (Figure B3)

Appendix H Vertical hydraulic conductivity multiplication factor

Report on

Project China Stone

Additional Information on Groundwater (For MacMines Austasia Pty Ltd)

1 Introduction

This document has been prepared by Australian Groundwater and Environmental Consultants Pty Ltd (AGE), on behalf of MacMines Austasia Pty Ltd, in response to submissions made on the Project China Stone (the project) Draft Environmental Impact Statement (draft EIS).

This document provides additional information on groundwater in response to submissions provided by the Department of Environment and Heritage Protection (EHP), Department of Natural Resources and Mines (DNRM) and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the IESC).

These submissions raised issues in relation to:

- baseline groundwater levels;
- conceptual groundwater regime in the vicinity of Lake Buchanan;
- sensitivity analysis; and
- subsidence effects on vertical hydraulic conductivity.

The following additional information has been provided in support of the responses to these submissions and as requested by DNRM in the groundwater meeting convened by the Office of the Coordinator-General on 21 June 2017:

- Appendix A provides hydrographs showing baseline groundwater level data collected from monitoring bores and vibrating wire piezometers (VWPs) as part of the pre-mining groundwater monitoring program described in Section 12.5.1 of the draft EIS.
- Appendix B provides a figure showing groundwater levels in the vicinity of Lake Buchanan supporting the conceptualisation of Lake Buchanan as a discharge zone for the regional groundwater table.
- Appendix C provides information on the relationship between coal seam hydraulic conductivity and its depth below surface, and the basis of the representation of coal seam conductivity in the EIS groundwater model.
- Appendix D provides figures showing the sensitivity of modelled depressurisation predictions in the Tertiary Sediments, Clematis Sandstone and Betts Creek Beds (including the target coal seams). Figures show the results of:
    - The sensitivity analysis scenarios described in Appendix B of the draft EIS Groundwater Report.
    - An additional sensitivity analysis of the effects of increasing the hydraulic conductivity values in only the coal seams (shown as 'Coal (K+)' on each figure.
    - The effects of reducing the rate at which the hydraulic conductivity of the coal seams declines with depth, coupled with an increase in the minimum hydraulic conductivity that the coal seams reduce to (shown as 'Coal (K depth))' on each figure).

- Appendix E provides a figure illustrating an example of the modelled factors applied to reflect the effects of subsidence on vertical hydraulic conductivity.
- Appendix F provides a figure showing the monitoring bores in the groundwater monitoring bore program described in Attachment 24-4 of the draft EIS.
- Appendix G provides an updated Figure B3 from the draft EIS Groundwater Report with the correct model recharge rates presented in the legend (mm/yr rather than m/yr).
- Appendix H provides the factors applied to the horizontal hydraulic conductivity values to calculate the vertical hydraulic conductivity for each model layer in the EIS. The same factors were applied to calculate the vertical hydraulic conductivity of a selected layer where changes were made to the horizontal hydraulic conductivity values during sensitivity analyses.

This report is an attachment to the Supplement to the draft EIS for the project. The Supplement of the draft EIS is Volume 6 and should be read in conjunction with the draft EIS Volumes 1 – 5 that were publicly exhibited. Together, Volumes 1 – 6 form the revised draft EIS for the project.

To the extent of any inconsistencies, the information in this attachment supersedes any information in any other volume of the draft EIS.

Appendix A **Baseline groundwater levels**

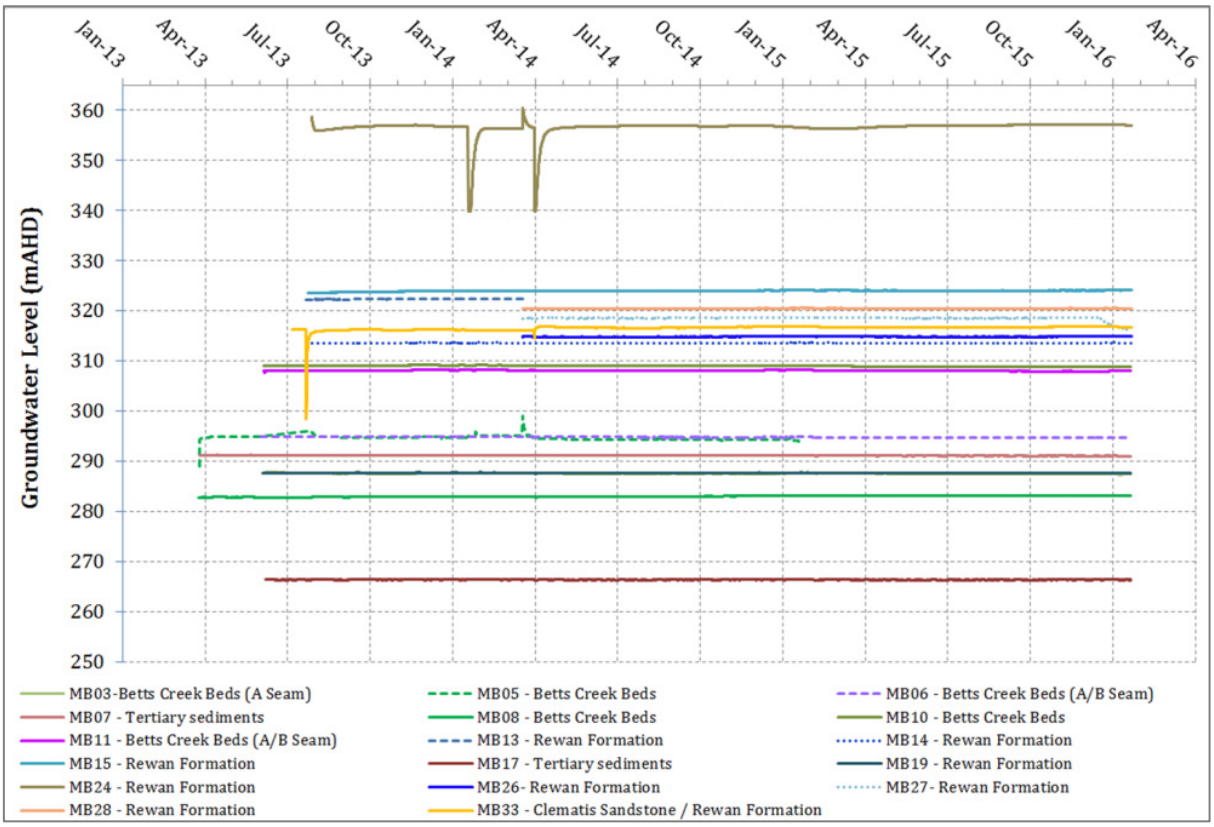


Figure A1 Monitoring bore hydrographs

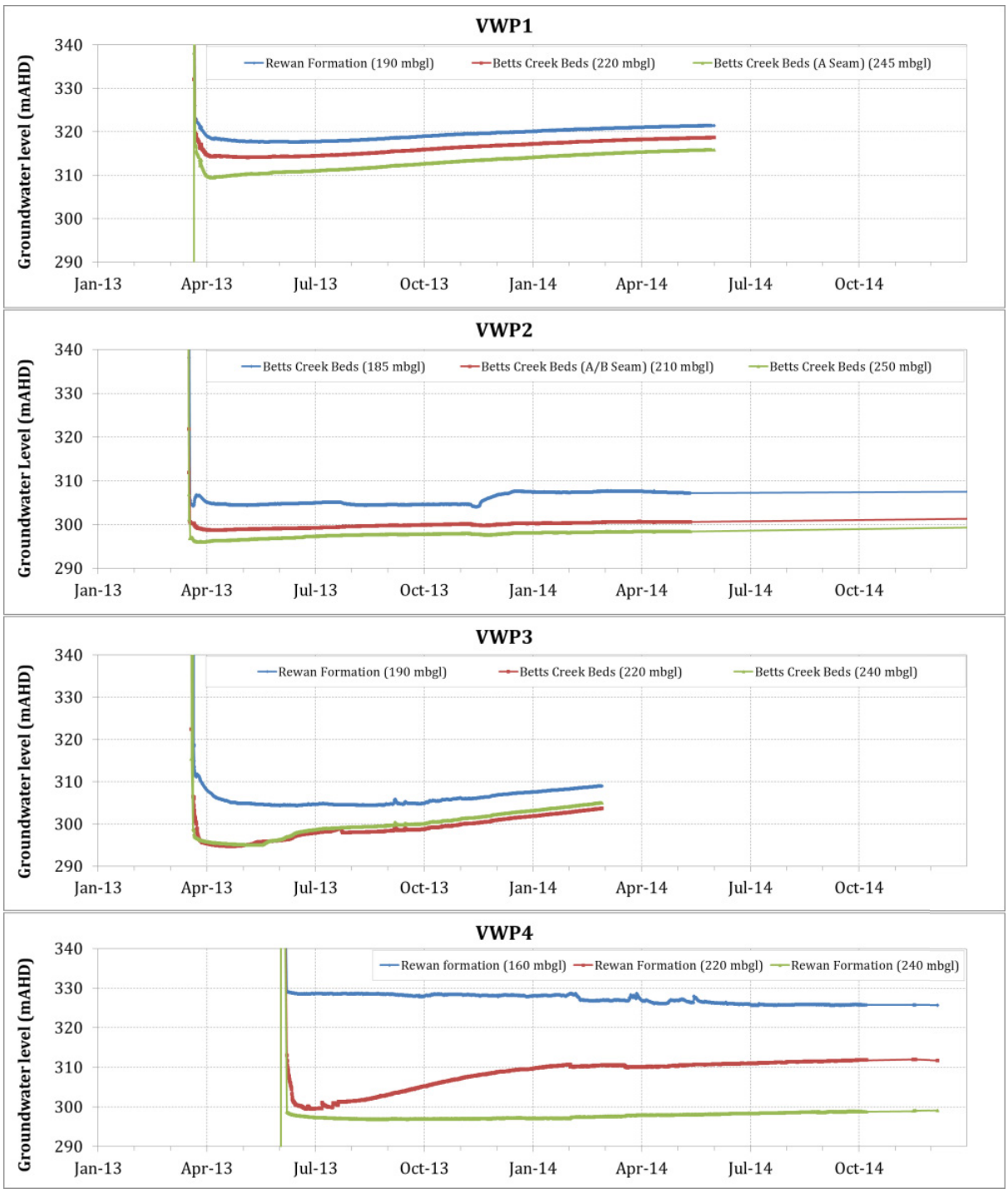
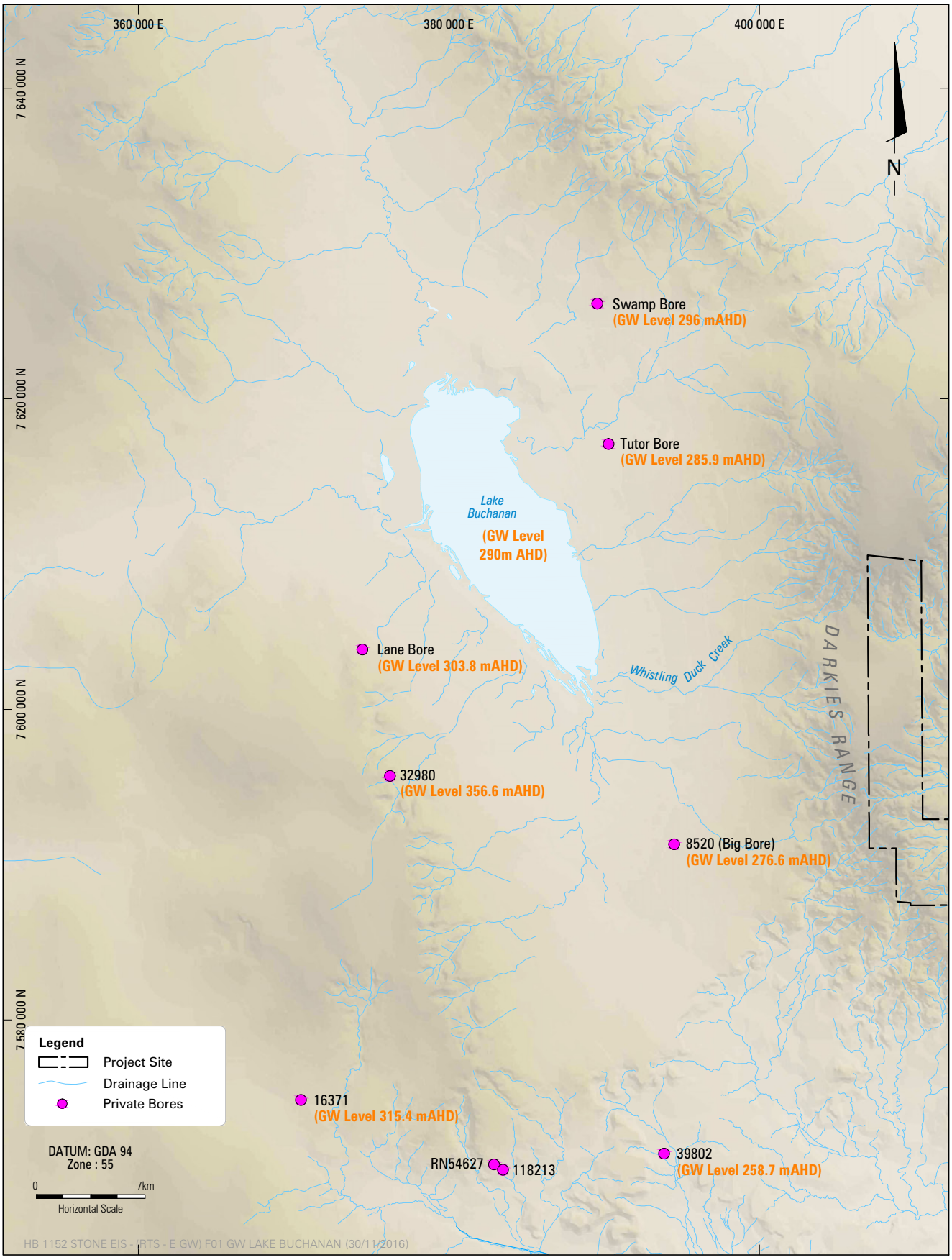


Figure A2 Vibrating wire piezometer hydrographs

Appendix B **Lake Buchanan groundwater regime**



PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Lake Buchanan Groundwater Regime

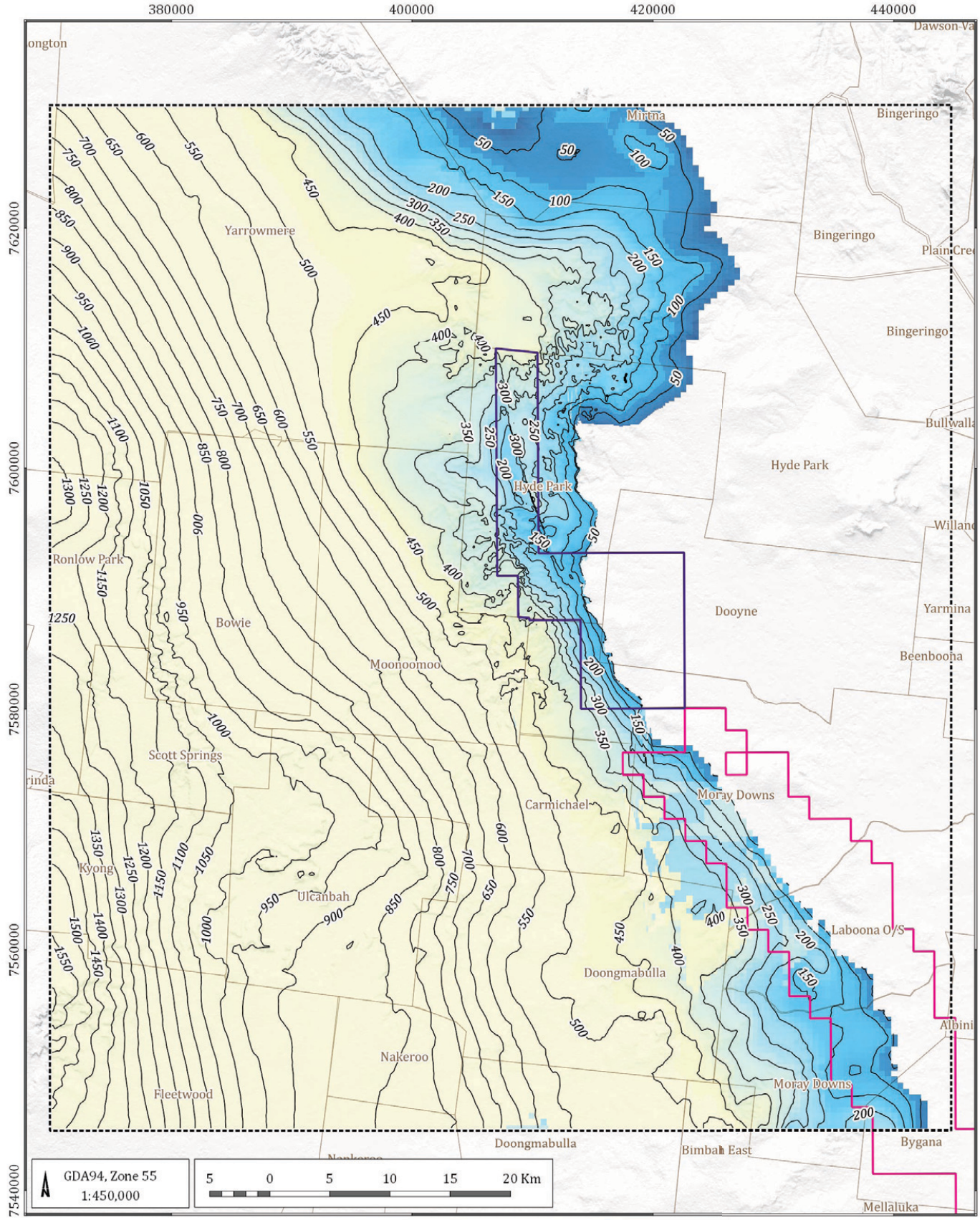
FIGURE B1

Appendix C Coal seam hydraulic conductivity vs depth

C1 Modelled hydraulic conductivity with depth

Figures C1 to C4 show the modelled baseline hydraulic conductivity of the coal seams across the model domain along with the depth to the top of the model layer representing the top of each seam. The figures show a deepening of the coal seams towards the west, with the hydraulic conductivity only changing in the upper 400-500 m. Below this depth the hydraulic conductivity of the coal is limited to a minimum of 8.6×10^{-6} m/d.

The relationship developed to represent a decline in hydraulic conductivity with depth is provided in Section C2.



LEGEND

- Project site
- Carmichael Coal Mine Project
- Model boundary
- Pastoral station

Depth to top of coal seam contour (m)

Hydraulic conductivity (m/day)

- 0.00001
- 0.00005
- 0.0001
- 0.0005
- 0.001
- 0.005
- 0.01
- 0.05
- 0.1
- 0.5
- 1.0

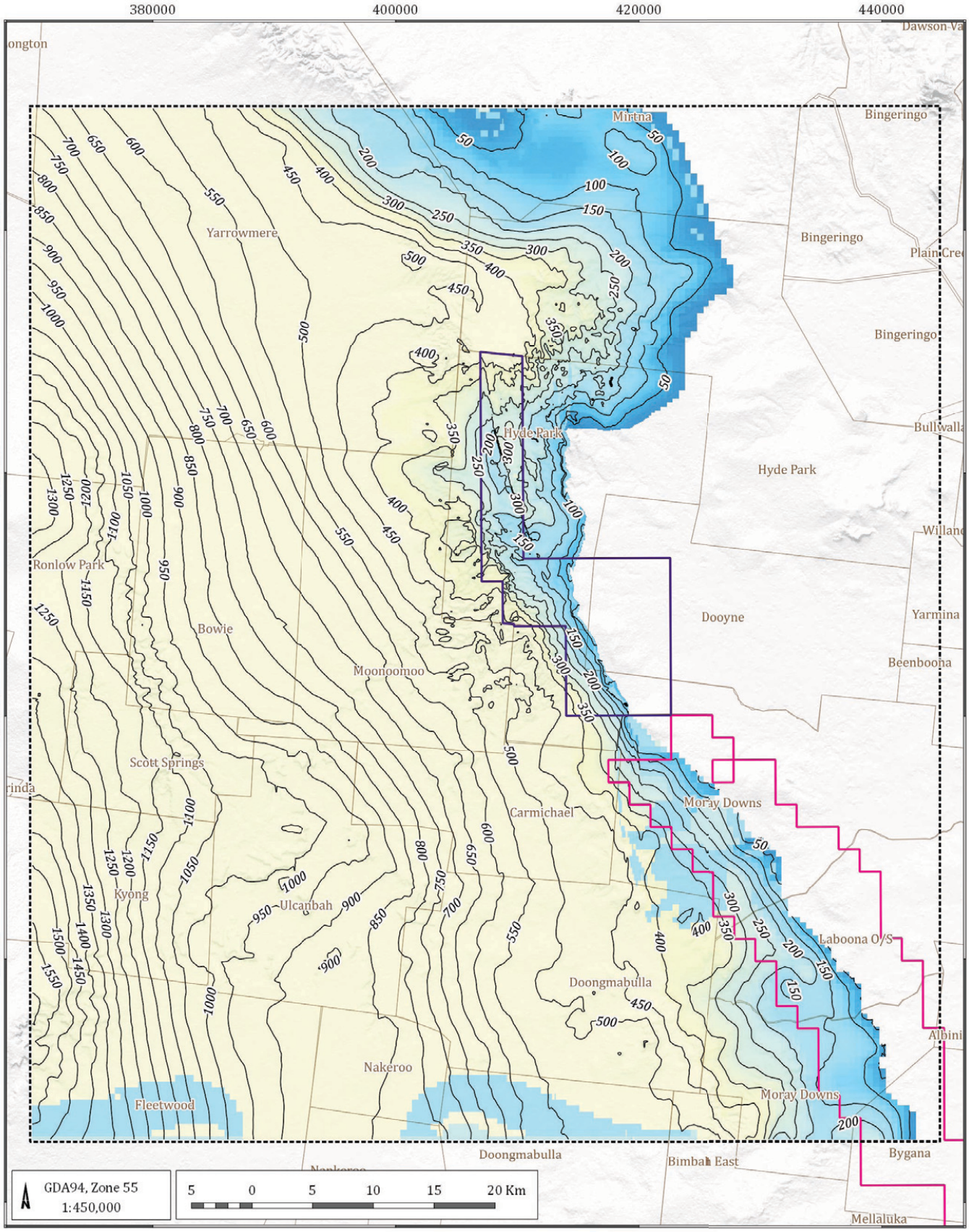
Project China Stone (G1587F)

Horizontal hydraulic conductivity and depth to top of coal seam
A seam (layer 10)

DATE 04/07/2017

FIGURE No: **C1**

©2017 Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) - www.ageconsultants.com.au
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LEGEND

- Project site
- Carmichael Coal Mine Project
- Model boundary
- Pastoral station

Depth to top of coal seam contour (m)

Hydraulic conductivity (m/day)

- 0.00001
- 0.00005
- 0.0001
- 0.0005
- 0.001
- 0.005
- 0.01
- 0.05
- 0.1
- 0.5
- 1.0

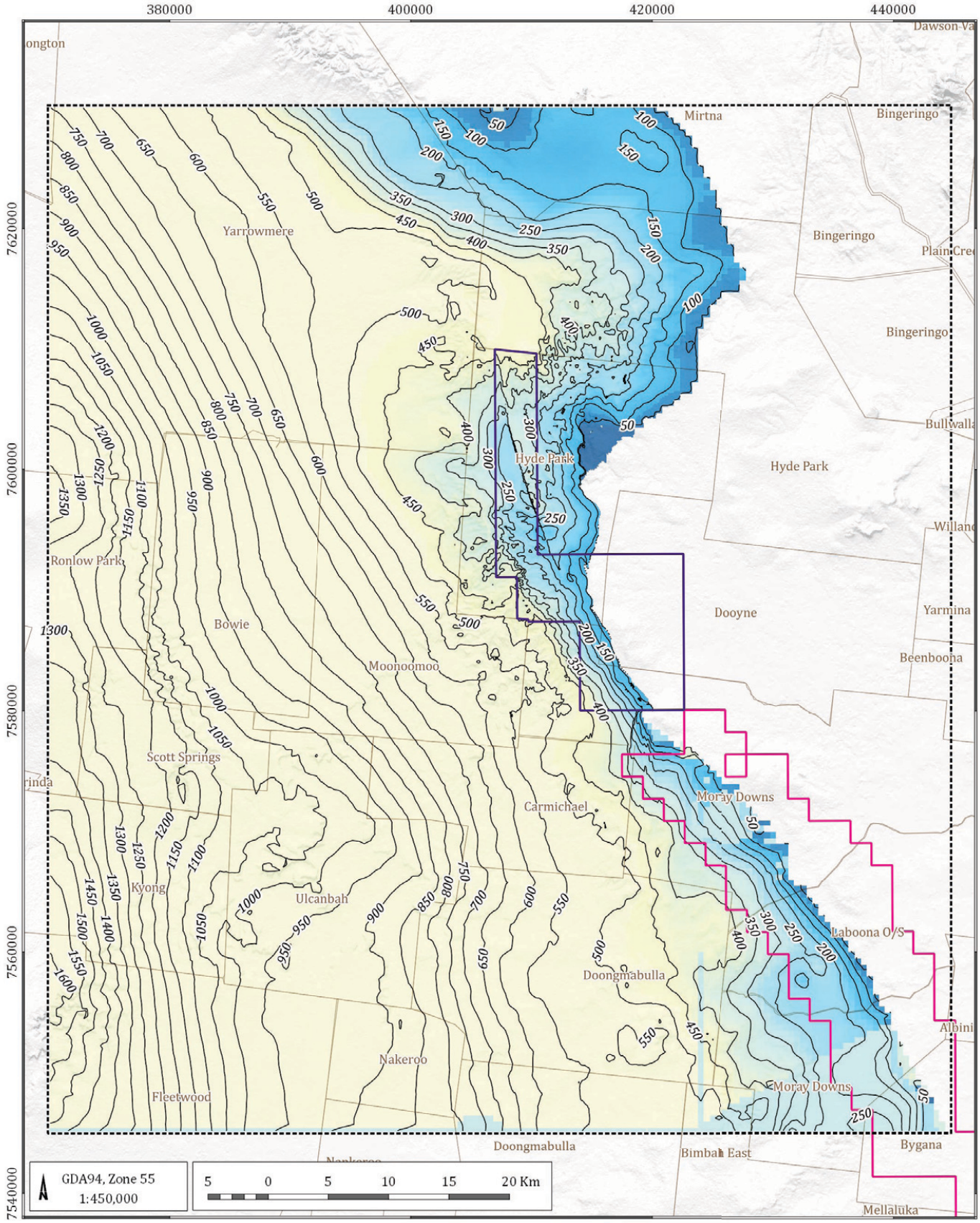
Project China Stone (G1587F)

Horizontal hydraulic conductivity and depth to top of coal seam
B seam (layer 12)

DATE 04/07/2017

FIGURE No: **C2**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Model boundary
- Pastoral station

Depth to top of coal seam contour (m)

Hydraulic conductivity (m/day)

- 0.00001
- 0.00005
- 0.0001
- 0.0005
- 0.001
- 0.005
- 0.01
- 0.05
- 0.1
- 0.5
- 1.0

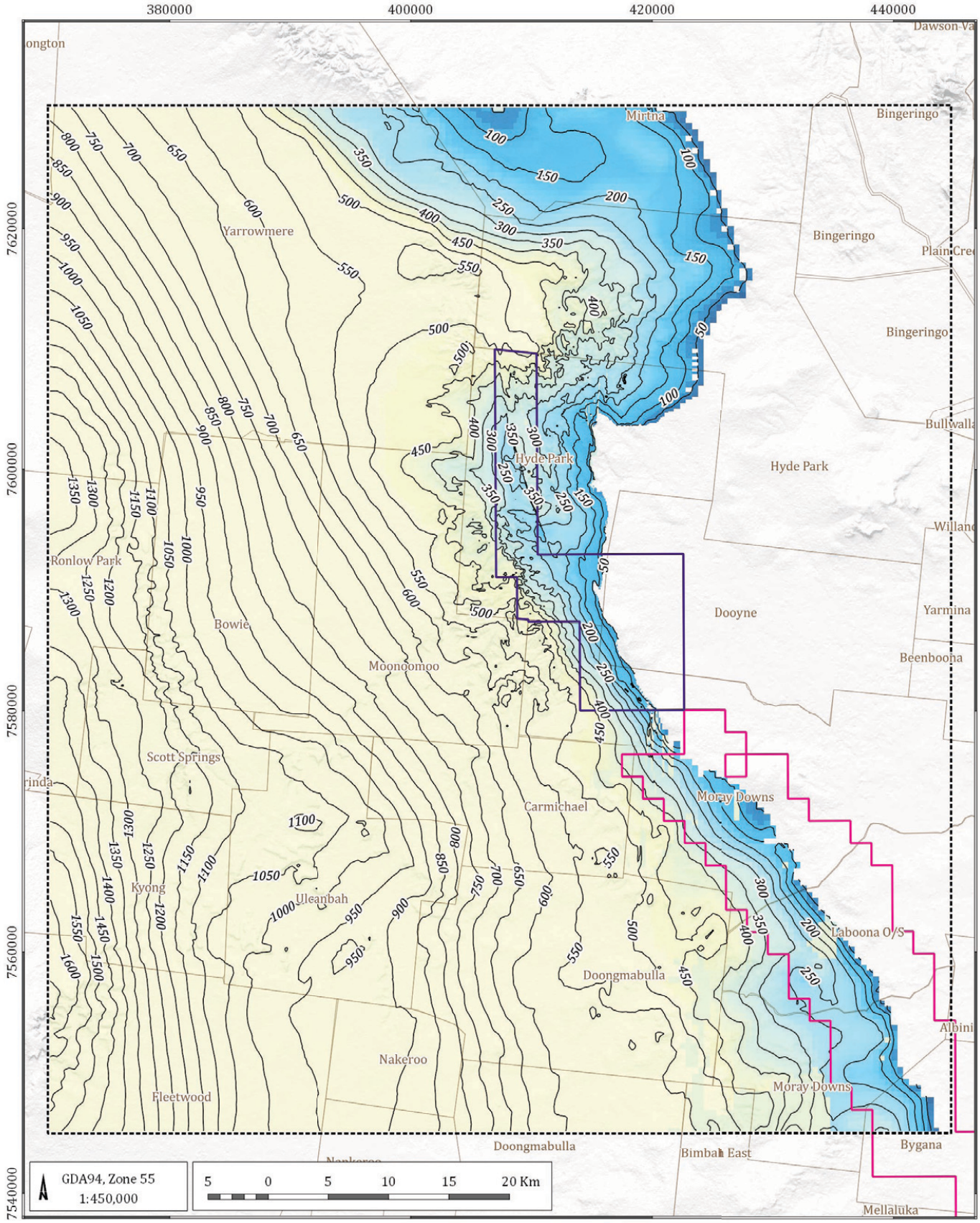
Project China Stone (G1587F)

Horizontal hydraulic conductivity and depth to top of coal seam C seam (layer 14)

DATE 04/07/2017

FIGURE No: **C3**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Model boundary
- Pastoral station

Depth to top of coal seam contour (m)

Hydraulic conductivity (m/day)

- 0.00001
- 0.00005
- 0.0001
- 0.0005
- 0.001
- 0.005
- 0.01
- 0.05
- 0.1
- 0.5
- 1.0

Project China Stone (G1587F)

Horizontal hydraulic conductivity and depth to top of coal seam
D seam (layer 16)

DATE 04/07/2017

FIGURE No: **C4**

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//bne01dc/Shared/Projects/G1587F.Chinastone RTS additional/3_GIS/Workspaces/001_Deliverable1/00_G1587F_HHC and depth to top of coal seam.qgs

C2 Coal seam hydraulic conductivity with depth relationship

Mackie (2009) used data from the Hunter Valley to establish a declining relationship in coal seam hydraulic conductivity with depth (Figure C5). Measurements of hydraulic conductivity in coal were available to a depth of some 450 m below surface. There was a wide degree of scatter in the results which Mackie attributed to the brightness of the coal. The gradients plotted by Mackie indicate an order of magnitude decline in hydraulic conductivity per 180-200 m depth of cover.

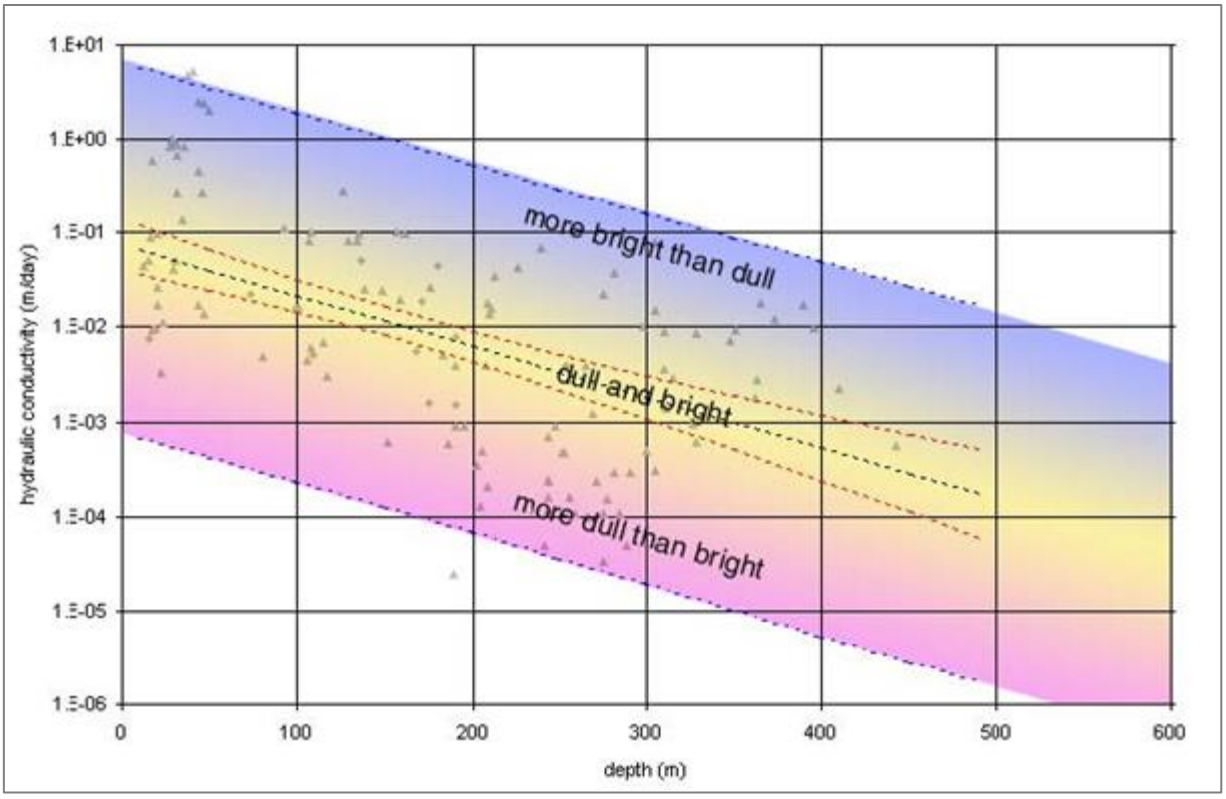


Figure C5 Simplified representation of the relationship between hydraulic conductivity and depth (Mackie, 2009[1])

A relationship of decreasing hydraulic conductivity with depth was also noted for the Walloon Coal Measures of the Surat Basin in Queensland[2]:

"The long term affected area (LAA) for the Walloon Coal Measures extends further in the north-east and has contracted in the south-west. The extension towards the north-east reflects an improved understanding of the spatial variation in horizontal permeability within the Walloon Coal Measures. Horizontal permeability tends to be relatively high in the north-east where the coal is close to the surface and then gradually reduce with depth towards the south-west".

[1] Mackie, C.D., 2009. Hydrogeological characterisation of coal measures and overview of impacts of coal mining on groundwater systems in the Upper Hunter Valley of NSW. University of Technology, Sydney, January 2009.

[2] Department of Natural Resources and Mines, Office of Groundwater Impact Assessment. 2016. Underground Water Impact Report for the Surat Cumulative Management Area.

Results from hydraulic field testing of coal seams within the Project China Stone site and the adjoining Carmichael Project site are presented on Figure C6 along with the depth relationship developed by Mackie. Coal within the Project China Stone site is noted as being dull on geological logs, so would be expected to plot at the lower end of the hydraulic conductivity range.

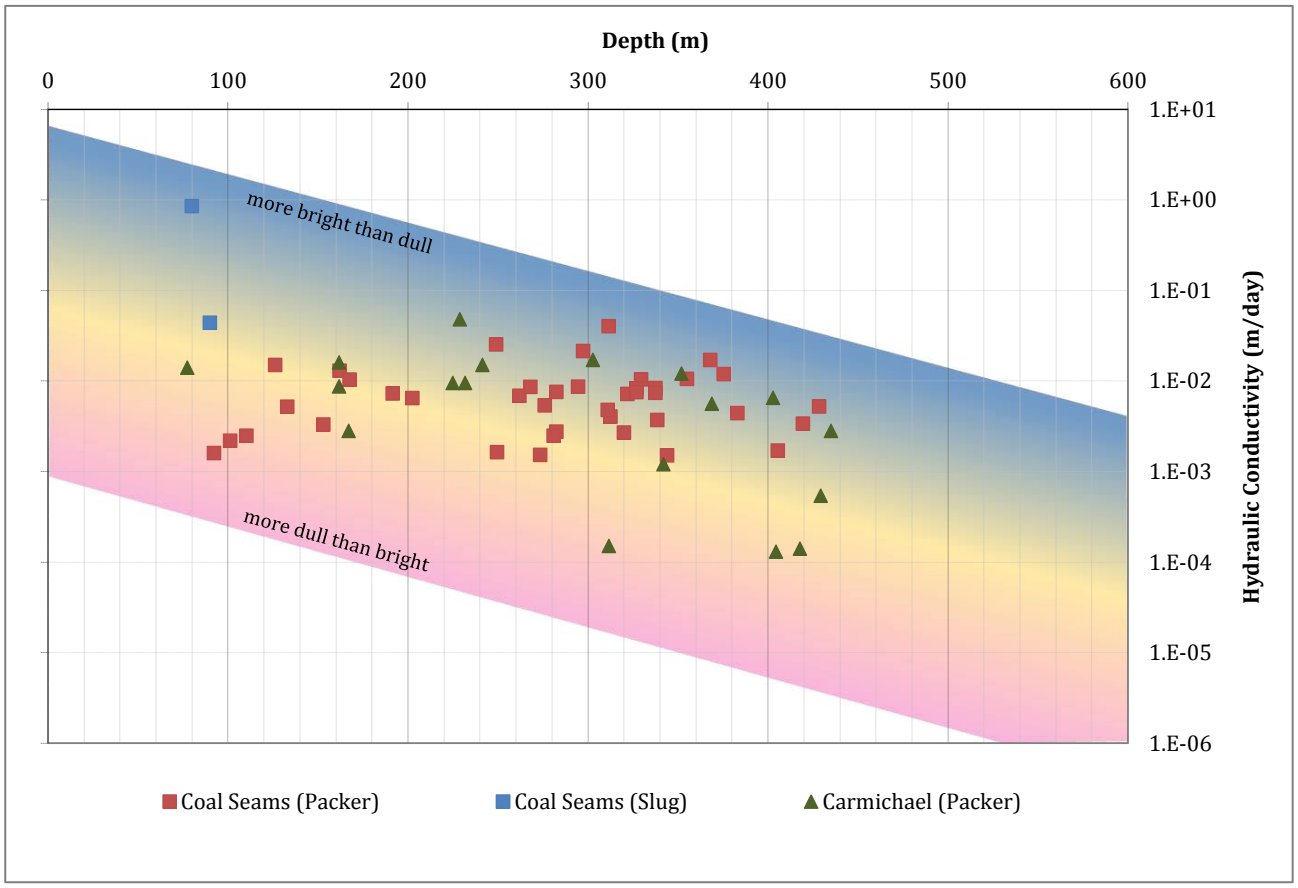


Figure C6 Field testing hydraulic conductivity data and DNRM relationship

Figure C7 shows the field testing data plus the two depth gradients used within the Project China Stone EIS numerical model to represent the hydraulic conductivity of the coal seams. The B seam was generally described as being duller than the other seams at the site (A, C, and D) so was represented with a lower hydraulic conductivity at surface. The equation used to generate the hydraulic conductivity at a specific depth is:

$$Permeability\ at\ prescribed\ depth = Hydraulic\ conductivity\ at\ surface * \exp(-0.022 * depth\ below\ surface)$$

Equation C1

The hydraulic conductivity at surface was set as 0.1 m/day for the B seam and 0.4 m/day for the A, C and D seams. The minimum hydraulic conductivity of the coal in any layer was limited to 8.6×10^{-6} m/d.

The sensitivity analysis of the effects of increasing the hydraulic conductivity values in only the coal seams used the same depth/permeability gradient, but with a higher surface hydraulic conductivity of 4 m/d for all coal seams, moving the slope higher on the graph. The minimum hydraulic conductivity in this scenario is therefore reached at a depth of ~ 600 metres (Figure C7).

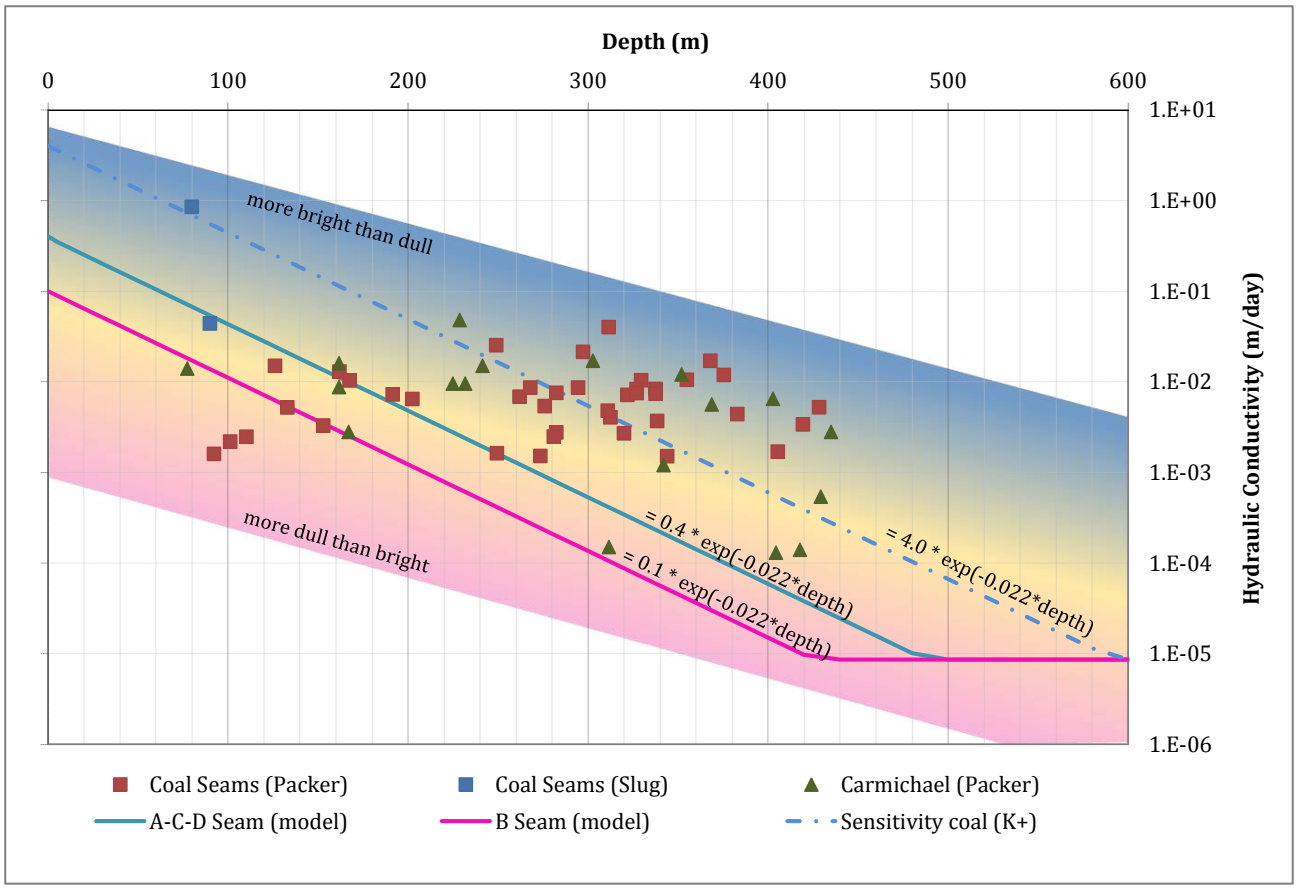


Figure C7 Field testing hydraulic conductivity data and basecase model gradient

In response to a request by the DNRM, a second sensitivity analysis on the coal permeability has been completed that uses a flatter depth gradient with the equation:

$$Permeability\ at\ prescribed\ depth = Hydraulic\ conductivity\ at\ surface * \exp(-0.013 * depth\ below\ surface)$$

Equation C2

The relationship is shown graphically on Figure C8.

There was no change to the surface hydraulic conductivity of the coal seams but the gradient was flattened to more closely match the gradient developed by Mackie. The minimum conductivity that the coal seams can fall to was also limited to 1.0 x 10^{-4} m/day to more closely match the minimum hydraulic conductivities observed during the field testing.

The effect of these changes on the zone of depressurisation within the coal seams is shown on figures included within Appendix D.

DNRM provided an alternative indicative line of best fit in the meeting on 21 June 2017 for the depth versus conductivity relationship, based on packer test data for the China Stone A seam and the Carmichael AB seams. This line is also shown in Figure C8. The gradient of the DNRM line of best fit represents an order of magnitude decline in hydraulic conductivity for approximately each 300 m depth of cover. The decline in hydraulic conductivity with depth is noticeably less than the relationship developed by Mackie, which is achieved by starting with a hydraulic conductivity that is lower at the surface than those adopted for the basecase numerical modelling.

The depth gradient adopted for the second sensitivity analysis is expected to result in a more conservative prediction of depressurisation than the DNRM best fit line for the A, C, and D seams above a depth of 500 m. This is because at the surface the modelled A, C, and D seams are more permeable by over an order of magnitude, with the difference gradually reducing to 500 m depth.

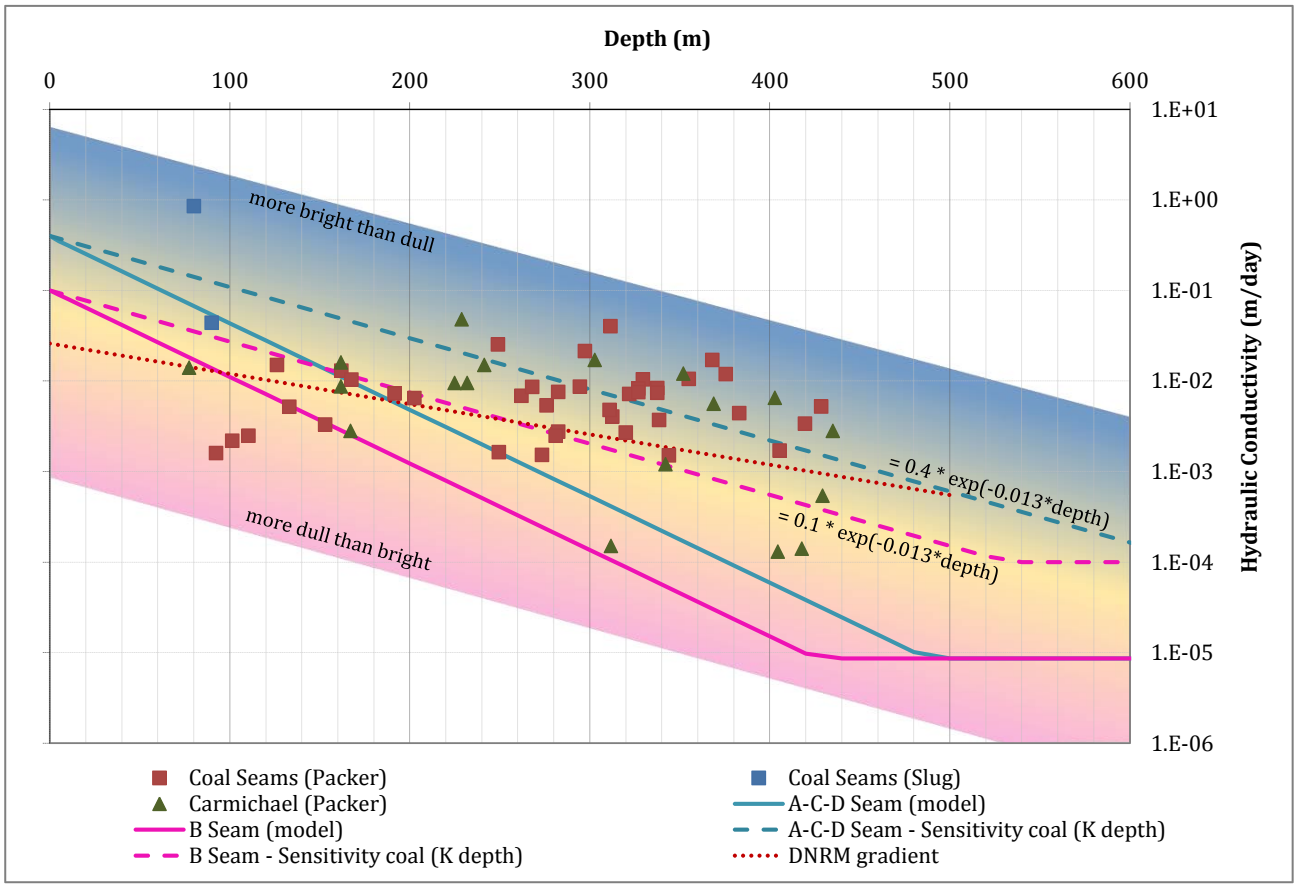
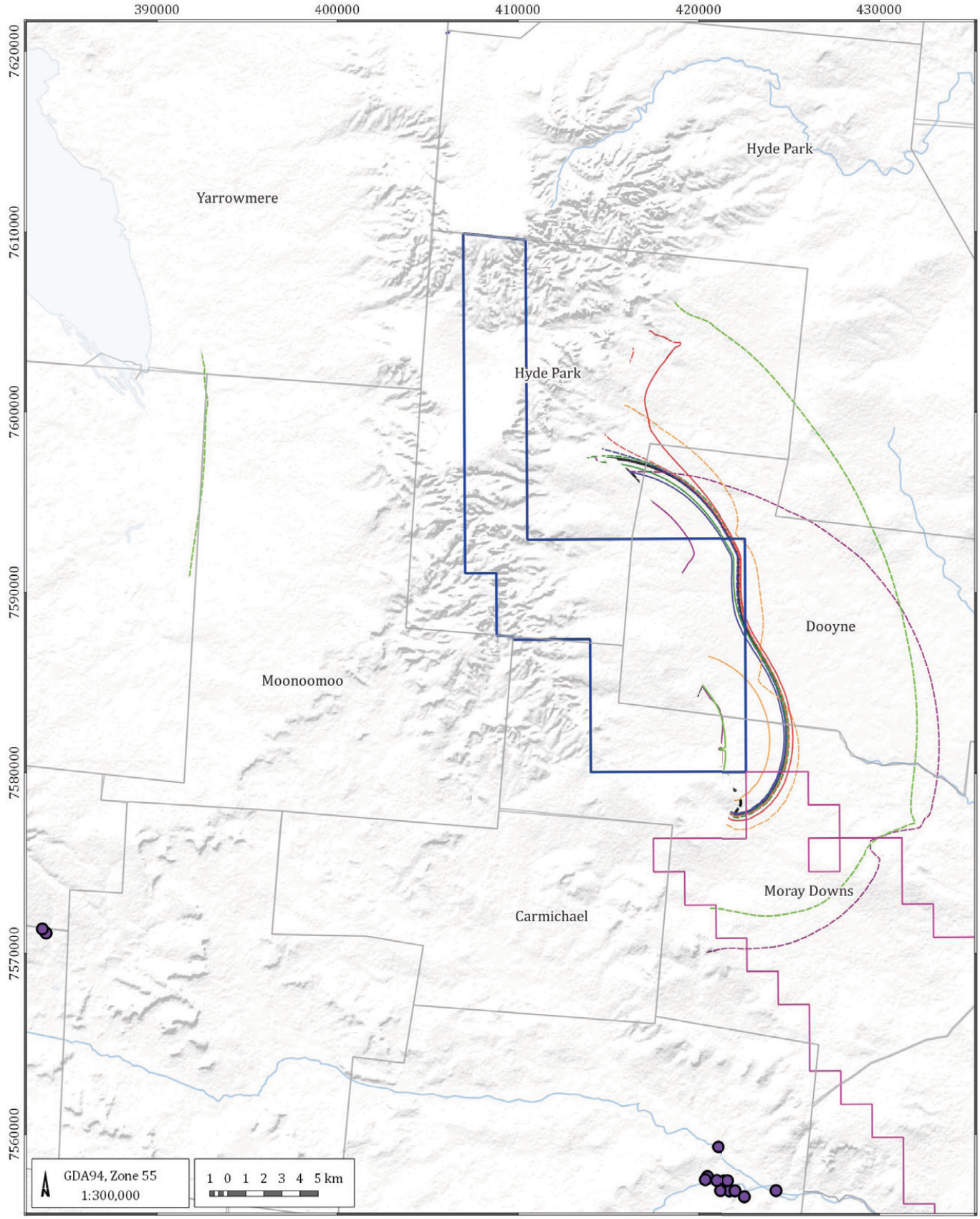


Figure C8 Reduced coal depth gradients adopted for Coal (K depth) sensitivity analysis

Appendix D **Sensitivity analysis results**



LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

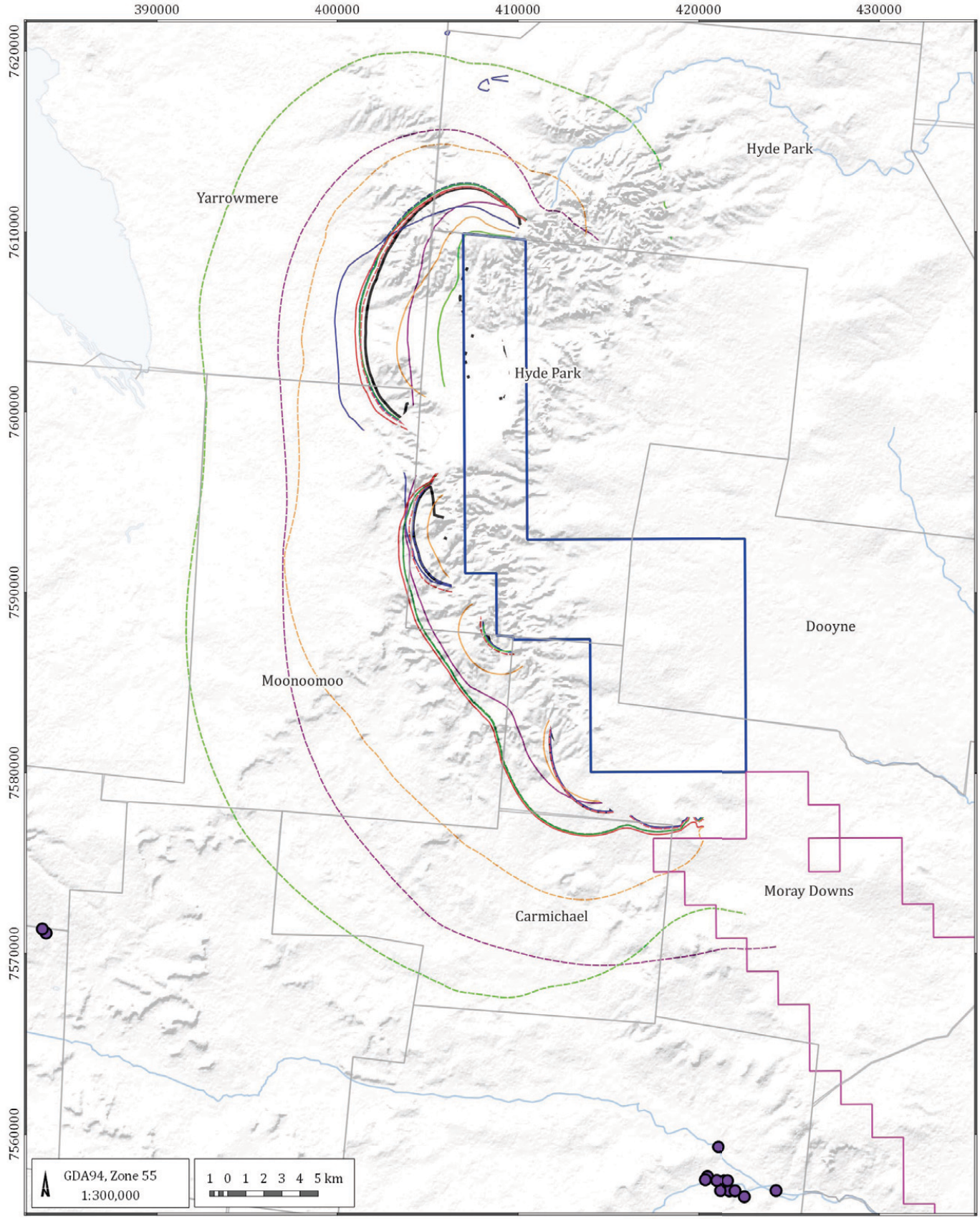
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation during mining - Tertiary sediments

DATE 04/07/2017

FIGURE No: **D1**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

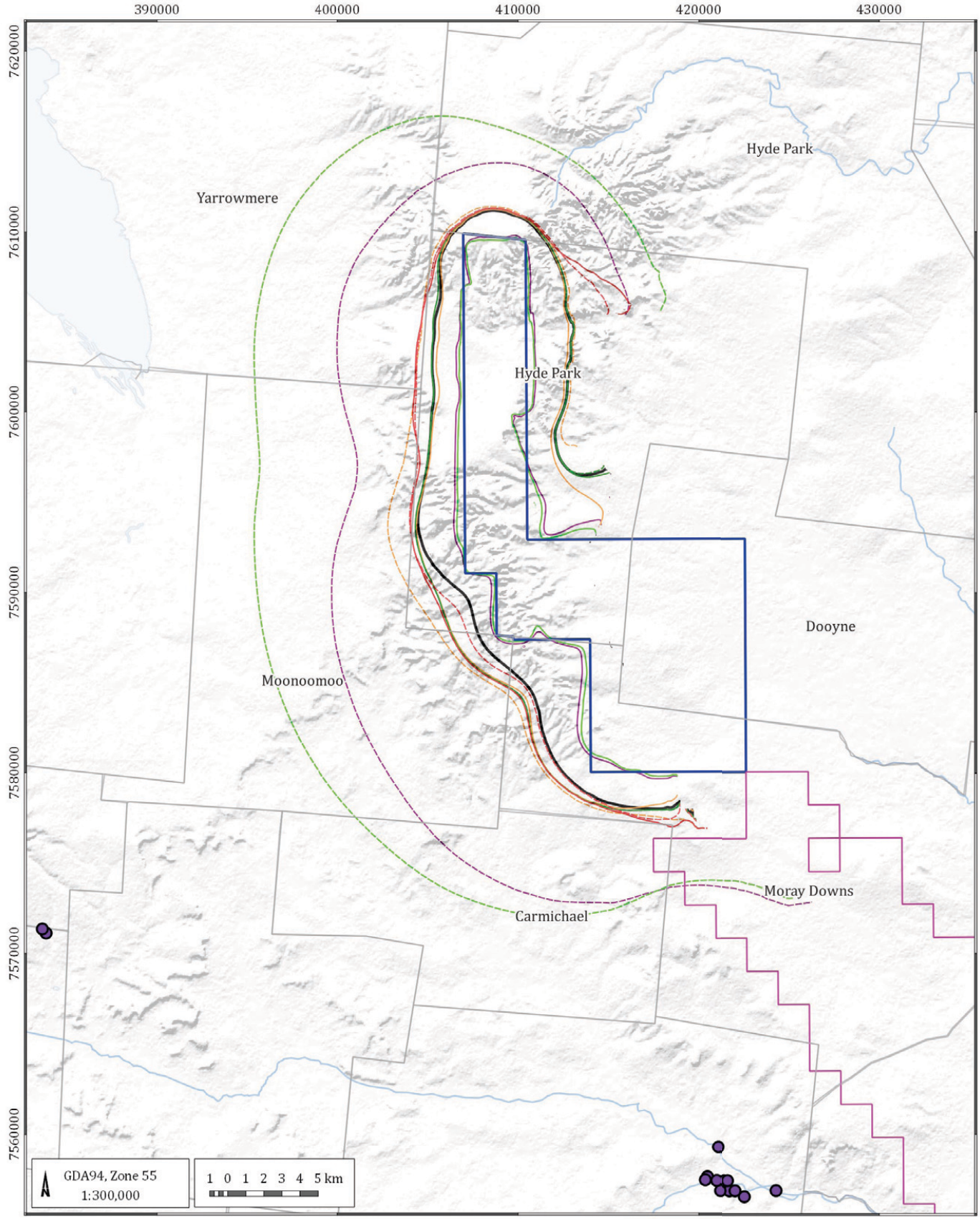
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Sensitivity of maximum zone of depressurisation during mining - Clematis Sandstone

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FIGURE No: **D2**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

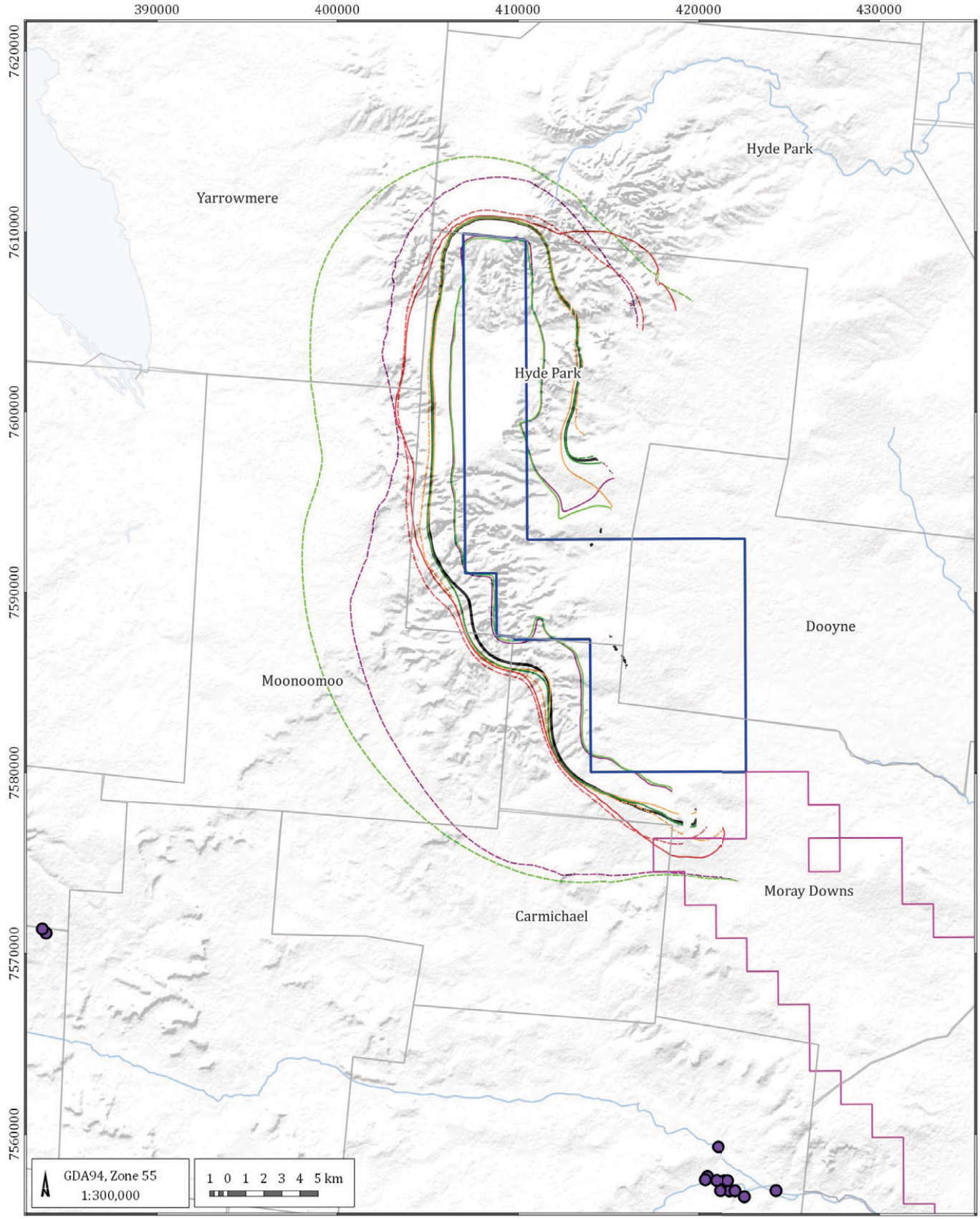
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation during mining - Permian sediments above A seam

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FIGURE No: **D3**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

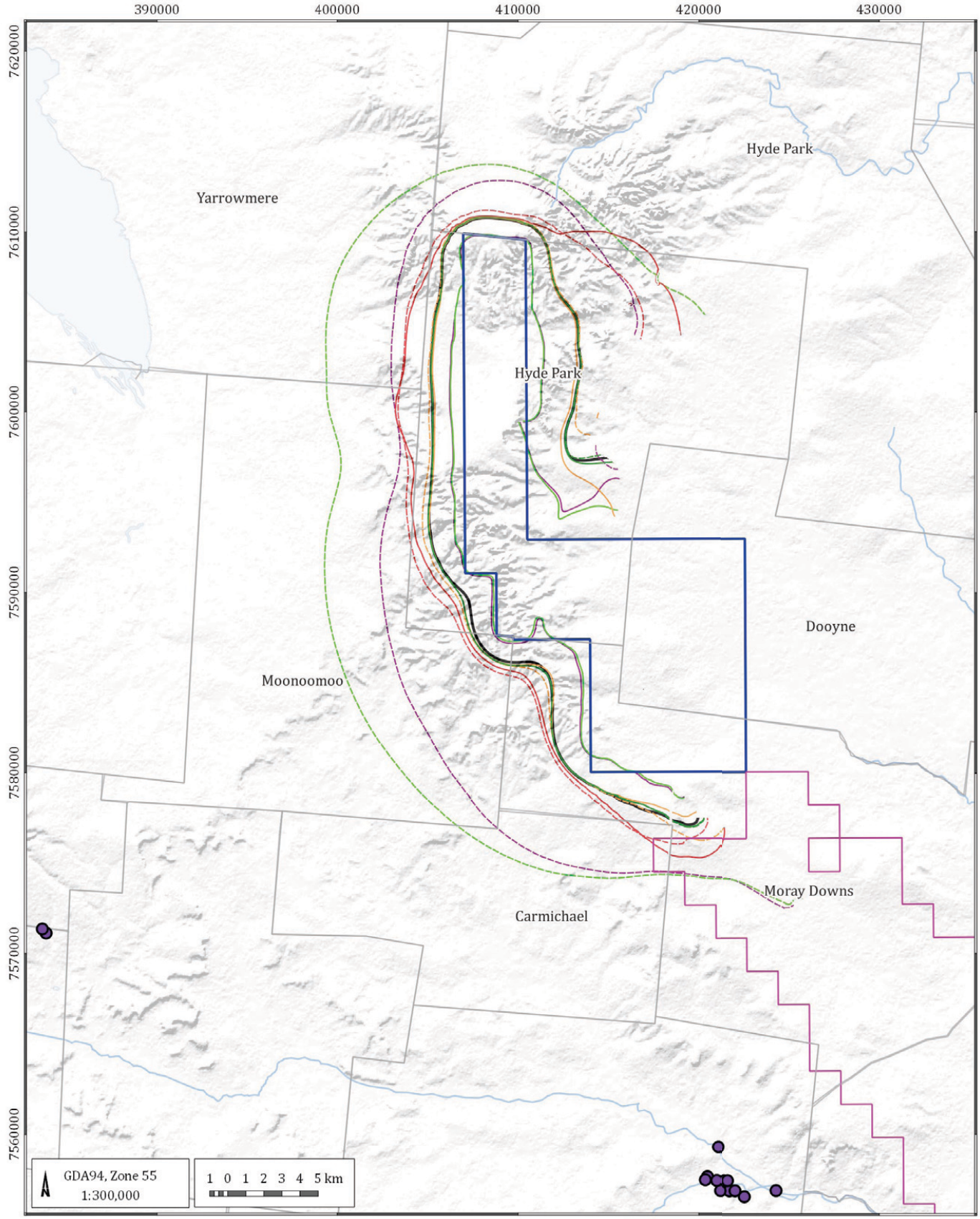
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation during mining - A seam

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FIGURE No: **D4**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

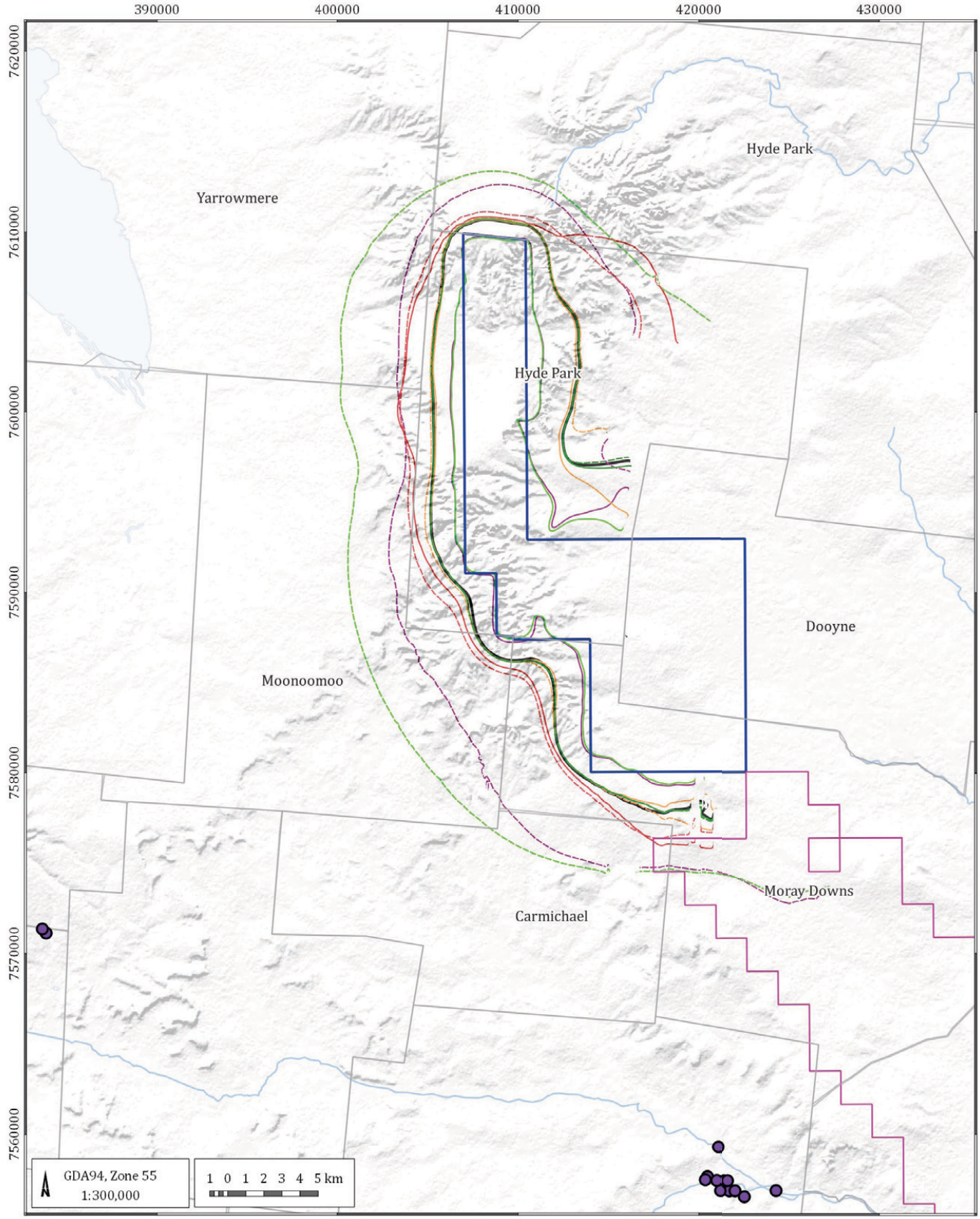
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Sensitivity of maximum zone of depressurisation during mining - C seam

DATE 04/07/2017

FIGURE No: **D5**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

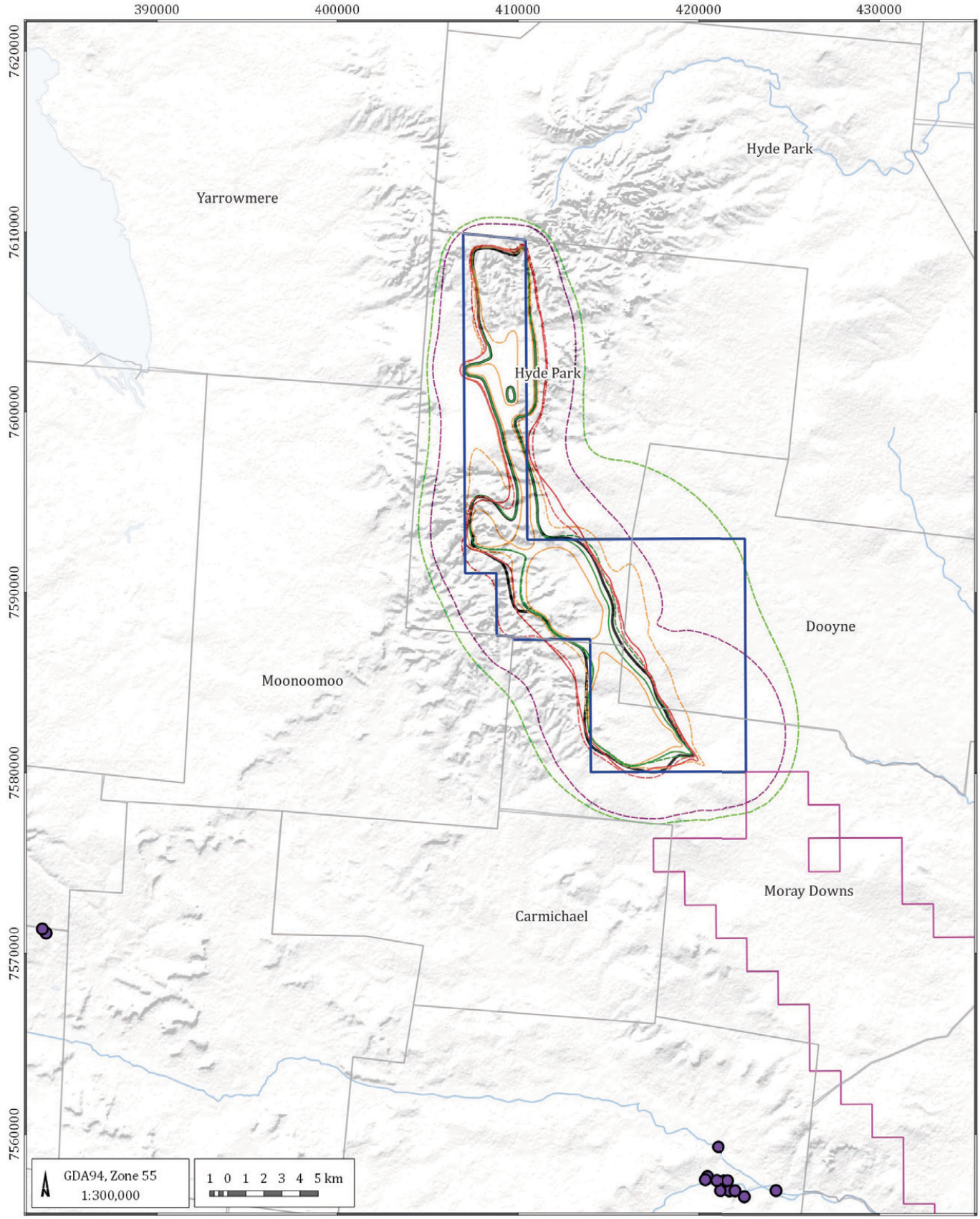
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation during mining - D seam

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FIGURE No: **D6**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal(K depth)

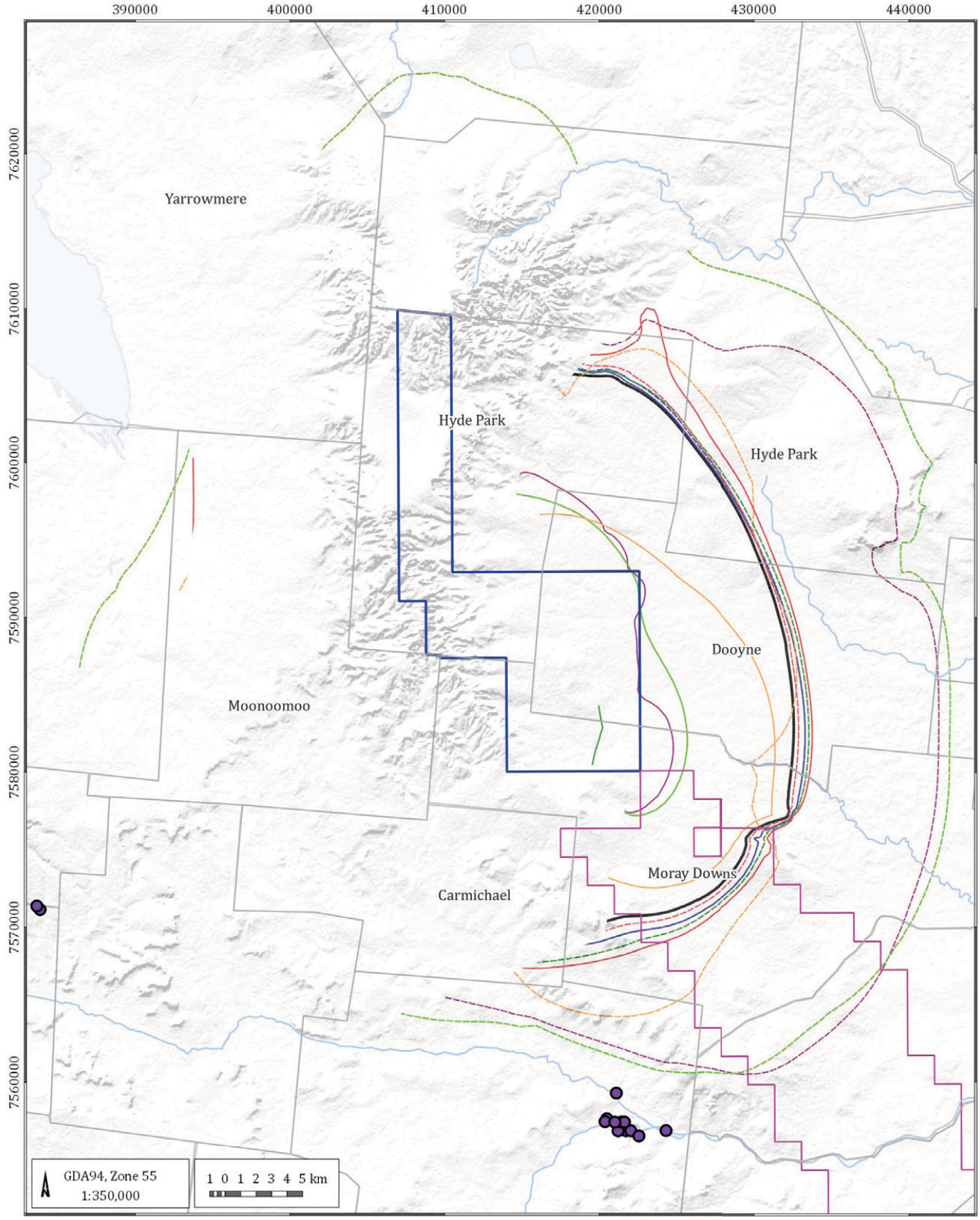
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation during mining - Permian sediments below D seam

DATE 04/07/2017

FIGURE No: **D7**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

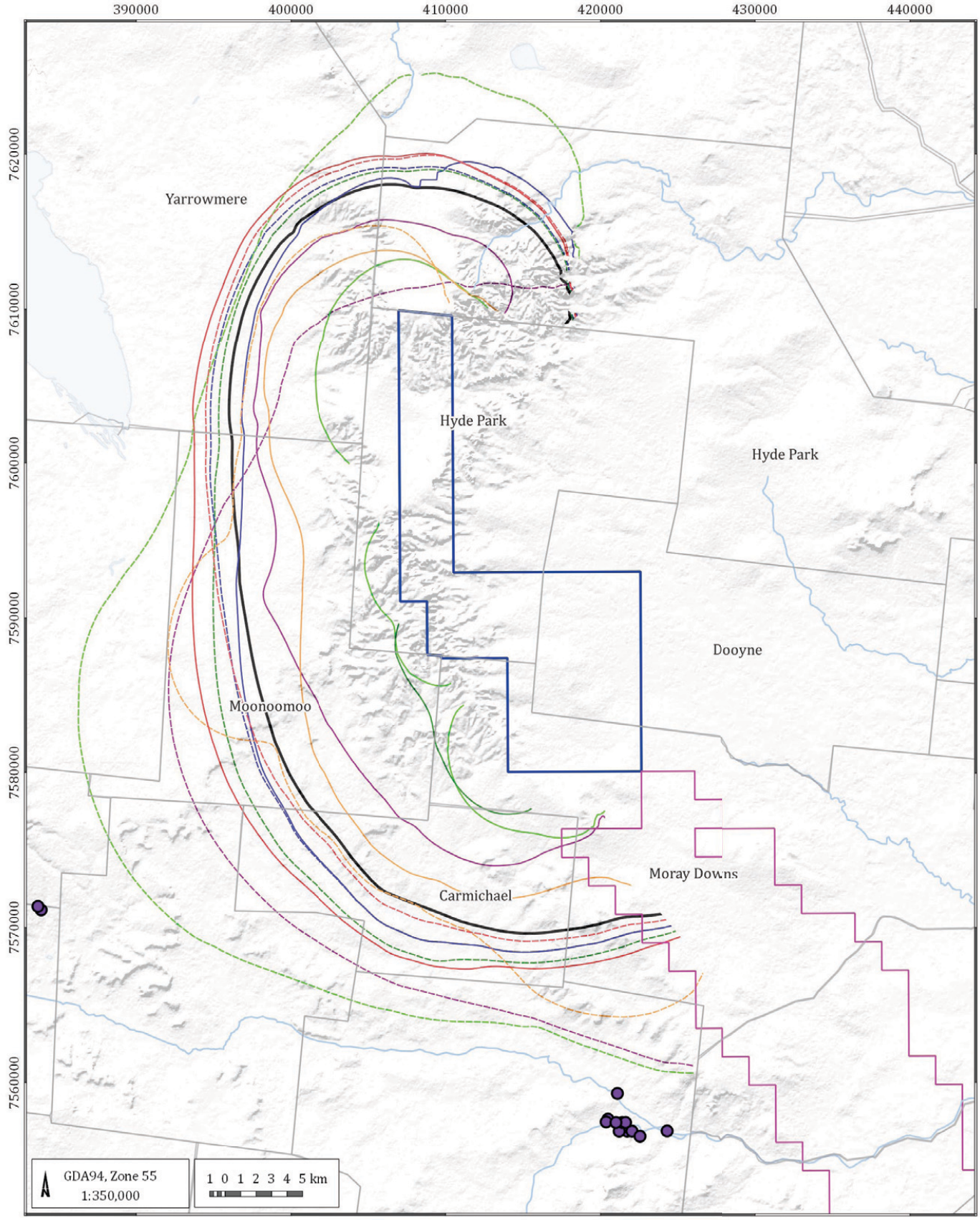
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - Tertiary sediments

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FIGURE No: **D8**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

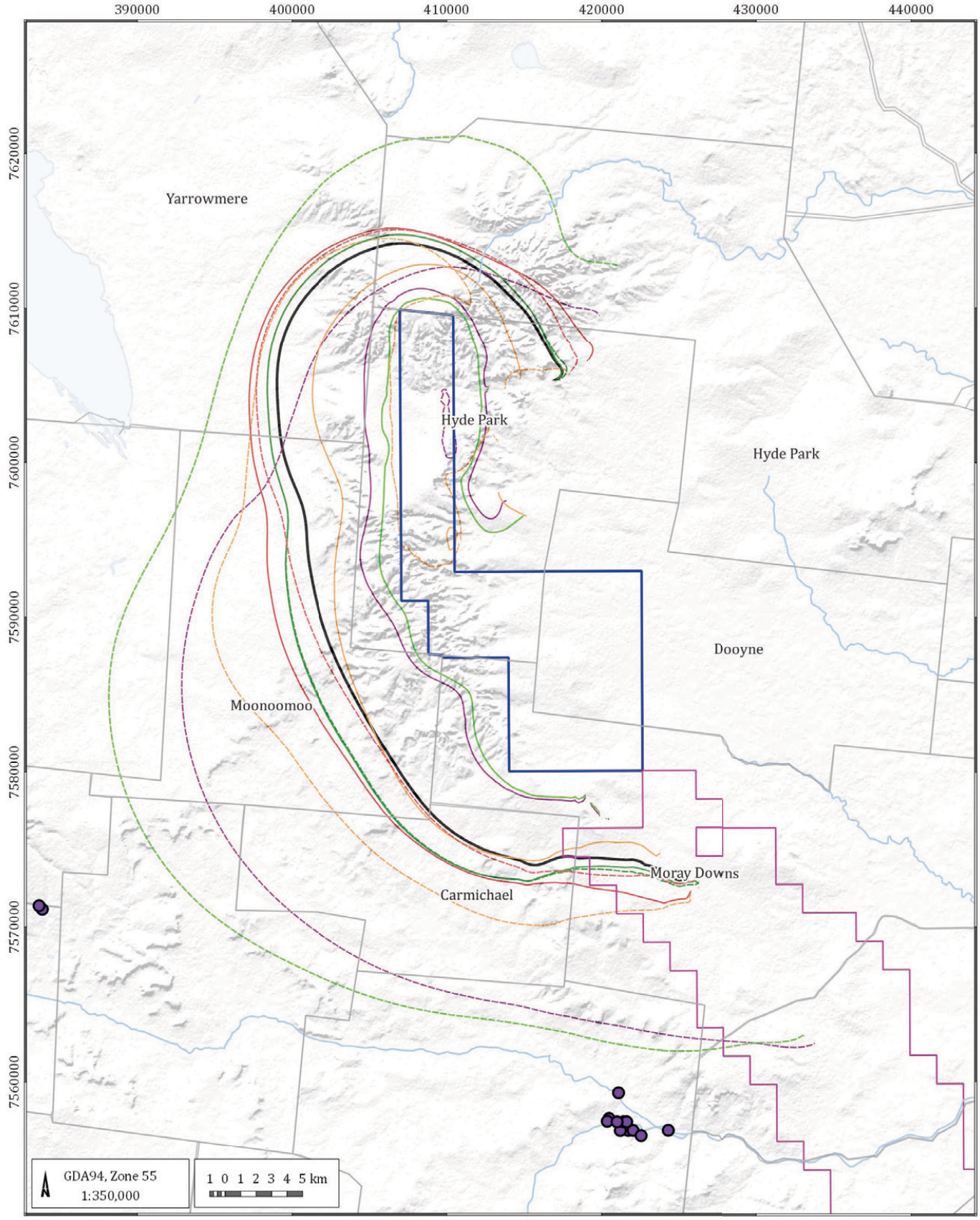
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - Clematis Sandstone

DATE 04/07/2017

FIGURE No: **D9**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

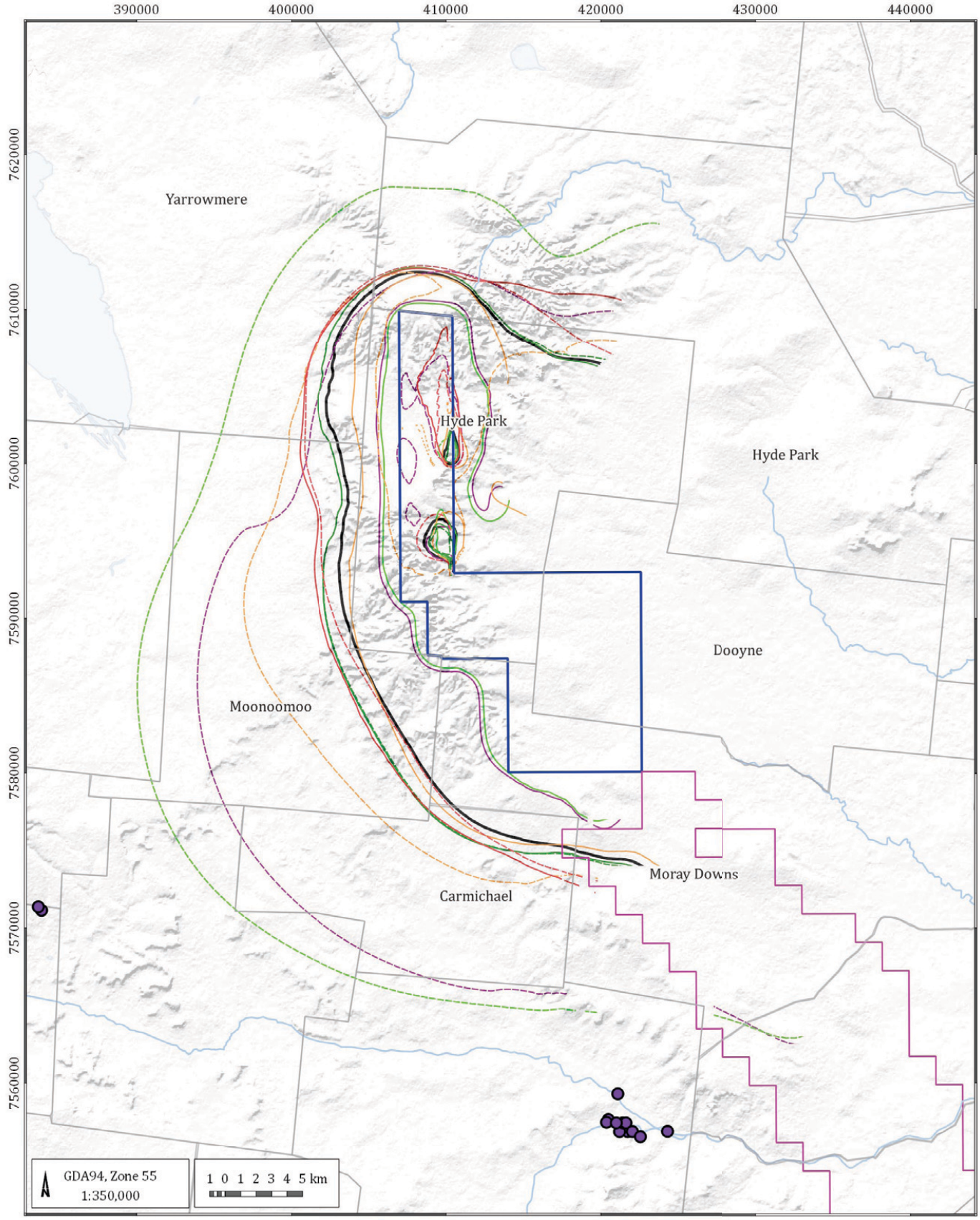
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - Permian sediments above A seam

DATE 04/07/2017

FIGURE No: **D10**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

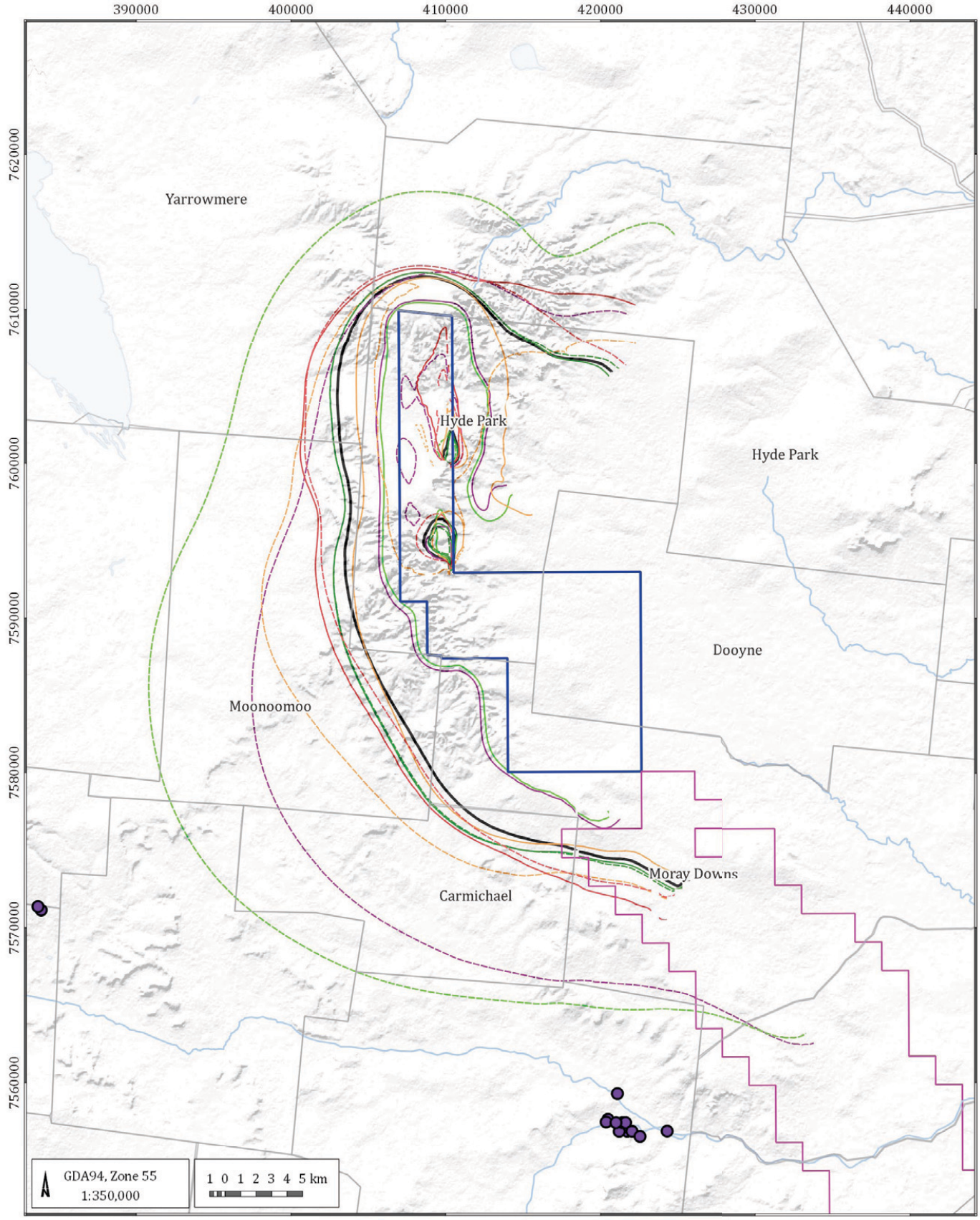
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - A seam

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FIGURE No: **D11**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
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- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

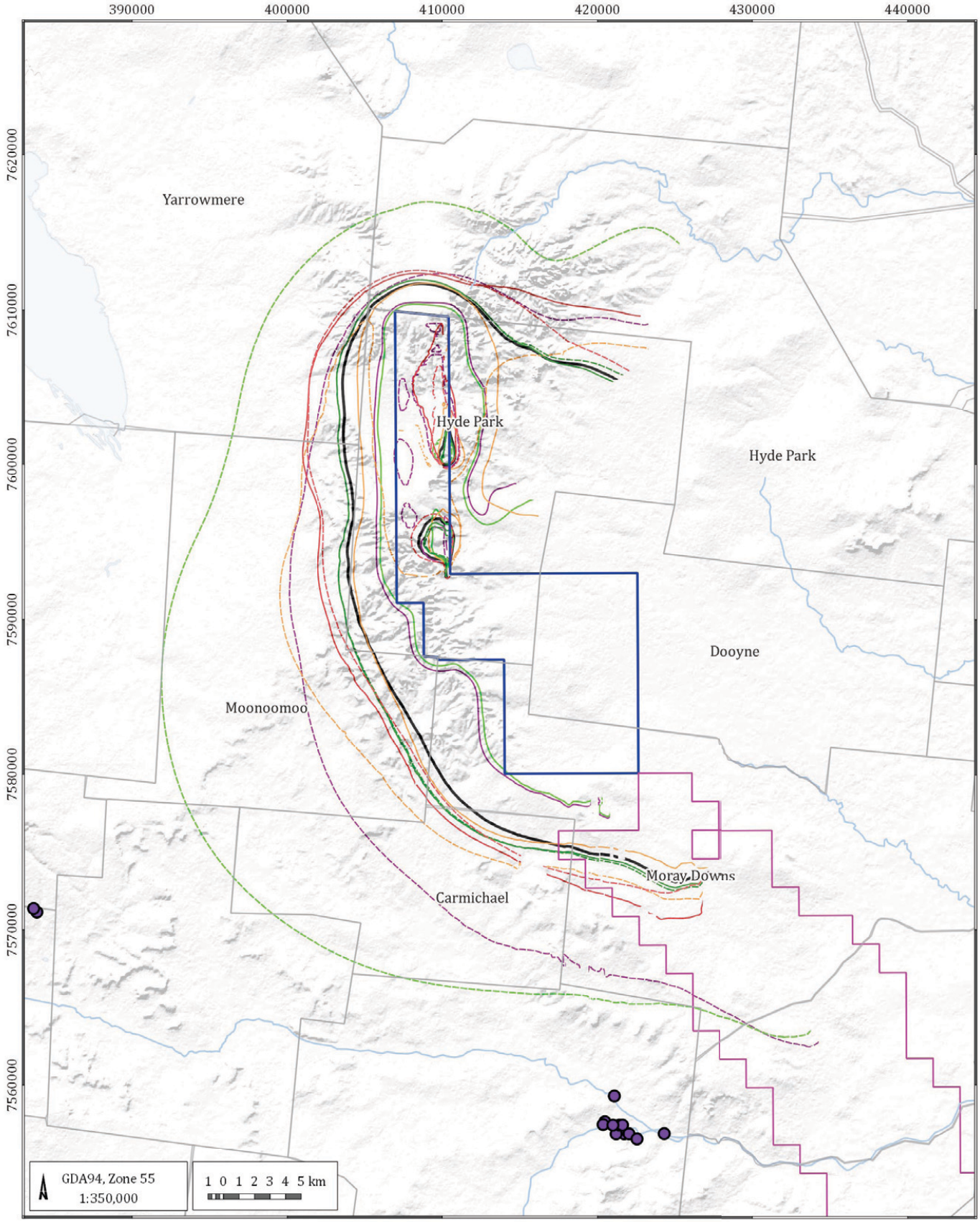
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Sensitivity of maximum zone of depressurisation post mining - C seam

DATE 04/07/2017

FIGURE No: **D12**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

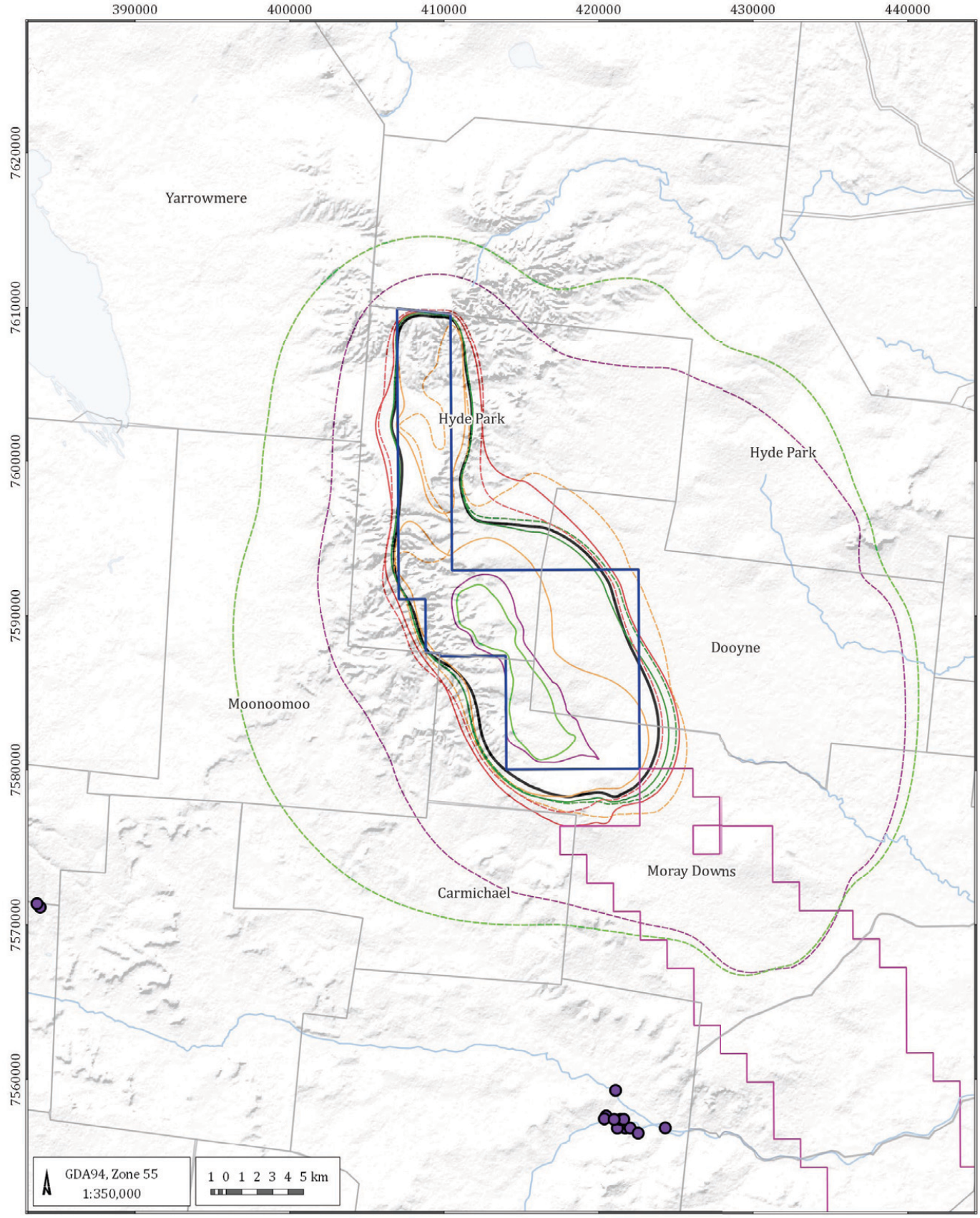
Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - D seam

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FIGURE No: **D13**

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LEGEND

- Project site
- Carmichael Coal Mine Project
- Major drainage
- Springs
- Cadastre
- Lake

Sensitivity - 1m contour

- Basecase
- Hydraulic conductivity (K) +
- Hydraulic conductivity (K) -
- Conduit fault (K/S)
- Barrier fault (HFB)
- Recharge (Rch) -
- Recharge (Rch) +
- Storage (S) -
- Storage (S) +
- Overburden (K/S/Rch) +
- Overburden (K/S/Rch) -
- Coal (K+)
- Coal (K depth)

Project China Stone (G1587F)

Sensitivity of maximum zone of depressurisation post mining - Permian sediments below D seam

DATE 04/07/2017

FIGURE No: **D14**

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Appendix E Subsidence effects on vertical hydraulic conductivity

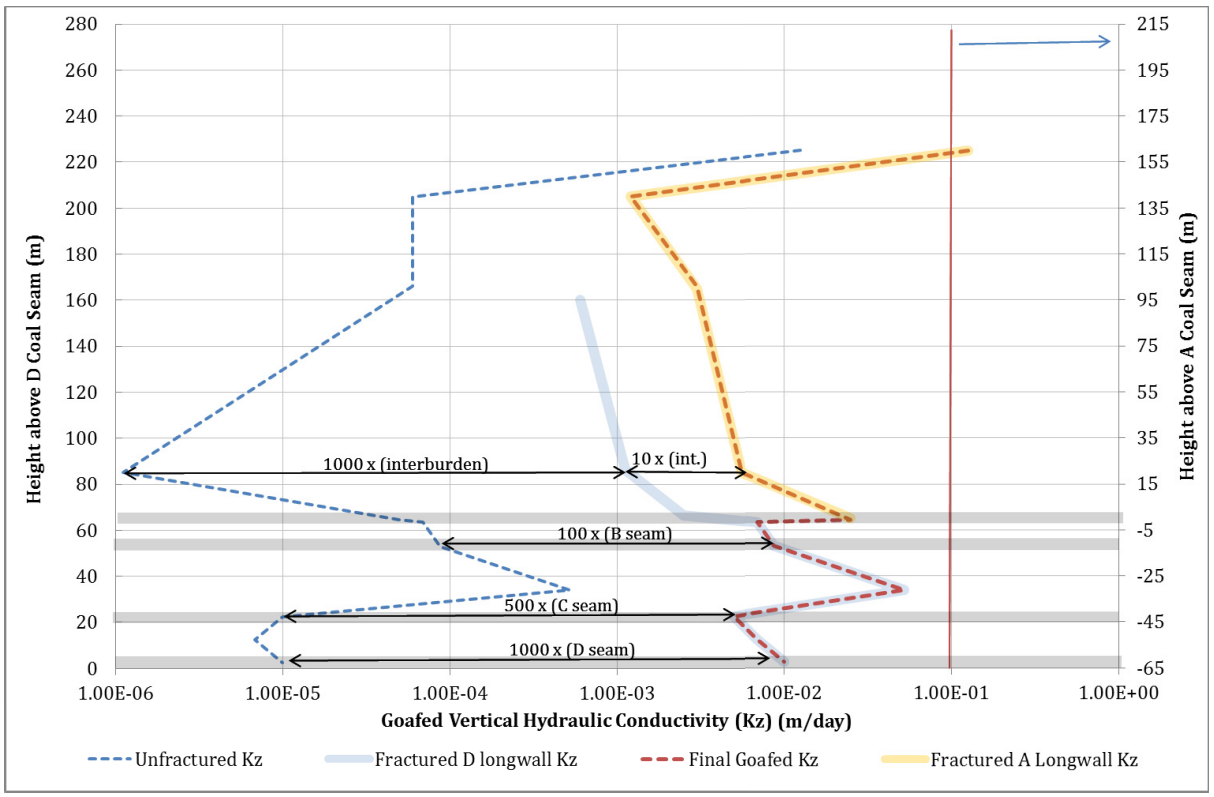
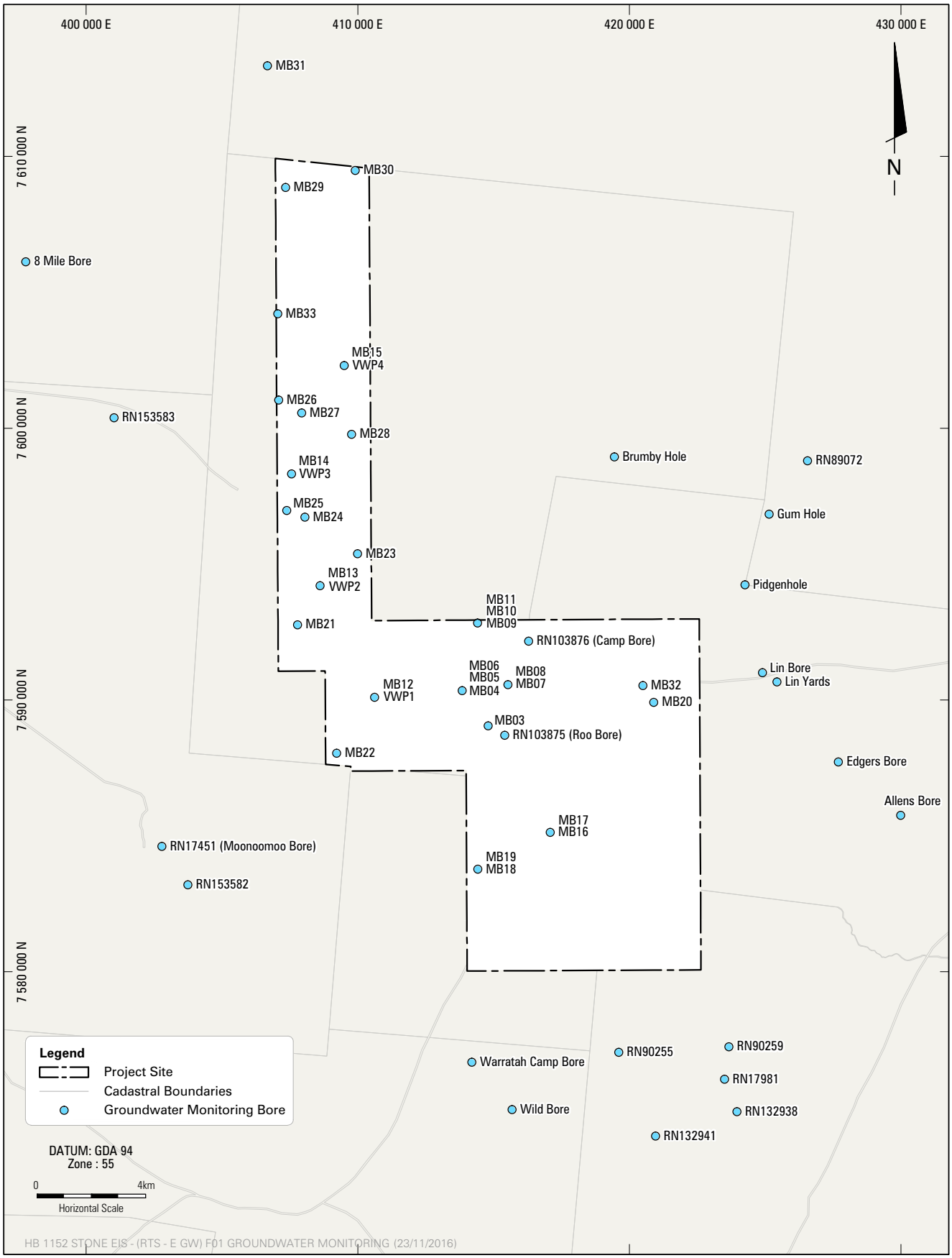


Figure E1 Subsidence effects on vertical hydraulic conductivity

Appendix F **Groundwater monitoring program**



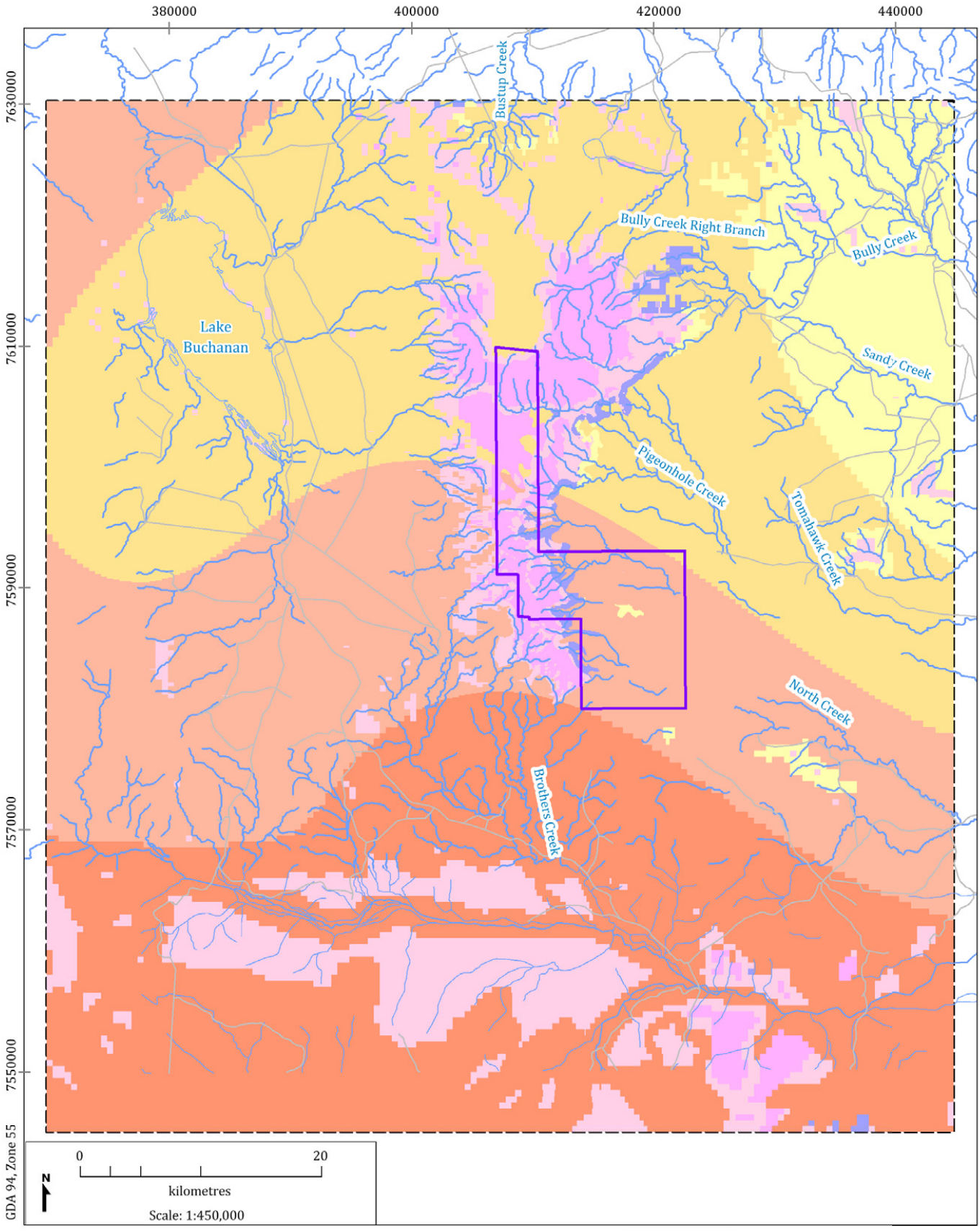
PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Groundwater Monitoring Program

FIGURE F1

Appendix G Updated model recharge figure (Figure B3)



LEGEND:

- Model boundary
- Model grid
- Project site
- Carmichael Coal Mine Project
- Road
- Drainage

Modelled recharge rates (mm/yr)

10	to	100
1	to	5
0.1	to	1
0.058	to	0.1
0.057	to	0.058
0.056	to	0.057
0.01	to	0.056

Project China Stone (G1587F)

Modelled Recharge Rates

DATE: 04/07/2017

FIGURE No: **B3**

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Appendix H **Vertical hydraulic conductivity multiplication factor**

The vertical hydraulic conductivity assigned to each layer in the model was a factor of the horizontal value. The factor was adjusted during calibration to optimise the match between the measured and simulated groundwater water level measurements. The multiplication factors used to calculate vertical hydraulic conductivity are shown in the table below.

Table H Vertical hydraulic conductivity multiplication factors

Layer	Geology	Multiplication factor
1	Alluvium	0.434
2	Tertiary	0.5
3	Ronlow Beds	0.242
4	Mooayameber Fm	0.5
5	Clematis Sandstone	0.251
6	Dunda Beds	0.02
7-8	Rewan Fm	0.022
9	Permian Interburden	0.01
10	AU Seam	0.5
11	Interburden	0.139
12	B Seam	0.872
13	Interburden	0.35
14	C Seam	0.1
15	Interburden	0.015
16	D Seam	0.1
17	Permian Seams/Interburden	0.5
18	Joe Joe Group	0.5



PROJECT CHINA STONE

Attachment E Additional Information on Surface Water

PROJECT CHINA STONE

ADDITIONAL INFORMATION ON SURFACE WATER

Prepared by:

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Level 15, 215 Adelaide Street
Brisbane QLD 4000

2 December 2016

For:

MACMINES AUSTASIA PTY LTD
320 Adelaide Street
Brisbane QLD 4000

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PROJECT CHINA STONE
ADDITIONAL INFORMATON ON SURFACE WATER

for
MacMines Austasia Pty Ltd

1 INTRODUCTION

This document has been prepared by Hansen Bailey, on behalf of MacMines Austasia Pty Ltd, in response to submissions made on the Project China Stone (the project) Draft Environmental Impact Statement (draft EIS).

1.1 BACKGROUND

During extended rainfall events the open cut pit will collect significant volumes of rainfall runoff. Following such events, it will be necessary to dewater the open cut pits to allow continuing production. The accumulated pit water will be dewatered to mine water storage dams where dam storage capacity is available. The mine water management system has been designed with sufficient storage capacity to contain mine-affected water without the need for uncontrolled release of mine-affected water. Excess mine-affected water will be discharged from the mine water management system under controlled conditions that are designed to prevent any adverse impacts on downstream environmental values.

Attachment 24-4 of the draft EIS provides proposed Environmental Authority (EA) release conditions for the controlled release of mine-affected water to the receiving water of the Belyando River. These EA conditions include release limits, investigation triggers and compliance monitoring requirements for mine-affected water released from the project.

The principal of releasing mine-affected water into ephemeral or high-catchment drainage features based upon flow rates in a larger, downstream receiving water is consistent with approved mine discharge strategies for other Galilee Basin coal mining projects including the Alpha Coal Project and the Galilee Coal Project. This approach also underpins the release strategies adopted for numerous operating Bowen Basin coal mines under the Fitzroy Basin Pilot Scheme.

A number of submissions on the draft EIS have requested that the proponent reconsider the proposed use of the Belyando River as the receiving water for the project. A submission provided by the Department of Environment and Heritage Protection (EHP) has specifically requested that the proponent nominate North Creek as the receiving water for the controlled release of mine-affected water from the project. These submissions also indicate that the release conditions and compliance monitoring locations presented in Attachment 24-4 of the draft EIS should also be reconsidered to better reflect the receiving waters and provide

greater protection to potential environmental values of North Creek, including any potential ecological values and water users downstream of the proposed release point.

Separately, several submissions requested clarification on the baseline monitoring data, the specific criteria presented within the proposed EA release conditions, the Receiving Environment Monitoring Program (REMP) and drainage from the conceptual final landform of the Tailings Storage Facility (TSF). These submission issues are also addressed in this report to ensure a consolidated response to surface water issues.

1.2 PURPOSE AND SCOPE OF REPORT

This document provides additional information on surface water in response to submissions provided by the EHP, the Department of Natural Resources and Mines (DNRM) and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the IESC).

The EHP submission requested that discharge flows for mine-affected water releases are based on the flows in North Creek rather than the Belyando River, as proposed in the draft EIS. The proponent has agreed to this alternative approach.

The project site is remote and experiences highly ephemeral, short duration, surface water flows due to its location at the head of the catchment. These factors severely limit the ability for any regular sampling of surface water flows from the project site, hence there is currently insufficient receiving water quality and flow data to enable the detailed calculation of flows triggers and water quality release limits associated with this change in accordance with the EHP model mining conditions.

Consequently the proponent is proposing to implement a baseline water quality and flow monitoring program in order to determine the following aspects of the program in accordance with the EHP model mining conditions:

- Water quality objectives can be calculated for North Creek in accordance with the Queensland Water Quality Guidelines;
- Flow conditions can be established for the receiving waters; and
- Flow criteria for discharge, maximum release rates, and release limits can be calculated.

This work will be undertaken prior to the commencement of the project and will also be used to inform the REMP.

This report provides:

- Details of the proposed baseline water quality and flow monitoring program (Section 2);
- Details of the proposed amended EA mine mine-affected water release conditions and the proposed compliance monitoring program for of mine-affected water releases (Section 3);
- Details of the proposed REMP (Section 4); and
- A revised conceptual TSF final landform drainage design (Section 5).

This report is an attachment to the Supplement to the draft EIS for the project. The Supplement of the draft EIS is Volume 6 and should be read in conjunction with the draft EIS Volumes 1 – 5 that were publicly exhibited. Together, Volumes 1 - 6 form the revised draft EIS for the project.

To the extent of any inconsistencies, the information in this attachment supersedes any information in any other volume of the draft EIS.

2 BASELINE SURFACE WATER MONITORING PROGRAM

This section describes the baseline water quality and flow monitoring program that will be implemented for North Creek and downstream surface waters.

Baseline water quality and flow data collected as part of this monitoring program will also be used to establish locally relevant water quality objectives for North Creek in accordance with the *Queensland Water Quality Guidelines* (QWQG) (EHP, 2013). The water quality objectives will be used in the development of site-specific EA conditions for the controlled release of mine-affected water to North Creek in accordance with the EHP model mining conditions. EA conditions for the controlled release of mine-affected water are discussed in Section 3.

The baseline water quality data (and derived water quality objectives) will also inform the REMP baseline and objectives. The REMP is described in Section 4.

2.1 BASELINE WATER QUALITY MONITORING PROGRAM

The surface water quality monitoring program will comprise a total of ten monitoring sites. Five monitoring sites will be located in the headwaters and main channel of North Creek. The remaining five monitoring sites will be located on the Belyando River and tributaries of North Creek. The distribution of these baseline monitoring sites is shown on Figure 1.

Monitoring sites have been located to provide data from representative reaches of North Creek and its headwaters, the Belyando River and associated wetland environs downstream of the proposed release point. The rationale behind the selection of each representative monitoring site is explained in Table 1.

Table 1
Baseline Surface Water Quality Monitoring Program Design

Site ID	Surface Water Feature	Rationale
Downstream Monitoring Points on North Creek		
BLMP1	North Creek	Location: 21°50'11.12"S, 146°15'18.96"E This site is located in the ephemeral headwaters of the upper North Creek catchment and upstream of the confluence with Laguna Creek and several minor drainage features. This site does not receive any input from significant tributaries and provides baseline water quality data for the ephemeral headwaters of North Creek.
BLMP2	North Creek	Location: 21°50'46.68"S, 146°16'56.67"E This site is located in the ephemeral headwaters of the upper North Creek catchment and upstream of the confluence with Laguna Creek and several minor drainage features. This site does not receive any input from significant tributaries and provides baseline water quality data for the ephemeral headwaters of North Creek.
BLMP2A	N/A	Location: 21°49'31.87"S, 146°17'27.81"E This site is located within a potential wetland environment. This site and potential wetland are not located on the direct downstream flowpath of the mine water release point (RP1). This site provides baseline water quality data for the potential wetland environment.
BLMP3	North Creek	Location: 21°57'58.00"S, 146°28'12.30"E This site is located on the upper reach of North Creek. This site is located downstream of Laguna Creek and several minor drainage features, and upstream of the confluence with Eight Mile Creek which traverses the Carmichael Coal Mine site. This site provides baseline water quality data for North Creek downstream of the project site and upstream of any input from significant tributaries and adjacent mining activities.
BLMP4	North Creek	Location: 21°54'50.07"S, 146°38'10.32"E This site is located on the lower reach of North Creek adjacent to potential lacustrine and palustrine wetland environments of the Belyando River floodplain. This site is located downstream of the confluence with Eight Mile Creek and upstream of the confluence with the Belyando River anabranch. This site provides baseline water quality data for North Creek flows entering the Belyando River system.

Site ID	Surface Water Feature	Rationale
Monitoring Points on Eight Mile Creek and Belyando River		
BLMP5	Eight Mile Creek	Location: 21°58'10.08"S, 146°28'8.38"E This site is located on the lower reach of Eight Mile Creek, upstream of the confluence with North Creek and downstream of an existing farm dam. This site provides baseline water quality data for Eight Mile Creek flows entering the North Creek system.
BLMP6	Belyando River Anabranch	Location: 21°57'34.06"S, 146°39'24.55"E This site is located on the Belyando River anabranch upstream of the confluence with North Creek. This site corresponds to MP2 as shown in Figure 13-2 of the draft EIS. This site provides baseline water quality data for the receiving waters of the Belyando River upstream of inputs from the North Creek catchment.
BLMP7	Belyando River Anabranch	Location: 21°52'21.73"S, 146°42'18.82"E This site is located on the Belyando River anabranch channel downstream of the confluence with North Creek and upstream of the confluence with the Belyando River main channel. This site is also located adjacent to potential lacustrine and palustrine wetland environments of the Belyando River floodplain. This site provides baseline water quality data for Belyando River anabranch including any drainage from the North Creek catchment.
BLMP8	Belyando River Main Channel	Location: 21°52'26.57"S, 146°42'37.75"E This site is located on the Belyando River main channel upstream of the confluence with the Belyando River anabranch. This site receives drainage from the upper Belyando River catchment including the Carmichael River catchment. This site does not receive drainage from the North Creek catchment. This site provides baseline water quality data for the Belyando River upstream of drainage from the North Creek catchment.
BLMP9	Belyando River Main Channel	Location: 21°47'46.01"S, 146°45'23.18"E This site is located on the Belyando River main channel downstream of the confluence with the Belyando River anabranch. This site provides baseline water quality data for the Belyando River downstream of inputs from the North Creek and upper Belyando River catchments, but upstream of Tomahawk Creek.

Site ID	Surface Water Feature	Rationale
Upstream *Monitoring Points on North Creek*		
BLMP10	Laguna Creek headwaters	Location: 21°51'51.79"S, 146°14'30.35"E This site is located in the ephemeral headwaters of the upper North Creek catchment, upstream of the proposed mining area and mine water release point (RP1). This site does not receive any input from significant tributaries and provides baseline water quality data for the ephemeral headwaters of North Creek upstream of any drainage from the proposed mining areas.

The baseline monitoring program will include monthly field testing and sample collection at each of the monitoring points. The proposed monitoring program includes field testing and laboratory analysis for a broad range of toxicants and physico-chemical parameters. Parameters to be monitored include electrical conductivity, total dissolved solids, major ions (i.e. Na, Ca, Mg, K, Cl, SO4, HCO3, fluoride), hardness, alkalinity, pH, turbidity, total suspended solids, dissolved oxygen, nutrients (i.e. ammonia, oxidised nitrogen, total nitrogen, total phosphorus, free reactive phosphorus), chlorophyll a, total and dissolved metals and metalloids (including iron) and total petroleum hydrocarbons.

A pre-mining baseline dataset spanning at least 12 months and a complete seasonal cycle (wet-dry-wet season) will be collected prior to commencement of the project.

Water quality sampling and monitoring will be undertaken in accordance with the QWQG and the *Monitoring and Sampling Manual* (EHP, 2009). All metals and metalloids will be measured as total (unfiltered) and dissolved (filtered). In addition, a 0.2 µm filter will be used to remove colloidal particles from samples to be tested for aluminium.

Water quality objectives will be calculated in accordance with the QWQG. The potential for water hardness to reduce the toxicity of certain metals (i.e. Cd, Cr (III), Cu, Pb, Ni and Zn) will be considered in the calculation of water quality objectives. An adjustment for hardness will be applied using the algorithms presented in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000), as necessary.

The proponent is not currently aware of any agricultural surface water abstractions from North Creek. In the event that this is identified during the baseline monitoring program or REMP, water quality objectives for this environmental value will be calculated, as necessary.

2.2 BASELINE FLOW MONITORING PROGRAM

Surface water flow monitoring will be undertaken at the following locations:

- BLMP6 on the Belyando River upstream of the confluence with North Creek (at the same location as EIS monitoring location MP2); and
- BLMP1 on the upper reach of North Creek.

Flow measurements will be undertaken in accordance with *Australian Standard 3778 – Measurement of water flow in open* channels and the QWQG. Flow data will be used to inform the REMP and the development of flow based release conditions.

3 EA CONDITIONS FOR MINE-AFFECTED WATER RELEASE AND COMPLIANCE MONITORING

The mine water management system for the project has been amended to allow for the controlled release of stored pit water from Release Point 1 (RP1) at the Mine Water Dam to the North Creek catchment (Figure 1), based on the flows in North Creek rather than the Belyando River, as proposed in the draft EIS.

The project site is remote and is located at the head of the catchment. It has highly ephemeral, short duration, surface water flows. These factors severely limit the ability for any regular sampling of surface water flows from the project site hence there is currently insufficient receiving water quality and flow data for North Creek to enable the detailed calculation of flow triggers and water quality release limits associated with this change in accordance with the EHP model mining conditions.

Consequently, the baseline water quality and flow monitoring program described in Section 2 will be implemented so that that receiving water flow criteria for discharge, maximum release rates, Electrical Conductivity (EC) and turbidity release limits can be calculated for North Creek, in accordance with the EHP model mining conditions.

The proposed EA conditions for release and monitoring of mine-affected water are presented in Tables A1 to A6 of Appendix A. Table 2 provides a summary of the key changes to these EA conditions in response to submissions.

Table 2
Summary of Changes to Draft EA Conditions for Mine-Affected Water

EA Discharge Conditions Table	Key Changes to Draft EIS
Table A1 – Mine-affected Water Release Points, Sources and Receiving Waters	Receiving waters changed from the Belyando River to North Creek
Table A2 – Mine-affected Water Release Limits	EC release limit to be advised based upon baseline water quality and flow monitoring data. pH limit revised to align with QWQG in response to issue 24.023. Turbidity release limit to be advised based upon baseline water quality and flow monitoring data in response to issue 24.019. All release limits to be finalised based upon baseline water quality and flow monitoring data.
Table A3 – Release Contaminant Trigger Levels, Potential Contaminants:	In response to issue 24.023, the EHP *Guideline: Model Mining Conditions* trigger levels have been amended to reflect the guideline values (nutrients and physicochemical) for the protection of slightly to moderately disturbed upland streams presented in Table 3.2.1a of the QWQG. All trigger levels to be finalised based upon baseline water quality and flow monitoring data.
Table A4 – Mine-affected Release During Flow Events	Flow based release limits to be advised based upon baseline water quality and flow monitoring data. Flow monitoring locations revised in response to issue 24.019.
Table A5 – Receiving Water Upstream Background Sites and Downstream Monitoring Points	Amended compliance monitoring locations to align with baseline monitoring program. All compliance monitoring locations to be finalised based upon baseline water quality and flow monitoring data.
Table A6 – Receiving Waters Contaminant Trigger Levels	Receiving environment trigger levels to be advised based upon baseline water quality and flow monitoring data in response to issue 24.019. All trigger levels to be finalised based upon baseline water quality and flow monitoring data.

Any controlled releases of mine-affected water will be monitored in accordance with the EHP's model mining conditions relating to the release of mine-affected water. These conditions require monitoring of the water released from the site, as well as the receiving waters.

Parameters to be included in the monitoring program include pH and EC and annual monitoring of a comprehensive suite of water quality parameters, including metals and metalloids.

This section describes the site-specific monitoring requirements for controlled releases, in accordance with the EHP model mining conditions.

The quality of the receiving waters will be monitored at the locations specified in Table A5 of Appendix A for each quality characteristic and at the monitoring frequency stated in Table A6 of Appendix A.

If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table A6 of Appendix A during a release event an investigation will be undertaken to compare the downstream results to the upstream results in the receiving waters.

If the investigation shows that the downstream results exceed the upstream results a further investigation into the potential for environmental harm will be undertaken and the findings reported to the EHP.

4 RECEIVING ENVIRONMENT MONITORING PROGRAM

In accordance with the EHP Guideline *Model Mining Conditions*, the proponent will prepare a REMP Design Document that addresses the requirements of the REMP. The REMP Design Document will be developed in accordance with EHP's *Receiving Environment Monitoring Program guideline* (EHP, 2014). The REMP Design Document will describe the aims, objectives and methodology of the REMP and will identify:

- Environmental values for receiving waters;
- Measurable indicators and associated water quality objectives for each of the environmental values;
- Monitoring sites within the downstream receiving waters;
- Control sites representative of background or reference conditions;
- An assessment methodology for determining potential impacts to downstream environmental values based upon the water quality objectives and representative control site data; and
- A quality control / quality assurance method to be adopted for the REMP.

The proponent will provide the REMP Design Document to the regulatory authority for approval prior to commencement of the REMP.

In outline, the REMP will be designed to:

- Encompass the extent of North Creek downstream of RP1 (including any relevant lacustrine and palustrine habitats associated with North Creek) and the proximal reaches of the Belyando River. These extents will be informed by the baseline water quality monitoring program which incorporates monitoring locations on North Creek and its headwaters and the Belyando River system, including several potential wetland areas.
- Include surface water monitoring for all toxicants and physico-chemical indicators of concern including but not limited to electrical conductivity, total dissolved solids, major ions (i.e. Na, Ca, Mg, K, Cl, SO4 and HCO3), hardness, alkalinity, pH, turbidity, total suspended solids, dissolved oxygen, nutrients (i.e. ammonia, oxidised nitrogen, total nitrogen, total phosphorus and free reactive phosphorus) and chlorophyll a. The REMP monitoring parameters will be informed by the results of the baseline water quality monitoring program described in Section 2 to be completed prior to commencement of the project or the REMP.
- The REMP will include monitoring of flow rates in the receiving waters.
- The REMP will include monitoring of the receiving waters for any change in ecological condition arising from the release of mine-affected water from the project. The monitoring will address riparian vegetation, emergent macrophytes, aquatic macroinvertebrates and fish, as necessary based upon the characteristics of any mine-affected water released.
- Monitoring of physico-chemical and ecological parameters in accordance with the REMP will be undertaken periodically under natural flow conditions and during and after the release of mine-affected water over the life of the mine.
- The REMP will provide sufficient information to allow for the identification of significant impacts to of the Belyando River and North Creek as a result of the project or cumulatively with upstream water users.

In accordance with the EHP Guideline: *Model Mining Conditions*, the proponent will also prepare a report outlining the findings of the REMP, including all monitoring results and interpretations. The report will be prepared annually and made available to the administrating authority, upon request. This report will include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of approved EA release limits to protect downstream environmental values.

5 TSF CONCEPTUAL FINAL LANDFORM DRAINAGE

The conceptual TSF and Power Station Waste Storage Facility (PSWSF) final landform and drainage design has been revised to address the potential for erosion and instability in the long term post mining. The revised conceptual design is shown on Figure 2.

The key features of the revised conceptual design include:

- A PSWSF landform that it is integrated with the TSF final landform so that the plateau area of the PSWSF is at the same level and contiguous with the TSF plateau;
- The final surface of the TSF/PSWSF plateau area will be internally draining and will include drains to convey runoff from the plateau area to natural ground at the northern end of the TSF; and
- The use of mine overburden to extend the TSF landform to the north-west and enable the TSF plateau to tie into the natural ground level with a gentle gradient.

The proposed drain will have a maximum gradient of less than 1% that is suitable to ensure the long term stability of the TSF capping layer. The drain will have sufficient capacity to convey runoff from the PMP (Probable Maximum Precipitation) event to natural ground at the northern end of the TSF.

Flow velocities will be less than 1 m/s during the 1% Annual Exceedance Probability (AEP) (i.e. 1 in 100) flow event and are well within the applicable hydraulic design criteria. Based upon these design specifications the drains will be stable in the long term.

6 REFERENCES

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC and ARMCANZ). (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Department of Environment and Heritage Protection (2013) *Queensland Water Quality Guidelines.*

Department of Environment and Heritage Protection (2009) *Monitoring and Sampling Manual* (Version 2 September 2010, July 2013 format edits).

Department of Environment and Heritage Protection (2014) *Receiving Environment Monitoring Program guideline - For use with Environmental Relevant Activities under the Environmental Protection Act 1994*.

Standards Australia (1990) Australian Standard 3778: *Measurement of water flow in open channels.*

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for
HANSEN BAILEY

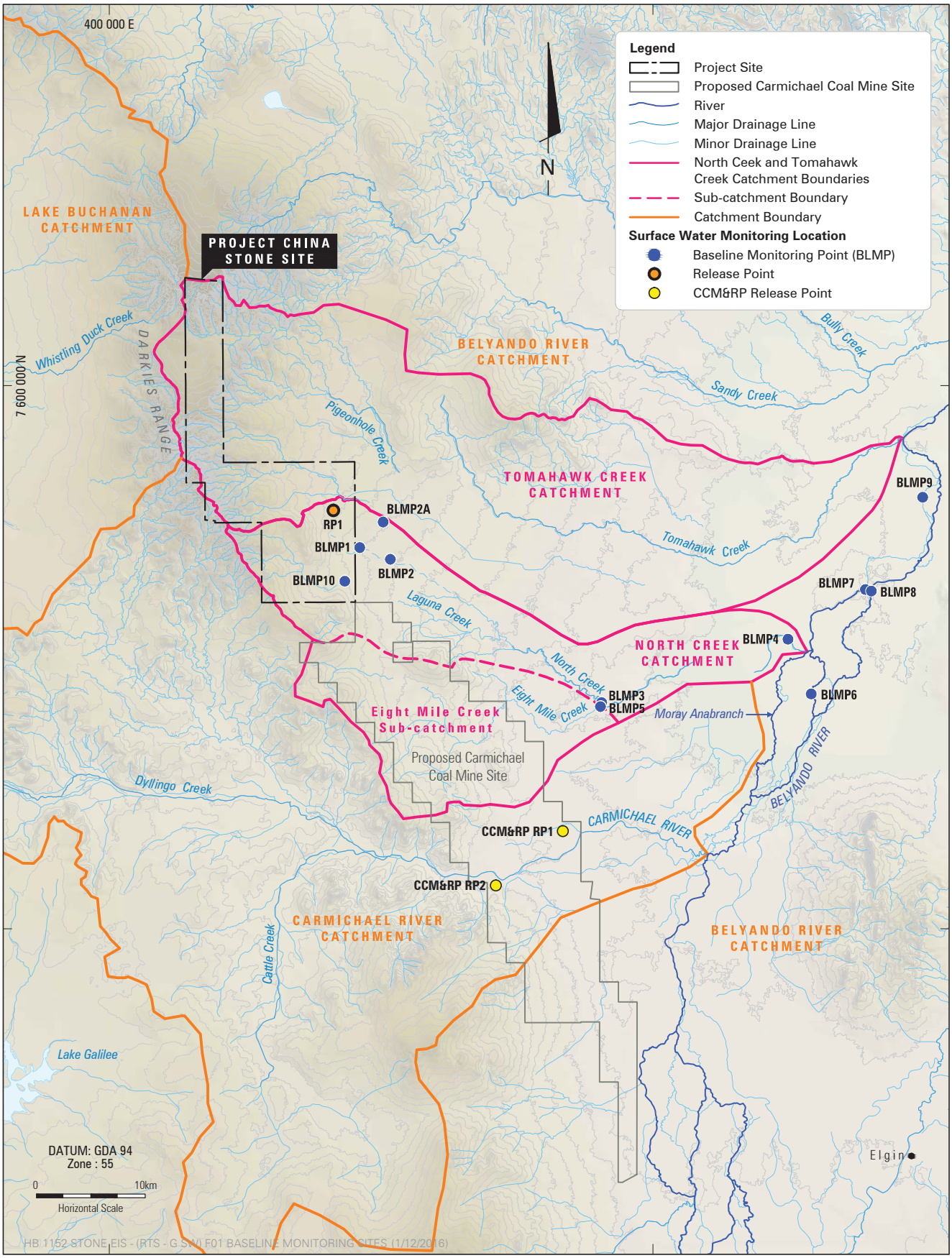




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FIGURES

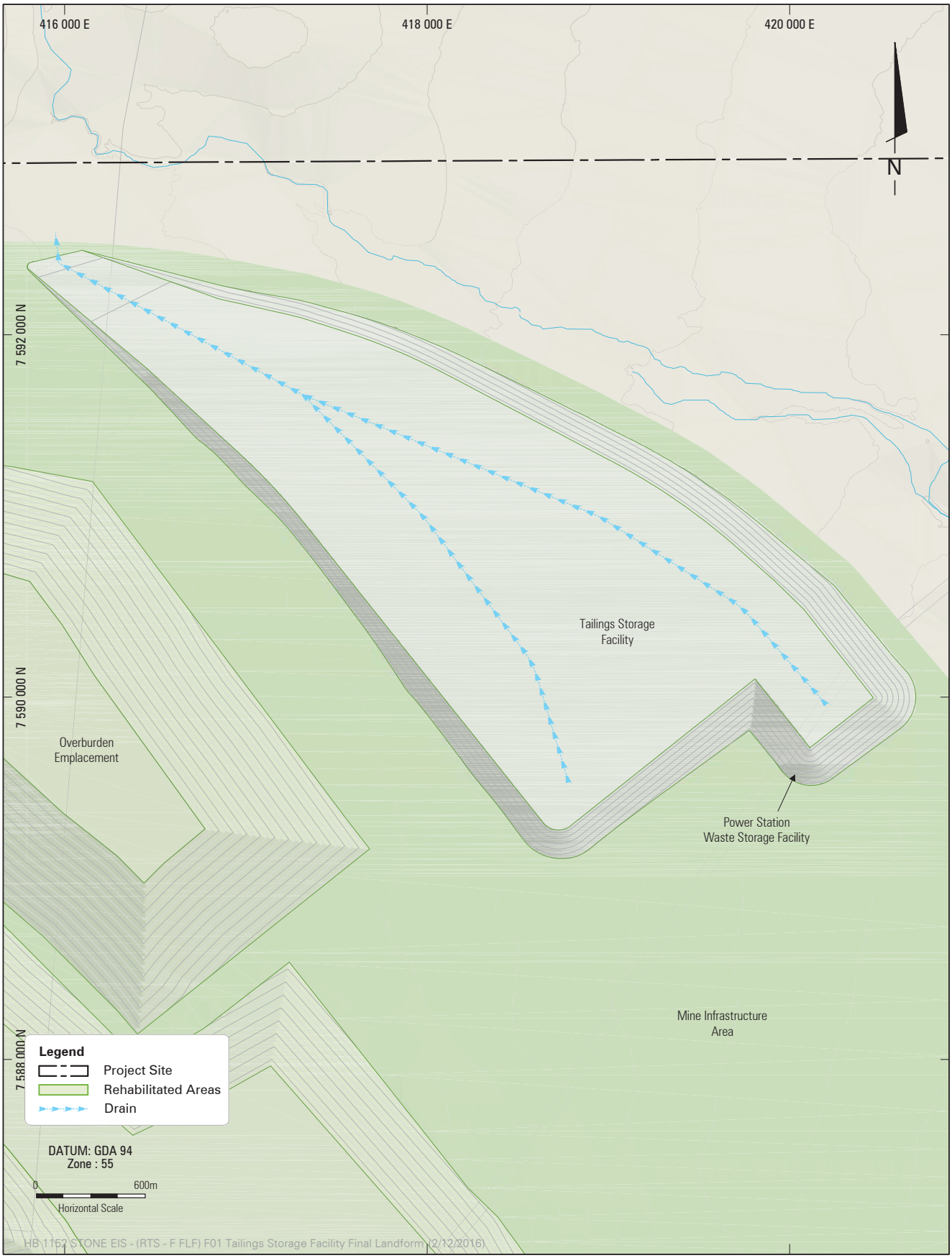


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Baseline Monitoring Sites

FIGURE 1



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Conceptual Tailings Storage Facility and Power Station Waste Storage Facility Final Landform Drainage Design

FIGURE 2

APPENDIX A

Draft EA Conditions for Mine-affected Water Release

Table A1
Mine-affected Water Release Points, Sources and Receiving Waters

Release Point	Easting (GDA94)	Northing (GDA94)	Mine-affected Water Source and Location	Monitoring Point	Receiving Waters
RP 1	420441.25	7588525.72	Mine Water Dam piped release point	Mine Water Dam discharge point	North Creek headwaters

Table A2
Mine-affected Water Release Limits

Quality characteristic	Release Limits	Monitoring frequency
Electrical Conductivity (µS/cm)	TBA	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 7.5 (maximum)	
Turbidity (NTU)	TBA	

** To be advised based upon outcomes of baseline monitoring program*

Table A3
Release Contaminant Trigger Investigation Levels, Potential Contaminants

Quality characteristic	Trigger Levels (µg/L) *	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	Model Conditions	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Arsenic	13	Model Conditions	
Cadmium	0.2	Model Conditions	
Chromium	1	Model Conditions	
Copper	2	Model Conditions	
Iron	300	Model Conditions	
Lead	4	Model Conditions	
Mercury	0.2	Model Conditions	
Nickel	11	Model Conditions	
Zinc	8	Model Conditions	
Boron	370	Model Conditions	
Cobalt	90	Model Conditions	
Manganese	1,900	Model Conditions	
Molybdenum	34	Model Conditions	
Selenium	10	Model Conditions	
Silver	1	Model Conditions	
Uranium	1	Model Conditions	
Vanadium	10	Model Conditions	

Quality characteristic	Trigger Levels (µg/L) *	Comment on Trigger Level	Monitoring Frequency
Ammonia	10	QWQG Table 3.2.1a	
Oxidised Nitrogen	15	QWQG Table 3.2.1a	
Organic Nitrogen	225	QWQG Table 3.2.1a	
Total Nitrogen	250	QWQG Table 3.2.1a	
Filtered Phosphorus	15	QWQG Table 3.2.1a	
Total Phosphorus	30	QWQG Table 3.2.1a	
Dissolved Oxygen	90 – 110 % saturation	QWQG Table 3.2.1a	
Turbidity	TBA	TBA	
Petroleum Hydrocarbons (C6-9)	20	Model Conditions	
Petroleum Hydrocarbons (C10-36)	100	Model Conditions	
Fluoride (total)	2,000	Model Conditions	
Sodium	TBA	TBA	
Suspended Solids	TBA	TBA	
Sulphate (SO_4) (mg/L)	TBA	TBA	

** To be revised based upon outcomes of baseline monitoring program*

Table A4
Mine-affected Release During Flow Events

Receiving Waters	Release Point	Gauging Station	Easting (GDA94)	Northing (GDA94)	Flow recording Frequency	Receiving Water Flow Criteria (m^3/s)	Max. Release Rate (m^3/s)	Electrical Conductivity Release Limits (µS/cm)
North Creek headwaters	RP 1	GS1 – Belyando River Anabranch Upstream of North Creek	21°57’34.06”S	146°39’24.55”E	Continuous (Hourly)	Low Flow: <TBA* m3/s for a period of 28 days after natural flow events	TBA*	TBA*
						Medium Flow: > TBA*	TBA*	TBA*
						High Flow: > TBA*	TBA*	TBA*
North Creek headwaters	RP 1	GS2 – North Creek headwaters	21°50'11.12"S	146°15'18.96"E	Continuous (Hourly)	Low Flow: <TBA* m3/s for a period of 28 days after natural flow events	TBA*	TBA*
						Medium Flow: > TBA*	TBA*	TBA*
						High Flow: > TBA*	TBA*	TBA*

** To be advised based upon outcomes of baseline monitoring program*

Table A5
Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring point	Receiving Water Location Description	Latitude	Longitude
Downstream Monitoring Points on North Creek			
Monitoring Point 1 (BLMP1)	North Creek headwaters	21°50'11.12"S	146°15'18.96"E
Monitoring Point 2 (BLMP2)	North Creek headwaters	21°50'46.68"S	146°16'56.67"E
Monitoring Point 3 (BLMP3)	North Creek headwaters	21°57'58.00"S	146°28'12.30"E
Monitoring Point 4 (BLMP4)	North Creek at Belyando River	21°54'50.07"S	146°38'10.32"E
Downstream Monitoring Points on Belyando River and Eight Mile Creek			
Monitoring Point 5 (BLMP5)	Eight Mile Creek	21°58'10.08"S	146°28'8.38"E
Monitoring Point 6 (BLMP6)	Belyando River Anabranch Upstream of North Creek	21°57’34.06”S	146°39’24.55”E
Monitoring Point 7 (BLMP7)	Belyando River Anabranch Downstream of North Creek	21°52'21.73"S	146°42'18.82"E
Monitoring Point 8 (BLMP8)	Belyando River Upstream of Anabranch	21°52'26.57"S	146°42'37.75"E
Monitoring Point 9 (BLMP9)	Belyando River Downstream of Anabranch	21°47’46.01”S	146°45'23.18"E
Upstream Monitoring Points on North Creek			
Monitoring Point 10 (BLMP10)	Laguna Creek headwaters	21°51'51.79"S	146°14'30.35"E

Table A6
Receiving Waters Contaminant Trigger Levels

Quality Characteristic	Trigger Level *	Source *	Monitoring Frequency
pH	TBA	TBA	Daily during release
Electrical Conductivity (µS/cm)	TBA	TBA	
Turbidity	TBA	TBA	
Sulphate (SO_4) (mg/L)	TBA	TBA	

** To be advised based upon outcomes of baseline monitoring program*



PROJECT CHINA STONE

Attachment F Additional Information on Ecology

PROJECT CHINA STONE

ADDITIONAL INFORMATION ON ECOLOGY

COMMERCIAL IN CONFIDENCE INFORMATION HAS BEEN REDACTED

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Please note that Figures 7 – 11 have been redacted as they contain Commercial In Confidence material

PROJECT CHINA STONE
ADDITIONAL INFORMATION ON ECOLOGY

for
MacMines Austasia Pty Ltd

1 INTRODUCTION

1.1 OVERVIEW

This report is an attachment to the Supplement to the draft Environmental Impact Statement (draft EIS) for Project China Stone (the project). The Supplement to the draft EIS (the Supplement) is Volume 6 and should be read in conjunction with the draft EIS Volumes 1 – 5 that were publicly exhibited. Together, Volumes 1 - 6 form the revised draft EIS for the project. To the extent of any inconsistencies, the information in this attachment supersedes information in any other volume of the draft EIS.

1.2 PURPOSE AND SCOPE

This attachment provides additional information in relation to habitat modelling for threatened fauna species and biodiversity offsets. This additional information has been provided in response to specific issues raised in submissions on the draft EIS, including issues raised by the Department of the Environment and Energy (DoEE), Department of Environment and Heritage Protection (EHP) and the Black-throated Finch Recovery Team.

This report was prepared in consultation with key stakeholders and the following meetings guided the preparation of this report:

- A meeting with officers from DoEE, and the Office of the Coordinator-General – OCG on 21 December 2015; and
- A meeting with officers from EHP, OCG, and the Department of Natural Resources and Mines on 10 November 2016.

This report does not address all the ecological issues raised in stakeholder submissions in relation to the draft EIS Terrestrial Ecology Report (Appendix F). Individual responses to specific ecological issues that were raised are provided in the Supplement Attachment A – Individual Responses to Submissions.

1.3 DOCUMENT STRUCTURE

This report is structured as follows:

- Section 1 (this section) describes the purpose and content of the report.
- Section 2 describes proposed changes to habitat modelling for the Black-throated Finch and Squatter Pigeon and provides preliminary habitat modelling for the Yakka Skink.
- Section 3 provides further information on biodiversity offsets, including additional information about the most prospective offset property.

This document should be treated as confidential given that it contains commercial in confidence information about potential properties to be used for biodiversity offsets.

2 HABITAT MODELLING FOR THREATENED FAUNA SPECIES

2.1 INTRODUCTION

This section describes revised habitat modelling for the Black-throated Finch and Squatter Pigeon. It describes the reasons for revising the habitat modelling and the basis of the revised habitat definition. It also provides figures indicating the areas of revised habitat to be disturbed by project activities. Preliminary habitat modelling for the Yakka Skink is also provided in this section.

2.2 BLACK THROATED-FINCH

2.2.1 Introduction

The draft EIS included a definition of Black-throated Finch habitat based on information contained in conservation advice for the species, particularly the Black-throated Finch Recovery Plan and the SPRAT profile. The definition accounted for vegetation communities listed in the Black-throated Finch Recovery Plan located within 3 km of permanent water.

Submissions from DoEE, EHP, the Black-throated Finch Recovery Team raised issues in relation to Black-throated Finch habitat modelling. These submissions indicated that the habitat definition was too restrictive because it relied on the presence of permanent water and hence did not account for seasonally available habitat in times of good rainfall. The submissions highlighted specific areas of the project site (i.e. southern and central areas) that were not mapped as habitat and indicated that these areas should be considered to be habitat, particularly given that there are records of the species from these areas.

2.2.2 Revised Habitat Modelling

The habitat mapping has been revised in response to the issues raised in these submissions. Although the definition used in the draft EIS captured the most significant areas of habitat, a broader, more conservative definition has been adopted for the Supplement. The revised definition of Black-throated Finch habitat is as follows:

- Grassy woodland on any Queensland regional ecosystem (RE) on Land Zone 3, 5 or 7 which is either:
  - Within 600 m of permanent water; or
  - Within 3 km of a wetland or ≥ 3rd order stream.

This is the definition contained in the following two recent *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approvals:

- Approval for the South Galilee Coal Project (EPBC 2010/5496), dated July 2015; and
- Approval for the Galilee Coal and Rail Project (EPBC 2009/4737), dated December 2013.

The definition of Black-throated Finch habitat from these approvals is applicable to the project because:

- The habitat definitions in these approvals relate to general habitat features (e.g. land zones, distance to water, etc.), rather than specific locations on the South Galilee Coal Project site or Galilee Coal and Rail Project site. The habitat definitions are therefore not unique to the South Galilee Coal Project site or Galilee Coal and Rail Project site and are equally applicable to other projects in the region.
- The South Galilee Coal Project and Galilee Coal and Rail Project EPBC Act approvals were issued relatively recently (in July 2015 and December 2013, respectively).
- The South Galilee Coal Project and Galilee Coal and Rail Project are located in the same bioregion as the project.
- The South Galilee Coal Project and Galilee Coal and Rail Project are located in areas with similar broad vegetation types and habitat features as the project site.

The revised habitat modelling for the Black-throated Finch within the project site is shown on Figure 1. Based on this habitat modelling, the project site contains a total of 12,334 ha of Black-throated Finch habitat.

The revised habitat modelling has addressed key issues raised in the submissions as follows:

- The revised habitat modelling includes habitat around seasonal sources of water, not just permanent water;
- The revised habitat modelling incorporates the southern and central areas of the project site; and
- The revised habitat modelling provides a good match between mapped habitat and Black-throated Finch records. Figure 1 shows records of the Black-throated Finch within the project site. These include records from the field surveys undertaken for the project, as well from field surveys undertaken by Adani for the Carmichael Coal Mine and Rail Project (CCM&RP). As shown on Figure 1, the majority of Black-throated Finch records fall in an area mapped as Black-throated Finch habitat (using the revised habitat definition).

2.2.3 Project Disturbance Footprint Relative to Revised Habitat Mapping

Figure 2 shows the areas of Black-throated Finch habitat proposed to be disturbed as part of the project. This includes areas cleared for the development of the open cut mine and infrastructure, as well as areas that will be subject to subsidence due to longwall mining. Table 1 indicates the areas of Black-throated Finch habitat proposed to be disturbed, based on the revised definition of habitat. The values in this table replace the areas of habitat listed in:

- Sections 9.6.8 and 9.8 of the draft EIS;
- Sections 4.6.6, 5.2, 5.3, 5.4, 5.9, 7 and Appendices G, L, N and O of the draft EIS Terrestrial Ecology Report (Appendix F); and
- Section 3.2 of the draft EIS Biodiversity Offset Strategy (Appendix H).

Table 1
Proposed Disturbance of Revised Black-throated Finch Habitat

Total Area in Project Site (ha)	Areas to be Cleared(ha)		Disturbance Due to Subsidence Crack Rehabilitation
	Open Cut and Mine Infrastructure	Remedial Drains	
12,334	8,499	10	15

The area of Black-throated Finch habitat potentially impacted by the project has increased as a result of the revised, more conservative habitat definition for this species. This is not due to a change in proposed project activities, but is rather due to the fact that the revised definition has increased the total area of mapped Black-throated Finch habitat within the project site. Although the amount of habitat proposed to be disturbed has increased, the key

findings of the impact assessment contained in the draft EIS Terrestrial Ecology Report (Appendix F) have not changed and the proposed management measures to mitigate potential impacts on this species have also not changed. In particular, the Assessment of Significance prepared for the Black-throated Finch concluded that the project would give rise to the permanent loss of habitat within the project site and, for this reason, has the potential to give rise to a significant, residual impact on the species. For this reason, and in keeping with the requirements of the *EPBC Act Environmental Offsets Policy 2012* (EPBC Act Environmental Offsets Policy), offsets will be required to be provided. The revised habitat mapping has not changed this conclusion. Section 3 provides further detail on proposed offsets for the Black-throated Finch.

2.3 SQUATTER PIGEON

2.3.1 Introduction

The draft EIS included a definition of Squatter Pigeon habitat based on information contained in conservation advice for the species. The definition accounted for remnant vegetation within 1 km of permanent water.

The DoEE's submission raised issues in relation to Squatter Pigeon habitat mapping. The submission indicated that the habitat definition was too restrictive and did not account for all areas of potential habitat on the project site. The submission raised the issue that the habitat definition in the draft EIS was reliant on permanent water and did not account for seasonally available water. There was a particular concern about some areas in the southern and central parts of the project site not being mapped as habitat, despite records of the species from these areas.

2.3.2 Revised Habitat Modelling

The habitat mapping has been revised in response to the issues raised in this submission. Although the definition used in the draft EIS captured the most significant areas of habitat (i.e. breeding habitat), a broader, more conservative definition has been adopted for the Supplement. The revised definition of Squatter Pigeon habitat is as follows:

- Grassy woodland on any Queensland RE on Land Zone 3, 5 or 7 which is either:
  - Within 1 km of permanent water; or
  - Within 1 km of a wetland or ≥ 3rd order stream.

This is the definition contained in the following two recent EPBC Act approvals:

- Approval for the Galilee Coal and Rail Project (EPBC 2009/4737), approved December 2013; and
- Approval for the Red Hill Mining Project (EPBC 2013/6865), approved August 2015.

Section 2.2 describes the relevance of the Black-throated Finch habitat definitions contained in the Galilee Coal and Rail Project EPBC Act approval to the project. These reasons are also relevant to the applicability of the habitat definitions for the Squatter Pigeon to the project. The fact that the Squatter Pigeon habitat definition was also used in the recently issued EPBC Act approval for the Red Hill Project indicates its broad applicability to projects in Central Queensland.

The revised habitat modelling for the Squatter Pigeon within the project site is shown on Figure 3. Based on this habitat modelling, the project site contains a total of 6,642 ha of Squatter Pigeon habitat.

The revised habitat modelling has addressed key issues raised in the submissions as follows:

- The revised habitat modelling includes habitat around seasonal sources of water, not just permanent water; and
- The revised habitat modelling provides a good match between mapped habitat and Squatter Pigeon records. Figure 3 shows records of the Squatter Pigeon within the project site and indicates that the majority of records fall within the area mapped as Squatter Pigeon habitat (using the revised habitat definition).

2.3.3 Project Disturbance Footprint Relative to Revised Habitat Mapping

Figure 4 shows the areas of Squatter Pigeon habitat that will be cleared as a result of the project. This includes areas cleared for the development of the open cut mine and infrastructure, as well as areas that will be subject to subsidence due to longwall mining. Table 2 indicates the areas of Squatter Pigeon habitat proposed to be disturbed, based on the revised definition of habitat.

The values in this table replace the areas of habitat listed in:

- Sections 9.6.8 and 9.8 of the draft EIS;
- Sections 4.6.6, 5.2, 5.3, 5.4, 5.9, 7 and Appendices G, L, N and O of the draft EIS Terrestrial Ecology Report (Appendix F); and
- Section 3.2 of the draft Biodiversity Offset Strategy (Appendix H).

Table 2
Proposed Disturbance of Revised Squatter Pigeon Habitat

Total Area in Project Site (ha)	Areas to be Cleared(ha)		Disturbance Due to Subsidence Crack Rehabilitation
	Open Cut and Mine Infrastructure	Remedial Drains	
6,642	3,476	5.7	39

The area of Squatter Pigeon habitat potentially impacted by the project has increased as a result of the revised, more conservative habitat definition for this species. This is not due to a change in proposed project activities, but is rather due to the fact that the revised definition has increased the total area of mapped Squatter Pigeon habitat within the project site. Although the amount of habitat proposed to be disturbed has increased, the key findings of the impact assessment contained in the draft EIS Terrestrial Ecology Report (Appendix F) have not changed and the proposed management measures to mitigate potential impacts on this species have also not changed. In particular, the Assessment of Significance prepared for the Squatter Pigeon concluded that the project would give rise to the permanent loss of habitat within the project site and, for this reason, has the potential to give rise to a significant, residual impact on the species. For this reason, and in keeping with the requirements of the EPBC Act Environmental Offsets Policy, offsets will be required to be provided. The revised habitat mapping has not changed this conclusion. Section 3 provides further detail on proposed offsets for the Squatter Pigeon.

2.4 YAKKA SKINK

2.4.1 Yakka Skink Presence within Project Site

The draft EIS Terrestrial Ecology Report (Appendix F) contains a detailed assessment of the likelihood of the Yakka Skink occurring within the project site. It explains that the species was not recorded during the draft EIS field surveys conducted for this project, nor was it recorded during field surveys conducted for the CCM&RP. The draft EIS Terrestrial Ecology Report (Appendix F) explains that the project site lacks core habitat for the species, given that it is not located with the Mulga Lands or Brigalow Belt South Bioregions. Based on these factors, the draft EIS Terrestrial Ecology Report (Appendix F) concluded that there is a low potential for the Yakka Skink to be present in the project site.

The EHP indicated in its submission on the draft EIS that EHP officers believe that the project site contains suitable habitat for the species, although the submission explained that the habitat requirements for the Yakka Skink are poorly known.

The conclusions of the draft EIS in relation to the potential presence of the Yakka Skink within the project site are valid based on publicly available information about the species. However, it is acknowledged that there is some uncertainly in relation to the distribution and

habitat requirements of this species. Given this uncertainty, the Yakka Skink has now been considered as part of the assessment of project impacts.

2.4.2 Preliminary Habitat Modelling for the Yakka Skink

Yakka Skink habitat is defined in the EPBC Act approval for the Galilee Coal and Rail Project (EPBC 2009/4737) as follows:

- Open forest or woodland on any Queensland RE on Land Zone 3, 4 (not associated with current alluvium), 5, 7, 9 or 10; and
- Supports ground cover vegetation (>30% foliage projective cover) and >30% leaf litter and fallen woody material; and
- Supports any combination of the following:
  - Abundant rock outcrops (containing crevices); or
  - Fallen logs (>30 cm diameter); and/or tree stumps; and/or animal burrows with an abundance (combined or otherwise) of >10 per 100 m x 100 m plot.

This is the only EPBC Act approval to contain a definition of Yakka Skink habitat and this definition will therefore be used to guide habitat modelling for the project. The definition is broad and would include the vast majority of remnant vegetation within the Desert Uplands Bioregion (as the definition includes all of the land zones within this bioregion). It may therefore be necessary to adjust the definition to reflect the specific characteristics of the project site. This work is proposed to be undertaken as part of future field surveys of the project site that will be completed when the Offset Management Plan is prepared. The field surveys will also identify the various microhabitat features listed in the definition (e.g. ground cover, fallen logs etc.). Given that these field surveys are still to be undertaken, the Supplement has made use of the definition as currently drafted for the purposes of assessing potential impacts (with the exception that it does not take into account the presence of microhabitat features). This is a highly conservative approach and it is anticipated that the area of mapped habitat will be significantly reduced once the field surveys have been completed.

A preliminary habitat map has been prepared for the Yakka Skink based on this approach and is provided in Figure 5. The majority of the project site is considered to be habitat based on this preliminary habitat definition.

2.4.3 Potential Impacts

Figure 6 shows the areas of preliminary Yakka Skink habitat that will be cleared as a result of the project. This includes areas cleared for the development of the open cut mine and infrastructure, as well as areas that will be subject to subsidence due to longwall mining. Table 3 indicates the areas of preliminary Yakka Skink habitat proposed to be disturbed.

Figure 6 and the areas in Table 3 are based on a preliminary assessment of habitat. These figures will need to be confirmed during field surveys, given that the availability of habitat is dependent on microhabitat features such as ground cover, rock crevices, fallen logs, etc. These features will be surveyed as part of the fieldwork to be conducted as part of the development of the Offset Management Plan. This fieldwork will also allow for any necessary adjustments to be made to the habitat definition to account for site specific features. Once this fieldwork has been completed, the revised habitat mapping will be produced for the Yakka Skink.

Table 3
Proposed Disturbance Preliminary Yakka Skink Habitat

Total Area in Project Site (ha)	Areas to be Cleared(ha)		Disturbance Due to Subsidence Crack Rehabilitation
	Open Cut and Mine Infrastructure	Remedial Drains	
20,057	10,997	12	103

Based on the preliminary habitat mapping, it is anticipated that the project will be likely to give rise to a significant impact on the Yakka Skink and offsets will therefore be provided for this species. Section 3 provides further detail on proposed offsets for the Yakka Skink.

3 BIODIVERSITY OFFSETS

3.1 INTRODUCTION

The draft EIS contains a Biodiversity Offset Strategy (BOS) (Appendix H) for the project. This section provides a revised assessment of offsets, based on the changes to the habitat modelling described in Section 2. In particular, the habitat definitions for the Black-throated Finch and Squatter Pigeon have been revised and it is therefore necessary to apply these new definitions to the habitat mapping contained in the BOS. In addition, offsets are now proposed to be provided for the Yakka Skink and consequently it is necessary to include preliminary habitat mapping for the Yakka Skink in the BOS. Section 3.2 provides this information for [redacted] (Property C).

[redacted] (Property C) is the most prospective offset property assessed in the BOS given that:

- There are sound technical reasons for securing offsets on [redacted]. In particular, it [redacted] has similar vegetation types and habitat values. There are records of the Black-throated Finch, Squatter Pigeon and Koala from [redacted]
- [redacted].

Although [redacted] is the most prospective offset property, the draft EIS had included information about a number of other prospective offset properties. This information was intended to

demonstrate that there are several options available for securing offsets but it was not meant to detract from the fact that [redacted] is the most prospective offset property. The draft EIS explained that [redacted] alone has sufficient vegetation to satisfy the project's offset requirements. Section 3.2 provides a revised property profile for [redacted] based on the revised habitat modelling. The revised property profile demonstrates that [redacted] will still be able to satisfy the project's offset requirements, even with the revised habitat definitions. It could be anticipated that the other potential offset properties would also be able to satisfy the offset requirements, but these properties are not discussed further, given that they are considered to be secondary offset properties.

Some minor editorial clarifications were also made to the BOS in response to submissions and these are contained in the Supplement Section 5.3 – Editorial Corrections.

3.2 PROPERTY C – [redacted]

The revised property profile included in the following sections is intended to replace the property profile contained in Section 5.5 of the draft EIS BOS (Appendix H).

3.2.1 Property Overview

[redacted] is a [redacted] property [redacted]. This property overview describes the section of the property that is being proposed for offsets [redacted]. This section of the property comprises [redacted].

The primary land use is grazing, with several dams and Queensland Government mapped wetlands located on the property ([redacted]). [redacted] waterways traverse the property, namely [redacted] in the [redacted], [redacted] in the [redacted] and [redacted] and [redacted] in the [redacted], along with numerous smaller ephemeral drainage lines. No major roads or rail lines traverse the property ([redacted]).

The property is [redacted].

[redacted] is not covered by any production permits such as Mining Leases, Mining Lease Applications, or Petroleum Leases. However, the entire property is overlain by several Exploration Permits for Coal and Petroleum.

3.2.2 Vegetation Communities

According to Queensland Government mapping, the property comprises approximately [redacted] of remnant vegetation. Table 4 lists the vegetation communities present within the property that are also present on the project site, as well as the equivalent broad habitat types and land zones for each Queensland RE type.

Table 4
Vegetation Communities within Property C – [redacted]

RE Number	RE Name	Land Zone	Broad Habitat Type
10.3.6	*Eucalyptus brownii* open-woodland on alluvial plains	3	Grassy open forest or woodland
10.3.6a	*Eucalyptus brownii* open-woodland on alluvial plains	3	Grassy open forest or woodland
10.3.10	*Corymbia dallachiana* and *C. terminalis* open-woodland on old alluvial plains (western)	3	Grassy open forest or woodland
10.3.11a	*Corymbia leichhardtii* woodland on alluvium in valleys	3	Grassy open forest or woodland
10.3.14	*Eucalyptus camaldulensis* and/or *E. coolibah* open-woodland along channels and on floodplains	3	Open forest or woodland
10.3.14d	*Eucalyptus camaldulensis* with or without *Corymbia leichhardtii* open-woodland along watercourses	3	Grassy open forest or woodland
10.3.15k	*Eucalyptus brownie* open-woodland in closed depressions	3	Palustrine wetland
10.3.16d	Ephemeral lakes with sparse-herbland or sparse-tussock grassland	3	Palustrine wetland
10.3.28a	*Eucalyptus melanophloia* open-woodland on sandy alluvial fans	3	Grassy open forest or woodland
10.5.1a	*Eucalyptus similis* open-woodland on sand plains	5	Grassy open forest or woodland
10.5.1c	*Eucalyptus similis* and *Corymbia setosa* low open-woodland on sand plains	5	Grassy open forest or woodland
10.5.1d	*Corymbia setosa* low open-woodland on sand plains	5	Grassy open forest or woodland
10.5.4	*Eucalyptus crebra* or *E. drepanophylla* open woodland on sand plains	5	Grassy open forest or woodland
10.5.4b	*Eucalyptus crebra* open-woodland on sand plains	5	Grassy open forest or woodland
10.5.5a	*Eucalyptus melanophloia* open-woodland on sand plains	5	Grassy open forest or woodland
10.5.10	*Corymbia leichhardtii* open-woodland on sand plains	5	Grassy open forest or woodland
10.7.2a	*Eucalyptus persistens* low open-woodland with soft spinifex on ferricrete above scarps	7	Grassy open forest or woodland
10.7.3a	*Acacia catenulata* low woodland on scarps	7	Grassy open forest or woodland
10.7.3b	*Acacia shirleyi* woodland on scarps	7	Grassy open forest or woodland
10.7.3c	*Corymbia lamprophylla* and/or *C. leichhardtii* open-woodland on ferricrete above scarps	7	Grassy open forest or woodland
10.7.4	*Eucalyptus persistens* low open-woodland on pediments below scarps	7	Grassy open forest or woodland

RE Number	RE Name	Land Zone	Broad Habitat Type
10.7.5	*Eucalyptus thozetiana* open-woodland on scarps and on pediments below scarps	7	Grassy open forest or woodland
10.7.7b	*Melaleuca tamariscina* low open-woodland on ferricrete	7	Grassy open forest or woodland
10.7.11a	*Eucalyptus melanophloia* low open-woodland on ferricrete	7	Grassy open forest or woodland
10.7.12a	*Eucalyptus drepanophylla* open-woodland on ferricrete	7	Grassy open forest or woodland
10.10.1a	*Acacia shirleyi* woodland on sandstone ranges	10	Open forest or woodland
10.10.1b	*Acacia catenulata* low woodland on sandstone ranges	10	Open forest or woodland
10.10.3	*Eucalyptus drepanophylla* open-woodland on sandstone ranges	10	Grassy open forest or woodland
10.10.4a	*Corymbia leichhardtii* open-woodland on sandstone ranges	10	Grassy open forest or woodland
10.10.4c	*Eucalyptus similis* open-woodland on sandstone ranges	10	Grassy open forest or woodland
10.10.5a	*Corymbia trachyphloia* and/or *C. lamprophylla* or *Eucalyptus mediocris* open woodland on sandstone ranges	10	Grassy open forest or woodland

3.2.3 Offset Potential

Table 5 outlines a conservative estimate of project offset requirements, compared with the potential fauna habitat available within [redacted]. The conservative estimate of project offset requirements has been determined by multiplying the project's clearing footprint by four.

Table 5
Areas of Potential Habitat for Threatened Fauna Species on Property C – [redacted]

	Black-throated Finch Habitat (ha)	Squatter Pigeon Habitat (ha)	Yakka Skink Habitat (ha)	Koala Habitat (ha)
Conservative Estimate of Project Offset Requirements	33,996	13,904	43,988	12,984
Area within Offset Property	68,280	68,280	72,610	26,300

As can be seen from the areas presented in Table 5, [redacted] has a high offset potential, given it potentially contains ample areas of Black-throated Finch habitat, Squatter Pigeon habitat, Yakka Skink habitat and Koala habitat.

It should also be noted that the EPBC Act Protected Matters Search Tool report for this property indicates that:

- The Squatter Pigeon, or habitat for the Squatter Pigeon, is known to occur within the area;
- The Black-throated Finch, or habitat for the Black-throated Finch, is known to occur within the area;
- The Yakka Skink, or habitat for the Yakka Skink, may occur within the area; and
- The Koala, or habitat for the Koala, is known to occur from the area.

[redacted]--.

* * *

for
HANSEN BAILEY





Laura Knowles
Principal Environmental Scientist

Peter Hansen
Director

FIGURES



PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Black-throated Finch Habitat
(Based on Revised Habitat Modelling)

FIGURE 1



PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Black-throated Finch Habitat Disturbance
(Based on Revised Habitat Modelling)

FIGURE 2

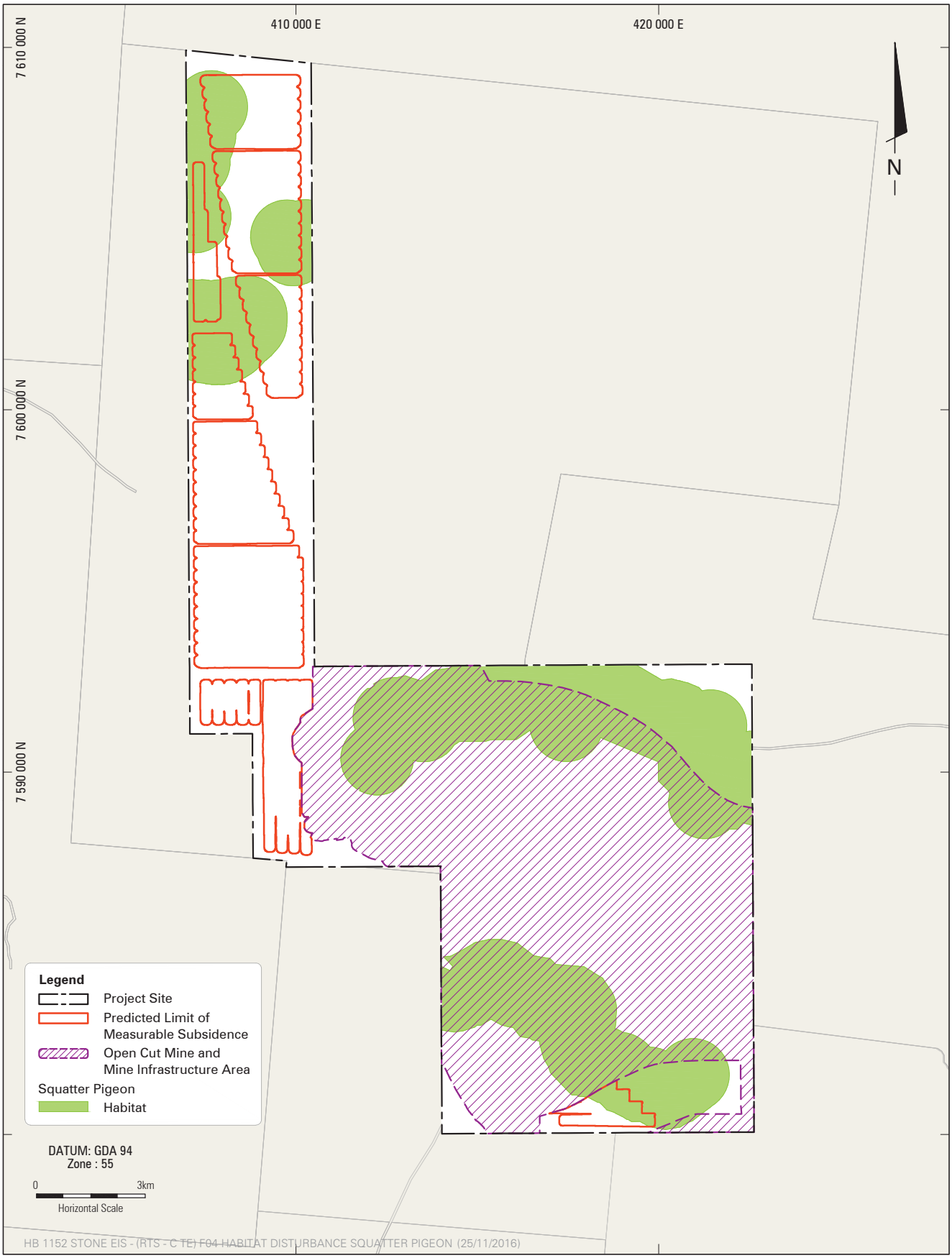


PROJECT CHINA STONE

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Squatter Pigeon Habitat
(Based on Revised Habitat Modelling)

FIGURE 3

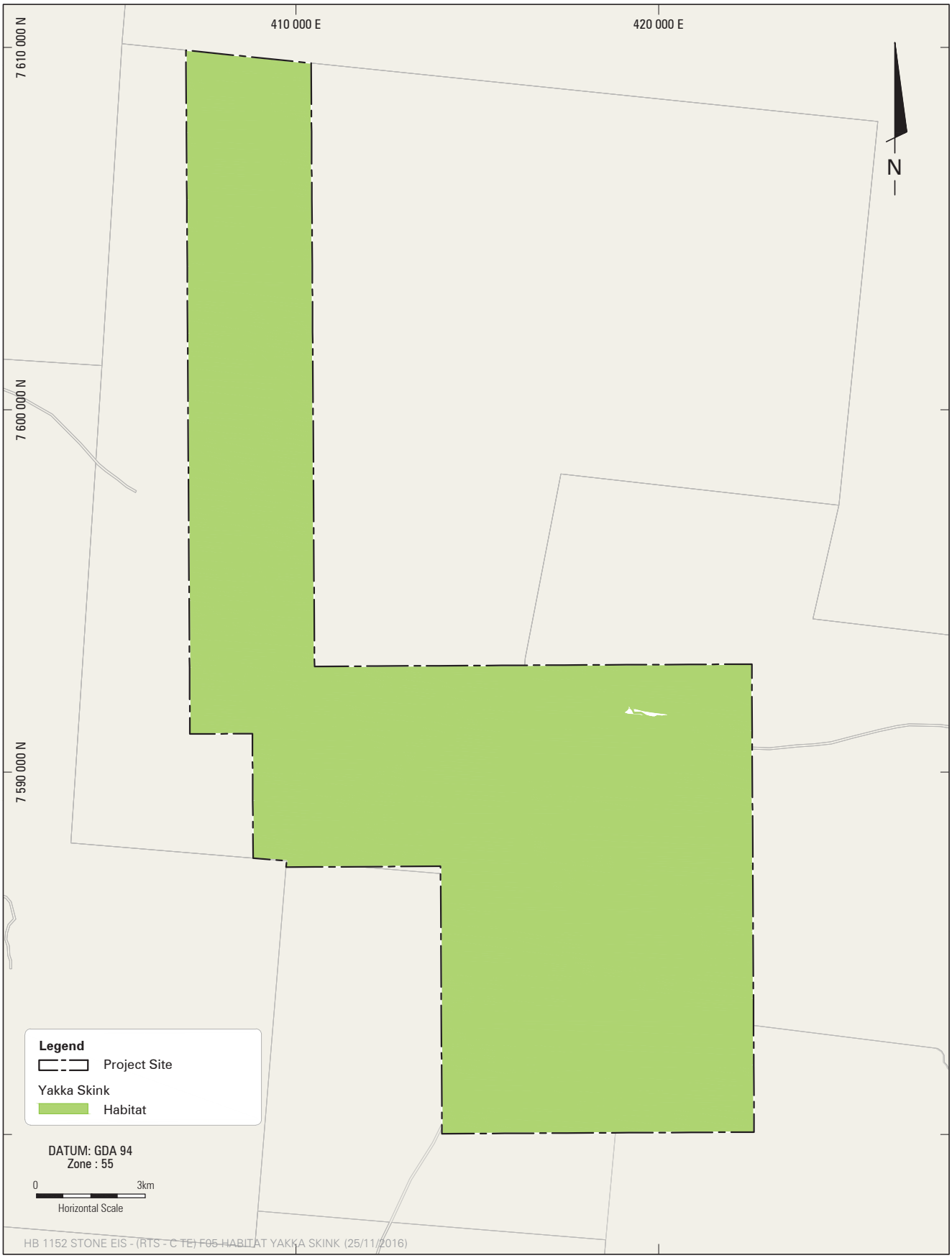


PROJECT CHINA STONE

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Squatter Pigeon Habitat Disturbance
(Based on Revised Habitat Modelling)

FIGURE 4

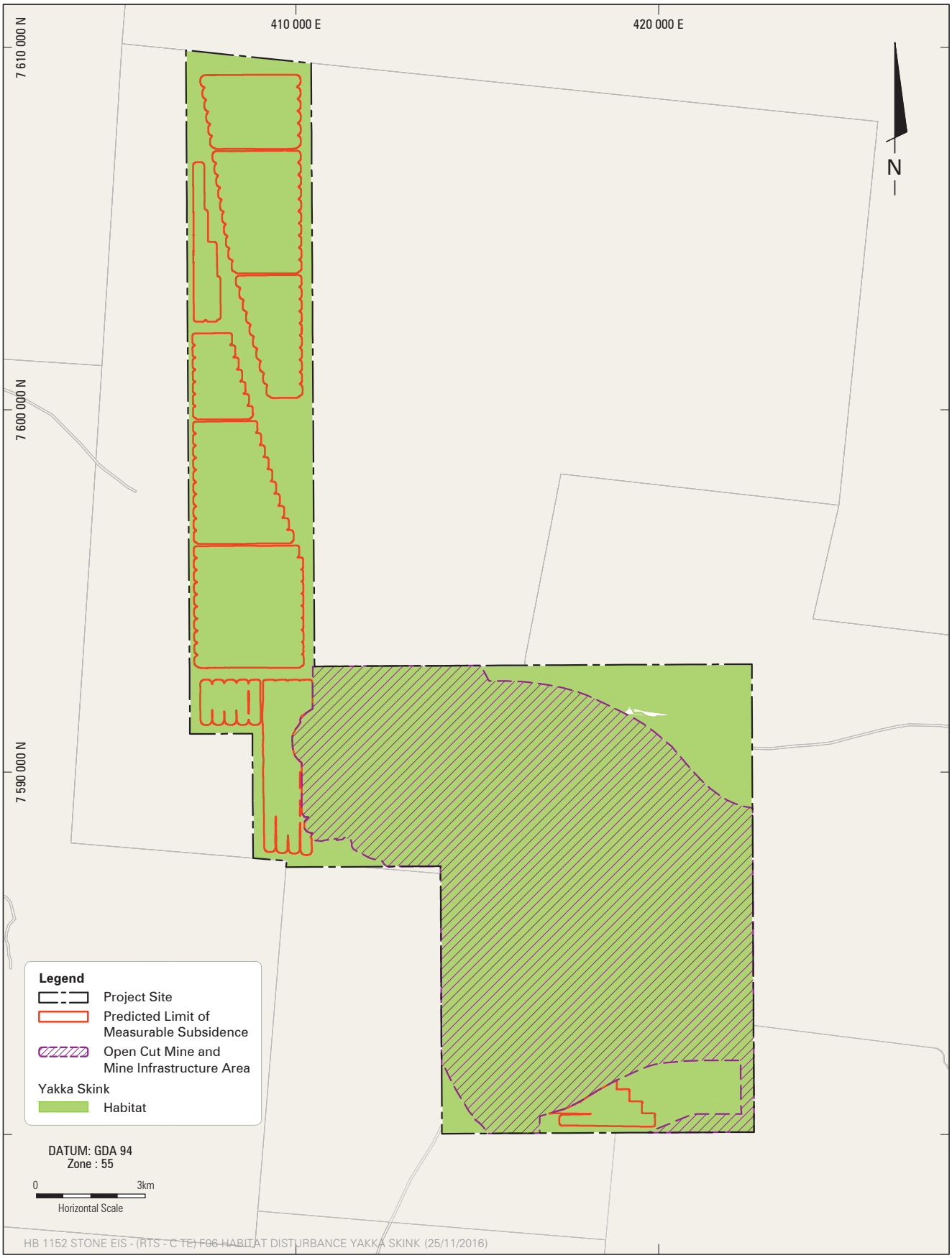


PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Yakka Skink Habitat
(Based on Preliminary Mapping)

FIGURE 5



PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Yakka Skink Habitat Disturbance
(Based on Preliminary Mapping)

FIGURE 6



PROJECT CHINA STONE

Attachment G Responses to DSD SIA Advice

PROJECT CHINA STONE
RESPONSE TO DEPARTMENT OF STATE DEVELOPMENT SIA COMMENTS ON DRAFT EIS
for
MacMines Austasia Pty Ltd

1 DSD SIA ADVICE

This is an attachment to the Supplement to the draft Environmental Impact Statement (draft EIS) for Project China Stone (the project). It provides the proponent's response to the comments received from the Coordinated Project Delivery (CPD) team within the Department of State Development (DSD) regarding the Social Impact Assessment (SIA) undertaken as part of the draft EIS. These comments were received from the CPD on 16 October 2015 and were provided separately to the formal public submissions on the draft EIS. Following this, the proponent, Hansen Bailey and representatives from the CPD team met in January 2016 to discuss the comments and confirm the required actions and responses. These are included in the proponent's responses within this attachment.

This attachment presents the CPD team comments on the draft EIS in tabular format, as provided to the proponent, followed by the proponent's response.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
1.	General Comment	Project Timing	What is the current timeline for the commencement of the project given reliance on Adani Project and associated Rail Line?

The Carmichael Coal Mine and Rail Project (CCM&RP) is much further advanced in the approval process than Project China Stone, having been issued key approvals from State and Federal Government regulatory agencies. However, the unanticipated and repeated legal challenges from anti-mining groups have delayed the anticipated commencement of construction of the CCM&RP. Similar challenges may also potentially delay subsequent progression of the approval process for Project China Stone. These ongoing legal challenges mean that it is not possible to accurately predict the timing of commencement of construction of the CCM&RP or the subsequent commencement of Project China Stone.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
2.	General Comment	Proposed start date of project unclear in current economic environment and reflects on the usefulness and relevance of the current SIA once the project commences. In addition the SIA does not reflect current social and economic environment this includes but not limited to baseline data, workforce management. arrangements, cumulative impacts and also arrangements and commitments for stakeholder and community consultation and engagement processes.	SIA needs to reflect current social and economic downturn and this document does not do this clearly enough and therefore fails to describe most update situation in regard to key aspects of the SIA in particular workforce arrangements, cumulative impacts. Review of all aspects of the SIA 12 months prior to the commencement of construction including: • Review and renegotiation of existing and development of new mitigation and management impact strategies. • These must reflect the current social and economic environment. • Must provide timelines for implementation. • Need to describe the outcomes to be achieved. • This would include the development of all plans strategies and commitments contained in the current SIA document and delivered with the Review. Provide as part of the Additional Information Request the Stakeholder and Community Consultation and Engagement Strategy **see requirements at item 12 below.** This SIA review is required given the potential for changing social and economic environment before the commencement of the project. Current start date 2016 will not be possible without provision of the rail line to be constructed by Adani.

An SIA review will be conducted 12 months prior to the commencement of construction. This new commitment is included in Attachment I – Additional Commitments.

In addition, the following suite of new management plans have been prepared and are presented in Attachment H – Additional Information on SIA:

- Operations Phase Workforce Management Plan;
- Housing and Accommodation Management Plan;
- Health and Community Wellbeing Management Plan;
- Local Content Plan; and
- Cumulative Impact Management Plan.

Each plan includes the following information:

- Description of the key issues;
- Description of the desired outcomes;
- List of management commitments;
- An outline of the stakeholder engagement process to facilitate plan preparation and implementation; and
- Timeline for plan preparation and list of key inputs.

Each plan includes a commitment by the proponent to reviewing the plan contents 12 months prior to the commencement of construction and following the completion of the SIA review.

These new management plans, together with the suite of new commitments provided in Attachment I – Additional Commitments, address the CPD concerns in relation to the validity of the baseline data reported in the draft EIS Socio-Economic Impact Assessment Report (Appendix N).

A Stakeholder Engagement Plan for all phases of the project is provided in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
3.	*Socio – Economic Impact Assessment Report* (Appendix N-Labor Supply 6.3.3.)	<u>Workforce Planning</u> There is a commitment to develop a strategy for the operational workforce. There is a commitment to undertake another Labor Study.	• Will require an Operational Workforce Management Plan for the project – as figures based on current planning have the potential to be subject to change over time. This will be required 12 months prior to the commencement of operations. Will likely be conditioned. Government policy on Fly-in Fly-out (FIFO) will need to be reflected in Revised SIA and Operational Workforce Management Plan. • Labour Study will need to be undertaken 12 months prior to construction as part of the Review of the SIA. • Plan to be developed in conjunction with appropriate state agencies local government and other stakeholders.

Refer response to Item 2.

Table 1 of Attachment 24-2 Project Commitments Register already includes a commitment to update the existing project labour study (Appendix D of Appendix N) prior to the commencement of the construction phase.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
4.	*Socio-Economic Impact Assessment Report* (Appendix N)	Workforce Management FIFO work practices and alignment with Government commitments.	• FIFO reporting requirement will be required. • CG will not accept a 100% FIFO workforce and there must be strategies for local and regional workers included in the Workforce Operation Management Plan. • Bus-in Bus-out (BIBO) does not include Mackay Whitsunday Region or Isaac Region, only includes Townsville and Emerald. • Proponent to provide additional information on the detail behind the intended strategies as this is not clear

Table 1 of Attachment 24-2 Project Commitments Register already includes a commitment to keep the State Government, Charters Towers Regional Council (CTRC) and Isaac Regional Council (IRC) informed of the size of the non-resident worker population associated with the project.

The project is not 100% FIFO. Any worker who lives within a one-hour commute of the project site is permitted to drive on a daily basis to work. This issue has been clarified in the Workforce Management Plan described in Attachment H – Additional Information on SIA.

As stated in Section 4.4.1 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N) the proponent will not support Drive-in Drive-out (DIDO) for employees who live more than a one-hour commute from the project site for fatigue safety reasons. Potential BIBO locations will be reviewed as part of the preparation of the Operations Workforce Management Plan described in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
5.	*Socio-Economic Impact Assessment Report* (Appendix N)	Workforce Management Local Employment opportunities and recruitment practices. Recognizing increased unemployment.	Insufficient attentions paid to the opportunities to employ local and regional workers were these opportunities exist. These need to be reflected in the EIS clearly and needs to include strategies for employment, training and skills development opportunities in the following areas: Moranbah, Charters Towers Clermont, Dysart, Emerald, Barcaldine and Mackay, Whitsunday and Fitzroy Regions. What mitigation and management strategies will the proponent implement? The detail of these to be included in the EIS.

An outline of the Operations Phase Workforce Management Plan, including key commitments to employment, training and skill development in regional communities is included in Attachment H – Additional Information on SIA.

Training, employment and skill development strategies will be considered in detail in the new Operations Phase Workforce Management Plan, which the proponent has committed to preparing 12 months prior to the commencement of the construction phase (Refer response to Item 2 and 3).

Table 1 of Attachment 24-2 Project Commitments Register already includes a commitment to update the existing project labour study (Appendix D of Appendix N) prior to the commencement of the construction phase. The updated labour study will inform the content of the Operations Phase Workforce Management Plan. Employment, training and skill. Development opportunities in regional communities such as Moranbah, Charters Towers, Dysart, Emerald, Barcaldine and the Regions of Mackay Isaac Whitsunday and Fitzroy will be considered in new Operations Phase Workforce Management Plan.

The Operations Phase Workforce Management Plan will include a detailed stakeholder engagement process to facilitate implementation. An outline of the engagement process is provided in Attachment H – Additional Information on SIA. The proponent sees little value in providing any further detail regarding mitigation and management in the draft EIS at this stage.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
6.	*Socio-Economic Impact Assessment Report* (Appendix N)	Workforce Management Roster Arrangements.	• Clarification required - are resident workers expected to live on the camp during the Roster period, in the same way as non – resident are expected to. • Clarify the roster arrangements for the operational work force are they 7 on 7 off as for construction. • Assume no leave days during roster period if 7 on 7 off for operational workers.

This has been clarified in the Operations Phase Workforce Management Plan and Housing and Accommodation Management Plan provided in Attachment H – Additional Information on SIA. If a worker lives within a one-hour commute of the project site, they will be permitted to drive to work each day and return to their home each night.

Roster arrangements for the operations workforce are described in Section 4.4.3 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N).

There will be no leave days during the roster period if 7 on 7 off for operational workers.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
7.	*Socio-Economic Impact Assessment Report* (Appendix N - 5.0 Profile of the Areas of Influence)	Workforce Management Labor source areas and home base locations.	• Labour source and Home base locations are too limited and need to consider opportunities presented in the following towns and regions Moranbah, Emerald, Clermont, Dysart Barcaldine, Charters Towers, Mackay Region and Fitzroy Region.

The selection of home base locations will be informed through the SIA review to be undertaken 12 months prior to the commencement of the construction phase. The Operations Workforce Management Plan, which will also be prepared 12 months prior to the commencement of the construction phase, will identify the preferred home base locations and will provide justification as to why certain locations are not considered suitable. An outline of the Operations Phase Workforce Management Plan including key components and proponent commitments is provided in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
8.	*Socio-Economic Impact Assessment Report* (Appendix N - 6.2 Population and Demographics)	Workforce Management Population impacts.	• Based on the proponent's current recruitment and employment strategy they suggest that impacts from population increase resident workers are only likely to affect Charters Towers with 1% increase or 29 persons approximate. What are the intended strategies for any town impacted given operational recruitment needs to reflect Gov Policy on FIFO work practices. On what basis was this figure reached for Charters Towers. There needs to be consideration of the housing market particularly housing availability and the projects impact on affordability at the time the project commences and the cumulative impacts of ADANI given China Stone is reliant on that project proceeding. • How will the proponent response to demand generated by population growth (6.2.4 of Appendix N Management Action 1). • Clear mitigation and management strategies to be provided to understand their response in resolving population impacts.

This submission is concerned with:

- The project's potential to result in significant population increases in regional centres with resulting impacts on housing availability and affordability; and
- Cumulative impacts.

The proponent will undertake a review of the SIA 12 months prior to the commencement of the project construction phase. This review will include a review of the social baseline and the potential impacts and management measures. Importantly, this review will test the suitability of the locations identified as home base locations in the draft EIS and will inform the identification of additional and preferred home base locations for the workforce. The review will also enable greater clarity around the size and location of any potential project induced population growth.

The proponent has committed to the preparation of an Operations Phase Workforce Management Plan 12 months prior to the commencement of the construction phase. The Operations Phase Workforce Management Plan will document the proponent's response to potential population growth, including a process for engaging with key stakeholders to identify suitable management measures. An outline of the Operations Phase Workforce

Management Plan, including key commitments from the proponent to the management of impacts associated with project induced population growth is provided in Attachment H – Additional Information on SIA.

The proponent has also committed to the preparation of a Cumulative Impact Management Plan 12 months prior to the commencement of the construction phase. The Cumulative Impact Management Plan will document the proponent's response to the management of potential impacts primarily arising as a result of the project's interaction with the proposed Carmichael Coal Mine and the Moray Power Project. The Cumulative Impact Management Plan will detail how the proponent intends on engaging with Adani Mining Pty Ltd (Adani) and other relevant stakeholders e.g. CTRC and state government agencies, to manage potential impacts. An outline of the Cumulative Impact Management Plan, including key commitments from the proponent to the management of cumulative impacts is provided in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
9.	*Socio-Economic Impact Assessment Report* (Appendix N - 6.2.4 Man Actions 1 to 3)	<u>Workforce Management</u> Engagement and consultation in relation to Labour Sourcing and Workforce Number. Potential Population Growth. Supporting Sustainable Growth	Proponent to provide additional information on the detail behind the intended strategies as this is not clear. This should include: • Frequency and range and mechanism for discussion negotiation and liaison with Local and State Government in relation to labour sourcing strategies and workforce numbers and project induced permanent resident population growth. See Stakeholder and Community Consultation and Engagement Strategy requirement. • What form will the support take if population impacts are realised. Provide information of mitigation and management strategies. • Explain what strategies will be employed by extending Employee Wellbeing Plan to selected FIFO location. • Describe what regular communication means as part of a more detailed Stakeholder and Community Consultation and Engagement Strategy. This relates to project timing, project labour force requirements and project induced population growth.

Refer response to item 2.

A Stakeholder Engagement Plan for all phases of the project is provided in Attachment H – Additional Information on SIA. This strategy details the approach to engaging with interested and affected stakeholders across all stages of the project in relation to key areas of interest including population growth, labour sourcing, workforce numbers, infrastructure requirements etc.

Additional information in relation to the Employee Wellbeing Plan is provided in the Operations Phase Workforce Management Plan and the Health and Community Wellbeing Management Plan contained in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
10.	*Socio-Economic Impact Assessment Report* (Appendix N-6.3.5 Skills Enhancement 6.3.6 Impact Management)	<u>Workforce Management</u> Apprenticeships and Traineeships graduate and mature age placement programs. Skills enhancement – proponent committed to direct provision and investment in education and training opportunities. Develop and implement Employee Wellbeing Project. Flexible employment opportunities in relation to Women and other disadvantaged groups. Workforce diversity. Indigenous Employment, training and development programs	Provide details of intended programs including what will be provide, when it will commence, how it will be implemented, who will be consulted, what will be likely targets be. Will there be a program to support mining and non-mining supply chain industries and tertiary education in local and regional centers. Provide details of what will be provided in terms of investment and the development of opportunities. Current descriptions and commitments do not commit to measurable outcomes in majority of cases. The narrative is broadly focused on Charters Towers and needs to be widened to clearly show consideration and initiatives for other towns and regional centers. Provide detail of all these initiatives and intended outcomes in the EIS and include as part of the Recruitment and Training Strategy.

Refer to response to Issue 2.

The proponent has committed to the preparation of an Operations Phase Workforce Management Plan 12 months prior to the commencement of the construction phase. An outline of the Operations Phase Workforce Management Plan is provided in Attachment H – Additional Information on SIA. This outline includes:

- An overview of the training and skill development initiatives the proponent intends to progress for the project; and

- A strategy for the planning and implementation of these initiatives including any required stakeholder engagement and long term monitoring of program success.

Table 1 of Attachment 24-2 Project Commitments Register already includes a commitment to update the existing project labour study (Appendix D of Appendix N) prior to the commencement of the construction phase. The labour study review will inform the selection of home base locations. The Operations Workforce Management Plan, which will also be prepared 12 months prior to the commencement of the construction phase, will identify the preferred home base locations and will provide justification as to why certain locations are not considered suitable.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
11.	*Socio-Economic Impact Assessment Report* (Appendix N-6.4 Employee Health and Wellbeing)	Workforce Management Workforce Health and Wellbeing is supported by the proponent and a Plan to be developed.	Explain how it will be supported and what are the associated mitigation and management strategies to achieve this. This needs to cover issue on and off the mine site for the workforce and their families.

Refer response to Item 2.

Section 6.4 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N) provides details of the mitigation and management strategies to support employees on and off the site.

Additional commitments by the proponent to the management of employee health and wellbeing including mental health are described in the Health and Community Wellbeing Management Plan provided in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
12.	*Socio-Economic Impact Assessment Report* (Appendix N-7.0 Management Strategies and monitoring Approach)	Workforce Management Proposed plans.	The following plans need to be available now as part of the additional information or developed and available 12 months prior to construction as part of the Review of the SIA and how they will be communicated more broadly where this is appropriate. • Indigenous Participations Plan – as part of current EIS. • Recruitment Plan – 12 months prior to construction. • Workforce Diversity Policy – 12 months prior to construction. • Training and Skilling Plan – 12 months prior to construction. • Employee Wellbeing Plan– 12 months prior to construction. • Workforce Code Of Conduct – 12 months prior to construction. • Main Contractor Social Management Plan – 12 months prior to construction if appropriate.

These plans have been incorporated into the following management plans, which are provided in Attachment H – Additional Information on SIA:

- Operations Phase Workforce Management Plan;
- Housing and Accommodation Management Plan;
- Health and Community Wellbeing Management Plan;
- Local Content Plan; and
- Cumulative Impact Management Plan.

Additional commitments have been included in Attachment I – Additional Commitments in relation to the conduct of an SIA review and the review of all SIA management plans 12 months prior to the commencement of construction.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
13.	Consultation Chapter 3 *Socio Economic Impact Assessment Report (*Appendix N Stakeholder Communication Strategy 7.6 and Table 26*)* Terms Of Reference	<u>Stakeholder and Community Consultation and Engagement</u> Consultation and Engagement to date. Process lacks detail. Current consultation strategy does not provide sufficient information to assess suitability of process described or proposed during EIS development phase pre-construction, construction and operation. Proponent commits to early consultation and engagement but this is not reflected in the EIS currently. Information provided in Chapter 3 only relates to what has been carried out to date. This information is limited, appears to be spread over 3 years but information on timing of these process's is limited and is not clear when specific consultation and engagement took place and when during these process's issues were raised.	Proponent to provide Community Consultation and Engagement Strategy and Grievance, Disputes and Complaints handling procedures as required by the Terms of Reference. Community Consultation and Engagement Strategy needs to be provided as part of the request for additional information by the CG. It should include pre-construction, construction and operations covering all stakeholders and provide details of the following information: • Timelines and frequency to indicate when consultation and engagement will occur during all phases of the project. • The full range of methods to be adopted based on the level of impact for the stakeholder, whether individual or agency and the topic being addressed. • What targeted and or tailored consultation process will exist for those landholders, traditional owners' residents and sensitive receptors. • What staff resources/ contact points will the Proponent put in place for stakeholders? • The level of information that will be provided for each topic area. • How information will be provided. • What outcomes and/or mitigation and management strategies have been negotiated, agreed and implemented. • Provide details of collaborative and consultative arrangements to be developed across the region – particularly in relation to Cumulative Impacts. In accordance with the Terms of Reference. • Provide Grievance, Dispute and Complaints handling procedures

A Stakeholder Engagement Plan for all phases of the project is provided in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
14.	Consultation Chapter 3 *Socio Economic Impact Assessment Report (*Appendix N Stakeholder Communication Strategy 7.6 and Table 26*)* Terms Of Reference	<u>Stakeholder and Community Consultation and Engagement</u> Submissions from landholders, traditional owners, residents and sensitive receptors and other stakeholders and the level of concerns raised points to a need for the proponent to provide clarity on the potential impacts across a range of social and environmental issues They appears to be • A limited understanding how they will be mitigated or managed, • When will they be consulted in the future during pre-construction phases, construction and on-going during operations. • How will they receive information? • What information will they get. • What arrangements will be in place for on –going discussion, negotiation and engagement? Terms of Reference requires: *Consistent with national and international good practice, and with regard to local and regional strategies for community engagement, the proponent should undertake a community engagement strategy to engage at the earliest practicable stage with likely affected parties to discuss and explain the project, and to identify and*	The following areas need to be included in the Strategy requested above and the proponent needs to describe the stakeholder and community consultation and engagement process and intended mitigation and management strategies to be developed and implemented for each phase of the project to keep all stakeholders informed. These should include but not limited to: • Water Management System Methodology, Impacts and Monitoring including – water resources, groundwater regime, surface water, flooding, hydrology, agricultural impacts raw water, water quality and bores. • Air Quality/Dust Methodology Impacts and Monitoring including agricultural Impacts and greenhouse gas. • Noise / Blasting/ Vibration Methodology, Impacts and Monitoring including agricultural impacts. • Road Safety/Traffic concerns and impacts, including agricultural impacts. • Visual Amenity Methodology and Impacts including Agricultural impacts. • Land Ownership and Land Use impacts – Land Access and landholder compensation protocols. • Emergency Response Planning with all key agencies and stakeholders. (Emergency Services Consultative Committee). • Collaborative arrangements in association with Adani and other proponents in the Galilee Basin to inform the communities affected by Cumulative Impacts. • Workforce Management Impacts and Monitoring including Labor sourcing, employment and recruitment process's, training and development opportunities.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
		respond to issues and concerns regarding social impacts. The strategy should detail all existing relevant community forums, groups and any proposal to establish additional community engagement. *Provide details of the community engagement processes used to conduct open and transparent dialogue with stakeholders. Such processes should include, but not be limited to, community reference group forums. Include any proposal to establish a common forum with other proponents and/or existing forums in the southern sector of the Galilee Basin.* *Include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes should consider social and cultural factors, customs and values, and, where relevant, linkages between environmental, economic, and social impact issues.* *Discuss engagement strategies and processes, including how complaint resolution will be addressed, for all stages of the project.*	• Housing Impacts and Monitoring including housing market impacts, population growth impacts, accommodation village arrangements. • Local Content and Supply Chain Opportunities including procurement, capability and capacity building opportunities. • Local and Regional impacts, opportunities and benefits of FIFO workforce for Local Councils and Communities. • Indigenous Traditional Owners and indigenous communities including participation, cultural issues. heritage impacts, land use, visual amenity. • Air Traffic Methodology, Impacts including noise, proximity to accommodation village. • Stocks Route Impacts. • Tailings, waste, storage facilities, impacts and rehabilitation. • Subsidence impacts including rehabilitation. • Mine overburden rehabilitation. • Off Lease Infrastructure – Rail Corridor.

Refer to response to Item 13.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
15.	Consultation Chapter 3	Stakeholder and Community Consultation and Engagement Consultation with Traditional Owners and indigenous community representatives.	Identify and discuss the level of consultation and engagement that has been undertaken with Traditional Owners and indigenous community representatives during the development of the EIS.

A Stakeholder Engagement Plan for all phases of the project is provided in Attachment H – Additional Information on SIA. This plan includes consultation with Traditional Owners and Indigenous community representatives across the life of the project.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
16.	Cumulative Impacts Chapter 23. *Socio-Economic Impact Ass Report* (Appendix N)	Cumulative Impacts Term of Reference requirements: *Evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. Cumulative impacts, in this context, is defined as the additional impacts on population, workforce, accommodation, housing, and use of community infrastructure and services, from the project, and other proposals for development projects in the area, which are publicly known or communicated by the office of the Coordinator-General, if they overlap the proposed project in the same timeframe as its construction period.*	Lack of discussion and clear mitigation and management strategies for cumulative impacts. Lack of acknowledgement that China Stone Project is reliant on the commencement of the Adani Project and therefore cumulative impacts are fundamental to the EIS and need to be fully addressed in the SIA. Not covered off sufficiently in the EIS given reliance on Adani Project and potential impacts of other Galilee Projects in relation to the following: • SIA needs to consider and respond to Cumulative Impacts in relation to workforce management, housing and accommodation, local business and industry content, health, safety and community wellbeing and Community and stakeholder engagement. • Detail of all mitigation and management strategies. • Community Consultation and Engagement on Cumulative Impacts. • Partnership to manage Cumulative Impacts (Round Table other mechanisms). • Environmental impacts highlighted in the submissions provided by stakeholders and in particular existing landholders, including Water Management, Air Quality, Noise and Vibration, Road Safety and Traffic, Emergency response planning. • Joint Community Consultative arrangements. • Community safety off mine site.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
			• Project timing/labour sourcing and workforce requirements and numbers. • Skill Shortages. • FIFO Work Practices. • Increased permanent resident population growth in home based locations. • Labor draw. • Change in rural character. • Increased demand on emergency services. • Impacts on health services and social infrastructure. • Increased traffic movements and reduced road safety. • Impacts on the ability of local and regional industries to have fair and equitable access to business opportunities as part of the supply chain. What partnership arrangements with ADANI in the first instance. • Housing availability and affordability impacts if CS and Adani projects proceed which is required based on current scenario described by China Stone.

The identification and management of potential cumulative impacts will be considered in the Cumulative Impact Management Plan, an outline of which is included in Attachment H – Additional Information on SIA. The Cumulative Impact Management Plan will be prepared 12 months prior to the commencement of construction and will be informed through the review of the SIA baseline and impact assessment, which will also be undertaken 12 months prior to the commencement of construction. By this point in time there will be greater certainty as to the potential additional projects occurring within the vicinity of the project, namely the proposed Carmichael Coal Mine.

The following two new commitments have also been included in Attachment I – Additional Commitments:

- *The SIA (including social baseline, impacts and management measures) will be reviewed 12 months prior to the commencement of construction.*
- *The SIA management plans and their respective components as described in Attachment H – Additional Information on SIA will be developed 12 months prior to the commencement of construction*.

The SIA assumed that, given the CCM&RP has received approval from State and Federal government agencies, the CCM&RP would be developed prior to Project China Stone. As such, cumulative impacts with the CCM&RP were included in the SIA. There is currently

uncertainty regarding the timing of commencement of construction of the CCM&RP and other Galilee Basin projects arising from unanticipated and ongoing legal challenges from anti-mining environmental groups. Given this, the proponent proposes to revisit the cumulative impacts of the project as part of the review of relevant aspects of the SIA, 12 months prior to construction (refer item 1). At this point in time there will be greater certainty regarding the status and anticipated timing of all projects and cumulative impact management will be able to be discussed in more detail.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
17.	Housing Project Description 4.11 Accom. Village *Socio- Economic Impact Assessment Report* (Appendix N)	Housing Accommodation Village and other housing options to be provided.	Timing of Accommodation village needs to be clarified to ensure that it is before Mine infrastructure. Size of camp - What housing options will be provided if workers want to live locally. Proponent has stated that camp will house all construction workers. Does this include all contractors, sub-contractors, visitors and management. Narrative talks about sufficient accommodation to accommodate the entire operational workforce. Given that 100% FIFO is not acceptable to Government the EIS needs to be revised to reflect this requirement.

As stated in Section 4.14.2 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N), it is anticipated there will be a 5 month establishment phase of the initial accommodation village prior to the commencement of construction of mine infrastructure.

The Housing and Accommodation Management Plan, to be prepared 12 months prior to the commencement of construction will document the proponent's approach to the supporting the provision of worker accommodation in home base locations i.e. Charters Towers. A commitment to assessing accommodation options in home base locations and developing a strategy to respond to potential impacts such as housing accessibility and affordability is included in Attachment H – Additional Information on SIA.

The proponent confirms that the accommodation village will house all construction workers, including contractors, sub-contractors, visitors and management.

The narrative issues are acknowledged. The terminology adopted in the draft EIS reflects the remote location of the project site and the reality that very few employees (i.e. less than 10) are likely to reside within a one-hour commute of the project site. The issue raised has been clarified in the Operations Phase Workforce Management Plan and the Housing and

Accommodation Management Plan included in Attachment H – Additional Information on SIA.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
18.	4.3.5 Workforce Accommodation *Socio- Economic Impact Assessment Report* (Appendix N)	Housing Housing of accommodation village construction workers will be housed in an existing exploration camp and progressively moved into first stage of village.	Where will the exploration camp be? How many workers will be in the camp? When will the camp be established? Has this been discussed with Regional Council?

The exploration camp is already established (although currently decommissioned) and is located on the Carmichael property adjacent to the project site i.e. outside the project MLAs. The Carmichael property is shown on Figure 5-3 of the draft EIS as the property containing receptor R3, which is the Carmichael Homestead. The exploration camp has capacity to accommodate 50 workers. The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes a requirement to consult with IRC and the CTRC in relation to the reinstatement of the exploration camp.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
19.	4.3.5 Workforce Accommodation *Socio- Economic Impact Assessment Report* (Appendix N)	Housing Accommodation impacts of construction workforce.	How many staff will be required to live locally and what positions will they be employed in. What strategies are being put in place by the proponent for those workers not in accommodation village – How will accommodation be provided for these workers by the proponent? Potential project and cumulative impacts- this needs to be considered in EIS and mitigation and management strategies need to be developed. Not covered off in EIS, No discussion about how CS would work with ADANI and other Galilee Basin mining projects to mitigate impacts. Housing cumulative impacts for construction and operation need to be addressed. Scenario is small towns that have small housing markets, potential for increased property speculation resulting in housing affordability and availability issues for locals. Charters Towers, Clermont, Barcaldine, Moranbah.

All workers are proposed to be housed in the accommodation village, with the exception of any employees who reside within a one-hour drive of the project site who will be free to commute on a daily basis.

Refer response to Items 8, 16 and 17.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
20.	6.8 Housing and Accommodation *Socio- Economic Impact Assessment Report* (Appendix N)	Housing Proponent considers housing impacts low risk.	Given reliance on Adani Project proceeding, this is not a realistic outcome given the potential cumulative housing impacts and governments' position on no 100% FIFO approvals.

The proponent's approach to management of cumulative social impacts was to, where possible, avoid targeting labour source locations and home base locations that were likely to be targeted by Adani. This approach seeks to minimize potential cumulative impacts at the outset. In addition, home base locations were identified based on their sizeable population base and ability to absorb any project related population growth. This approach and the assessment of potential housing impacts was discussed during adequacy review with CPD.

It is reiterated that the project is not 100% FIFO. Employees residing within a one-hour commute of the project site will be able to commute on a daily basis to work.

Refer response to Items 2, 8, 16, 17.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
21.	6.8 Housing and Accommodation *Socio- Economic Impact Assessment Report* (Appendix N)	Housing Housing and Accommodation Planning.	Proponent needs to develop a Housing and Accommodation Plan for the accommodation village, mitigation and management strategies for impacts on local housing markets based on increased employment opportunities as a result of workers choice or as part of job requirements to live locally. This needs to be based on current data 12 months prior to construction commencing and should form part of the overall review of the SIA at this time. Needs addressing more broadly than just Charters Towers.

Refer response to Item 2 and 17.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
22.	*Socio-Economic Impact Assessment* (Appendix N - 6.4.1)	Community Health , Safety and Wellbeing and Cumulative Impacts Workers access to health services.	What level of health and welfare services will be provided on the mine site for workers? This is not clear. What support will be given to Health services where they are impacted by project workforce increasing demand for services? (Charters Towers and home based locations potentially).

Refer to Section 4.4.6 and Section 7.5.1 of the draft EIS Socio-Economic Impact Assessment Report (Appendix N) which outlines the health and welfare services anticipated to be provided on the mine site for employees.

The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes proposed consultation with relevant health service providers to ensure project induced demands can be met. The Cumulative Impact Management Plan described in Attachment H – Additional Information on SIA also includes specific commitments to the management of cumulative impacts on health services and infrastructure over the life of the project.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
23.	*Socio-Economic Impact Assessment* (Appendix N - 6.6.9 Action 22)	Community Health , Safety and Wellbeing and Cumulative Impacts Community Road Safety impacts and cumulative Impacts.	What mitigation and management strategies will be implemented for community road safety impacts?

The proponent does not support long-distance DIDO due to potential fatigue safety issues. In addition, the SIA discusses a number of community road safety mitigation and management strategies including the development of a Traffic Management Plan (discussed in Section 7.5.2 of the draft EIS Socio-Economic Impact Assessment Report [Appendix N[) and Management Actions 26 and 28.

Additional commitments to the management of community road safety impacts are described in the Health and Community Wellbeing Management Plan and the Operations Phase Workforce Management plan provided in Attachment H – Additional Information on SIA. The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes proposed mechanisms to inform key stakeholders, including the community of potential project related health and safety issues on the road network.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
24.	*Socio-Economic Impact Assessment* (Appendix N - 7.4)	Local Content Lack of consideration in regard to Mackay/ Whitsunday Region.	EIS needs to reflect opportunities that exist through supply chain and business capability and capacity to compete and to provide supply chain employment opportunities.

Procurement in the Mackay/Whitsunday Region will be considered as part of the development of the Local Content Plan, to be developed 12 months prior to construction.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
25.	*Socio-Economic Impact Assessment* (Appendix N - 7.4.1)	Local Content and Supply Chain Development Ensure early and ongoing engagement of local industry- A commitment made by the proponent	Include this information in the Community Consultation and Engagement Strategy requested above showing the mitigation strategies that will be implemented to inform educate and advise local and regional business in procurement and business opportunities.

The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes proposed consultation to inform, educate and advise local and regional business in procurement and business opportunities. The Local Content Plan to be prepared 12 months prior to construction will detail the specific strategies to inform, educate and advise local and regional business in procurement and business opportunities.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
26.	*Socio-Economic Impact Assessment* (Appendix N - 7.4.2)	Local Content and Supply Chain Development Development of Local Content Plan and associated strategies needs to be completed and implemented as early as possible before commencement of early works to realise maximum opportunities for local and regional business??	Proponent to provide information in the EIS on engagement with the Industry Capability Network regarding the development of A Local Content Delivery Framework, QRC in regard to the adoption of the Local Content Code Of Practice and Dept. of State Development in relation to Industry Programs. Local Content Plan to be completed prior to early works commencing and provide details of all mitigation management strategies to be introduced to provide opportunities for local and regional businesses.

The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes engagement with the Industry Capability Network and Queensland Resource Council in relation to the Local Content Plan.

Section 24 of the draft EIS contains a commitment to the development of a Local Content Plan prior to the commencement of construction, and in consultation with the CTRC, IRC and local businesses.

Item	Draft EIS Section	Description of Issue	CPD Proposed Solution
27.	*Socio-Economic Impact Assessment* (Appendix N)	Local Content Cumulative Impacts across supply chain in relation to Adani and other Galilee Projects running concurrently.	What engagement has there been with Adani in regard to joint mitigation and management strategies that will be implemented, to ensure Local and Regional businesses have capability and capacity to pursue supply chain opportunities.

Engagement with Adani in relation to mitigation and management strategies to address cumulative impacts across the supply chain will be undertaken as part of the development of the Local Content Plan. The Stakeholder Engagement Plan described in Attachment H – Additional Information on SIA includes engagement with Adani in relation to local content.



PROJECT CHINA STONE

Attachment H Additional Information on SIA

PROJECT CHINA STONE

ADDITIONAL INFORMATION ON SOCIAL IMPACT ASSESSMENT

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14 July 2017

For:

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PROJECT CHINA STONE
ADDITIONAL INFORMATION ON SOCIAL IMPACT ASSESSMENT

for
MacMines Austasia Pty Ltd

1 INTRODUCTION

1.1 OVERVIEW

This report is an attachment to the Supplement to the draft Environmental Impact Statement (draft EIS) for Project China Stone (the project). The Supplement to the draft EIS (the Supplement) is Volume 6 and should be read in conjunction with the draft EIS Volumes 1 – 5 that were publicly exhibited. Together, Volumes 1 - 6 form the revised draft EIS for the project. To the extent of any inconsistencies, the information in this attachment supersedes information in any other volume of the draft EIS.

1.2 PURPOSE AND SCOPE

This attachment provides additional information on the draft EIS Socio-Economic Impact Assessment (SIA) (Appendix N). This additional information has been provided in response to specific comments submitted by the Department of State Development (DSD) regarding the SIA and future community engagement for the project. The DSD comments were not lodged as a formal submission for the project; however have been considered and responded to. The comments, the proponent's proposed responses and the additional information to be provided were discussed and an approach was agreed with the DSD in January 2016.

Individual responses to all the DSD comments on the SIA are also provided in Attachment G – Responses to DSD SIA Advice. Some other stakeholders raised other social and economic issues and these have also been responded to in Section 4 – Response to Submissions or in Attachment A – Responses to Individual Submissions.

Table 1 provides an overview of the additional information presented in this report.

Table 1
Overview of Additional Information on Social Impact Assessment

Topic	Sections in Draft EIS	Nature of Revision	Section in This Attachment
Management Measures	Sections 6.2.4, 6.3.6, 7.2 and 7.3 of the draft EIS SIA (Appendix N)	Creation of a series of action plans that contain all relevant commitments and act as content guides for the following future Management Plans: • Workforce Management • Housing and Accommodation • Health and Wellbeing • Local Business and Industry Content • Cumulative Impacts • Community and Stakeholder Engagement Redrafting of management actions as commitments.	2.3 Workforce Management
	Section 6.8.3 of the draft EIS SIA (Appendix N)		2.4 Housing and Accommodation
	Sections 6.4.2 and 7.3 of the draft EIS SIA (Appendix N)		2.5 Health and Wellbeing
	Sections 6.5.6 and 7.4 of the draft EIS SIA (Appendix N)		2.6 Local Business and Industry Content
	Sections 6.9 and 7.5 of the draft EIS SIA (Appendix N)		2.7 Cumulative Impacts
Community Consultation	Section 7.6 of the draft EIS SIA (Appendix N)	Provision of a comprehensive Community Consultation and Engagement Strategy for all phases of the project.	3 Stakeholder Consultation Strategy
Complaints and Grievances	Section 7.6.1 of the draft EIS SIA (Appendix N)	Provision of further details in relation to the resolution of complaints and grievances.	3.5 Complaints and Grievances
Report and Evaluation	Section 7.7 of the draft EIS SIA (Appendix N)	Redrafting of reporting actions as commitments and inclusion of evaluation procedures.	3.6 Evaluation and Reporting

1.3 DOCUMENT STRUCTURE

This report is structured as follows:

- Section 1 – Introduction (this section) describes the purpose and content of the report.
- Section 2 – Management Measures describes the scope of the plans to be prepared to manage potential social impacts and provides an outline of each management plan including key commitments and initiatives.
- Section 3 – Stakeholder Consultation Strategy provides a description of the:
  - Stakeholder engagement process for all phases of the project;
  - Complaints and grievances strategy; and
  - The approach to evaluation and reporting.

2 MANAGEMENT MEASURES

2.1 INTRODUCTION

The draft EIS SIA (Appendix N) outlines the proponent's identified strategies to avoid, minimise and, where required, mitigate or enhance the potential socio-economic impacts of the project. These strategies are based on the outcomes of the SIA and associated stakeholder engagement program. These strategies include the development of a number of management plans to address the key social issues associated with the project, including:

- Workforce management;
- Housing and accommodation;
- Health and community wellbeing;
- Local business and industry content; and
- Cumulative impacts.

Detailed management plans are typically developed prior to the project construction phase and are not required to be developed as part of the EIS process. However, the DSD has requested that the proponent provide an outline of each of the above management plans to supplement the information that was provided in the draft EIS. Proponent management commitments and initiatives are to be documented in the outline plans. An outline of each of these plans is presented in Sections 2.3 to 2.7. This outline provides a description of the indicative content of the management plan and will be reviewed and revised, as necessary, following the SIA review and update (refer Section 2.2.2). The proponent will fully develop these plans 12 months prior to the commencement of construction of the project.

2.2 KEY MANAGEMENT COMMITMENTS

2.2.1 SIA Review and Update

The proponent acknowledges the changing nature of the socio-economic environment due to the recent downtown in the mining industry and, as such, has committed to undertaking a full revision of the draft EIS SIA (Appendix N) prior to the commencement of the Construction and Early Works (CEW) phase of the project. The following actions will be undertaken as part of this process:

- Confirm the project social and cultural area of influence;
- Update the socio-economic baseline using the latest available statistical data;
- Review and update the Labour Market Study (Appendix D of the SIA);
- Review and validation of labour sourcing locations;
- Review and validation of potential workforce home base locations;

- Confirm the location of collection nodes for the long-distance commuting workforce;
- Confirm the associated workforce transport options e.g. bus-in-bus-out (BIBO) and fly-in-fly-out (FIFO);
- Review and update the assessment of impacts, particularly cumulative impacts based on the updated socio-economic baseline; and
- Review management strategies identified in the draft EIS and develop new strategies, where necessary, to reflect any changes in the socio-economic baseline.

This review and update is a precursor to the preparation of plans to manage social impacts. The review and update of the SIA will confirm the impacts and therefore the associated management strategies necessary to be developed and implemented for the project. The revised SIA will include a justification for the preferred collection node for the long-distance commuting workforce and potential nodes that are excluded. The SIA review and revision has been included in Attachment I – Additional Commitments.

2.2.2 Preparation and Review of Management Plans

Following the SIA review and update (Section 2.2.1), any required social management plans will be prepared and submitted to the Office of the Coordinator-General. This will occur at least 12 months prior to the commencement of the CEW phase of the project. At this stage, it is anticipated that the following management plans will be prepared:

- Workforce management - CEW phase;
- Housing and accommodation;
- Health and community wellbeing;
- Local business and industry content; and
- Cumulative impacts.

These plans will also be reviewed and updated for the operations phase, at least 12 months prior to the completion of the CEW phase.

All social management plans prepared for the project will adopt the following structure:

- Section 1 - Background setting - A brief overview of the social setting relevant to the management plan;
- Section 2 - Impacts - A brief description of the nature of the relevant impacts including their magnitude, spatial extent, duration and relevant project phase;
- Section 3 - Desired outcomes - The outcomes sought through the implementation of the management plan;
- Section 4 - Stakeholders - A list of interested and affected stakeholders;

- Section 5 - Management Actions - a suite of detailed actions to manage potential adverse social impacts and enhance positive benefits of the project. These actions will be aligned with the commitments defined in this document and will include timelines for the implementation of actions. Management actions will be supported by key performance indicators (KPIs);
- Section 6 - Monitoring Framework - Documented strategy for monitoring the success of the management plan in achieving the desired outcomes. The monitoring framework will define overall performance goals, targets, data sources and monitoring frequency; and
- Section 7 - Consultation Actions - Schedule of consultation actions to support the implementation of the management plan.

The implementation of the social management plans will be further supported by the project Stakeholder Consultation Strategy (SCS) described in Section 3.

2.3 OUTLINE OF WORKFORCE MANAGEMENT PLAN

2.3.1 Purpose

The Workforce Management Plan (WMP) will provide a framework for the management of potential social impacts associated with the training, recruitment, retention and management of a temporary phase workforce for the CEW phase and a permanent workforce for the operations phase of the project. The WMP will support the creation of local and regional employment opportunities, and will be tailored to support employment opportunities for groups traditionally under-represented in the mining industry.

2.3.2 Overarching Commitments

The following key commitments guide the preparation and implementation of the WMP for the project:

- A CEW Phase Workforce Management Plan including all components defined here-in will be prepared at least 12 months prior to the commencement of the CEW phase;
- An Operations Phase Workforce Management Plan including all components defined here-in will be prepared 12 months prior to the commencement of the operations phase;

- A full review of the Labour Market Study (draft EIS Appendix N) will be completed as part of the SIA review and update (Section 2.2.1), prior to the commencement of the CEW phase and prior to the completion of all social management plans for the CEW phase. This review will include:
  - A full review of the labour market and training conditions across all Queensland regions using the latest available data;
  - A reassessment of potential workforce home base locations using the findings of the labour market review and updated social baseline information for relevant communities; and
  - Justification for the selection and exclusion of collection nodes.
- A further review of the Labour Market Study and home base locations assessment will be conducted prior to the completion of the CEW phase to inform the recruitment and retention plan for the project's operations phase.
- Workforce collection nodes will be nominated prior to the commencement of the CEW Phase, and reviewed and revised as necessary prior to the commencement of the operations phase.

2.3.3 Desired Outcomes

It is anticipated that the following outcomes will be achieved as a result of the implementation of the WMP:

- Potential employees are not discriminated as a result of their chosen residential location;
- A healthy and happy workforce is employed on the project, as evidenced by strong project workforce retention rates;
- The project facilitates employment of local and regional workforces, as practicable, and therefore contributes to a stronger region;
- Direct and in-direct employment opportunities on the project are accessible to groups who are traditionally under-represented in the mining industry;
- The skill base of residents of the Charters Towers Local Government Area (LGA) is diversified through the provision of education and training opportunities associated with the project;
- Local Governments in which the workforce resides are provided with the necessary information to make informed decisions around strategic planning to accommodate project induced population growth;
- State Government, Isaac Regional Council (IRC) and Charters Towers Regional Council (CTRC) remain informed of the size of the non-resident workforce associated with all stages of the project; and
- Labour force impacts on the non-mining sector are minimised.

The WMP will include a suite of key performance indicators which will be used to measure progress towards the achievement of the desired outcomes.

2.3.4 Key Initiatives

This section describes the key initiatives to be included in the WMP to address:

- Workforce recruitment and retention;
- Indigenous participation;
- Workforce training and skilling; and
- Workforce sourcing and the use of workforce collection nodes.

Workforce Recruitment and Retention Plan

A Workforce Recruitment and Retention Plan will be prepared as part of the WMP for each of the CEW and the operations phases. The Workforce Recruitment and Retention Plan will:

- Identify the nominated collection nodes (CEW phase and operations phase) for the long-distance commuting workforce. Note, the selection of nodes will be determined through the outcomes of the review of the SIA, including the labour study.
- Confirm the range of transport options available to the workforce to access the site during the CEW phase and the operations phase e.g. BIBO and FIFO.
- Define the workforce accommodation arrangements for the project. All employees residing more than a one hour commute from the project site will be required to reside on a shift roster basis at the on-site accommodation village.
- Define the workforce commuting arrangements. No worker employed on the project and who resides further than a one hour commute from the project site will be permitted to commute by private vehicle to the project site for shift roster. These workers will be required to use the company or contractor provided transport options (bus service or air service) from identified collection nodes.
- Identify the shift patterns and roster arrangements proposed for each respective phase of the project.
- Include a detailed portfolio of job descriptions and key selection criteria. This will cover all employment opportunities including school based traineeships, apprenticeships, graduate programs and mature aged placement programs.
- Include a tailored Local Employment Strategy to support the provision of direct and indirect employment opportunities to residents of the CTRC and IRC LGA.
- Include an Advertising Strategy for employment opportunities that encompasses media advertising, face-to-face engagement with residents of the Local Area (as defined in the SIA), home base locations and other regional communities.

- Include suitable employment and retention targets (aspirational local employment targets and Indigenous employment targets).
- Include a Workforce Diversity Strategy that documents actions to be undertaken to encourage a higher rate of labour force participation amongst groups traditionally underrepresented in the mining industry e.g. women, single parents, Indigenous people. Strategies will include:
  - Provision of part-time and/or flexible employment opportunities, where practicable, such as in any off-site mine administration centre;
  - The establishment of an annual scholarship for engineering or a related field at a Queensland university for a female and/or Indigenous person who meets the defined selection criteria; and
  - Provision of apprenticeship opportunities initially in Charters Towers, to target under-represented groups in the mining industry e.g. young school leavers.
- Include a Mentoring Strategy, designed to support the retention of employees who are new to long-distance commuting, or new to the mining industry.
- Include a Workforce Code of Conduct (WCC) to create a culture of tolerance, fairness and equity at work which includes the workers accommodation village. The WCC will include the following components:
  - Fitness for Work (FFW) Plan including a Fatigue Management Procedure and Drug and Alcohol Management Procedure;
  - Equal Opportunity Policy – To ensure a work environment in which all employees and contractors are treated fairly and with respect;
  - Complaints Handling Procedure – To assist employees and contractors to resolve their workplace issues. If during the process of addressing their concerns, they believe they have been treated unfairly, this policy will provide a step by step process to follow to attempt to resolve the concern. The policy aims to have employee concerns addressed promptly, fairly and competently; and
  - Behavioural Management Procedure – To ensure all employees and contractors are aware of the proponent's expectations in relation to standards of behaviour; and to ensure inappropriate behaviour is addressed and corrected.
- Include an Employee Wellbeing Plan to support a healthy workforce, manage workforce wellbeing and respond to the prevalence of high industry workforce turnover rates. The plan will include:
  - The provision of on-site or tele-health mental health and counselling support services;
  - Engagement with FIFO Families to establish a Project China Stone FIFO Families group within the identified Home Base Locations;
  - The establishment of an on-site activities calendar, including sporting, recreation and group activities to enhance social network building among the workforce;
  - Where possible, roster scheduling to align employees from the same Home Base Location with each other; and

  - Where possible, fast and reliable internet access and mobile services for all employees to encourage communication with partners and families.
- Include an Employee Assistance Program (EAP) to assist employees in dealing with personal issues and minimise impacts on family assistance services in their residential locations. The EAP will include access to mental health and isolation adjustment support for all employees and their families for the first year of employment.
- Include a Contractor Social Management Procedure, to ensure all contractors engage in their activities in a socially responsible manner. The procedure will require all contractors to prepare a contractor social management plan detailing how the contractor proposes to support the proponent's objectives and desired outcomes in relation to:
  - Workforce management;
  - Housing and accommodation;
  - Health and wellbeing;
  - Local business and industry content; and
  - Cumulative impact management.

Indigenous Employment and Training

An Indigenous Participation Strategy (IPS) will be prepared prior to the commencement of the CEW phase. The IPS will provide local Traditional Owners, government, industry and community stakeholders including Indigenous stakeholders with an overview of the proponent's commitment to supporting Indigenous employment and procurement on the project, as well as the expectations MacMines' has of its contractors.

The IPS will be reviewed and updated 12 months prior to the commencement of the operations phase.

Through the IPS the proponent seeks to:

- Build strong, sustainable and respectful relationships with Indigenous people in the Local Area;
- Provide long-term, sustainable employment, training and business opportunities for Indigenous people;
- Create a working and living environment that recognises and respects the local customs and practices of Indigenous people, and the importance of these practise in preserving and protecting their culture; and
- Deliver culturally appropriate employment and training processes and practices.

With respect to Indigenous employment opportunities, the IPS will include the following information:

- An overview of state and commonwealth Indigenous participation requirements;
- A description and analysis of the Indigenous employment context in the Local and Regional Area;
- Actions and initiatives to provide opportunities for Indigenous workforce development;
- Defined contractor responsibilities in relation to Indigenous employment; and
- Indigenous participation reporting.

The following key initiatives will be included in the IPS in relation to Indigenous employment:

- Establishment of a dedicated Indigenous liaison role for the project.
- Assessment of Indigenous labour force composition in the Local Area and in communities where collection nodes are located. The purpose of this assessment would be to determine interested jobseekers suitability for project roles or related employment and training programs. This assessment would be undertaken prior to the commencement of the CEW Phase and revisited prior to the operations phase. The proponent would work with service providers to develop baseline Indigenous labour availability data.
- The establishment of partnerships with regional Indigenous training and employment agencies and the Queensland government.
- The provision of support for Indigenous employees that considers cultural sensitivities and supports Indigenous employment and retention.
- The identification of suitable project roles based on a job skills analysis and feedback from employment and training service providers.
- Defined contractor responsibilities including the following requirements:
  - All contractors and subcontractors engaged on the project to have existing Indigenous employment standards, or adopt the proponent's Indigenous employment standards for the duration of their engagement.
  - All Tier 1 contractors to prepare a project-specific Indigenous Participation Plan.
  - All Tier 1 contractors to identify project roles suitable for Indigenous job seekers.
  - All Tier 1 contractors to report on Indigenous participation outcomes.
  - Defined target for Indigenous representation in the workforce. In this regard the proponent will aim to achieve Indigenous representation on the project matching Indigenous representation in the wider Australian population.
- A process for investigating available opportunities to extend established Indigenous training initiatives (such as those provided by recognised Indigenous training organisations e.g. Myuma, and Jenagar), to the project.

The IPS will also include a reporting framework for local Indigenous employment and participation in development, training and skills programs.

Training and Skilling Strategy

A Training and Skilling Strategy will be prepared as part of the WMP for the CEW phase and reviewed and updated 12 months prior to the commencement of the operations phase.

The strategy will respond to the following opportunities and issues:

- Increased labour force participation;
- Building stronger regional communities through a focus on skill development;
- Provision of apprenticeships, traineeships and scholarships; and
- Supporting work readiness programs and pre-trade training concepts.

The project has a large workforce requirement. The strategy will include specific activities to facilitate the successful recruitment and retention of an appropriate workforce by optimising direct and indirect employment opportunities while managing challenges around the availability of and competition for local labour.

Consultation will be conducted with all levels of government, local and regional stakeholders to develop the strategy. This consultation is reflected in the SCS described in Section 3.

The Training and Skilling Strategy will include:

- Defined objectives that seek to deliver the outcomes of the WMP.
- Defined responsibilities for the proponent, primary contractors and partner agencies in relation to the delivery of training and skilling programs.
- A detailed analysis of workforce skill requirements for the CEW phase workforce and later for the operations phase workforce.
- A review of baseline labour skills across the Local and Regional Area and in potential home base locations, undertaken through the review of the Labour Market Study described in Section 2.3.2.
- Audit of relevant training and skill development initiatives available in the communities of the Local and Regional Area and in neighbouring resource communities such as Emerald.
- Risk assessment to determine the key challenges and focus areas for the strategy.

- Mining industry skill development initiatives that support employment on the project. Initiatives may include:
  - A structured apprenticeship program in a range of trades for post school leavers. The program will be available to applicants who meet the defined eligibility requirements and who have permanent accommodation in one of the identified workforce collection nodes (including Charters Towers) for the duration of a four-year apprenticeship.
  - A structured school-based apprenticeship and traineeship program delivered initially in Charters Towers through partnerships with existing secondary schools, the Dalrymple Trade and Training Centre (DTTC) and regional training providers.
  - A structured apprenticeship and traineeship program specifically targeting Indigenous people with permanent accommodation in one of the identified workforce collection nodes (including Charters Towers). These programs will be delivered through a partnership with existing Indigenous training providers.
- Internal training and development initiatives that facilitate continual development of the local and regional skill base to provide an appropriately specialised workforce for the project. Initiatives will include:
  - A requirement for project contractors to develop a Workforce Development Plan that outlines the opportunities for development and training of personnel (including traineeships and apprenticeships) and identifies measures to ensure that all personnel (including trainees and apprentices) are compliant with the proponents training and competency requirements.
  - A New Entrant program aimed at those people with no prior experience or skills in the mining sector. This program would initially give preference to the inclusion of residents from Charters Towers and would be extended as necessary to other communities in the Local and Regional area and to residents in home base locations. The program will also give preference to people from groups traditionally under-represented in the mining industry.
  - Career progression initiatives such as graduate development programs, leadership development, personal development programs delivered through the proponent or primary contractors and sub-contractors. These initiatives will assist in up-skilling the workforce, and enable backfilling of lower level positions with local people or people from traditionally under-represented groups.
- Partnerships with secondary schools in the Local Area and the DTTC to:
  - Support work experience placements;
  - Deliver career mentoring programs; and
  - Deliver a pipeline of school based apprenticeships and traineeships relevant to the project.
- Engagement with the Queensland Minerals and Energy Academy and the Queensland Resources Council (QRC) to extend relevant programs to the Local Area.

- Communications strategy for engaging with relevant stakeholders e.g. FIFO Coordinators in Home Base Locations, government agencies, RTOs to progress the development and implementation of initiatives in the project Training and Skilling Strategy.
- Monitoring of the labour market and skill base across the Local and Regional Area and at collection nodes to inform any changes to the strategy. Monitoring would include analysis of publically available labour market data and discussions with peak employment agencies operating in the collection node locations.
- Review of the strategy throughout the CEW Phase and for the first five years of operations phase. A documented procedure for evaluation and review of the strategy will be developed. The purpose of the evaluation and review is to ensure the strategy continues to respond to the labour demands of the project and any changes in the local and regional labour market.
- Specific training targets for proponent and contract workforces.
- Key Performance Indicators specific to identified workforce and training targets.

The strategy will be developed in consultation with the Department of Education and Training (DET).

In developing the Training and Skilling Strategy, the proponent will ensure the components align with the objectives of relevant State and Commonwealth Government resource workforce planning, skill development and training strategies and policies such as the Skilling Queenslanders for Work initiative.

Management of Impacts associated with Workforce Sourcing

The following strategies, plans and actions will be included in the WMP to manage potential impacts associated with the workforce sourcing arrangements for the project:

- A program for monitoring workforce geographic movements and the movement of the in-direct workforce will be established prior to the commencement of the operations phase. The proponent will conduct regular monitoring of the workforce home base locations in order to understand the magnitude of any project induced potential population growth in the geographical areas where collection nodes are located.
- A register of employee residential location preferences will be established and maintained to inform any future decisions around workforce collection nodes.
- Regular communication with relevant FIFO coordinators and/or regional councils will occur in order to keep relevant stakeholders informed of project timing and project labour force requirements. Communication actions are discussed in Section 3.0.

- The provision of support (financial and/or in kind) to Local Governments affected by significant project induced resident population growth. Support may include assistance with local service delivery and/or partnering with relevant stakeholders to implement management strategies.
- A schedule for regular reporting of the size of the project non-resident workforce to relevant stakeholders to ensure the state government, CTRC and the IRC remain informed of the size of the non-resident workforce.

2.4 OUTLINE OF HOUSING AND ACCOMMODATION MANAGEMENT PLAN

2.4.1 Purpose

The Housing and Accommodation Management Plan (HAMP) will provide a framework for the management of potential direct and indirect impacts associated with workforce accommodation arrangements for all phases of the project. In this context the project workforce includes both permanent and contract employees.

2.4.2 Context

The project includes an on-site accommodation village. All workers (permanent and contract) will be required to reside permanently for block shift periods at the accommodation village during all phases of the project. Only those workers who permanently reside (i.e. have their permanent residence) within a one hour commute of the project site (ie the proposed mining lease area) will be permitted to commute on a daily basis to the mine site. All other employees and contractors will be required to either FIFO or BIBO from collection nodes.

It is anticipated that the majority of workers will reside permanently within or nearby to communities that are identified as collection nodes. It is anticipated that there will be some in-migration of potential employees and their families to these communities during the CEW phase and the operations phase of the project. The HAMP will seek to manage potential social impacts associated with the in-migration of employees and families.

2.4.3 Overarching Commitments

The following key commitments will guide the preparation and implementation of the HAMP for the project:

- A HAMP including all components defined here-in will be prepared at least 12 months prior to the commencement of the CEW phase;

- The HAMP will be reviewed and updated at least 12 months prior to the commencement of the operations phase; and
- The management actions described in the HAMP will reflect the outcomes of the SIA review (Section 2.2.1) notably the communities within which collection nodes are located.

2.4.4 Desired Outcomes

It is anticipated that the following outcomes will be achieved as a result of the implementation of the HAMP:

- Project workforce accommodation demands do not result in significant changes to housing market dynamics in communities within which collection nodes are located.
- LGAs within which collection nodes are located are able to plan proactively for any incoming population associated with the project.
- Project workforce accommodation demands do not reduce access to affordable accommodation for lower socio-economic groups.

The HAMP will include a suite of key performance indicators which will be used to measure progress towards the achievement of the desired outcomes.

2.4.5 Key Initiatives

The following key initiatives will be included in the HAMP:

- Monitor employee residential movements and provide timely information to the relevant LGAs to ensure these LGAs remain informed of the size of any incoming project related population.
- Monitor the availability and cost of rental housing in Charters Towers and collection node communities to ensure the housing demands of the construction and operations phase workforce do not impact on affordability in these areas.
- Liaise with local real estate agents, short stay accommodation providers and emergency accommodation providers in collection node communities to remain informed of potential housing issues in collection node communities.
- Undertake early consultation with local accommodation providers in collection node locations to discuss peak employment periods during the CEW and operations phases of the project, and capacity to absorb in-migrating workforce.

2.5 OUTLINE OF HEALTH AND COMMUNITY WELLBEING MANAGEMENT PLAN

2.5.1 Purpose

The Health and Community Wellbeing Management Plan (HCWMP) will provide a framework for the management of potential direct and indirect impacts on health services and boarder community wellbeing for all phases of the project. Employee health and wellbeing is addressed in the WMP (Section 2.3).

2.5.2 Overarching Commitments

The following key commitments will guide the preparation and implementation of the HCWMP for the project:

- A HCWMP including all components defined here-in will be prepared at least 12 months prior to the commencement of the CEW phase; and
- The HCWMP will be reviewed and updated for the operations phase at least 12 months prior to the commencement of the operations phase.

The HCWMP will reflect the outcomes of the SIA review to be prior to the commencement of the CEW phase.

2.5.3 Desired Outcomes

It is anticipated that the following outcomes will be achieved as a result of the implementation of the HCWMP:

- Minimal risk of project related accidents along the Gregory Developmental Road and Flinders Highway during the CEW phase.
- Local emergency service personnel are fully informed of the project timing and have the necessary equipment and personnel to respond to project related off-site incidents.
- The CEW and operations phases of the project have a neutral impact on emergency services in the Local Area, health service providers and community infrastructure in communities that host collection nodes.
- Changes in rural amenity (noise, dust, lighting and visual) are minimised across all phases of the project and potential changes do not unduly distress surrounding landholders.

2.5.4 Key Initiatives

This section describes the key initiatives to be included in the HCWMP to address:

- Health service provision;
- Emergency response;
- Road safety; and
- Changes in rural amenity.

Health Service Provision

- A Project Servicing Strategy will be developed in consultation and coordination with Adani Mining. The purpose of the Project Servicing Strategy is to ensure the coordinated delivery of services for the project and the project workforce. The Project Servicing Strategy will document delivery arrangements for the following:
  - Provision of on-site health services for the workforce;
  - Provision of on-site tele-health facilities;
  - The use of the project airstrip by emergency services during emergencies;
  - The use of mine site safety and rescue equipment by emergency services when necessary;
  - Provision of up-to-date workforce figures, inventory lists of emergency and medical equipment and vehicle lists to Queensland Police Service (QPS), Queensland Fire and Rescue Service (QFRS) and Queensland Ambulance Service (QAS) on an annual basis;
  - Provision of on-site security; and
  - Provision of dedicated remote services room on-site, for use by service providers.
- Provision of key workforce statistics to the Government Statistician and relevant Queensland Government departments to facilitate service provision planning.
- Conduct regular consultation with key health service providers in the CTRC and IRC LGAs in the communities where collection nodes are located (Section 3).

Emergency Response

- Preparation and implementation of an Emergency Response Management Plan (ERMP) in consultation with the relevant emergency services providers, and where relevant Adani Mining, prior to the commencement of the CEW phase.
- Proactive engagement with local emergency service providers and traffic authorities prior to and during the CEW phase to ensure that all parties remain informed of key CEW activities, anticipated traffic movements and road closures, to allow forward-planning by emergency services.
- Provision of a one-off donation of a heavy vehicle rescue kit to QFRS in Charters Towers to improve local emergency service response to CEW incidents.

- Co-ordination of project infrastructure upgrades, including communications upgrades, with local emergency services to enable cost effective expansion of emergency service communications along the Gregory Developmental Road.
- Maintain an effective and well-communicated Safety and Health Management System (SHMS) to limit the number of project-related emergencies. This includes undertaking appropriate site induction and health/safety training of consultants, contractors and employees across all phases of the project to minimise the number of project related health and safety incidents.

Road Safety

- Road impacts and safety issues related to the movement of construction traffic and any potential road closures will be addressed in the detailed design phase within the Road Use Management Plan (RMP) that will be submitted to the Department of Transport and Main Roads (TMR) and CTRC when the project execution contracts have been awarded. The RMP will be developed in consultation with CTRC and TMR and will include:
  - Engagement with the CTRC and regional road groups to establish a public notification system for traffic delays;
  - Potential options for minimising vehicle load dimensions in order to decrease the number of Over Dimensional Vehicle movements required;
  - A process for issuing advance notice to the CTRC of traffic movements expected to impact on traffic flows in the area.
- Preparation of a communications strategy to inform road users of potential traffic changes and delays during the CEW phase.
- Consultation with the IRC, CTRC, TMR, QPS, Adani Mining and the Road Accident Action Group (RAAG) to determine the need or otherwise for additional driver rest areas along the primary project supply routes.
- Fatigue Management Policy and associated Fatigue Management Plan for workers and their families. The proponent will implement a Fatigue Management Plan within its Safety and Health Management Systems with the workforces for all phases of the project to ensure that all individuals are fit for work, thereby not compromising safety within the workforce. The procedure should be in line with Section 42(2)(c),(d)of the *Coal Mining Safety and Health Regulation 2001* and is intended to reduce the risk of mine workers becoming fatigued whilst travelling to and from work and whilst on the job.

Changes in Rural Amenity

- Preparation of an Environmental Management System that includes environmental management plans and programs to ensure all regulatory requirements are met and the objective of the proponent's environmental policy are achieved.

- Implement tailored Landholder Consultation Plans for the life of the project (Section 3.4).
- Implement a compliance and grievances system for the project (Section 3.5).
- Design a night lighting system that meets safety and security requirements, is focussed on specific site areas as required and limits extraneous light where necessary.
- Maintain locally based Community Liaison Officer (or equivalent) as a central point of contact for ongoing landholder issues and concerns regarding the project (Section 3).
- Develop, with the relevant Traditional Owner group, and have approved, a Cultural Heritage Management Plan (CHMP) under Part 7 of the *Aboriginal Cultural Heritage Act 2003.*

2.6 OUTLINE OF THE LOCAL BUSINESS AND INDUSTRY CONTENT PLAN

2.6.1 Purpose

The Local Business and Industry Content Plan (LBICP) will provide a framework for local business and industry participation in the project supply chain.

2.6.2 Overarching Commitments

The LBICP, including Local Content Strategy (LCS) will be prepared at least 12 months prior to the commencement of the CEW phase.

2.6.3 Desired Outcomes

It is anticipated that the following outcomes will be achieved as a result of the implementation of the LBICP:

- Local and regional benefits of the project are maximised;
- Local businesses are given full, fair and reasonable opportunity to tender for and win project procurement contracts;
- Infrastructure upgrades and service provision associated with the project will provide ongoing tangible benefits to the surrounding community; and
- Workforce accommodation and commuting arrangements support sustainable population growth in regional centres.

2.6.4 Key Initiatives

This section describes the key initiatives to be included in the LBICP to:

- Enhance procurement opportunities;
- Support local industry participation:
- Support participation of Indigenous businesses; and
- Evaluate the effectiveness of local content initiatives.

Procurement
The proponent will prepare a project Procurement Policy and make the policy available on the company website.

Local Industry Participation
The proponent will adopt the *Queensland Resources and Energy Sector Code of Practice for Local Content* (QRC, 2013) (the QRC Code). The proponent will undertake the following initiatives (outlined in the QRC Code) for ensuring that local industry receives a full, fair and reasonable opportunity to tender for project opportunities:

- Openly promoting the adoption of the QRC Code and the project LCS.
- Holding public briefings in Charters Towers, Moranbah, Clermont and Emerald explaining what opportunities are available for local contractors and the anticipated timelines.
- Developing and openly publicising a forward procurement plan which identifies upcoming supply opportunities available for each project phase.
- Inviting pre-qualified suppliers to tender in addition to advertising tender opportunities via public avenues. This will include the development and implementation of a supplier-prequalification process.
- Utilise a variety of public communication avenues to openly promote supply opportunities in addition to inviting target pre-qualified suppliers to tender. Communication tools will include the use of the Industry Capability Network (ICN) Gateway, project website, Black Business Finder, media advertisements and public briefings with local industry.
- Establishing an ICN Gateway Portal for the project and associated supply opportunities to publically communicate all relevant project-related information.
- Developing procurement strategies that encourage local participation.

A LCS will be prepared as part of the LBICP at least 12 months prior to the commencement of the CEW phase. The LCS will include the following information:

- Local Content Policy describing the proponent's commitment to local procurement. The policy will outline the following:
  - Advertising of tenders;
  - Payment terms;
  - Point of contact for procurement enquiries;
  - How to divide large tenders into smaller work packages; and
  - Instructions on completing paperwork and regulations.
- Description of the benefits or business drivers for procuring locally.
- A database of capable local industry.
- A list of the local content practices the proponent will undertake, including how the practices will be resourced and implemented.
- A plan for communicating procurement opportunities to local industry.
- A description of the tender valuation process including evaluation criteria.

Key local content practices to be included in the LCS include:

- Appointment of a dedicated procurement officer for the project, as a single point of contact for local business to contact in relation to procurement opportunities.
- Identification of supply opportunities in local (CTRC and IRC LGAs) and regional (North Central and Mackay Isaac Whitsunday) areas throughout project life cycle.
- Communication with local industry (CTRC and IRC LGA) regarding requirements for supplier registration, pre-qualification and tendering. This will include the establishment of a regular meeting with the CTRC to keep the local government informed of the progress of the project to inform investment decisions in the town.
- Engagement with local supplier advocates such as ICN, Resource Industry Network (RIN) and Regional Economic Development Corporations (REDC) to identify local suppliers and the known supply chain gaps.
- Engagement with CTRC and other relevant stakeholders to ensure that project initiatives build on the outcomes sought by the CTRC in relation to supply chain development. The proponent notes that the CTRC is seeking to develop a system and agreement with industry which enables small engineering companies in the Charters Towers LGA to bid for, and supply, major mining and agricultural contracts. The CTRC is currently in discussions with Adani Mining and Townsville Enterprise Limited in relation to creating a simplified procurement procedure for small business.
- Audit of local industry capability in Charters Towers.
- Inclusion of a mechanism for supplier registration, on the project website. Analysis of these suppliers to identify ones that meet the proponent's capability requirement.

- Inclusion of 'local content' as a tender evaluation criteria for suitable opportunities.
- Inclusion of local content reporting in contract conditions with contractors and sub-contractors.
- Development of procurement strategies that encourage local industry participation. The proponent will:
  - Unbundle supply packages, where feasible and appropriate, to allow pre-qualified suppliers to respond to the tender in part;
  - Encourage pre-qualified suppliers to establish joint ventures and collaborate with other pre-qualified suppliers when responding to tenders; and
  - Assist tenderers to understand tender specifications and requirements, and share questions and answers with all tenderers.
- Provision of assistance to suppliers including:
  - Supporting and guiding suppliers through the registration process, pre-qualification and tendering;
  - Ensuring bidders are aware of their responsibilities toward 'local content'; and
  - Providing feedback to local suppliers regarding performance during pre-qualification, tendering and contract fulfilment.

To support industry capability development in the communities of the CTRC and IRC LGAs the proponent will implement the following initiatives:

- Identify the industry capability development programs provided by other parties e.g. Enterprise Connect and ICN, and promote these to suppliers using the following mechanisms:
  - Feedback following unsuccessful prequalification or tendering; and
  - Supplier guides (or similar).
- Support, partner or collaborate with program providers to ensure programs assist in improving supplier capabilities relevant to the project. Mechanisms to be employed by the proponent include:
  - Identification of programs that build capabilities to pass pre-qualification;
  - Support programs that assist suppliers to develop capability statements; and
  - Work with program providers to encourage local industry to participate in the programs where applicable.
- Advise program providers of the capabilities required for the project.
- Advise program providers of the local industry capability gaps identified in relation to the project.

Indigenous Business Supply

An Indigenous Participation Strategy (IPS) will be prepared prior to the commencement of the CEW phase. The IPS is described in Section 2.3.4. With respect to procurement the IPS will include:

- A description and analysis of the Indigenous business context in the Local and Regional Area;
- Actions and initiatives to provide opportunities for local Indigenous supply;
- Defined contractor responsibilities in relation to Indigenous employment and supply; and
- Indigenous participation reporting.

The following initiatives will be included in the IPS in relation to the involvement of Indigenous businesses in the project supply chain:

- Establishment of a dedicated Indigenous liaison role for the project.
- The establishment of partnerships with Traditional Owners and Indigenous groups to develop Indigenous business opportunities related to the project.
- Defined contractor responsibilities including the following requirements:
  - All contractors and subcontractors engaged on the project to have existing standards to support fair and equitable tendering by Indigenous businesses for project services; and
  - All Tier 1 contractors to report on Indigenous participation outcomes.

The IPS will also include a reporting framework for local Indigenous spend.

Monitoring and Evaluation

The proponent will report annually on the effectiveness of the LCS in accordance with the requirements of the QRC Code.

2.7 OUTLINE OF CUMULATIVE SOCIAL IMPACT MANAGEMENT PLAN

2.7.1 Purpose

The Cumulative Social Impacts Management Plan (CSIMP) will provide a framework for the ongoing identification, evaluation and management of potential cumulative social impacts resulting principally from a combination of the project and the adjacent Carmichael Coal Mine and Rail Project (CCM&RP) and the associated Moray Power Project (MPP).

2.7.2 Context

The potential for cumulative social impacts associated with project is considered in Table 24, Section 6.9 of the draft EIS SIA (Appendix N). The potential cumulative social impacts of the project are related to the adjacent CCM&RP and the associated MPP which is proposed to supply power to the CCM&RP. The project is not reliant on the commencement of the CCM&RP, however the proponent acknowledges the strong potential that both projects will be operational at the same time.

The CCM&RP is much further advanced in the approval process than Project China Stone, having been issued key approvals from State and Federal Government regulatory agencies. However, the unanticipated and repeated legal challenges from anti-mining groups have delayed the anticipated commencement of construction of the CCM&RP. These ongoing legal challenges mean that it is not possible to accurately predict the timing of commencement of construction of either the CCM&RP or the project. However, it is noted that to date Adani have not made any public comments regarding not proceeding with the CCM&RP. It is, therefore, still most likely that the CCM&RP will proceed prior to the commencement of construction of Project China Stone, as assumed in the draft EIS.

In the absence of the CCM&RP, cumulative impacts associated with the project are likely to relate to:

- Project induced population growth in the collection node communities and the associated demand for housing and accommodation, and community services and facilities; and
- Labour market dynamics.

2.7.3 Overarching Commitments

The following key commitments will guide the preparation and implementation of the CSIMP for the project:

- The potential for cumulative impacts will be reassessed as a component of the SIA review (Section 2.2.1) at least 12 months prior to the commencement of the CEW phase.
- Community consultation with key stakeholders will underpin the identification and assessment of cumulative impacts.
- The CSIMP will be prepared at least 12 months prior to the commencement of the CEW phase and updated at least 12 months prior to the commencement of operations.
- Where the CCM&RP precedes the development of Project China Stone, engagement and collaboration with Adani will underpin management of cumulative impacts.

2.7.4 Desired Outcomes

It is anticipated that the following outcomes will be achieved as a result of the implementation of the CSIMP:

- Cumulative impacts associated with the project are managed through proactive impact identification, targeted consultation with interested and affected stakeholders and the implementation of adaptive management strategies.
- The adverse cumulative impact of the project on road users, service providers, nearby landholders and communities within and nearby collection nodes is minimized.
- Affected communities are proactively engaged in the identification and management of cumulative impacts without being subjected to successive periods of consultation.

2.7.5 Key Initiatives

The following key initiatives will be included in the CSIMP:

- Targeted engagement with directly affected communities and individuals, across all phases of the project to identify cumulative impacts and potential management strategies (Section 3.4).
- Regular and ongoing discussion and collaboration with Adani in relation to the management of cumulative impacts associated with workforce management specifically workforce accommodation arrangements and workforce recruitment and training, local industry content, traffic and emergency service provision.
- Establishment of a consultative forum e.g. roundtable forum, consultative committee with Adani, regulators, key service providers. The forum would provide an opportunity for open discussion around cumulative impacts, and the development of strategies to respond to potential cumulative social impacts of the two projects. Collaboration with state and local government and the resource sector will underpin the management of cumulative impacts.
- Preparation of a Project Servicing Strategy in consultation with Adani (where relevant), regulators and local and regional service providers. The purpose of the Project Servicing Strategy is to ensure the coordinated delivery of services, including health services, for the project and the project workforce.
- Preparation of emergency and evacuation planning and response procedures in consultation with state, regional and local emergency service providers. Procedures will include clear protocols, roles and responsibilities for responding to emergencies.
- Ongoing liaison with QFRS, QAS, local State Emergency Services and local hospital services.

- Provision of first aid and firefighting services at the project site. This will reduce the demand placed on government services. In addition the proponent will continue to liaise with the Queensland Government to identify potential impacts on emergency services over time.
- Establishment and maintenance of contingencies to deal with emergency situations. An emergency response capability and appropriate facilities will be provided, and maintained, to enable the management of emergency situations in an appropriate manner. In addition, Emergency Preparedness and Response shall be tested via emergency exercises, audits and reviews to verify adequacy and effectiveness. This will be completed in consultation with local emergency service providers.
- Conduct of periodic emergency simulation drills with regional emergency service providers over the life of the project.
- Preparation and implementation of a cumulative impact monitoring plan, as necessary, to ensure any potential new impacts are proactively identified and managed, and the success of existing strategies is evaluated.

3 OUTLINE OF THE STAKEHOLDER CONSULTATION STRATEGY

3.1 INTRODUCTION

The proponent is committed to engaging with interested and affected stakeholders including local communities, industry organisations, LGAs and State Government departments during the following stages of the project:

- Preconstruction - This is the period during which the project approvals process is progressed and relevant management plans and strategies are prepared.
- Construction and Early Works Consultation (CEW) - This is the period during which the various project components are constructed and includes the initial extraction of development coal. The CEW phase is anticipated to extend from Project Year (PY)1 to PY5.
- Operations Phase Consultation - This period commences in PY6 and extends for the life of the operation to ~PY49.

Given the considerable life of the project, consultation for the mine closure phase is not considered at this time. This consultation will be managed through the implementation of the comprehensive Stakeholder Consultation Strategy (SCS) described herein.

3.1.1 Purpose and Objectives

The purpose of the SCS is to:

- Provide the proponent with a documented roadmap for the implementation of the community consultation and engagement program over the life of the project; and
- Demonstrate the proponent's commitment to ongoing engagement with all interested and affected parties over the life of the project.

The objectives of the SCS include to:

- Demonstrate the proponent's commitment to open and transparent communications with communities of the Local Area about project activities;
- Continue to enhance the stakeholder relationships initially established during the preparation of the draft EIS;
- Progress the development of key strategies and plans designed to enhance the delivery of benefits to the local area and to manage any potential adverse impacts of the project on the local area; and
- Ensure a coordinated approach to project communications.

3.1.2 Key Commitments and Desired Outcomes

The proponent makes the following key commitments in relation to stakeholder consultation for the project:

- MacMines will engage in open and transparent communication with any interested or affected stakeholder(s) throughout the life of the project;
- MacMines will seek to understand and address the concerns of interested and affected stakeholders in relation to the environmental and socio-economic impacts of the project;
- MacMines will proactively and effectively manage community expectations around employment, training, accommodation, transport, economic and development opportunities; and
- MacMines will develop a personalised program of consultation and engagement for directly affected individual landowners that is specific to their property and issues of concern.

The proponent seeks the following outcomes through the implementation of the SCS for the project:

- To be considered a good corporate neighbour, respected and trusted by landowners, host communities and other stakeholders.
- Project stakeholders are informed of project components, timing and potential project impacts and benefits.
- A range of consultative opportunities are made available to stakeholders across the life of the project, to engage with the project team.
- An effective complaints and disputes resolution mechanism operates for all project phases.
- Stakeholder issues and concerns are identified and addressed by the project team, as they arise.

3.2 STRUCTURE

The SCS has the following three primary components:

- Stakeholder Engagement Plans. These are described in Section 3.4.
- Complaints and Grievances System. This is described in Section 3.5.
- Evaluation and Reporting Procedure. This is described in Section 3.6.

The structure of the SCS is illustrated in Figure 1.

3.3 ROLES AND RESPONSIBILITIES

Table 2 summarises the roles and responsibilities of project team members in relation to the delivery of the SCS for the project.

Table 2
Project Team Roles and Responsibilities for Community Engagement

Role	Responsibility
Chief Executive Officer	Final approval of all communication material including environmental, social and consultation reports for external distribution
Environmental Manager	Manage environmental aspects of the project Participate in engagement with directly affected landowners and adjoining landowners as requested by the Community Liaison Officer and in order to respond to complaints and grievances
Corporate Affairs Manager	Media Management Manage interactions with directly affected landowners and adjoining landowners, broader community and other stakeholders including government and non-government stakeholders Manage stakeholder and community issues/concerns Annual review and evaluation of stakeholder engagement implementation plans Review and evaluate all management plans relevant to the management of the project's social impacts
Indigenous Liaison Officer	Establish and manage interactions with Indigenous representatives and organisations in relation to project employment, training and procurement opportunities
Project Procurement Officer	A single point of contact for local business to contact in relation to procurement opportunities associated with the project.
Community Liaison Officer	Draft and implement the annual stakeholder engagement implementation plans Interact with key stakeholders, particularly directly affected and adjoining landholders, and the community, engaging on issues/concerns Manage the complaints and grievances system for the project and conduct awareness training with relevant stakeholders Attend community events in home base locations and nearby communities of Clermont and Charters Towers Prepare media releases, newsletters, facts sheets and other engagement tools Provide a local presence for the project

3.4 STAKEHOLDER ENGAGEMENT PLANS

The following section details the key components of the stakeholder engagement program for all phases of the project, excluding mine closure. These programs will form the basis of the detailed Stakeholder Engagement Plan (SEP) to be prepared by the proponent for each phase of the project.

The stakeholder engagement program described in the following sections also addresses the environmental concerns raised by stakeholders in submissions on the draft EIS.

Section 3.4.4 provides an outline of a Landholder Engagement Plan. Landholder Engagement Plans will be prepared for all directly affected and adjoining landholders to the project site.

3.4.1 Pre-Construction Phase

Table 3 provides an outline of the stakeholder consultation program for the Pre-Construction Phase of the project.

Table 3
Pre-Construction Phase Consultation Program

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Landowners within the project site			
Develop tailored landholder consultation plan for the life of the project	Individual face-to-face meetings with affected landowners/residents	Plan completed prior to commencement of CEW phase.	Agree number of meetings annually with landowners Reconfirm contact protocols Document tailored consultation plan
Provide project updates	Individual face-to-face meetings with affected landowners/residents	Ongoing throughout project approvals. Plan completed prior to commencement of CEW phase.	Offer a minimum of two face-to-face meetings each year Meeting updates to include a range of key information such as findings of environmental monitoring, enquiries and complaints, and environmental management
	Personal telephone calls, letters and emails	As further project information becomes available	Overview of current activities, key milestones achieved or request for property access
Land access agreements	Individual face-to-face meetings on affected properties	As required to finalise negotiations prior to commencement of CEW	Provision of Landholder Agreement Discussion of the purpose and process of a Landholder Agreement between MacMines and the landholder
Opportunity to talk to technical specialists	Face-to-face meeting	One meeting offered	Detailed explanation of modelling and potential groundwater impacts, including specific information about any bores on the landowners property. Detailed discussion in relation to surface water management including subsidence and potential impacts, and rehabilitation. Discussions could be included as part of regular update discussion

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Impact management	Face-to-face meeting	One meeting offered	Discuss management and potential realignment of stock routes
Landowners with properties adjoining or in proximity to the project site			
Develop tailored landholder consultation plan for the life of the project	Individual face-to-face meetings with affected landowners/residents	Plan completed prior to commencement of CEW phase.	Agree number of meetings annually with landowners Reconfirm contact protocols Document tailored consultation plan
Opportunity to talk to technical specialists	Face-to-face meeting	One meeting offered	Detailed explanation of modelling and potential groundwater impacts, including specific information about any bores on the landowners property. Detailed discussion in relation to surface water management including subsidence and potential impacts, and rehabilitation. Discussions could be included as part of regular update discussion
General project update and discussion	Individual face-to-face meetings with affected landowners/residents	Ongoing throughout project approvals. Plan completed prior to commencement of CEW phase.	Offer a minimum of two face-to-face meetings each year Meeting updates to include a range of key information such as progress of project approvals, approach to environmental management, workforce size and management
	Personal telephone calls, letters and emails	As further project information becomes available	
Impact management	Face-to-face meeting	One meeting offered	Discuss management and potential realignment of stock routes
Traditional Owners			
Cultural Heritage Management Plan (CHMP)	Face-to-face meetings with representatives of directly affected Traditional Owner Groups	As necessary to complete the negotiation of the CHMP	Present findings of final EIS environmental, cultural and social studies Discuss Indigenous employment and training opportunities Negotiate components of CHMP
Agree tailored consultation plan moving forward	Face-to-face meetings with representatives of directly affected Traditional Owner Groups	As necessary to complete tailored consultation plan prior to commencement of CEW phase	Confirm key contacts Agree frequency of contact and issues of relevance Confirm contact arrangements with the proponent
Off lease infrastructure	Face-to-face meetings with representatives of directly affected Traditional Owner Groups	As necessary	Discuss location and requirements for off-lease infrastructure

Engagement Activity	Consultation Actions	Frequency & Timing	Details
General project update and discussion	Face-to-face meetings with representatives of directly affected Traditional Owner Groups	On-going, as required and in accordance with the procedures agreed in the tailored consultation plan	Meeting updates to include a range of key information such as findings of environmental monitoring, enquiries and complaints, and environmental management
	Personal telephone calls, letters and emails		
CTRC and IRC			
General project update and discussion	Face-to-face meetings with key representatives of the respective LGAs	Quarterly or as requested by respective LGAs	Provide update on project approvals process and timing of CEW phase Discuss timing of infrastructure upgrades Discuss CEW phase traffic management Confirm workforce numbers and preferred accommodation strategy
	Personal telephone calls, letters and emails	As necessary	
	Project newsletters	Annually	Provide update on the project Newsletters made available to the public at LGA offices in Charters Towers and Clermont Advertise key contacts for the proponent
Report on content of management plans and findings of revised SIA	Briefing sessions with representatives of respective LGAs	Prior to the commencement of the CEW phase	Provide feedback on the findings of the revised SIA, particularly the social baseline and labour market dynamics. Present key components of Management Plans: • Workforce Management • Housing and Accommodation • Health and Community Wellbeing • Local Businesses and Industry including the LCS
Opportunity to talk to project technical staff	Face-to-face or phone call	On request	Further explanation of project activities from technical staff members, with particular focus on potential impacts on CTRC/IRC infrastructure and townships
Impact management	Face-to-face meeting	One meeting offered	Discuss management of potential impacts to stock routes Present approach to cumulative Impact management and seek participation in appropriate forums
Regional Councils in Home Base Locations			
General project update and discussion	Face-to-face meetings with key representatives of the respective LGAs	Biannual during CEW or as requested by respective LGAs	Provide update on project approvals process and timing of CEW phase

Engagement Activity	Consultation Actions	Frequency & Timing	Details
	Personal telephone calls, letters and emails	As necessary	Confirm workforce numbers and preferred accommodation strategy Discuss workforce recruitment strategies and potential impacts on home base locations. Where relevant present findings of updated SIA and components of relevant management plans
	Project newsletters distributed to the Mayor of each Regional Council	Annually	Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Charters Towers and Clermont Residents			
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Local Business			
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Business capability audit and Local Content Plan	Briefing sessions	Quarterly following receipt of all necessary environmental approvals and final investment decision (FID), prior to commencement of	Engagement with project business representative bodies e.g. Charters Towers Chamber of Commerce and Mines and Clermont Business Group Discuss key areas of interest such as:

Engagement Activity	Consultation Actions	Frequency & Timing	Details
		CEW	• LCS • Project supply chain opportunities • Tender requirements • Project timing • Labour market dynamics Commence discussions around business capability and project investment opportunities to support enhancement of business capability
Dedicated project procurement staff	Face-to-face engagement with local businesses	Following FID and prior to CEW	Discuss key areas of interest such as project supply chain opportunities and tender requirements Discuss local business capability Training for local businesses in procurement arrangements
	Procurement training and assistance with development of business capability	Following FID and prior to CEW	
	Newspaper advertisements	As necessary to advertise procurement opportunities	Contain information relating to upcoming procurement opportunities or procurement training opportunities
Local Supplier Advocates e.g. ICN, RIN and REDC			
Local Business and Industry Content Plan (LBIC)	Face-to-face engagement and telephone calls	During the preparation of the LBIC Plan	Identification of local suppliers, known supply gaps Establishment of Black Business Finder and ICN Gateway Portal for the project Identification of existing programs that support supplier capability improvements
Indigenous organisations, representatives and wider Indigenous community			
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Appointment of dedicated Indigenous liaison role for the project	Engage with relevant Indigenous organisations and Indigenous community representatives	Prior to the commencement of the CEW phase and following FID	Engagement to occur across all identified home base locations including Charters Towers and Clermont Issues for discussion include employment and training and local content

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			Engagement to occur consistent with consultation strategy
Department of Employment			
Development of project Recruitment and Retention Plan (RRP) and Training and Skilling Strategy (TSS)	Face-to-face meeting(s) during the preparation of the workforce Management Plan	As required during project planning and prior to release of Workforce Management Plan	Approach to recruitment and training Content of RRP and TSS Timing of recruitment program and range of potential opportunities Workforce size and diversity
Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP)			
Design and implementation of Indigenous Participation Strategy (IPS)	Face-to-face meeting	As required during project planning and prior to release of Workforce Management Plan	Content of the IPS and the broader Workforce Management Plan Appointment of Indigenous Liaison Officer
State Emergency Service Providers i.e. QPS, QAS, Queensland Fire and Emergency Services (QFES)			
Coordination of emergency service provision	Face-to-face planning meeting	During project planning and prior to the finalisation of relevant management plans	Design and implementation of Project Servicing Policy including: • Servicing arrangements for the CEW and operations phase of the project • Management of potential cumulative impacts with Adani Mining • Road safety and incident response • Monitoring of project impacts on emergency services in the local area. • Size of future service demand generated by the project. • Placement and timing of infrastructure upgrades
	Personal telephone calls, letters and emails	As necessary	
General project update and discussion	Face-to-face meetings with local and regional representatives	Biannual or as requested	Provide update on project approvals process and timing of CEW phase Confirm workforce numbers and preferred accommodation strategy Where relevant present findings of updated SIA and components of relevant management plans
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Queensland Health (QH)			
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
Project Servicing Strategy	Face-to-face planning meeting	During the preparation of the Project Servicing Strategy and prior to commencement of CEW phase	Discuss health service provision at the on-site accommodation village and the broader Project Servicing Strategy Discuss relevant strategies for incorporation into the Health and Wellbeing Management Plan and Workforce Management Plan Discuss approach to management of potential impacts on regional service delivery associated with potential cumulative population growth in home base locations
Engagement around Mental Health	Face-to-face meeting	During the design of the accommodation village	Discuss with the Queensland Health and the Queensland Mental Health Commission worker mental health needs and appropriate workplace health initiatives
Queensland Department of Natural Resources and Mines (DNRM)			
Stock route accessibility	Face-to-face meetings and electronic communication	As necessary	Management and possible realignment of stock routes, where necessary.
Department of Education and Training (DET)			
RRP and TSS	Face-to-face planning meeting	During the preparation of the RRP and TSS and prior to CEW phase	Employment, education and training initiatives and opportunities for partnering with the proponent at the local level
Transport and Main Roads (TMR)			
Traffic management and	Face-to-face meetings	As necessary	Development and implementation of Traffic

Engagement Activity	Consultation Actions	Frequency & Timing	Details
community safety			Management Plan. Placement and timing of infrastructure upgrades Management of CEW phase traffic on regional road network
EHP			
Issue of Environmental Authority (EA)	Electronic review of information for draft and final EA	As required, following issuance of CG Evaluation Report	Provision of any requested environmental information. Discussion and negotiation of EA conditions with EHP.
Review of Environmental Management Plans (EMPs)	Electronic review of documents	Following completion of EMPs	Provision of relevant EMPs to EHP as required by the approved Environmental Authority
Registered Training Organisations (RTO), and Education Providers including Charters Towers and Clermont Schools, Dalrymple Trade Training Centre (DTTS), Myuma and Jenagar			
Development of RRP and TSS	Face-to-face discussions with Charters Towers and Clermont Schools, Dalrymple Trade Training Centre, Myuma and Jenagar and any other relevant training provider	During the development of IPS, RRP and TSS	Review and update existing stakeholder database to reflect changing labour market and training dynamics in the regional area and potential home base locations. Discuss the components of the Training and Skilling Strategy, and opportunities for partnerships. Discuss partnership opportunities for training and skilling of project workforce
Information and updates provided through project newsletter	Project newsletters	Annually	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on project approvals process and timing of CEW phase Update project initiatives and scope of potential training programs Provide contact details for project team
FIFO Families (organisation)			
Development of Health and Wellbeing Plan	Face-to-face/telephone meetings	Following FID and as necessary to develop strategies	Discuss potential strategies to be adopted to manage impact of working arrangements on employees and family health and wellbeing

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Adani Mining			
Project Servicing Strategy and Cumulative Impact Management	Face-to-face engagement with Adani Mining representatives	Ongoing as necessary following FID. This will depend on the progress and timing of the Carmichael Mine Project	Management of cumulative impacts Development of a suitable stakeholder engagement strategy to address common issues e.g. emergency services delivery Project timing Project Servicing Strategy Management of cumulative environmental and social Impacts
Real Estate Agents, Short Stay Accommodation Providers and Emergency Accommodation Providers in Communities within which collection nodes are located			
Development of CEW phase Housing and Accommodation Management Plan	Face-to-face/telephone meetings	Ongoing as necessary to inform the development of the HAMP and monitoring of outcomes	Discuss housing market conditions in communities within which collection nodes are located Discuss potential housing and accommodation demands associated with peak employment periods during CEW and operations phases of the project and capacity for communities to absorb in-migrating workforce Discuss potential strategies to respond to the impacts of any potential change in housing and accommodation pressures

3.4.2 Construction and Early Works Phase

Table 4 provides an outline of the stakeholder consultation program for the CEW phase of the project.

Table 4
Construction and Early Works Phase Consultation Program

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Landowners within and adjacent to the project site, Landowners with properties along the Gregory Development Road			
General project update	Individual face-to-face meetings with affected landowners/residents Personal telephone calls, letters and emails	Initial meetings at commencement of CEW phase then as necessary throughout CEW Ongoing throughout project approvals and in	Meeting updates to include a range of key information such as: • Project timing and progress of CEW • Overview of current activities, key milestones achieved or request for

Engagement Activity	Consultation Actions	Frequency & Timing	Details
		accordance with tailored landholder consultation plan	property access • Provision of training in the operation of the project complaints and grievances system • Management of potential environmental and social impacts associated with CEW phase • Traffic delays and road upgrades • Placement and timing of infrastructure upgrades • Findings of environmental monitoring, enquiries and complaints, and environmental management; and • Stock routes. Offer a minimum of 2 face-to-face meetings each year to report on environmental performance
	Project newsletters	Quarterly	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
24hr Phone Line	Phone call	Available for directly affected and adjoining landowners only for the life of the project	Allows landowner to report urgent operation impacts e.g. noise at night, and speak to a site personnel
Notification of blast events	Phone call	As necessary prior to blast	Sensitive receptors to be notified of blasts at least 24 hours before a blast. Where blasts are in proximity to Gregory Development Road CTRC, IRC and TMR to also be notified
Notification of road closures	Phone call, letters of notification	As necessary	Notify landholder of any potential road closures likely to impact accessibility. Provision of supporting information around road closures including alternate route. Reassurance regarding

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			emergency services access. Expected dates that roads will close Any mitigation measures for inconvenience.
Report on environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
Annual Report	Email or mail out of annual report	Annually	Provision of Annual Report on Project social performance including evaluation report on stakeholder engagement plan and complaints and grievances
Opportunity to talk to project technical staff	Face-to-face or phone call	On request	Further explanation of project activities from technical staff members, with particular focus on potential impacts on the landowner's property
CTRC and IRC			
General project updates	Project newsletters	Quarterly	Distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Emails, letters and phone contact	As necessary	Key issues arising, project changes, project timing changes
	Face-to-face meetings with relevant Council representatives	Quarterly during CEW or as requested by IRC or CTRC	CEW timing and progress Project workforce accommodation strategy Infrastructure upgrades Construction phase roads and traffic planning Employment and business development opportunities Proposed strategies to manage project environmental and social impacts Provision of information around road closures
Annual Report	Email or mail out of annual report	Annually	Provision of Annual Report on project social performance including evaluation report on stakeholder engagement plan and complaints and grievances

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Report on monthly environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
Regional Councils in Home Base Locations			
General project updates	Project newsletter	Quarterly	Project newsletters distributed to the Mayor of each Regional Council Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Face-to-face meetings with relevant representatives	Biannual during CEW	Project Workforce Accommodation Plan, Recruitment Plan and TSP progress. Timing of recruitment strategies for construction and operations Infrastructure and service demands
Charters Towers and Clermont Residents			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Presentations to relevant organisations e.g. Charters Towers Chamber of Commerce and Mines and Clermont Business Group	Biannual	Project timing Employment opportunities Business development opportunities
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Community Liaison Officer	Position established at commencement of CEW	Available to provide presentations to community groups, meet with individuals or provide project information over the phone
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
Community services, organisations and groups in Clermont and Charters Towers			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Community Liaison Officer	Position established at commencement of CEW	Available to provide presentations to community groups, meet with individuals or provide project information over the phone
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
Report on environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
RAAG			
General project updates and	Face-to-face meeting	Annually during CEW	Strategies to manage employee journey management and driver

Engagement Activity	Consultation Actions	Frequency & Timing	Details
tailored road safety campaign.			fatigue Community road safety
	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
Road users including tourists			
Tailored safety campaign	Media releases, radio interviews and bill boards on key roads	Ongoing throughout CEW phase or in line with significant increase in construction traffic volumes	Tailored campaign to raise awareness of potential travel delays on regional road network during the CEW phase. Road safety and potential travel delays on regional road network Target populations to include CTRC, IRC, Townsville and surrounding Councils, Mackay City Council and Central Highlands Regional Council
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
Local business including relevant industry groups e.g. Charters Towers Chamber of Commerce and Mines, Clermont Business Group			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Community Liaison Officer	Position established at commencement of CEW	Available to provide presentations to community groups, meet with individuals or provide project information over the phone
	Regular presentations/meetings with local business groups in Charters Towers and Clermont	Quarterly during CEW, or as determined in consultation with relevant groups	Local Content Plan Tendering procedures and opportunities Project timing Labour market dynamics
Project Procurement Officer	Dedicated project procurement staff	Established during pre-construction and ongoing throughout CEW and operations phases	Responsible for promoting project procurement opportunities, implementing Local Content Plan and providing conduit between local businesses and the project.
Local Content	Newspaper advertisements	As necessary	Advertise procurement opportunities throughout CEW
	Procurement advertisements on project website and any relevant government tendering websites	As necessary	
	Advertise procurement opportunities on ICN Gateway	From commencement of CEW	
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify organisations of procedure
Local Supplier Advocates e.g. ICN, RIN and REDC			
Local business and industry content	Telephone calls	Ongoing with implementation of LBICP	Local supplier capability audit Implementation of programs to support local supplier tender capabilities Preparation of LBICP for operations phase
Indigenous organisations, representatives and wider Indigenous community			
Indigenous participation	Face-to-face	Quarterly during CEW, or as deemed necessary	Engagement with Indigenous representatives of nearby communities, host communities and organisations. Potential items for discussion include; • IPP • Employment and training opportunities • Business development

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			opportunities • Role of Indigenous Liaison Officer
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Project Indigenous Liaison Officer	Position established at commencement of CEW	Available to meet with individuals or organisations and provide project information including information relating to employment ,training, procurement, community development investment opportunities etc.
	Face-to-face engagement with Indigenous representatives	Quarterly during CEW, or as deemed necessary	Engagement with Indigenous representatives
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify organisations of procedure
Australian Government Department of Employment (DE)and Queensland Department of Employment and Training (DET)			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			programs Discuss complaints and grievances procedure Provide contact details for project team
Recruitment and training planning	Face-to-face meeting	As required during CEW in preparation for operations phase	Items for discussion include employment, education and training
Emergency service providers in the Local Area			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
Coordination of service delivery	Face-to-face meetings	Quarterly meetings during CEW or as required	Discuss progress of CEW phase and potential issues in service delivery. Monitoring of project impacts on emergency services in the local area. Placement and timing of infrastructure upgrades
Community service and facility providers in home base locations			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Community Liaison Officer	Position established at commencement of CEW	Available to provide presentations to community groups, meet with individuals or provide project information over the phone
Monitoring social impacts	Face-to-face meetings, letters, emails and phone calls	As necessary during CEW	Monitoring potential project induced population growth impacts on community services and facilities. Discuss service demand and supply Discuss potential community development opportunities to enhance service delivery.
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
QH			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Community Liaison Officer	Position established at commencement of CEW	Available to provide presentations to community groups, meet with individuals or provide project information over the phone

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Monitoring social impacts	Face-to-face meetings, letters, emails and phone calls	As necessary during CEW	Monitoring potential project induced population growth impacts on health services. Discuss service demand and supply Monitor success of service delivery strategy for QH
TMR			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
	Face-to-face meetings as necessary	As necessary during CEW	Review and continue implementation of Traffic Management Plan. Placement and timing of infrastructure upgrades.
RTOs and Education Providers			
General Project Updates	Project newsletter	Quarterly	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Update on progress and key milestones for CEW phase Update project initiatives and scope of potential training programs Discuss complaints and grievances procedure Provide contact details for project team
Workforce training and skilling	Face-to-face, emails, letters and phone calls as necessary	Ongoing	Discussions with Education and Training Providers including: • Charters Towers and Clermont Schools • Dalrymple Trade Training Centre • Myuma • Jenagar Consultation as required to

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			implement the TSP prepared prior to CEW in consultation with education and training providers
FIFO Families (organisation)			
Monitoring impacts on employee health and wellbeing	Telephone discussions and emails	Ongoing as necessary	Ensure strategies to address employee and family health and wellbeing remain relevant and effective
Adani			
Project coordination and cumulative impact management	Face-to-face engagement with Adani representatives	Quarterly meetings where both projects are progressing on a similar timeframe. Where timeframes are significantly difference, biannual meetings or meetings as necessary	Project timing Project Servicing Strategy Management of cumulative environmental and social Impacts
Queensland Government Statisticians Office (QGSO)			
Galilee Basin Population Report	Provision of data	Annually	Project workforce size and accommodation arrangements
Queensland Resources Council (QRC)			
LCS	Submission of reporting documents	Annual	Annual reporting on effectiveness of the LCS in complying with the QRC Code of Practice
Real Estate Agents, Short Stay Accommodation Providers and Emergency Accommodation Providers in Communities within which collection nodes are located			
Development of Housing and Accommodation Management Plan for operations phase	Face-to-face/telephone meetings	Ongoing as necessary to inform the development of the HAMP and monitoring of outcomes	Discuss housing market conditions in communities within which collection nodes are located Discuss potential housing and accommodation demands associated with peak employment periods during Operations phases of the project and capacity for communities to absorb in-migrating workforce Discuss potential strategies to respond to the impacts of any potential change in housing and accommodation pressures Cumulative impact management
Monitoring of housing market conditions	Face-to-face/telephone meetings	Annually during CEW phase	Discuss housing market conditions in communities within which collection nodes are located Obtain housing data to report against HAMP outcomes Cumulative impact management

3.4.3 Operations Phase

Table 5 provides an outline of the stakeholder consultation program for the operations phase of the project.

Table 5
Operations Phase Consultation Program

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Landowners within and adjacent to the project site, Landowners with properties along the Gregory Development Road			
Tailored consultation plan	Face-to-face meeting	At commencement of operations phase	Update CEW phase tailored landholder consultation plan
General Project Updates	Newsletter	Biannual for first 5 years then annual	Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team Notify of road closures for blasting activities
	Face-to-face meetings and consultation in accordance with tailored landowner consultation plan	Ongoing	Management of potential environmental and social impacts associated with operations phase
		Quarterly	Individual face-to-face meetings on affected properties
		Ongoing	Complaints and grievances system
		Annually for first two years of operations	Provision of Annual Report on Project social performance
Blasting notification	Telephone call	At least 24hrs prior to blast	Notify landholder of intention to blast including time frames and any road closures resulting from the blast.
24hr Phone Line	Phone call	Available for directly affected and adjoining landowners only for the life of the project	Allows landowner to report urgent operation impacts e.g. noise at night, and speak to a site personnel
Report on environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
Opportunity to talk to project technical staff	Face-to-face or phone call	On request	Further explanation of project activities from technical staff members, with particular focus on potential impacts on the landowner's property

Engagement Activity	Consultation Actions	Frequency & Timing	Details
CTRC and IRC			
General Project Updates	Project newsletter	Biannual	Project newsletters distributed through stakeholder register and made available at key locations e.g. library. To include information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Notify of road closures of blasting activities Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
Project changes	Face-to-face discussions	As necessary	Discuss changes to production rates or any significant operational events.
Environmental and social performance	Provision of Annual Report on project social performance	Annually for first two years of operations	Management of potential environmental and social impacts associated with operations phase
Report on environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
Opportunity to view environmental management and mitigation practices and outcomes	Site tour	Biannual	Stakeholders invited to visit the project site to view and experience environmental, operational and rehabilitation practices first hand
Regional Councils in Home Base Locations			
General Project Updates	Project newsletter	Biannual	Project newsletters distributed through stakeholder register and made available at key locations e.g. library. To include information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			scope of potential employment and training programs Discuss complaints and grievances procedure Notify of road closures of blasting activities Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and grievance procedure
	Face-to-face meetings with relevant representatives	Biannual for first two years of operations, then as necessary	Provide updates on project timing and planning for workforce recruitment and training Discuss potential project induced population growth and associated social impacts
Residents, community services and organisations in Charters Towers and Clermont			
General Project Updates	Project newsletter	Biannual	Project newsletters distributed through stakeholder register and made available at key locations e.g. library. To include information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Notify of road closures of blasting activities Provide contact details for project team
	Media releases	Ongoing and aligned with key milestones or as necessary	Provide updates on key project activities Notify road users of potential road closures and alternate routes Notify residents of road closures Advertise availability of any public reports relevant to the project Advertise complaints and

Engagement Activity	Consultation Actions	Frequency & Timing	Details
			grievance procedure
Report on environmental monitoring	Electronic review of documents	As required by EA	Written report providing an overview of findings of environmental monitoring
Opportunity to view environmental management and mitigation practices and outcomes	Site tour	Biannual	Stakeholders, particularly residents of Clermont and Charters Towers and families of employees, invited to visit the project site to view and experience environmental, operational and rehabilitation practices first hand
Complaints and grievances system	Fact Sheet and media releases	From commencement of CEW	Notify residents of procedure
RAAG			
General Project Updates	Project newsletter	Biannual for first five years then annually	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team
	Personal telephone calls, letters and emails	As necessary	To discuss progress of operations
Local business including relevant industry groups e.g. Charters Towers Chamber of Commerce and Mines, Clermont Business Group			
General Project Updates	Project newsletter	Biannual for first five years then annually	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team
Dedicated project procurement staff	Face-to-face engagement with local businesses	Life of Project	Discuss key areas of interest such as project supply chain opportunities and tender requirements
	Procurement training and assistance with	Life of Project	

Engagement Activity	Consultation Actions	Frequency & Timing	Details
	development of business capability		Discuss local business capability Training for local businesses in procurement arrangements
	Newspaper advertisements	As necessary to advertise procurement opportunities	Information relating to upcoming procurement opportunities or procurement training opportunities
Procurement activities	Briefing sessions and training sessions	Periodically over life of Project	Build local business capability Identify new businesses as they come on line Ensure procurement policy and procedure remains fair and equitable
Local Supplier Advocates e.g. IICN, RIN and REDC			
Monitoring of LBIC Plan outcomes	Telephone calls	Ongoing	Local supplier capabilities Implementation of programs to support local supplier tender capabilities Local spend
Indigenous organisations, representatives and wider Indigenous community			
General Project Updates	Project newsletter	Biannual for first five years then annually	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team
	Project Indigenous Liaison Officer	Life of Project	Available to meet with individuals or organisations and provide project information including information relating to employment ,training, procurement, community development investment opportunities etc.
Opportunity to view environmental management and mitigation practices and outcomes	Site tour	Biannual	Stakeholders, particularly residents of Clermont and Charters Towers and families of employees, invited to visit the project site to view and experience environmental, operational and rehabilitation practices first hand
Emergency Service providers in the Local Area			

Engagement Activity	Consultation Actions	Frequency & Timing	Details
Social impacts	Face-to-face meetings	Biannual	Monitoring of project impacts on emergency services in the local area
Community service and facility providers in home base locations			
General Project Updates	Project newsletter	Biannual for first five years then annually	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team
Social impacts	Face-to-face meetings, letters, emails and phone calls	When monitoring of workforce home base locations suggests potential for project related social impacts.	Discuss population growth and potential impacts with key service providers in home base locations to determine whether project induced impacts are occurring
QH			
Social impacts	Face-to-face meetings, letters, emails and phone calls	Biannual for first two years then as necessary	Service delivery in home base locations and on site
Education and Training Providers			
General Project Updates	Project newsletter	Biannual for first five years then annually	Project newsletters distributed through stakeholder register and made available at key locations e.g. library Information and reminders on areas of key community interest. Discuss production rates and any changes to site activities Update project initiatives and scope of potential employment and training programs Discuss complaints and grievances procedure Provide contact details for project team
Implementation on TSP	Face-to-face	Biannual with key training providers, otherwise as necessary	Partnership opportunities for training and skilling of project workforce Evaluation of project TSP
Queensland Resources Council			
LCS	Submission of reporting documents	Annual	Annual reporting on effectiveness of the LCS in complying with the QRC Code of Practice

Engagement Activity	Consultation Actions	Frequency & Timing	Details
FIFO Families (Organisation)			
Monitoring impacts on employee health and wellbeing	Telephone discussions and emails	Ongoing as necessary	Ensure strategies to address employee and family health and wellbeing remain relevant and effective
Adani			
Consultation strategy for common issues	Face-to-face engagement with Adani representatives	At commencement of operations phase as relevant	Update consultation strategy for common issues, prepared prior to CEW
Project coordination and cumulative impact management	Face-to-face engagement with Adani representatives in accordance with consultation strategy for common issues	Quarterly meetings where both projects are progressing on a similar timeframe. Where timeframes are significantly different, biannual meetings or meetings as necessary	Management of cumulative environmental and social Impacts Project servicing strategy
QGSO			
Galilee Basin Population Report	Provision of data	Annually	Project workforce size and accommodation arrangements
Real Estate Agents, Short Stay Accommodation Providers and Emergency Accommodation Providers in Communities within which collection nodes are located			
Housing and accommodation impacts	Face-to-face/telephone meetings	Ongoing as necessary to monitor housing and accommodation impacts associated with changing workforce arrangements during operations phase.	Discuss housing market conditions in communities within which collection nodes are located Discuss potential housing and accommodation demands associated with changing workforce size during operations phase of the project Discuss potential strategies to respond to the impacts of any potential change in housing and accommodation pressures Cumulative impact management

3.4.4 Landholder Engagement Protocol

The proponent will prepare a Landholder Engagement Protocol (the protocol) for the project 1 month prior to the granting of the mining lease. The purpose of the protocol is to:

- Provide an overview of the approach employed by the proponent when engaging with directly affected and adjoining landholders;
- Reassure landholders that the proponent is committed to resolving problems, improving relations and building trust with landholders;
- Explain how landholders may access and engage with the proponent;
- Describe the process for resolution of concerns; and

- Explain the process to gain access to landholder property.

The protocol will include the following information:

- Guiding principles;
- Engagement activities and tools (consistent with the actions described in the SCS);
- Defined roles and responsibilities within the project team for landholder engagement;
- Land access process;
- Ongoing communications arrangements;
- Process for raising concerns;
- Contact details for relevant project personnel; and
- Protocol review mechanism.

The proponent recognises that stakeholders residing close to the project site i.e. neighbours may have concerns that are urgent. As such, access to senior site personal via a telephone number which operates 24 hours a day, will be available to near neighbours for issues relating directly to the CEW and operations phases.

The protocol will be provided to all affected landholders and also placed on the company website.

3.5 COMPLAINTS AND GRIEVANCES SYSTEM

3.5.1 Overview

The proponent will establish a complaints and grievances system (the system), including a clear procedure for receiving, managing, investigating and responding to stakeholder complaints in a timely and respectful manner. The complaints and grievances system will be underpinned by a commitment to openness, transparency and accountability.

3.5.2 Purpose

The purpose of the complaints and grievances system is to provide a formal process whereby interested and affected stakeholders can submit complaints regarding construction or operational aspects of the project and can, through a defined process, and within a predefined timeframe, receive a response or resolution of the complaint.

The complaints and grievances system will be modelled on the principles of fairness, accessibility, responsiveness, efficiency and integration. Complaint handling staff will be skilled and professional. Information about complaints will be examined as part of a continuous process of organisational review and improvement.

3.5.3 Objectives

The objectives of the system will be to:

- Provide stakeholders with a clear and accessible process for making comments on the project and/or raising grievances;
- Reassure stakeholders that MacMines is committed to resolving problems and building trust with stakeholders;
- To structure and manage the handling of comments, responses and grievances, and allow monitoring of effectiveness of the mechanism; and
- To ensure that stakeholder issues, concerns and grievances are handled in a fair and transparent manner.

3.5.4 System Components

The system will consist of the following two primary components:

- Complaints and Grievances Procedure (the procedure); and
- Complaints and Grievances Register.

Complaints and Grievances Procedure
The procedure will describe the following stages in complaint handling:

- Acknowledgment of the complaint or grievance;
- Assessment and prioritisation;
- Planning and scheduling of any required investigation;
- Resolution of factual issues and consideration of options for complaint resolution;
- Dealing with situations where the complainant is not satisfied with the response e.g. internal review of the decision or external review options; and
- Dealing with secondary issues arising as a result of the complaint.

The procedure will be implemented in time for the commencement of the CEW phase.

All communications received through the complaints and grievances process will be recorded and responded to in accordance with the Complaints and Grievances Procedure.

Complaints and Grievances Register
During pre-construction an electronic register will be established, in which to record any complaints or grievances received over the life of the project. The register will enable

entering, tracking and monitoring of complaints, and the analysis of complaint data. The register will incorporate the following features:

- Simple data entry;
- The ability to search across various fields; and
- Regular reporting, to prompt MacMines to monitor trends and quickly identify and respond to new issues.

3.5.5 Community Engagement

Proactive engagement will be undertaken with directly affected landowners and adjoining landowners at the commencement of the CEW phase to ensure stakeholders are informed about the complaints and grievances procedure and understand the process for raising concerns and complaints should they occur.

In relation to the implementation of the Complaints and Grievances Procedure, the proponent will undertake the community engagement activities described in Table Table 6.

Table 6
Stakeholder Engagement - Complaints Procedures

Purpose	Engagement Activity	Frequency	Project Phase	Detail
Directly affected landowners, adjoining and nearby landowners				
Clarify the complaints and grievances procedure	Face-to-face meeting	Yearly during CEW phase and once at commencement of operations phase or when procedure is updated	Life of Project	Opportunity to talk landowners through the procedure, specifically the use of the 24hr phone number.
Information regarding the procedure	Distribution of a fact sheet	At commencement of CEW phase or when the procedure is updated	Life of Project	Information sheet detailing the key components of the complaints and grievances procedure.
CTRC and IRC				
Information regarding the procedure	Distribution of a fact sheet	At commencement of CEW phase or when the procedure is updated	Life of Project	Information sheet detailing the key components of the complaints and grievances procedure.

Charters Towers and Clermont communities and other interested stakeholders				
Information regarding the procedure	Fact sheet made available on project website	At commencement of CEW phase or when the procedure is updated	Life of Project	Information sheet detailing the key components of the complaints and grievances procedure.
	Newsletter	Annually	Life of Project	Include details of complaints and grievances procedure

3.6 EVALUATION AND REPORTING PROCEDURE

The SCS will include a procedure for the evaluation, review and reporting against the Complaints and Grievances System and the Stakeholder Engagement Plan for each phase of the project. The procedure will document:

- Objectives and desired outcomes;
- Key roles and responsibilities; and
- A schedule for evaluation, review and reporting.

3.6.1 Evaluation and Review

Table 7 outlines the proponent's commitments in relation to the evaluation of the SCS and the desired outcomes from the process.

Table 7
Evaluation Commitments and Desired Outcomes

Commitments	MacMines will monitor and evaluate the effectiveness of the stakeholder consultation strategy every six months during pre-construction and annually throughout the CEW and operations phase of the project.
Desired Outcomes	Stakeholder engagement techniques remain useful, relevant and accessible to interested and affected stakeholders. MacMines remains informed of stakeholder issues and concerns to enable proactive management.

Table 8 describes the key actions to evaluate the effectiveness of the SCS.

Table 8
Evaluation Actions

Evaluation Action	Frequency
Development of an evaluation framework, including review schedule, for the evaluation of the SCS against the objectives and articulated desired outcomes.	During pre-construction and prior to the commencement of the CEW phase
Maintenance of an issues tracker (consultation manager or similar) enabling analysis and comparison of key issues across multiple years.	Ongoing over life of project
Preparation of a procedure for evaluation and review of the complaints and grievances system.	Prior to the commencement of CEW phase
Internal review of database records including feedback forms submitted, website hits, telephone calls, emails and issues.	Monthly during CEW phase and quarterly during operations
Evaluation of SCS, specifically the annual stakeholder implementation plans and overarching SEPs.	Annual over life of project

3.6.2 Reporting

Table 9 outlines the actions for reporting against the SCS. Each of the identified reports will include a discussion of issues and trends identified through the complaints and grievances register. All public reports will be made available on the company website.

Table 9
Reporting Actions

Reporting Action	Frequency
Publically report on the implementation of the SEP for the pre-construction phase.	Every six months following the granting of the mining lease and prior to the commencement of the CEW Phase
Publicly report on the implementation of the SEP for the CEW Phase.	Annually for the duration of the CEW phase.
Publicly report on the implementation of the SEP for the operations phase.	Annually for the first two years of the operations phase
Each of the above reports will include a discussion of issues and trends identified through the complaints and grievances register.	As above

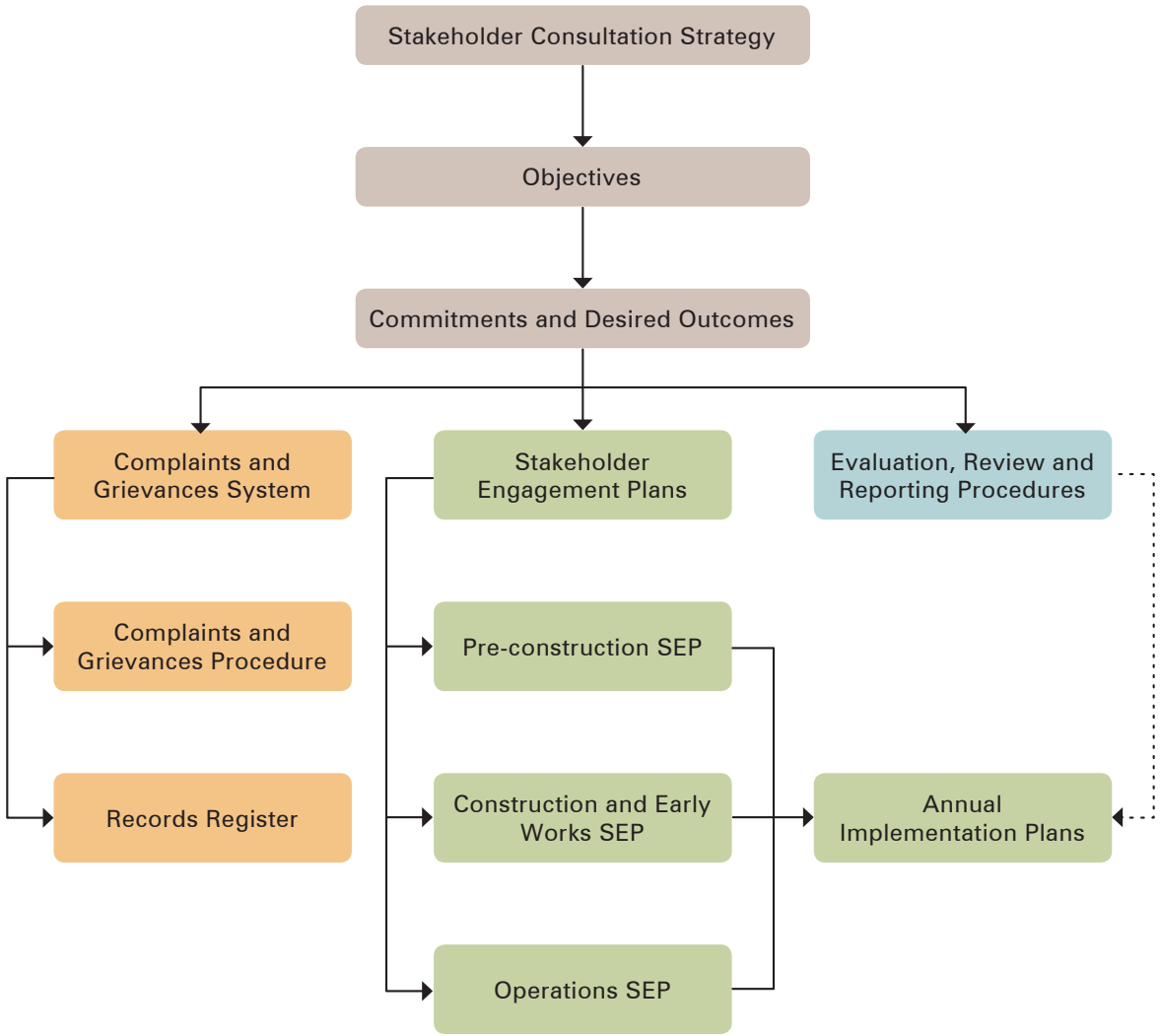
* * *

for
HANSEN BAILEY



Bronwyn Pressland
Principal Social Planner

FIGURES



PROJECT CHINA STONE

MACMINES AUSTASIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Stakeholder Consultation Strategy

FIGURE 1



PROJECT CHINA STONE

Attachment I Additional Commitments

PROJECT CHINA STONE
ADDITIONAL COMMITMENTS
for
MacMines Austasia Pty Ltd

1.1 OVERVIEW

This document is an attachment to the Supplement to the draft Environmental Impact Statement (draft EIS) for Project China Stone (the project). The Supplement to the draft EIS (the Supplement) is Volume 6 and should be read in conjunction with the draft EIS Volumes 1 – 5 that were publicly exhibited. Together, Volumes 1 - 6 form the revised draft EIS for the project. To the extent of any inconsistencies, the information in this attachment supersedes information in any other volume of the draft EIS.

1.2 PURPOSE

This attachment summarises the key additional environmental management commitments that are detailed throughout the Supplement. The management commitments and the relevant sections of the Supplement in which they are found are also referenced. These commitments are provided in addition to the commitments provided in the draft EIS Attachment 24-2 Project Commitments List.

Table 1
Statement of Additional Commitments for Project China Stone

COMMITMENT	SUPPLEMENT SECTION
Land Use	
The proponent will liaise with the Department of Natural Resources and Mines, the Isaac Regional Council and affected landowners in relation to the management of possible realignment of the stock route that traverses the project site. This consultation will occur prior to commencing construction.	Attachment A, Issue 11.003
A search of historical petroleum and coal exploration boreholes will be conducted to identify and seal boreholes prior to the construction of the underground mines.	Attachment A, Issue 41.006
Tailings and Power Station Waste Storage Facilities	
Monitoring of the consolidation of the deposited tailings will be undertaken and included in the TSF design plan.	Attachment A, Issue 24.015
The conceptual design of the final surface of the TSF plateau will include an internal drain with capacity to convey runoff from the Probable Maximum Precipitation to natural ground at the northern end of the TSF.	Attachment A, Issue 24.016
The PSWSF final landform will be integrated with the TSF final landform so that the plateau area of the PSWSF is at the same level and contiguous with the TSF plateau.	Attachment A, Issue 24.016

COMMITMENT	SUPPLEMENT SECTION
Flora and Fauna, including Matters of National Environmental Significance	
The assessment of impacts on the Northern Seasonal Wetland (based on detailed mine planning (informed by further exploration work) and subsidence predictions) that was proposed in the draft EIS will be described in the Plan Of Operations for the relevant area.	Attachment A, Issue 24.013
As per the requirements of the EPBC Act Offsets Policy, the Offset Management Plan will describe contingency measures to manage the risk of the offset not succeeding.	Attachment A, Issue 42.0007
Detailed field surveys will be undertaken of the project site and offset properties as part of the development of the Offset Management Plan. This will include an assessment of habitat condition for the purpose of confirming offset area calculations.	Attachment A, Issue 12.009
Groundwater	
Where the project is predicted to contribute to cumulative water supply bore impacts, the proponent will liaise with Adani to negotiate make good agreements, proportionate to the predicted project contribution to any impacts.	Section 5.3
Surface Water	
Implement a baseline water quality and flow monitoring program for the purpose of calculating receiving water flow criteria in North Creek and informing the REMP baseline and objectives.	Attachment A, Issue 24.019 and 24.020, Attachment E Section 2
Air Quality	
The proponent will implement the Greenhouse Gas initiatives detailed in Section 15.9.2 of the draft EIS.	Section 5.3
Socio-Economic Impacts	
Mental health and isolation adjustment support will be provided for employee families as well as employees	Section 5.3
The Mackay Regional Council will continue to be engaged in future consultation undertaken for the project. The Resource Industry Network will also be included as a key stakeholder for future consultation. These processes will follow regulatory requirements for consultation with relevant parties.	Attachment A, Issue 3.004
The Social Impact Assessment (SIA), including the social baseline, impacts and management measures, will be reviewed twelve months prior to the commencement of construction.	Attachment G, Issue 2 and 16
Any required social impact management plans will be developed twelve months prior to the commencement of construction. At this stage, it is anticipated that the following management plans will be prepared: ■ Workforce Management Plan; ■ Housing and Accommodation Management Plan; ■ Health and Community Wellbeing Management Plan; ■ Local Content Plan; and ■ Cumulative Impact Management Plan.	Attachment G, Issue 12 and 16

COMMITMENT	SUPPLEMENT SECTION
Social impact management plans prepared for the construction phase will be reviewed and revised, as necessary, for the operations phase. This will occur at least twelve months prior to the completion of the construction phase.	Attachment H, Section 2.2.2
The Indigenous Participation Strategy will be reviewed and updated twelve months prior to the commencement of the operations phase.	Attachment H, Section 2.3.4
The Training and Skilling Strategy will be reviewed throughout the construction phase and for the first five years of operations to ensure the strategy continues to respond to the labour demands of the project and any changes in the local and regional labour market.	Attachment H, Section 2.3.4
The proponent will prepare a Landholder Engagement Protocol for the project 1 month prior to the granting of the mining lease. The protocol will be provided to landholders and placed on the company website.	Attachment H, Section 3.4.4
MacMines will monitor and evaluate the effectiveness of the stakeholder consultation strategy every six months during pre-construction and annually throughout the CEW and operations phase of the project. These reports will be placed on the company website.	Attachment H, Table 7 Section 3.6.1
Traffic and Transport	
The Road Impact Assessment (RIA) will be updated six months prior to the commencement of construction.	Attachment A, Issue 23.002
The proponent's DIDO workforce policy will be enforced through the project employment agreements.	Attachment A, Issue 23.002
A Road Use Management Plan, including a commitment to monitor project generated traffic, and an Infrastructure Agreement, will be prepared for the project, if necessary.	Attachment A, Issue 16.013 and 23.002
Hazard and Risk	
The detailed design process for the accommodation village will consider the need for acoustic insulation which, if necessary, will be included in the design of the accommodation units.	Attachment A, Issue 27.008
The proponent has committed to developing a Bushfire Management Plan as part of the project's Safety and Health Management System to address bushfire hazards, risks and management. The draft model code for Bushfire Hazards will be consulted in the development of this plan.	Attachment A, Issue 16.001a
A site assessment will be conducted as part of the development of the Bushfire Management Plan, if necessary, to determine the level of bushfire risk at the project site.	Attachment A, Issue 16.001c
In addition to addressing major on-site emergencies and incidents that could impact on surrounding land uses, the proponent will also address non-mining specific matters in the ERMP including transport emergencies, mass medical treatment and/or evacuations due to the remoteness of the project site.	Attachment A, Issue 16.002 and 8.001
Testing of coal propensity for spontaneous combustion will be undertaken as part of the development of the Safety and Health Management System.	Attachment A, Issue 41.008
Operating procedures will be developed for any surface activities that have a significant risk of spontaneous combustion outbreaks.	Attachment A, Issue 41.011



PROJECT CHINA STONE

Attachment J Redacted Biodiversity Offset Strategy (EIS Appendix H)

PROJECT CHINA STONE

BIODIVERSITY OFFSET STRATEGY

COMMERCIAL IN CONFIDENCE

INFORMATION HAS BEEN REDACTED

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14 July 2017

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PROJECT CHINA STONE
BIODIVERSITY OFFSET STRATEGY

for
MacMines Austasia Pty Ltd

1 INTRODUCTION

1.1 BACKGROUND

Project China Stone (the project) involves the construction and operation of a large-scale coal mine on a greenfield site in Central Queensland. The project site (the area that will ultimately form the Mining Leases (MLs) for the project) is remote, being located approximately 270 km south of Townsville and 300 km west of Mackay at the northern end of the Galilee Basin (Figure 1). The project proponent is MacMines Austasia Pty Ltd.

The project site comprises approximately 20,000 ha of well vegetated land, with low-lying scrub in the south and east and a densely vegetated ridgeline, known as 'Darkies Range', running north to south through the western portion of the site.

The mine will produce up to approximately 55 million tonnes per annum of Run of Mine thermal coal. Coal will be mined using both open cut and underground mining methods. Open cut mining operations will involve multiple draglines and truck and shovel pre-stripping. Underground mining will involve up to three operating longwalls. Coal will be washed and processed on site and product coal will be transported from site by rail. It is anticipated that mine construction will commence in 2016 and the mine life will be in the order of 50 years.

The majority of the mine infrastructure will be located in the eastern portion of the project site. Infrastructure will include coal handling and preparation plants, stockpiles, conveyors, rail loop and train loading facilities, workshops, dams, tailings storage facilities and a power station. A workforce accommodation village and private airstrip will also be located in the eastern part of the project site.

1.2 PURPOSE AND STRUCTURE OF THIS REPORT

Commonwealth and Queensland legislation is in place to protect and manage Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES), respectively. Environmental offsets are actions taken to counterbalance residual, significant impacts on matters of environmental significance (e.g. MNES or MSES). Offsets are used as a last resort in instances where an action will give rise to residual, significant impacts, even after the application of management measures.

An Environmental Impact Statement (EIS) has been prepared for the project that contains a Terrestrial Ecology Report and an Aquatic Ecology and Stygofauna Report. These reports assess the project's potential impacts on MNES and MSES. The reports conclude that the project will give rise to a number of residual, significant impacts that will require offsets. This Biodiversity Offset Strategy documents the offsets that are proposed to be provided for the project.

This document has been split into two main parts:

- Part A: Describes the offset requirements under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Part B: Describes the offset requirements under Queensland Legislation.

Part A and Part B are each structured as follows:

- Legislative framework - describes the legislative framework in regards to offset requirements;
- Project offset requirements - provides a summary of the offset requirements for the project that were identified in the EIS;
- Delivery of offsets - outlines the process that must be undertaken for the delivery of offsets;
- Potential offset properties - provides details on the properties identified as potential offset properties; and
- Conclusion - provides detail as to the suitability of these properties to provide offsets in relation to the project.

This document should be treated as confidential.

PART A
OFFSETS UNDER THE EPBC ACT

2 LEGISLATIVE FRAMEWORK

2.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

2.1.1 Overview

The EPBC Act is the Commonwealth government's principal piece of environmental legislation, and is administered by the Commonwealth Department of the Environment (DotE). It is designed to protect national environmental assets (i.e. MNES), which include threatened species of flora and fauna, threatened ecological communities (TECs), migratory species as well as other protected matters.

Any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES is termed a Controlled Action and is subject to assessment under the EPBC Act.

2.1.2 Project EPBC Act Referral

The project was declared a Controlled Action on 30 October 2014 and the Controlling Provisions are listed threatened species and communities; listed migratory species; and a water resource, in relation to coal seam gas development and large coal mining development.

2.1.3 EPBC Act Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* (EPBC Act Offsets Policy) (Commonwealth Department of Sustainability, Environment, Water, Population and Communities [SEWPaC] [now the DotE] 2012) came into force in October 2012 and provides guidance on the role of offsets in environmental impact assessments. The EPBC Act Offsets Policy sets out the requirements for offsets to compensate for residual, significant impacts on MNES.

The EPBC Act Offsets Policy relates to all protected matters under the EPBC Act and has five key aims:

- To ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act;
- To provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act;

- To deliver improved environmental outcomes by consistently applying the policy;
- To outline the appropriate nature and scale of offsets and how they are determined; and
- To provide guidance on acceptable delivery mechanisms for offsets.

The EPBC Act Offsets Policy acknowledges that avoidance and mitigation measures are still the primary strategies for managing the potential impact of a proposed action. The focus of an offset is to compensate for any residual, significant impact after avoidance and mitigation steps have been taken.

According to the policy, an offsets package is a "*suite of actions that a proponent undertakes in order to compensate for the residual significant impact of a project"* (SEWPaC 2012). It can comprise a combination of direct offsets and other compensatory measures.

Direct offsets (generally land based offsets) are those actions that provide a measurable conservation gain for an impacted protected matter. Direct offsets are an essential component of a suitable offsets package. A minimum of 90% of the offset requirements for any given impact must be met through direct offsets. Other compensatory measures are those actions that do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter, for example funding for research or educational programs (SEWPaC 2012).

The EPBC Act Offsets Calculator has been developed to provide guidance on the suitability of the proposed offsets and size of offset required. Use of the calculator requires detailed information about the quality of the vegetation in the area to be impacted and in the proposed offset area. Further information on the EPBC Act Offsets Calculator is presented in Section 3.3.

3 PROJECT OFFSET REQUIREMENTS

3.1 OVERVIEW OF IMPACT ASSESSMENT

The EIS Terrestrial Ecology Report and EIS Aquatic Ecology and Stygofauna Report assess the potential impacts of the project on MNES and describe residual, significant impacts that require offsets.

These reports explain that the project has been designed, where possible, to avoid, manage and mitigate adverse impacts on MNES. There is limited flexibility in locating the open cut pit, given that its location is constrained by the location of the coal resource. There are, however, a number of mitigation and management measures proposed to minimise impacts on MNES. These are described in detail in the EIS Terrestrial Ecology Report and EIS Aquatic Ecology and Stygofauna Report and include:

- Implementation of procedures to minimise clearing impacts, including implementation of the following procedures:
  - Delineating the limits of clearing and marking this area clearly on plans and on the ground;
  - Undertaking construction adjacent to drainage lines only when flows have ceased within the drainage lines;
  - Not disturbing vegetation beyond the identified clearing areas; and
  - Undertaking vegetation clearing sequentially and in accordance with the proponent's Permit to Disturb process.
- Pre-clearance surveys, including the presence of a Spotter Catcher to supervise clearing and rescue any injured animals;
- Conservation and management of vegetation within the project site, but beyond the project's clearing footprint. This vegetation will be managed for conservation outcomes;
- Subsidence crack rehabilitation program to repair subsidence cracks. Monitoring will be undertaken to ensure that vegetation in affected areas re-establishes to be consistent with the pre-disturbance vegetation communities;
- The installation of minor remedial drainage earthworks to prevent ponding in subsided areas;
- Progressive rehabilitation of areas cleared for mining purposes; and
- Preparation of management and monitoring plans.

3.2 PROJECT OFFSET REQUIREMENTS

Clearing for the development of the open cut mining area and the construction of mine infrastructure is predicted to give rise to residual, significant impacts on three threatened fauna species listed as MNES under the EPBC Act, and offsets are proposed to be provided for this impact. Table 1 provides a summary of the impacts that require offsets.

Table 1
Proposed Clearing of High Value Habitat for Threatened Fauna Species

Fauna Species	EPBC Act Status	Area in the Project Site (ha)	Area Cleared – Mining and Infrastructure (ha)	Area Cleared – Remedial Drains (ha)
Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*)	Vulnerable	3,440	1,436	3
Black-throated Finch (white-rumped subspecies) (*Poephila cincta cincta*)	Endangered	7,066	4,434	9
Koala (*Phascolarctos cinereus*)	Vulnerable	6,878	3,246	0.4

3.2.1 Squatter Pigeon (southern subspecies)

The Squatter Pigeon (southern subspecies) is listed as Vulnerable under the EPBC Act. This species was recorded from several locations in the project site.

Habitat modelling was undertaken for the Squatter Pigeon (southern subspecies) and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was considered to be potential breeding habitat, and was mapped to include all areas within 1 km of permanent water sources. For the purposes of this modelling, "permanent water" was taken to include areas that were recorded as containing water during the EIS flora and fauna surveys in October 2012 and/or October 2013. October is towards the end of the dry season and shortly before the onset of the wet season in the Desert Uplands Bioregion (in which the project is located) (Figure 1), and therefore any remnant pools that were recorded during the October surveys have been considered in this assessment to be relatively permanent. These remnant pools would, however, dry up during an extended drought, given that they are reliant on ephemeral surface water.

Areas of potential high value habitat are located in the southern part of the project site where lower-lying, flat, grassy woodland areas with nearby water occur and in the northern-central upland areas of the project site where similar habitats are present. Based on the habitat modelling conducted for this species, the project will clear 1,439 ha high value habitat for the Squatter Pigeon (southern subspecies) (i.e. 1,436 ha for mining and infrastructure plus 3 ha for minor remedial drainage earthworks).

3.2.2 Black-throated Finch (white-rumped subspecies)

The Black-throated Finch (white-rumped subspecies) is listed as Endangered under the EPBC Act. This species was recorded from several locations in the southern portion of the project site.

Habitat modelling was undertaken for the Black-throated Finch (white-rumped subspecies) and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was based on the presence of suitable Regional Ecosystems (REs). Suitable REs comprised REs listed in the National Recovery Plan for this species (New South Wales Department of Environment and Climate Change [DECC] and Queensland Parks and Wildlife Service 2007). The following REs are listed in the National Recovery Plan (New South Wales DECC and Queensland Parks and Wildlife Service 2007), and those REs that are present in the project site have been marked with an asterisk (*):

- *RE 10.3.6: *Eucalyptus brownii* open woodland on alluvial plains;
- RE 10.3.9: *Eucalyptus white*i open woodland on sandy alluvial fans;
- RE 10.3.13: *Melaleuca fluviatilis* and/or *Eucalyptus camaldulensis* woodland along watercourses;
- RE 10.3.28: *Eucalyptus melanophloia* or *E. crebra* open woodland on sandy alluvial fans;
- RE 10.4.8: *Dichanthium sericeum* and/or *Astrebla* spp. and/or *Panicum laevinode* tussock grassland on Cainozoic lake beds;
- *RE 10.5.1: *Eucalyptus similis* and/or *Corymbia brachycarpa* and/or *C. setosa* low open woodland to open woodland on sand plains;
- *RE 10.5.5: *Eucalyptus melanophloia* open woodland on sand plains; and
- *RE 10.7.11: *Eucalyptus melanophloia* low open-woodland on ferricrete.

This list was further expanded to include one additional RE (RE 10.3.28), in which this species was recorded during field surveys undertaken for the Carmichael Coal Mine and Rail Project. All vegetation polygons that contained these REs were included, even if the suitable RE only comprised a component of a mixed polygon.

Areas comprising high value habitat for this species are considered to comprise RE types that are suitable for the Black-throated Finch (white-rumped subspecies), and are located within 3 km from permanent water sources. The Black-throated Finch (white-rumped subspecies) has the requirement to drink daily and therefore its foraging range is restricted to the distance that it can fly to water. This species is known to be able to fly up to 3 km daily (Commonwealth Department of the Environment, Water, Heritage and the Arts [DEWHA] 2009) and therefore REs that provide potential habitat for this species and that are within 3 km of permanent water sources have been mapped as potential high value habitat.

The definition of permanent water is provided in the preceding section on the Squatter Pigeon (southern subspecies).

Based on the habitat modelling conducted for this species, the project will clear 4,443 ha of high value habitat for Black-throated Finch (white-rumped subspecies) (i.e. 4,434 ha for mining and infrastructure plus 9 ha for minor remedial drainage earthworks).

3.2.3 Koala

The Koala is listed as Vulnerable under the EPBC Act. This species was recorded from one location in the southern portion of project site.

Habitat modelling was undertaken for the Koala and is detailed in the EIS Terrestrial Ecology Report. High value habitat for this species was based on the presence of primary food trees. Primary food trees were based on the *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (herein referred to as the "draft Koala Guideline") (DotE [2013] and Melzer *et al*. [2014]). Primary food trees within the project site comprised River Red Gums (*Eucalyptus camaldulensis*) and Forest Red Gums (*E. tereticornis*). Melzer *et al*. (2014) identified that River Red Gum and Coolibah (*E. coolabah*) were the most frequently consumed tree species by the Koala in the Desert Upland Bioregion. No Coolibah were recorded within the project site. A 1 km buffer was placed around areas that contained these two tree species and these areas were modelled as high value habitat.

Based on the habitat modelling conducted for this species, the project will clear 3,246 ha high value habitat for the Koala.

3.3 ESTIMATE OF REQUIRED OFFSET AREA

The EPBC Act Offsets Assessment Guide (EPBC Act Offsets Calculator) has been developed to provide guidance on the suitability of the proposed offsets and size of offset required. Use of the calculator requires detailed information about the quality of the vegetation in the proposed offset area, and this information will only be available following a field survey of the offset area. The EPBC Act Offsets Calculator will therefore be used to confirm the size of the required offset once the offset property has been confirmed and arrangements have been made to access the property for the purpose of undertaking field surveys.

This Biodiversity Offset Strategy does, however, identify a number of proposed offset properties and confirms (based on desktop mapping) that these properties have large areas of potential habitat available. The exact size of the offset will, however, only be determined once field survey work has been undertaken and the EPBC Act Offsets Calculator has been used. This future work will be described in an Offset Management Plan (Section 4.4).

3.4 STAGING OF PROPOSED OFFSETS

Offsets are required as a result of impacts due to clearing of land for the construction of mine infrastructure and open cut mining. Open cut mining will be undertaken progressively, over a 30 year period and the associated clearing will also be undertaken progressively. The proponent therefore intends providing offsets in a staged manner, with offsets for infrastructure and the first five years of mining provided initially, and offsets for later years of mining being provided progressively. The Offset Management Plan for the project (Section 4.4) will describe the proposed staging of offsets.

4 DELIVERY OF OFFSETS

4.1 INTRODUCTION

This section describes the approach that has been adopted for providing offsets. The proponent has considered direct offsets and other compensatory methods and these are discussed in Sections 4.2 and 4.3, respectively. Section 4.4 describes the Offset Management Plan that will be prepared for the project, while Section 4.5 describes the mechanisms used to legally secure offsets. The surveys proposed to be undertaken within the proposed offset properties; management of offsets; and monitoring and reporting that will occur within the proposed offset properties is described in Sections 4.6 to 4.8.

4.2 DIRECT OFFSETS

As described in Section 2.1.3, direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter. MacMines is proposing to offset the loss of high value habitat for the species listed in Table 1, through securing and managing direct, land based offsets. Direct, land based offsets can comprise properties owned by the proponent or third party properties.

4.2.1 Properties Owned by the Proponent

The proponent does not currently own any properties that can be used as an offset for the project. Third party properties have therefore been investigated for offsets (Section 4.2.2).

4.2.2 Third Party Properties

The proponent has located a number of properties that contain potential habitat for the species listed in Table 1 and would appear to be suitable offset properties. These properties are described in detail in Section 5.

4.2.3 Galilee Basin Offset Strategy

In selecting properties to use as offsets, and based on the advice of the Queensland Department of Environment and Heritage Protection (EHP), the proponent has favoured properties identified in the *Galilee Basin Offset Strategy* (EHP, 2013) (GBOS). The GBOS was developed by the EHP in August 2013, with the specific purpose of providing a resource to help proponents locate suitable offset properties within strategic conservation hubs and corridors of the Northern Brigalow Belt and Desert Uplands Bioregions.

In developing the GBOS, the EHP identified properties within these two bioregions that form a strategic footprint that contains state significant values and provides landscape connectivity. The GBOS properties were selected to ensure that key areas are protected in order to contribute to the long term conservation outcomes for these bioregions.

As stated in the GBOS, the rationale for the strategic footprint is to:

- Protect the most significant areas of remnant habitats;
- Ensure these areas remain connected;
- Identify areas that could be acquired and managed for the protected area estate (conservation park);
- Identify non-remnant areas which can serve as viable offsets to enhance connectivity or enhance significant remnants as buffers;
- Provide opportunities for landholders to raise income from offset management; and
- Provide streamlined approvals for proponents requiring offsets.

The GBOS properties are classified into three priority categories, as follows:

- *Priority 1 – Conservation hubs:* Areas that contain high levels of conservation value, and have the lowest risk of future development through mining;
- *Priority 2 – Key north-south and east-west linkages:* Key connections or corridors providing important linkages across the bioregions; and
- *Priority 3 – Remaining properties within the strategic footprint:* Properties providing important linkages between the conservation hub areas.

The project is located within the Desert Uplands Bioregion and the GBOS therefore provides a useful basis for identifying potential offset properties for the project. The proponent has identified four potential offset properties for the project, all of which are GBOS properties. These are discussed further in Section 5.

4.3 OTHER COMPENSATORY METHODS

As described in Section 2.1.3, other compensatory measures are those actions that do not directly offset the impacts on the protected matter. The use of other compensatory measures is not currently proposed as part of this offset strategy, given that it is considered feasible to secure direct offsets for the project. However, in the event that the project approval conditions (either state approvals or the EPBC Act approval) require actions that constitute other compensatory measures (e.g. contribution to research programs), this would reduce the amount of direct offsets required. It is noted that the EPBC Act Offset Policy requires that direct offsets comprise at least 90% of the offset package.

4.4 OFFSET MANAGEMENT PLAN

Section 5 describes the potential offset properties that are being investigated by the proponent. It confirms that these properties provide large areas of potential habitat (more than ten times the area that is proposed to be cleared). There is still further work to be undertaken on these properties, including field surveys to characterise the condition of vegetation and identify suitable management measures. Consistent with the approach adopted in recent EPBC Act approvals, this future work will be documented in an Offset Management Plan. The plan will be prepared and submitted to DotE for approval once approval under the EPBC Act has been obtained prior to construction. This plan will include details such as:

- A detailed baseline description of offset areas, including surveys undertaken and condition of habitat for EPBC Act listed threatened species;
- The way in which the offset areas provide connectivity with other habitats and biodiversity corridors;
- Performance and completion criteria for evaluating the management of the offset area, and criteria for triggering remedial action (if necessary);
- A description of the management measures that will be implemented for the protection of EPBC Act listed threatened species and their habitat, including a discussion of how measures proposed are consistent with the measures in relevant conservation advice, recovery plans and threat abatement plans;
- A program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria; and
- A timeline for when actions identified in the Offset Management Plan will be implemented for the offset area (including staging of offsets) and the proposed legal mechanism for securing the offset.

A high level overview of the mechanism to secure offsets; field surveys; management measures; and monitoring and reporting of offset properties is provided in Sections 4.5 to 4.8. Further detail will be provided in the Offset Management Plan.

The offsets for the first stage of the project will be legally secured within two years of DotE's approval of the Offset Management Plan. The proposed timing for subsequent stages will be described in the Offset Management Plan.

4.5 MECHANISM TO LEGALLY SECURE OFFSETS

As a general guide, the best legal mechanisms for protecting land are mechanisms that are intended to be permanent (lasting forever) and are secure (that is, they are difficult to change or alter) (SEWPaC 2012). These two elements are important because they mean that land set aside as an offset will continue to provide a secure benefit to the impacted protected matter.

Legal mechanisms, such as conservation covenants, exist in each state and territory to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis.

All direct offset sites will be secured using one of the legally binding mechanisms that are available in Queensland to ensure the protection of the offset and implementation of the Offset Management Plan. Legally binding mechanisms relevant to Queensland are detailed in the *Environmental Offsets Act 2014* (EO Act) and include an area of land that is either an environmental offset protection area, an area of high nature conservation value under the Queensland *Vegetation Management Act 1999* (VM Act) or another area prescribed under regulation. However, the area is only a legally secured offset area if the area is subject to a delivery or management plan or agreement (however described) to achieve a conservation outcome.

4.6 DETAILED FIELD SURVEYS

Detailed field surveys of the offset areas are required to be undertaken to characterise the quality of the vegetation and habitat, and to identify potential management strategies. These field surveys can only be undertaken once the proponent has entered into formal access agreements with the relevant landowners. The field surveys are proposed to be undertaken once approval under the EPBC Act has been obtained for the project and the field survey results will be documented in the Offset Management Plan (Section 4.4).

Although field surveys have not yet been undertaken, the desktop mapping of potential offset properties has indicated that there are large areas of potential habitat available on the proposed offset properties. In addition, [redacted]. It could therefore be anticipated that the condition of vegetation on these potential offset properties would be similar to the vegetation surveyed as part of the EIS flora and fauna studies. In particular, the vegetation on the potential offset property will have been subject to similar pressures from grazing and bushfire.

The recently published *Guide to Determining Terrestrial Habitat Quality* (EHP 2014a) will be consulted before the potential offset property/properties are surveyed.

4.7 MANAGEMENT OF OFFSETS

As indicated in Section 4.4, a detailed Offset Management Plan will be developed for the proposed offset areas and will be approved by the Minister for DotE. The Offset Management Plan will also require approval under Queensland legislation (Section 7).

Offsets will be managed using methods such as:

- Management/exclusion of grazing to achieve conservation outcomes;
- Exclusion of cultivation;
- Weed management;
- Fire management;
- Feral pest management; and
- Detailed monitoring and reporting.

The provision of fauna watering points will also be considered.

4.8 MONITORING AND REPORTING

Regular monitoring and reporting on the progress of the offset area/s will be provided to the regulator. The Offset Management Plan will describe the proposed monitoring and reporting program. It is anticipated that biennial photo point monitoring will be conducted. Weed monitoring will be conducted annually by the land manager.

5 POTENTIAL OFFSET PROPERTIES

5.1 INTRODUCTION

The proponent has identified four potential properties for the provision of offsets for the project ("potential offset properties"). The identified properties are shown on Figure 1. The potential offset properties:

- Are located within the Desert Uplands Bioregion (the same bioregion as the project);
- Are GBOS properties (Figure 1). [redacted];
- Are mostly dominated by remnant vegetation (based on published Queensland government RE mapping [Queensland Herbarium 2014]); and

- Are identified through the EPBC Act Protected Matters Search Tool as being in areas where Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala habitat is known to occur (Appendix A).

The areas of habitat available on these properties are well in excess of the project's anticipated offset requirements. The anticipated offset requirements are an approximation of the offsets that will be required for the project and are based on the offset requirements for recent project approvals. As a result, the majority of properties will individually fulfil all of the offset requirement for the project. The proponent intends making use of a single property or, potentially, two properties to provide offsets for the project. The potential offset properties that will be selected for the provision of offsets will be confirmed when the Offset Management Plan is prepared.

As noted in the property descriptions (Sections 5.3 to 5.6), there are no production permits such as MLs or Mining Lease Applications (MLAs) on any of the potential offset properties. [redacted]

Table 2 provides a summary of the potential offset properties.

Table 2
Areas of Potential Habitat for Threatened Fauna Species within the Potential Offset Properties

Property						GBOS Priority	Potential Habitat (ha)		
ID	Lot	Plan	Name	Size (ha)	Owner / Lessee		Squatter Pigeon	Black-throated Finch	Koala
A	[redacted]						66,645	65,560	14,900
B	[redacted]						41,087	40,680	5,290
C	[redacted]						55,420	53,590	26,300
D	[redacted]						25,805	25,750	7,270

* [redacted].

5.2 HABITAT MODELLING METHODOLOGY

The habitat modelling that was undertaken for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala within the project site is described in Section 3.2. As described in Section 3.2, this habitat modelling was based on RE types as well as habitat features used by these species.

The habitat modelling of the potential offset properties has been based on RE types. The same REs that were used to map high value habitat within the project site have also been used to map potential habitat for these species within the potential offset properties. As per the habitat modelling that was conducted for the project site, all mixed polygons containing suitable REs were included, even if the suitable REs only comprised a component of a mixed polygon. Appendix B details the REs that comprise potential habitat for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala on each property. The potential offset properties will be surveyed for specific habitat features such as permanent water sources when field surveys are undertaken (Section 4.6).

5.3 PROPERTY A – [redacted]

5.3.1 Property Overview

[redacted] property located [redacted] The primary land use is grazing with several reservoirs/dams located on the property. Two un-named roads are located within the property (Figure 2).

The property is [redacted].

The property is not covered by any production permits such as MLs, MLAs or petroleum licences (PLs). However, parts of the property are overlain by Exploration Permits for Petroleum (EPM) and several Exploration Permits for Coal (EPC).

5.3.2 Offset Potential

[redacted] has a high offset potential, as it contains:

- 66,645 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 3);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 65,560 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 4);
- The EPBC Act Protected Matters search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 14,900 ha of potential Koala habitat (Figure 5);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A); and

- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the property mapped as high in accordance with the Department of Agriculture and Fisheries (DAF) mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.3.3 Other Biodiversity Values

[redacted] runs along the [redacted] part of the property (Figure 2). One [redacted], namely [redacted], is also present within the [redacted] part of the property (Figure 2). There are numerous smaller ephemeral drainage lines traversing the property. Several government mapped wetlands occur on the property (Figure 2).

5.3.4 Vegetation Communities

The entire property ([redacted] ha) comprises remnant vegetation (Figure 6). The dominant remnant vegetation within the property is Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains.

The other main remnant vegetation communities on the property include:

- Least Concern RE 10.3.10x1 *Corymbia plana* on lake dune;
- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains;
- Least Concern RE 10.7.7a *Melaleuca tamariscina* and/or *Acacia leptostachya* and/or *Thryptomene parviflora* and sometimes *Calytrix microcoma* open shrubland to shrubland on feericrete;
- Least Concern RE 10.10.1b *Acacia catenulata* low woodland on sandstone ranges; and
- Least Concern RE 10.10.5a *Corymbia trachyphloia* with *C. lamprophylla* open woodland on sandstone ranges.

5.4 PROPERTY B – [redacted]

5.4.1 Property Overview

[redacted] property located [redacted]. The primary land use is grazing with several reservoirs/dams located on the property. One [redacted], [redacted], is located within the property (Figure 7).

The property is [redacted].

The property is not covered by any production permits such as MLs, MLAs or PLs. However, the property is overlain by several exploration permits for coal.

5.4.2 Offset Potential

[redacted] has a high offset potential, as it contains:

- 41,087 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 8);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 40,680 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 9);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 5,290 ha of potential Koala habitat (Figure 10);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A); and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the property mapped as high in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.4.3 Other Biodiversity Values

No significant waterways traverse the property. There are, however, numerous smaller ephemeral drainage lines traversing the property. Several government mapped wetlands occur on the property (Figure 7).

5.4.4 Vegetation Communities

The entire property ([redacted] ha) comprises remnant vegetation (Figure 11). The dominant remnant vegetation within the property is Least Concern RE 10.5.1b *Corymbia brachycarpa* open woodland on sand plains.

The other main remnant vegetation communities on the property include:

- Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains;

- Least Concern RE 10.7.3b *Acacia shirleyi* woodland on scarps;
- Least Concern RE 10.7.3d *Acacia shirleyi* woodland on red soil above scarps; and
- Least Concern RE 10.7.7a *Melaleuca tamariscina* and/or *Acacia leptostachya* and/or *Thryptomene parviflora* and sometimes *Calytrix microcoma* open shrubland to shrubland on feericrete.

5.5 PROPERTY C – [redacted]

5.5.1 Property Overview

[redacted] property that [redacted]. This property overview describes the section of the property that is being proposed for offsets [redacted]. This section of the property comprises [redacted] ha. The primary land use is grazing with several reservoirs/dams located on the property. No major roads traverse the property (Figure 12).

The property is [redacted].

The section of the [redacted] property proposed for offsets is not covered by any production permits such as MLs, MLAs or PLs. However, the entire property is overlain by several EPCs.

5.5.2 Offset Potential

The section of the [redacted] property proposed for offsets has a high offset potential, as it contains:

- 55,420 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 13);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 53,590 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 14);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 26,300 ha of potential Koala habitat (Figure 15);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A);
- Nearby records of the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala, [redacted];

- 10,080 ha of Of Concern RE 10.10.3 *Eucalyptus drepanophylla* open woodland on sandstone ranges; and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the section of the [redacted] property proposed for offsets mapped as major in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.5.3 Other Biodiversity Values

[redacted] traverse the section of the [redacted] property proposed for offsets, namely [redacted]). There are numerous smaller ephemeral drainage lines traversing the section of the [redacted] property proposed for offsets. Several government mapped wetlands occur on the section of the [redacted] property proposed for offsets (Figure 12).

5.5.4 Vegetation Communities

The section of the [redacted] property proposed for offsets contains [redacted] ha of remnant vegetation (Figure 16). The dominant remnant vegetation within the section of the [redacted] property proposed for offsets is Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains.

The other main remnant vegetation communities on the section of the [redacted] property proposed for offsets include:

- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains;
- Of Concern RE 10.10.3 *Eucalyptus drepanophylla* open woodland on sandstone ranges;
- Endangered RE 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains (i.e. endangered Brigalow TEC);
- Of Concern RE 11.4.6 *Acacia cambagei* woodland on Cainozoic clay plains; and
- Endangered RE 11.4.8 *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (i.e. endangered Brigalow TEC).

The areas of non-remnant vegetation, classified as category X on the Regulated Vegetation Management Map for the section of the [redacted], are found mostly in the [redacted] areas of the property (Figure 16).

5.6 PROPERTY D – [redacted]

5.6.1 Property Overview

[redacted] property [redacted] (Figures 1 and 17). This property overview describes the section of the property that is being proposed for offsets ([redacted]). This section of the property comprises [redacted] ha. The primary land use is grazing with several reservoirs/dams located on the property (Figure 17). No major roads traverse the property.

The property is [redacted].

The section of the [redacted] property proposed for offsets is not covered by any production permits such as MLs, MLAs or PLs. However, the property is overlain by several EPCs.

5.6.2 Offset Potential

The section of the [redacted] property proposed for offsets has a high offset potential, as it contains:

- 25,805 ha of potential Squatter Pigeon (southern subspecies) habitat (Figure 18);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Squatter Pigeon (southern subspecies) or Squatter Pigeon (southern subspecies) habitat is known to occur within the area (Appendix A);
- 25,750 ha of potential Black-throated Finch (white-rumped subspecies) habitat (Figure 19);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Black-throated Finch (white-rumped subspecies) or Black-throated Finch (white-rumped subspecies) habitat is known to occur within the area (Appendix A);
- 7,270 ha of potential Koala habitat (Figure 20);
- The EPBC Act Protected Matters Search Tool report for the property indicates that the Koala or Koala habitat is known to occur within the area (Appendix A);
- Nearby records of the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala, [redacted]; and
- Watercourses mapped by the Queensland government on the vegetation management watercourse map, comprising mostly watercourses mapped as moderate as well as one watercourse within the section of the [redacted] property proposed for offsets mapped as major in accordance with the DAF mapping which classifies all waterways in Queensland in relation to the level of risk that waterway barrier works could pose to fish movement and fish communities (DAF 2014).

5.6.3 Other Biodiversity Values

[redacted] and [redacted] traverse the [redacted] of the section of the [redacted] property proposed for offsets and [redacted] runs along a section of the [redacted] (Figure 17). There are numerous smaller ephemeral drainage lines traversing the section of the [redacted] property proposed for offsets. Several government mapped wetlands occur on the section of the [redacted] property proposed for offsets (Figure 17).

5.6.4 Vegetation Communities

The section of the [redacted] property proposed for offsets contains [redacted] ha of remnant vegetation (Figure 21). The dominant remnant vegetation within the section of the [redacted] property proposed for offsets is Least Concern RE 10.3.6a *Eucalyptus brownii* open woodland on alluvial plains.

The other main remnant vegetation communities on the section of the [redacted] property proposed for offsets include:

- Least Concern RE 10.3.28a *Eucalyptus melanophloia* open woodland on sandy alluvial fans;
- Least Concern RE 10.5.1a *Eucalyptus similis* open woodland on sand plains;
- Least Concern RE 10.5.4b *Eucalyptus crebra* open woodland on sand plains;
- Least Concern RE 10.5.5a *Eucalyptus melanophloia* open woodland on sand plains; and
- Of Concern RE 11.4.6 *Acacia cambagei* woodland on Cainozoic clay plains.

The areas of non-remnant vegetation, classified as category X on the Regulated Vegetation Management Map for the section of the [redacted] property, are found mostly in the [redacted] and [redacted] areas of the property (Figure 21).

6 CONCLUSION

The proponent has identified four properties with high offset potential given that they contain large areas of potential habitat for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala.

A total of 188,957 ha of potential habitat for the Squatter Pigeon (southern subspecies) has been identified from the four potential offsets properties, against the 1,439 ha of high value habitat for this species that is proposed to be cleared for the project.

A total of 185,580 ha of potential habitat for the Black-throated Finch (white-rumped subspecies) has been identified from the four potential offsets properties, against the 4,443 ha of high value habitat for this species that is proposed to be cleared for the project.

A total of 53,760 ha of potential habitat for the Koala has been identified from the four potential offsets properties, against the 3,246 ha of high value habitat for this species that is proposed to be cleared for the project.

All potential offset properties have been identified in the GBOS.

Once EPBC approval has been obtained for the project, the proponent will enter into formal discussions with the owners of the potential offset properties in order to obtain agreement to undertake field surveys. This will enable the Offset Management Plan to be prepared.

The Offset Management Plan will include details of the management methods that will be put in place for the offset properties to achieve appropriate conservation outcomes, such as the management of grazing pressures, pests, weeds and fire. The Offset Management Plan will also describe the agreed monitoring and reporting procedures for the offset properties to ensure regulatory compliance.

PART B
OFFSETS UNDER QUEENSLAND LEGISLATION

7 LEGISLATIVE FRAMEWORK

7.1 QUEENSLAND GOVERNMENT ENVIRONMENTAL OFFSETS POLICY

7.1.1 Overview

Queensland recently passed the EO Act along with the *Environmental Offsets Regulation 2014* (EO Regulation). The *Queensland Environmental Offsets Policy* (QEOP) (EHP 2014b) came into force on 1 July 2014 and was subsequently updated on 19 December 2014. The EO Act, EO Regulation and QEOP comprise the Queensland Environmental Offsets Framework. According to this framework, it is necessary to provide offsets for any significant, residual impacts on MSES. These are described in detail in Sections 7.1.2 and 7.1.3.

7.1.2 Queensland Environmental Offsets Act 2014 and Environmental Offsets Regulation 2014

Under section 14 of the EO Act, offsets are required if the prescribed activity will, or is likely to have a significant, residual impact on the prescribed environment. Significant residual impacts are defined under section 8 of the EO Act as follows:

> *(1) Generally, a **significant residual impact** is an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that—*
>
> *(a) remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site mitigation measures for the prescribed activity; and*
>
> *(b) is, or will or is likely to be, significant*

The EO Regulation prescribes a number of MSES that are potentially relevant to the project. These include:

- Regulated vegetation including:
  - Endangered or of concern REs;
  - REs that intersect wetlands shown on the vegetation management wetlands map;
  - Essential habitat as shown on the essential habitat map; and
  - REs that are within a defined distance from the banks of a watercourse as shown on the vegetation management watercourse map.
- Connectivity areas that contain remnant vegetation;

- Wetlands and watercourses including:
  - Wetlands in wetland protection areas or with a high ecological significance; and
  - A wetland or watercourse in high ecological value waters.
- A designated precinct in a strategic environmental area;
- Protected wildlife habitats including:
  - High risk areas on the flora survey trigger maps that contain endangered or vulnerable plants;
  - Areas that contain endangered or vulnerable plants that are not shown as high risk areas on the flora survey trigger map;
  - Non-juvenile koala habitat trees in areas within the South East Queensland Koala Conservation State Planning Regulatory Provisions; and
  - Habitat for an animal that is endangered or vulnerable or the following special least concern species: Koala, Short-beaked Echidna and Platypus.
- Protected areas (such as National Parks);
- Highly protected zones of State marine parks;
- Fish habitat areas;
- Waterways providing for fish passage;
- Marine plants; and
- Legally secured offset areas.

Offsets are only required in the event that significant, residual impacts are predicted. The EHP published a guideline to further define the concept of a significant residual impact for individual MSES in December 2014. This guideline was used in the assessment of whether the project would have a significant residual impact on any MSES. The offset requirements for the project are discussed in Section 3.

7.1.3 Queensland Environmental Offsets Policy

The QEOP states that an environmental offset must meet the following seven offset principles:

1. Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy.
2. Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact.
3. Offsets must achieve a *conservation outcome* that achieves an equivalent environmental outcome.
4. Offsets must provide environmental values as similar as possible to those being lost.

5. Offset provision must minimise the time-lag between the impact and delivery of the offset.
6. Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values.
7. Where legal security is required, offsets must be legally secured for the duration of the impact on the *prescribed environmental matter*.

The Queensland Environmental Offsets Framework allows for offsets to take the form of one or a combination of the following three delivery options:

1 Financial settlement offset – whereby offset cost is determined in accordance with the EHP Financial Settlement Offset Calculation Methodology;

2 Proponent-driven offset – a proponent-prepared offset package primarily consisting of a:

- Land-based offset – Land-based offsets are to meet requirements of the EHP Land-based Offsets Multiplier Calculator. Habitat quality for impact and offset sites is to be determined via rapid assessment (habitat quality factors pre-determined by the EHP) or via alternative habitat factor scores through the undertaking of a habitat quality analysis in accordance with the EHP (2014a) *Guide to Determining Terrestrial Habitat Quality*; and
- Direct Benefit Management Plan – an offset which offers conservation gains via priority management actions that address threats to the prescribed environmental matter that is subject to the given offset condition; and

3 Combination of financial settlement and proponent-driven offset.

The QEOP has identified Strategic Offset Investment Corridors which are areas where land may be suitable for management activities that provide a benefit to environmental matters likely to be impacted by development.

8 PROJECT OFFSET REQUIREMENTS

8.1 IMPACT ASSESSMENT

The project has been designed, where possible, to avoid, manage and mitigate adverse impacts on MSES. Mitigation and management measures proposed for the project are described in Section 3.1.

Appendix C contains a full list of MSES as per Schedule 2 of the EO Regulation. It describes whether the MSES occur on the project site, and the potential for the project to give rise to significant, residual impacts on the MSES. Appendix C concludes that there is a potential that the project will give rise to a significant, residual impact on the following MSES:

- Of concern vegetation. Clearing of approximately 24 ha of RE 10.10.3 *Eucalyptus drepanophylla* open-woodland on sandstone ranges for the purposes of open cut mining and the construction of mine infrastructure.
- Vegetation along ephemeral drainage lines. Clearing of approximately 359 ha of vegetation comprising 23 REs as per the vegetation management watercourse map for the purposes of open cut mining and the construction of mine infrastructure.
- The Squatter Pigeon (southern subspecies). Approximately 1,436 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 3 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).
- The Black-throated Finch (white-rumped subspecies). Approximately 4,434 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 9 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).
- The Koala. Approximately 3,246 ha of high value habitat for this species is proposed to be cleared for the purposes of open cut mining and the construction of mine infrastructure. A further 0.4 ha of high value habitat may be cleared for the construction of minor remedial drainage earthworks in subsided areas (although it is noted that the exact location and design of drains is still to be confirmed).

The three fauna species listed above (i.e. Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and Koala) are also listed under the EPBC Act, and are considered further in Part A of this Biodiversity Offset Strategy. In addition, Part A of this Biodiversity Offset Strategy also lists the RE types present within the proposed offset

properties (including the presence of RE 10.10.3) as well as watercourses mapped by the Queensland government on the vegetation management watercourse map. The QEOP were used in undertaking the assessment of whether the potential impact of the project on these MSES is considered to be a significant, residual impact (and hence that offsets are required).

The offset requirements for MSES that are not listed as MNES (i.e. clearing of RE 10.10.3 and clearing of vegetation as per the vegetation management watercourse map) will be fulfilled through the provision of offsets that are required for the threatened species described in Part A. In particular:

- One of the offset properties described in Section 5.5 contains RE 10.10.3; and
- All the properties contain watercourses as mapped on the vegetation management watercourses map (and large areas of remnant vegetation surrounding watercourses).

The EHP has mapped a HES wetland as occurring in the northern portion of the project site (described in detail in the EIS Aquatic Ecology and Stygofauna Report). It will be necessary to provide offsets under the EO Regulation in the event of the project giving rise to significant, residual impacts on the wetland. The need for offsets will be determined prior to any subsidence of the wetland and based on detailed mine planning and subsidence predictions for the area. Even minor changes in the existing mine plan could significantly alter the nature and extent of currently predicted impacts on the wetland. Further detail will be provided in the Offset Management Plan (Section 4.4).

In conclusion, the offsets that have been identified for the project, at this stage, are for significant, residual impacts on of concern vegetation; vegetation along ephemeral drainage lines; and three threatened fauna species (Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and the Koala). The three fauna species are all listed under the EPBC Act, in addition to being MSES. Offsets are, therefore, required to be provided in accordance with the EPBC Act Offset Policy (SEWPaC 2012). Section 15 of the EO Act removes the ability for the State government to impose an offset condition in relation to a *prescribed activity*, if a Commonwealth decision has already been made in relation to the same, or substantially the same activity, *prescribed environmental matter* and area of impact. EPBC Act offsets are discussed in Part A.

9 REFERENCES

DAF (2014) *Queensland Waterways for Waterway Barrier Works.*

DECC (NSW), and Queensland Parks and Wildlife Service (2007) *National recovery plan for the black-throated finch southern subspecies Poephila cincta cincta*.

DEWHA (2009) *Significant Impact Guidelines for the endangered Black-throated Finch (southern) (Poephila cincta cincta).*

DotE (2013) *Draft EPBC Act Referral guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory*.

EHP (2013) *Galilee Basin Offsets Strategy*.

EHP (2014a) *Guide to Determining Terrestrial Habitat Quality. A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy*. Version 1.1, December 2014.

EHP (2014b) *Queensland Environmental Offsets Policy (Version 1.1) December 2014.*

Environmental Offsets Act 2014 (Qld).

Environmental Offsets Regulation 2014 (Qld).

Environment Protection and Biodiversity Conservation Act 1999 (Cth).

Environmental Protection Regulation 2008 (Qld).

Environmental Protection (Water) Policy 2009 (Qld).

Fisheries Act 1994 (Qld).

Land Act 1994 (Qld).

Marine Parks Act 2004 (Qld).

Melzer, A., Cristescu, R., Ellis, W., FizGibbon, S. and Manno, G. (2014) The habitat and diet of koalas (*Phascolarctos cinereus*) in Queensland. *Australian Mammalogy* 36: 189-199.

Nature Conservation Act 1992 (Qld).

Nature Conservation (Wildlife Management) Regulation 2006 (Qld).

Queensland Herbarium (2014) *Regional Ecosystem Description Database (REDD). Version 8.1 (November 2014) (DSITIA: Brisbane).*

SEWPAC (2012) *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Sustainable Planning Act 2009 (Qld).

Vegetation Management Act 1999 (Qld).

Wild Rivers Act 2005 (Qld).

* * *

for
HANSEN BAILEY





Laura Knowles
Principal Environmental Scientist

Peter Hansen
Director

FIGURES

Figures 1 – 21 have been redacted as they contain commercial in confidence information

APPENDIX A

EPBC Act Protected Matters Search Tool Results

Appendix A has been redacted as it contains commercial in confidence information

APPENDIX B

Regional Ecosystems used to Map Fauna Species Potential Habitat within the Potential Offset Properties

Table B.1
Regional Ecosystems used to Map Fauna Species Potential Habitat

Regional Ecosystem	Squatter Pigeon (southern subspecies)	Black-throated Finch (white-rumped subspecies)	Koala
RE 10.3.6	✓	✓	-
RE 10.3.9	✓	✓	-
RE 10.3.13	✓	✓	✓
RE 10.3.14	✓	-	✓
RE 10.3.15	✓	-	✓
RE 10.3.17b	✓	-	✓
RE 10.4.8	✓	✓	-
RE 10.5.1	✓	✓	-
RE 10.5.5	✓	✓	-
RE 10.7.7	✓	✓	-
RE 10.7.11	✓	✓	-
RE 10.3.28	✓	✓	-

APPENDIX C

Matters of State Environmental Significance

Table C.1
Matters of State Environmental Significance in the Project Site

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Regulated Vegetation				
The prescribed regional ecosystems that are endangered regional ecosystems comprise a MSES.	**Endangered regional ecosystem** means a RE declared to be an endangered regional ecosystem under section 22LA of the VM Act.	No Endangered REs listed under the VM Act have been recorded or are likely to occur within the project site.	Not applicable.	Not applicable.
The prescribed regional ecosystems that are of concern regional ecosystems comprise a MSES.	**Of concern regional ecosystem** means a RE declared to be an of concern regional ecosystem under section 22LB of the VM Act.	RE 10.10.3: *Eucalyptus drepanophylla* open-woodland on sandstone ranges is an open Eucalyptus woodland, which is listed as Of Concern under the VM Act. Approximately 271 ha of RE 10.10.3 is found on the project site.	Approximately 24 ha of RE 10.10.3 will be cleared for the purposes of open cut mining and the construction of mine infrastructure. No additional areas would be cleared for the construction of minor remedial drainage earthworks in subsided areas. There will also be disturbance of this community as a result of the subsidence crack rehabilitation program, but this disturbance is small scale and	In accordance with the EHP's (2014b) *Significant Residual Impacts Guideline*, the project will result in a significant residual impact on RE 10.10.3 within the Study Area. One potential offset property [redacted], contains 10,080 ha of RE 10.10.3. This property is described in detail in Section 5.5.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
			temporary and would not give rise to significant, residual impacts.	
A prescribed regional ecosystem is a MSES if it is— • a regional ecosystem that intersects with an area shown as a wetland on the vegetation management wetlands map (to the extent of the intersection); or • an area of essential habitat on the essential habitat map for an animal that is endangered wildlife or vulnerable wildlife or a plant that is endangered wildlife or vulnerable wildlife.	The **regulated vegetation management map** is the map certified by the chief executive as the regulated vegetation management map for a part of the State and showing the vegetation category areas for the part under section 20AA of the VM Act.	One area within the project site is shown on the regulated vegetation management map that intersects with an area shown as a wetland on the vegetation management wetlands map. This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.	This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.	This area has also been mapped by the EHP as a HES wetland and is discussed in detail below.
	The **essential habitat map** is a map certified by the chief executive as the essential habitat map for the State and showing, for the State, areas the chief executive reasonably believes are areas of essential habitat for protected wildlife under section 20AC(1) of the VM Act.	No essential habitat as per the EHP's essential habitat map has been mapped within the project site.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
A prescribed regional ecosystem is a MSES to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse. However, to the extent a prescribed regional ecosystem is located within an urban area, it is not a MSES.	**Defined distance** for a regional ecosystem, means a distance identified in the environmental offsets policy as the relevant distance from the defining banks of a relevant watercourse. **Relevant watercourse** means a watercourse identified on the vegetation management watercourse map. The **vegetation management watercourse map** is the map certified by the chief executive as the vegetation management watercourse map showing particular watercourses for the State under section 20AB of the VM Act.	Relevant watercourses as per the vegetation management watercourse map have been assessed within the project site and are described in the EIS Terrestrial Ecology Report. Defined distances for the REs on the banks of the watercourses have been applied.	Approximately 359 ha of vegetation comprising 23 REs as per the vegetation management watercourse map will be cleared as a result of the project.	In accordance with the EHP's (2014b) *Significant Residual Impacts Guideline*, offsets are required if more than 2 ha sparse vegetation is cleared. The project will therefore have a significant residual impact on vegetation along drainage lines. As described in the QEOP, offsets must be of the same broad vegetation group as the impacted RE, within the same bioregion and associated with a watercourse. The offsets that will be provided for other MSES (i.e. the Squatter Pigeon [southern subspecies], Black-throated Finch [white-rumped subspecies] and the Koala) will also address any significant, residual impacts on this MSES, given that the offsets involve securing and conserving large areas of woodland vegetation. In addition, the potential offset areas contain watercourses as mapped on the vegetation management watercourses map (and

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
				large areas of remnant vegetation surrounding watercourses). The potential offset properties proposed for the project are described in detail in Section 5.
Connectivity Areas				
This section applies to a prescribed regional ecosystem: • to the extent the ecosystem contains remnant vegetation; and • if the ecosystem contains an area of land that is required for ecosystem functioning (a connectivity area). The prescribed regional ecosystem is a MSES if the administering agency is satisfied, having had regard to criteria in the environmental offsets policy about connectivity areas, that: • the connectivity area is of sufficient size or	Remnant vegetation means vegetation forming the predominant canopy of the vegetation: • covering more than 50% of the undisturbed predominant canopy; and • averaging more than 70% of the vegetation's undisturbed height; and • composed of species characteristic of the vegetation's undisturbed predominant canopy.	The entire project site has been mapped as remnant vegetation. Biodiversity Planning Assessment mapping for the project site indicates that the entire project site is classified as State Biodiversity Significance, and that the majority of the project site, with the exception of the north-east and north-west corners, is considered to be within a State Biodiversity Corridor.	The project will not have a significant, residual impact on connectivity areas given the management of remaining vegetation on-site and the large gap (which contains remnant vegetation) that will remain between the proposed Carmichael Coal Mine site and the project. In addition, EHP's LFC Tool determined that the project would not result in a significant residual impact on local or regional connectivity and therefore offsets for connectivity are not required for the project.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
configured in a way that maintains ecosystem functioning; and • the prescribed regional ecosystem will remain despite a threatening process within the meaning of the *Nature Conservation Act 1992.* However, to the extent a prescribed regional ecosystem is located within an urban area, it is not a MSES.				
Wetlands and watercourses				
Each of the following matters is a MSES— • a wetland— -in a wetland protection area; or • of high ecological significance shown on the Map of referable wetlands;	**Wetland** means an area shown as a wetland on the Map of referable wetlands. **Wetland protection area** means an area shown as a wetland protection area on the Map of referable wetlands. **Map of referable wetlands** means the 'Map of referable wetlands', a document approved by the chief executive on 4 November 2011 and published by the	The Map of Referable Wetlands shows that there is one HES wetland (with an associated 500 m trigger area) (termed the northern seasonal wetland) located in the north of the project site.	The northern seasonal wetland will not be cleared as a result of the project. However, the area will be impacted as a result of subsidence. The potential impacts of the project on the northern seasonal wetland are described in detail in the EIS Aquatic Ecology and Stygofauna Report.	Subsidence impacts on the northern seasonal wetland may cause a significant, residual impact to this HES wetland. The EHP is currently preparing guidance material to assist proponents to determine whether impacts are considered to be significant (and hence require offsets). Any need for offsets will be determined after further survey and assessment work has been completed.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	department, as amended from time to time by the chief executive under section 144D of the *Environmental Protection Regulation 2008*.		Further survey and assessment work will be undertaken based on the detailed mine plan. This future work will determine whether the project will give rise to a significant, residual impact and hence whether offsets are required.	
• a wetland or watercourse in high ecological value waters.	**Wetland** means an area shown as a wetland on the Map of referable wetlands. **Watercourse** is defined in schedule 12, part 1, section 8 of the *Environmental Protection Regulation 2008* and is: • a river, creek or stream in which water flows permanently or intermittently— -in a natural channel, whether artificially improved or not; or -in an artificial channel that has	No wetlands or watercourses in high ecological value waters have been recorded within the project site.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	changed the course of the watercourse. • A watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water. **High ecological value waters** means waters in which the biological integrity of the water is effectively unmodified or highly valued under schedule 2 of the *Environmental Protection (Water) Policy 2009*.			
High preservation areas of wild river areas				
A part of a wild river area described as a high preservation area in the wild river declaration for the area is a matter of State environmental significance. However, to the extent a wild river area described as a high preservation area is in an urban area, it is not a matter of State environmental significance.	**Wild river area**s see the *Wild Rivers Act 2005*. **Wild river declaration** see the *Wild Rivers Act 2005.*	The project site does not contain any high preservation areas in a wild river declaration.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Protected Wildlife Habitat				
An area that is shown as a high risk area on the flora survey trigger map and that contains plants that are endangered wildlife or vulnerable wildlife is a MSES.	**Flora survey trigger map** means the map held by the EHP under section 247 of the *Nature Conservation (Wildlife Management) Regulation 2006*.	The flora survey trigger map has not identified any high risk areas that contain plants that are endangered wildlife or vulnerable wildlife within the project site.	Not applicable.	Not applicable.
An area that is not shown as a high risk area on the flora survey trigger map, to the extent that the area contains plants that are endangered wildlife or vulnerable wildlife is a MSES.	**Flora survey trigger map** means the map held by the EHP under section 247 of the *Nature Conservation (Wildlife Management) Regulation 2006*.	No threatened flora species listed as Endangered or Vulnerable under the NC Act have been recorded or are likely to occur within the project site.	Not applicable.	Not applicable.
A non-juvenile koala habitat tree located in an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory	**Koala habitat tree** means a tree of any of the following genera— • Angophora; • Corymbia; • Eucalyptus; • Lophostemon; • Melaleuca. **Non-juvenile koala habitat tree** means a koala habitat tree that— • is more than 4 m high; or	No areas within the project site have been mapped as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory Provisions.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
Provisions is a MSES.	• has a trunk with a circumference of more than 31.5 cm at 1.3 m above the ground. **South East Queensland Koala Conservation State Planning Regulatory Provisions** means the document called the '*South East Queensland Koala Conservation State Planning Regulatory Provisions'*, dated May 2010 and published on the website of the department in which the *Sustainable Planning Act 2009* is administered.			
A habitat for an animal that is endangered wildlife or vulnerable wildlife or a special least concern animal is a MSES.	Examples of habitat include an area of land used by an animal for foraging, roosting, nesting or breeding **Special least concern animal** means the following animals that are least concern wildlife under the NC Act: • a Koala (Phascolarctos cinereus); • an echidna (Tachyglossus	Four fauna species listed as threatened or Special Least Concern under the NC Act have been recorded within the project site, namely: • Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*) (listed as Vulnerable under the NC Act); • Black-throated Finch (white-rumped subspecies) (*Poephila cincta cincta*) (listed as Endangered	Please refer to Part A for a discussion of the Squatter Pigeon (southern subspecies); Black-throated Finch (white-rumped subspecies); and Koala, given that these species are also MNES and are addressed in this section. The Short-beaked Echidna has been recorded within the project site. However, as assessed in the EIS Terrestrial	Offsets are required under the EO Act for the Squatter Pigeon (southern subspecies), Black-throated Finch (white-rumped subspecies) and Koala. The potential offset properties selected to offset any significant residual impacts on these species are discussed in Section 5.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	aculeatus); • a platypus (Ornithorhynchus anatinus).	under the NC Act); • Koala (*Phascolarctos cinereus*) (listed as Special Least Concern under the NC Act); and • Short-beaked Echidna (*Tachyglossus aculeatus*) (listed as Special Least Concern under the NC Act).	Ecology Report, the project is unlikely to have a significant residual impact on this species and offsets are therefore not proposed for this species.	
Protected Areas				
A protected area is a MSES.	A coordinated conservation area under the *Nature Conservation Act 1992* is excluded by the *Environmental Offsets Act 2014*, definition protected area.	No protected areas are within the project site.	Not applicable.	Not applicable.
Highly protected zones of State marine parks				
A highly protected area of a relevant Queensland marine park is a MSES.	**Highly protected area** means: • a zone classified, under the *Marine Parks Act 2004*, as a conservation park zone, marine national park zone or preservation zone; or • another area prescribed	No highly protected areas of a relevant Queensland marine park are within the project site. The project site is located approximately 280 km from the Queensland coast.	Not applicable.	Not applicable.

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
	under a regulation or zoning plan, under the *Marine Parks Act 2004*, as a highly protected area. **Relevant Queensland marine park** means any of the following marine parks declared under the *Marine Parks Act 2004:* • the Great Barrier Reef Coast Marine Park; • the Moreton Bay Marine Park; • the Great Sandy Marine Park. **Zone**, for a marine park, see the *Marine Parks Act 2004*, schedule.			
Fish habitat areas				
An area declared under the *Fisheries Act 1994* to be a fish habitat area is a MSES.	The *Fisheries Act 1994* details areas to be declared as a fish habitat area.	No declaration of fish habitat has been made for the project site.	Not applicable.	Not applicable.
Waterway providing for fish passage				
Any part of a waterway providing for passage of fish and not located within an urban area is a matter of	**Fish** means fish regulated under the *Fisheries Act 1994*. **Passage**, for fish, means the	The majority of waterways in the project site are mapped as being green (low risk of impact) or amber (moderate	Not applicable.	Not applicable.

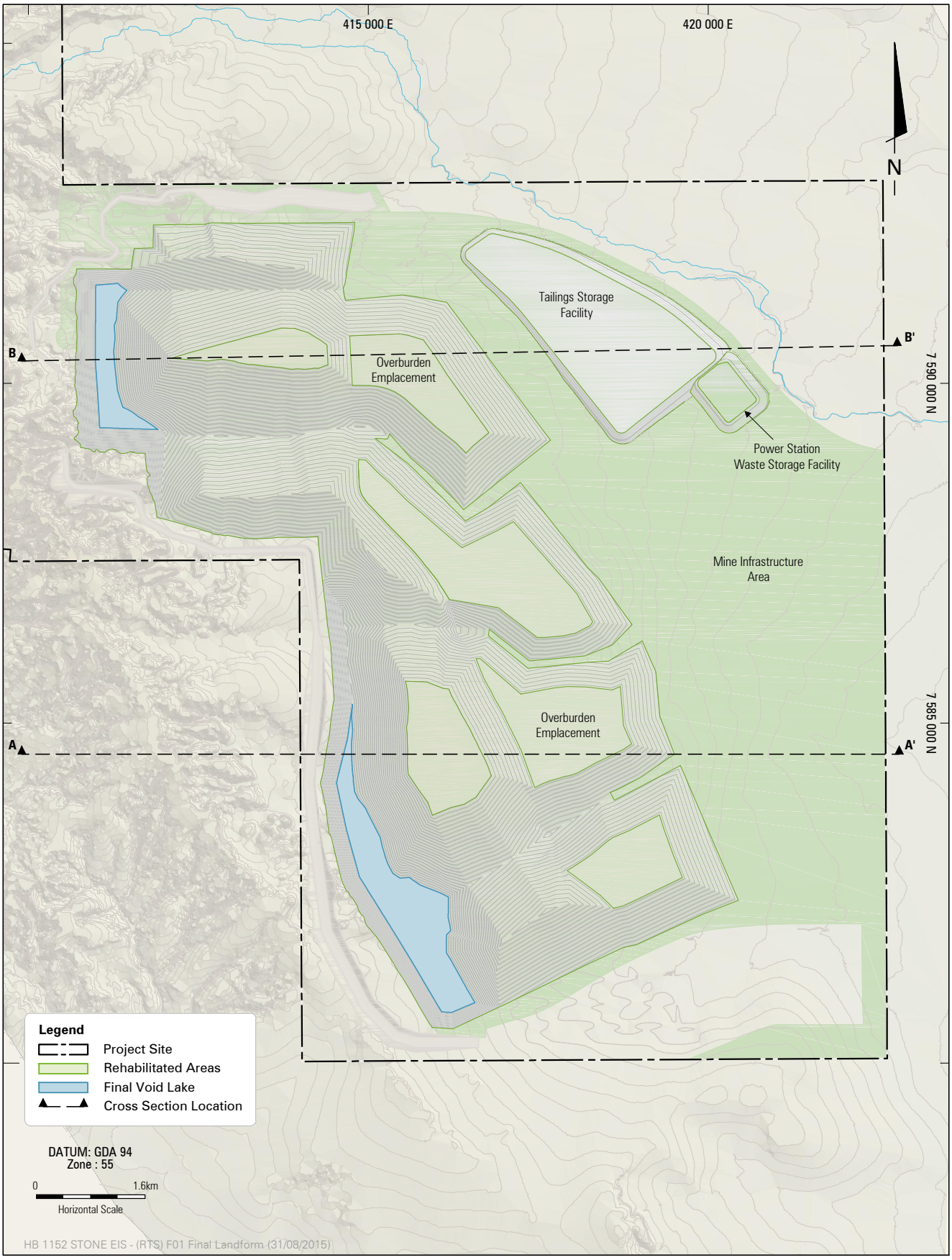
Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
State environmental significance only if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.	natural movement patterns of fish species required to maintain the biological integrity of the species. **Waterway** includes a river, creek, stream, watercourse or inlet of the sea. **Waterway barrier works** means a dam, weir or other barrier across a waterway.	risk of impact). The EIS Aquatic Ecology and Stygofauna Report concludes that the project is not predicted to give rise to any significant impacts on fish passage.		
Marine plants				
A marine plant within the meaning of the *Fisheries Act 1994* is a MSES. However, a marine plant is not a MSES if the plant is in an urban area.	Section 8 of the *Fisheries Act 1994* defines a marine plant as: • plant (a "tidal plant") that usually grows on, or adjacent to, tidal land, whether it is living, dead, standing or fallen; • material of a tidal plant, or other plant material on tidal land; • a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.	No marine plants were recorded within the project site.	Not applicable.	Not applicable.
Legally secured offset areas				

Matters of State Environmental Significance	Details	Presence in Project Site	Potential Project Impact	Offsets
A legally secured offset area is a MSES.	A **legally secured offset area** is an area of land the subject of a covenant under the *Land Act 1994.*	There are no offset areas present within the project site.	Not applicable.	Not applicable.



PROJECT CHINA STONE

Attachment K Final Landform Cross Sections



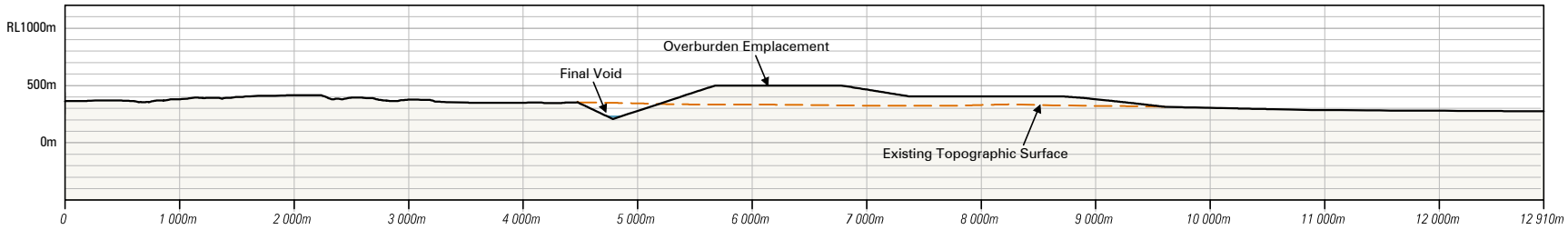
PROJECT CHINA STONE

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Conceptual Decommissioning Plan

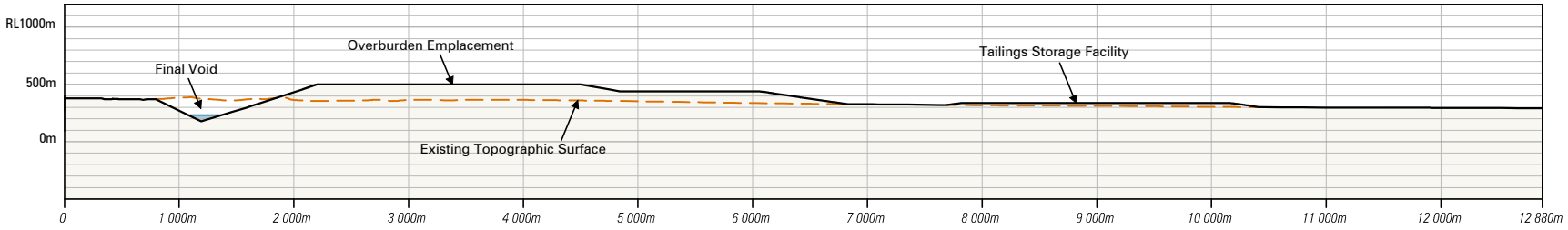
FIGURE 1

CROSS SECTION AA'



NOTE : Horizontal / Vertical Scale = 1 / 1

CROSS SECTION BB'



NOTE : Horizontal / Vertical Scale = 1 / 1

HB 1152 STONE EIS - (RTS) F02 Final Landform - Cross Section AA (1/09/2015)

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Final Landform Cross Sections

FIGURE 2