

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project Supplementary Environmental Impact Statement

AJ

DERM EIS Submissions
and Responses



Table of Contents

APPENDIX AJ DERM COMMENTS AND RESPONSES AJ-1

AJ.1	Introduction	AJ-1
AJ.2	General Comments	AJ-1
	Comment 1.0 Information Assessment.....	AJ-1
	Comment 2.0 Cumulative Impacts.....	AJ-1
	Comment 3.0 Offsets.....	AJ-2
	Comment 4.0 Standard Criteria	AJ-3
	Comment 5.0 Forestry Products.....	AJ-3
	Comment 6.0 Water Releases.....	AJ-4
AJ.3	Project Wide	AJ-6
	Comment 1.0 Section 0.3 – Project Overview (Page 0-4)	AJ-6
	Comment 2.0 Section 0.15 – Relevant Legislation and Policy requirements (Page 0-25) and Volume 2 Section 1.10 and Section 1.11.1	AJ-7
	Comment 3.0 Section 0.12.7 – Terrestrial Ecology (Page 0-11) and Section 3.5 – Cumulative Impacts	AJ-8
	Comment 4.0 Volume 1 and Volume 6 Section F2 – Terrestrial Flora and Fauna Assessment	AJ-9
	Comment 5.0 Section 0.12.7 – Nature Conservation and Biodiversity	AJ-9
	Comment 6.0 Section 0.12 – Nature Conservation Act	AJ-10
	Comment 7.0 Vegetation Management	AJ-13
	Comment 8.0 Section 1.11.1 – Relevant legislation and policy requirements (Page 1-15)	AJ-14
	Section 0.15 (Page 0-25)	AJ-14
	Volume 2 Section 1.10	AJ-14
AJ.4	Coal Mine.....	AJ-15
	Comment 1.0 Section 1.7.5 – Proposed mine waste management process – tailings storage facility and impacts on groundwater aquifers (Page various)	AJ-15
	Comment 2.0 Section 1.7.6 – Creek Diversions and Levees (Page 1-13).....	AJ-18
	Comment 3.0 Section 1.7.7.3 – Raw Water (Page 1-15).....	AJ-18
	Comment 4.0 Section 1.10.2.4 Sustainable Planning Act 2009 (SPA) – (Page 1-34)	AJ-20
	Comment 5.0 Section 2.5.4.2 – Operational Water Supply (Page 2-49)	AJ-20
	Comment 6.0 Section 2.5.5.1.5 – Lagoon Creek embankment crossing – Mining Infrastructure Area (MIA) and Coal Handling and Preparation Plan (CHPP) Areas (Page 2-56)	AJ-21
	Comment 7.0 Section 05 – Soils, Topography and Land Disturbance (Page 5-1).....	AJ-22
	Comment 8.0 Section 11.2.1.1 Water Planning Provisions of Water Act (Page 11-2).....	AJ-22
	Comment 9.0 Section 11.5.5.3 Diversion Layouts and Lengths (Page 11-29)	AJ-23
	Comment 10.0 Section 11.5.5.3 Diversion Layouts and Lengths (Page 11-29)	AJ-24
	Comment 11.0 Section 11.5.5 Creek Diversions (Various) & 11.6.3 Impacts of Flooding Level (Page 11-67)	AJ-26
	Comment 12.0 Section 11.6.4.6 Hydraulic impacts on stability of the proposed diversion channels (Page 11-69)	AJ-27
	Comment 13.0 Section 11.6.4.6 – Adequacy of Lagoon Creek floodplain corridor for extreme floods (Page 11-72/11-73)	AJ-28
	Comment 14.0 Section 12.9.8 – Void water	AJ-29
	Comment 15.0 Figure 12.4 – Lagoon Creek Wetlands	AJ-30
	Comment 16.0 Figure 1.2 – Landfill Site.....	AJ-31
	Comment 17.0 Figure 1.2 – Landfill Site.....	AJ-31
	Comment 18.0 Section 12 – Acid Mine Drainage Potential	AJ-33
	Comment 19.0 Section 16.2.5.1 – Landfill Leachate	AJ-35

	Comment 20.0	Landfill Closure	AJ-42
	Comment 21.0	Section 19.3.4.2 – Significance level of individual sites (Page 19-20)	AJ-43
	Comment 22.0	Section 19.4.2.2 – Further assessment of the 19 th century coach route (Page 19-23)	AJ-44
	Comment 23.0	Section 25.1.15 – Rehabilitation program (Page 25-18)	AJ-45
	Comment 24.0	Section 25.2.2.3 – Dams and Surface Water Features (Page 25-18)	AJ-47
	Comment 25.0	Section 25.2.3.2 – Final Void Management (Page 25-20).....	AJ-48
	Comment 26.0	Appendix J - Overburden	AJ-48
	Comment 27.0	Section 25.2.3.2 – Final Void Management (Page 25-20).....	AJ-52
AJ.5		Rail Line	AJ-53
	Comment 7.0	Section – Alpha Rail Line EIS	AJ-53
	Comment 8.0	Section 1 – Introduction (Pg 1-74)	AJ-55
	Comment 9.0	Sections 1.3, 19.2.2.2, 19.2.2.7.1 and following: Also Vol 6. Appendix J (Various Pages)	AJ-55
	Comment 10.0	Sections 1.11.3.6 Transport Infrastructure Act 1994 (TI Act) (Page 1-21)	AJ-56
	Comment 11.0	Section 2 – Figure 2.1 Sheet 3 of 14 (Page 2-2).....	AJ-56
	Comment 12.0	Section 2.4 Preferred Rail Alignment (Page 2-16)	AJ-57
	Comment 13.0	Section 2.4 Preferred rail alignment – Future dam site	AJ-58
	Comment 14.0	Section 2.4.8 Water Supply and Storage (Page 2-19)	AJ-60
	Comment 15.0	Section 2.4.9 Storage (Page 2-20).....	AJ-61
	Comment 16.0	Section 5.2.1 – Soils (Page 5-1)	AJ-62
	Comment 17.0	Section 5 Erosion and Sediment Control	AJ-63
	Comment 18.0	Section 5.2.1.3 – Soils, Topography and Land Disturbance (Pages 5-4 & 5-26)	AJ-63
	Comment 19.0	Section 5.2.1.5, 5.3.4 – Acid Sulfate Soils (ASS) (Various pages).....	AJ-64
	Comment 20.0	Section 5.2.2 – Good Quality Agricultural Land (Page 5-17).....	AJ-65
	Comment 21.0	Section 9 Terrestrial Ecology (Pages 9-25 & 9-26).....	AJ-65
	Comment 22.0	Section 9.3.1.1.2 – Mitigation and Management Measures (Page 9-28).....	AJ-66
	Comment 23.0	Section 9 – Table 9-9 (Page 9-29)	AJ068
	Comment 24.0	Section 9.3 and 26 – Terrestrial Ecology – Habitat Degradation (Page 9-31 & from 26-1)	AJ-68
	Comment 25.0	Section 10.3.2.2.3 – Lacustrine and Palustrine Habitats (Page 10-30)	AJ-69
	Comment 26.0	Section 10.3 - Potential Impact and Mitigation Measures (Page 10-29).....	AJ-70
	Comment 27.0	Section 11 – Surface Water (Page 11-1)	AJ-70
	Comment 28.0	Section 12.3.1 – Overview of potential impacts and mitigation measures (Page 12-14)	AJ-73
	Comment 29.0	Section 12.3.3.2 – Groundwater mitigation measure (Page 12-15)	AJ-74
	Comment 30.0	Section 19.3.1 and 19.3.2.2 – Potential Impacts and mitigation measures (Page 19-8)	AJ-74
	Comment 31.0	Section 25.0 Decommissioning and Rehabilitation (Page 25-1)	AJ-75
	Comment 32.0	Section Vol 3 – 26.0 Environmental Management Plan – Surface Water	AJ-75
	Comment 33.0	Wetlands	AJ-76
AJ.6		Environmental Management Plan (EMP) – Appendix P (Coal Mine Only).....	AJ-76
	Comment 1.0	Section P.1.5 – Stakeholders (Page P-9)	AJ-77
	Comment 2.0	Section P.2.2 – CHPP and Mine Infrastructure (Page P-11).....	AJ-77
	Comment 3.0	Section P.2 – Project Description (Page P-11)	AJ-80
	Comment 4.0	Section P.2 – Project Description (Page P-11)	AJ-83
	Comment 5.0	Section P.3.1.3.1 & P.3.4.9.1 – Monitoring of water storage quality	AJ-84
	Comment 6.0	Section P.3.3 – Air Quality (Page P-19).....	AJ-85
	Comment 7.0	Section P.3.3.7.2 – Dust Suppression Measures (Page P-23)	AJ-86

Comment 8.0	Section P.3.3.7.2 – Dust Suppression Measures (Page P-23).....	AJ-86
Comment 9.0	Section P.3.3.7.4 – Operational Procedures (Page P-23).....	AJ-87
Comment 10.0	Section P.3.3.8 – Monitoring (Page P-24)	AJ-87
Comment 11.0	Section P.3.3.8 – Monitoring Air Quality (Page P-24).....	AJ-88
Comment 12.0	Section P.3.4 – Water Resources (Page P-29)	AJ-88
Comment 13.0	Section P.3.4 – Water Resources (Page P-29)	AJ-89
Comment 14.0	Section P.3.4 – Water Resources (from Page P-29).....	AJ-94
Comment 15.0	Section P.3.4 – Water Resources (Page P-29)	AJ-96
Comment 16.0	Section P.3.4 – Water Resources (Page P-29)	AJ-98
Comment 17.0	Section P.3.4.2.1 Appendix P – Aquatic environmental values (Page P-29).....	AJ-100
Comment 18.0	Section P.3.4.2.1 – Surface Water Environmental Values (Page P-30)	AJ-105
Comment 19.0	Section P.3.4.2.2 – Groundwater Environmental Values (Page P-30)	AJ-106
Comment 20.0	Section P.3.4.3.1 – Surface Water Impacts.....	AJ-106
Comment 21.0	Section P.3.4.3.2 – Groundwater Impacts (Page P-32).....	AJ-107
Comment 22.0	Section S 8.3.1, App G. & P.3.4.3.2 – Leachate migration (Various Pages)	AJ-107
Comment 23.0	Section P.3.4.4 – Environmental Protection Objectives (Page P-35)	AJ-109
Comment 24.0	Section P.3.4.4 – Environmental Protection Objectives (Page P-36)	AJ-110
Comment 25.0	Section P.3.4.5 – Performance Criteria (Page P-36).....	AJ-111
Comment 26.0	Section P.3.4.6.2–Groundwater Specific Control Strategies (Page P-39)	AJ-111
Comment 27.0	Section P.3.4.7.6 – Measurement Parameters – On-Going Monitoring (Page P-49)	AJ-113
Comment 28.0	Section P.3.4.7.6 – Monitoring (groundwater)(Page P-52).....	AJ-114
Comment 29.0	Section 11.5.7.5 of Volume 2 & P.3.4.9.1 Volume 5: Contaminant release limits (Pages 11-37/P-57).....	AJ-120
Comment 30.0	Section P.3.4.9.1 – Contaminant release trigger levels (Page P-57).....	AJ-127
Comment 31.0	Section P.3.4.9.1. – Notifying the administering authority about the releases (Page P-60)	AJ-129
Comment 32.0	Section F4-S 9.2.3 & P.3.4.9.1 – Receiving monitoring locations (various pages).....	AJ-130
Comment 33.0	Section P.3.4.9.1 – Receiving waters monitoring during all flows – W18 (Page P-61)	AJ-134
Comment 34.0	Section P.3.4.9.1 – Receiving Environment Monitoring Program (REMP) and contaminant trigger levels – W20 (Page P-62).....	AJ-134
Comment 35.0	Section P.3.4.9.1 – REMP and physical-chemical parameters – W21 (Page P-63)	AJ-135
Comment 36.0	Section P.3.4.9.1 – REMP reporting – W22 (Page P-63).....	AJ-135
Comment 37.0	Section P.3.4.9.1 – Annual water monitoring reporting – W27 (Page P-64).....	AJ-136
Comment 38.0	Section P.3.4.9.3 – Groundwater – Proposed EA terms W42, W43 and W44 (Page P-70)	AJ-137
Comment 39.0	Section P.3.6 – Waste Management (Page P-87).....	AJ-141
Comment 40.0	Section P.3.6.5 – Mining Waste (Page P-97)	AJ-143
Comment 41.0	Section P.3.6.5 – Mining Waste	AJ-143
Comment 42.0	Section P.3.6.9 – Control Strategies (Page P-99)	AJ-144
Comment 43.0	Section P.3.6.9 – Control Strategies (Page P-99)	AJ-145
Comment 44.0	Section P.3.6.9 – Control Strategies (Page P-100)	AJ-146
Comment 45.0	Section P.3.6.12 – Proposed Environmental Authority Conditions (Page P-102).....	AJ-146
Comment 46.0	Section P.3.7 – Land Management (Page P-105).....	AJ-147
Comment 47.0	Section P.3.7 – Land Management (Page P-105).....	AJ-148
Comment 48.0	Section P.3.7.7.1 – Rehabilitation and Decommissioning (Page P-120).....	AJ-148
Comment 49.0	Section P.3.7.7.1 – Objectives (Page P-120).....	AJ-149

Comment 50.0	Section P.3.7.7.1 – Objectives (Page P-120)	AJ-150
Comment 51.0	Section P.3.7.7.1 – Objectives (Page P-123)	AJ-151
Comment 52.0	Section P.3.7.7 – Rehabilitation and Decommissioning (Page P-123)	AJ-151
Comment 53.0	Section P.3.7.8.1 – Rehabilitation (Page P-130)	AJ-152
AJ.7	Volume 6	AJ-153
Comment 1.0	Railway Corridor Appendices Volume 6 Appendix D	AJ-153

TABLES

Table AJ-1	Water licence legislation	AJ-8
Table AJ-2	Components and Concentrations of MSW leachate	AJ-37
Table AJ-3	Monto vetiver's tolerance ranges	AJ-39
Table AJ-4	Environmentally Relevant Activities	AJ-54
Table AJ-5	Summary of area to be cleared and offset obligation	AJ-68
Table AJ-6	Alpha Coal Project (Mine) proposed monitoring bores	AJ-78
Table AJ-7	Identified ERAs applicable to the Alpha Coal Mine	AJ-80
Table AJ-8	Onsite water storage parameters	AJ-84
Table AJ-9	Additional groundwater monitoring network bores	AJ-108
Table AJ-10	Alpha Coal Project (Mine) existing and proposed monitoring bores	AJ-116
Table AJ-11	Groundwater trigger levels	AJ-118
Table AJ-12	Quality Characteristic and release limits	AJ-123
Table AJ-13	Details of proposed water quality monitoring sites	AJ-124
Table AJ-14	Release point quality characteristic and trigger levels	AJ-128
Table AJ-15	Characteristics of the surface water quality monitoring points	AJ-132
Table AJ-16	Characteristics of the surface water quality monitoring points	AJ-132
Table AJ-17	Stream flow gauging station	AJ-133
Table AJ-18	Groundwater contaminant limits and trigger levels	AJ-139
Table AJ-19	Suggested species for use in rehabilitation of areas identified before clearing as Thozet's Box Woodland (RE 10.7.5)	AJ-151

FIGURES

Figure AJ-1	Alpha Coal Project (Mine) Conceptual Landfill Water Balance	AJ-41
-------------	---	-------

Appendix AJ DERM Comments and Responses

AJ.1 Introduction

The following comments are those submitted by the Department of Environment and Resource Management in relation to the Alpha Coal Project Environmental Impact Statement dated November 2010. Both the proposed Alpha Coal Mine and proposed rail link to Abbot Point were addressed in the below comments.

The submission received was in two parts - general advice addressing project wide information issues, and specific advice on the content of the EIS and the need for and required content of a Supplementary Report to the EIS (SEIS).

AJ.2 General Comments

Comment 1.0 Information Assessment

1A

Issue - *The online EIS and in particular the appendices are set out in a manner that has no paginated table of contents and therefore is very difficult to assess in a logical and thorough manner.*

Response:

In the public interest the Proponent invested in a web-based presentation of the EIS chapters that was user friendly and easily navigated. The appendices were also available online, just not in the same format.

1B

Recommendation - *It is recommended that the layout, presentation and formatting of the appendices need to be available in a format that is useful for the assessment process. The SEIS should be developed and presented in ways that allow easy navigation and links to the online EIS information.*

Response:

Noted.

Comment 2.0 Cumulative Impacts

2A

Issue - *The EIS does not adequately address cumulative impacts. Information is required to address cumulative impacts (as per section 7 of the Terms of Reference). A whole of region process is required to address cumulative environmental impacts from multiple developments. This is a requirement for decision making under the EP Act.*

Response:

The information available to the Proponent relating to the other proposed Galilee Basin projects is inadequate to undertake a more comprehensive cumulative impact assessment. The Proponent is willing to participate in a Cumulative Impact Management Group; however, the Proponent believes it is the role of government to convene and drive this group.

2B

Issue - As the Galilee Basin has not previously been developed this is an early opportunity to address the management of cumulative impacts including those on water quality, nature conservation, weed management and the potential for consolidation of transport and infrastructure corridors.

Recommendation - Implement a clear planning process that allows for a holistic approach to environmental management and natural resource management within development districts and a cumulative assessment of environmental impacts within the region.

The SEIS should investigate and propose solutions for limiting the cumulative environmental impacts from multiple projects within the Galilee basin. One option is to support and implement a Cumulative Impact Management Group for the basin.

Response:

The request for the development of a Cumulative Impact Management Group for the Galilee Basin is supported by Hancock. The formation of this group is seen as the responsibility of government and Hancock is willing to assist with provision of information for the impact assessment if requested.

Comment 3.0 Offsets**3A**

Issue - Offsets are discussed in the EIS however neither the EIS or the EMP provide details of specific offsets likely to be delivered.

Recommendation - The SEIS should provide details on the opportunities available to provide specific offsets for the nominated impacts on vegetation and habitat loss, groundwater, and air quality including greenhouse gas emissions. The revised EMPs for the mine and rail line should provide auditable commitments for any offsets proposed.

Response:

EIS Volume 2, Section 9.1.3.2.7 *Offsets under the EPBC Act* states that the draft EPBC policy *Use of Environmental Offsets* specifies requirements for mining activities to offset impacts to threatened ecological communities listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). No vegetation communities identified on the Project site are listed under the EPBC Act. Therefore, there are no requirements for offsetting EPBC-listed communities.

EIS Volume 2, Section 9.1.3.2.6 *Vegetation Management Offsets* notes that the Department of Environment and Resource Management (DERM) *Policy for Vegetation Management Offsets* (DERM, 2009) applies to an offset that is proposed to meet a performance requirement in an applicable *Vegetation Management Act 1999* (VM Act) code and is administered by the Queensland DERM. This policy is applicable for any Regional Ecosystem (RE) listed as Endangered, Of Concern, Essential Habitat, Natural Wetland or vegetation associated with watercourses under the VM Act Vegetation Management Status. The *Policy for Vegetation Management Offsets* is enacted by the VM Act; however, because the VM Act does not apply to mining projects, the *Policy for Vegetation Management Offsets* also does not apply to the Project.

However, the DERM *Policy for Vegetation Management Offsets* provides useful guidelines to propose voluntary vegetation offsets for the Project, even though this is not a legal requirement. Vegetation communities within the Project site that may be eligible for offsets include *Eucalyptus camaldulensis* and/or *E. coolabah* open woodland along channels and on floodplains (RE 10.3.14) and *Eucalyptus*

populnea woodland on alluvial plains (RE 11.3.2). Strategies that may be used to assist in offsetting may include, but are not limited to:

- Fencing off areas of these REs on the Project site to limit access of stock;
- Adopting (and thereby protecting) an area of remnant vegetation with the same or better ecological quality with a valid clearing approval (which therefore would otherwise be cleared); or
- Adopting (and thereby protecting) a non-remnant vegetation community that has the same pre-clearing regional ecosystem and, with management, could be attaining remnant status within five years.

Comment 4.0 Standard Criteria

4A

Issue - *The EIS does not address the standard criteria (see EP Act 1994) as required by Part A section 8 of the Terms of Reference. They are required to be addressed as part of decision making under the EP Act.*

Recommendation - *The SEIS should include a detailed explanation of how the standard criteria have been addressed.*

Response:

An assessment against the standard criteria has been undertaken and is presented in SEIS Volume 2, Appendix G.

Comment 5.0 Forestry Products

5A

Issue - *DERM Forest Products has the authority to sell native forest products and quarry material on crown lands and certain freehold lands under the Forestry Act 1959. DERM Forest Products (DERM FP) will assess and salvage suitable timber products from relevant lands.*

Recommendation - *That the SEIS include:*

- *an assessment, for each component of the project, of the areas of State-owned land where commercial native forest log timber will be affected and where salvage harvesting may be required;*

Response:

An assessment of the viable timber reserves on the state-owned land has not been undertaken as part of the EIS. The Proponent will work with DERM Forest Products to ensure an appropriate assessment of proposed impact areas is undertaken prior to any disturbance activities.

5B

- *an identification of sources of quarry material for each component of the project.*

Response:

The final location of the sources of quarry material for the project is still to be completed. For those locations that are not on the mining lease the appropriate development applications will be applied for and it is expected that DERM would be a referral authority. Any quarrying conducted on the mining lease will be in accordance with the lease conditions.

Comment 6.0 Water Releases**6A**

Issue - *The proposed release limits for discharges to waters in the environmental management plan do not take account of all the risk factors identified in the EIS for environmental values of waters.*

Response:

The water management of the Alpha Coal Project (Mine) is based on a zero release policy and assumes that all contaminated waters, be they from environmental dams or sedimentation dams, will be reused on-site. The water balance will confirm that all waters can be contained during the life of mine.

The above notwithstanding, the Surface Water Quality Technical Report (SEIS Volume 2, Appendix M, Section 7.1.2) has been updated with the latest water quality data from the site in order to enable a review of proposed release limits. This has provided input into the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.2) to ensure that discharge limits do not affect the identified Environmental Value (EV).

The Alpha Coal Project will also prepare a Receiving Environment Monitoring Plan (REMP), which aims at monitoring the upstream and downstream receiving environment to assess whether the mine/storage can release (based on water volume and quality). The chemical content of the water to be released and the receiving environment determine whether the conditions meet the Environmental Authority (EA) conditions for release.

6B

For aquatic ecosystems, risk factors identified by geochemical characterisation of leachate (see Appendix J Mine Waste) show aluminium, arsenic, boron, beryllium, cadmium, cobalt, copper, chromium, iron, lanthanum, manganese, molybdenum, phosphorus, selenium, uranium and zinc to be potential issues based on exceedance of criteria in the ANZECC 2000 water quality guidelines (see ANZECC 2000 trigger levels 95% species protection and ANZECC section 8.3.7). These guidelines are prescribed for determining water quality objectives under section 7 the Environmental Protection Water Policy 2009. Nitrogen may also be a concern when considering aquatic ecosystem impacts due to the use of ammonia nitrogen in explosives in the planned blasting operations.

Response:

Total nitrogen will be tested at each of the proposed monitoring location listed in Table V-18 of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.8.5). Monitoring parameters relevant to coal mine activities have been identified and incorporated as part of the ongoing monitoring measurement parameters and are presented in Table V-19 (SEIS Volume 2, Appendix V, Section 3.4.8.6).

6C

Similarly, groundwater can have an influence on discharge water quality due to groundwater dewatering operations. In cases where drinking water values may be affected, e.g. farm supply, total dissolved solids, sodium, chloride, sulphate, fluoride, aluminium, arsenic, lead, manganese, nickel and selenium are issues of concern (See EIS, Volume 2, section 12.8.8.2). In cases where stock water may be affected, total dissolved solids, fluoride, aluminium, and selenium are issues of concern (See EIS, Volume 2, section 12.8.8.2).

Compliance with irrigation water quality should also be considered where waters are abstracted for irrigation purposes.

Response:

As stated in the comment the type of analyte to be assessed in relation to groundwater monitoring will be dependant on the environmental value and end use. It should be noted that there has been no identification of irrigation as a groundwater use in the vicinity of the project mine site (SEIS Volume 2, Appendix N includes details of the bore survey and identified groundwater use).

6D

Under section 13 of the Environmental Protection Water Policy 2009, the administering authority must consider whether any release of contaminants to surface waters or ground waters is appropriately treated. This is defined as “for release to surface waters or ground waters—treatment that ensures the release will not affect the environmental values for the waters”.

The proposed release limits in the environmental management plan (see Appendix P, section P3.4.9) do not take account of all the above risk factors identified in the EIS relevant to environmental values of waters.

Response:

The release limits now proposed in the revised EM Plan consider the environmental values for waters. These revised release limits are presented in SEIS Volume 2, Appendix V, Section 3.4.10.1. The post EIS groundwater studies, including a bore survey, have allowed for a revision of the groundwater Environmental Values, which are included in SEIS Volume 2, Appendix N.

6E

Recommendation - The SEIS and revised EMP should propose release limits that ensure any water releases will not adversely affect the environmental values of the receiving waters, taking account of all risk factors identified in characterising wastes and potential discharges in the EIS.

Response:

The release limits now proposed in the revised EM Plan consider the environmental values for waters. These revised release limits are presented in SEIS Volume 2, Appendix V, Section 3.4.10.1.

AJ.3 Project Wide

Comment 1.0 Section 0.3 – Project Overview (Page 0-4)

Volume 2 Section 1.5.2 – Table 1-1 (Page 1-8)

Volume 2 Section 2.5.4 (Page 2-49)

1A

Issue - The EIS states that ‘approvals for water and power supplies under the project will be obtained by third party proponents’.

The EIS states that a contract has been established with Sunwater in regard to a proposed pipeline from the proposed Connors River dam project to supply water to the raw water dam for the project ‘during the construction phase of the project’ (Vol.2 p.1-8).

This SunWater project is subject to a separate EIS and, assuming it proceeds, may not be a viable source until at least 2013-2014 (subject to approvals and rainfall) whereas the Alpha Coal project ‘is envisaged to commence in late 2011’ (Vol.1 p.0-3). It is understood an alternative source may be the Burdekin Dam. It is not clear that the additional water supply is available.

Response:

The terms of the agreement between the Proponent and Sunwater are commercial-in-confidence. The Proponent is confident that Sunwater can provide a raw water supply to the project so that the project can be developed in a timely manner. An interim water supply if required and subject to the necessary approvals will be sourced from mine dewatering processes that will occur in advance of the mining operations.

1B

Issue - It is not known if the proposed pipeline from Moranbah to the Alpha Mine and the large offstream storage near the mine site will be assessed under the Sunwater EIS.

Response:

Any off-site water infrastructure including the proposed pipeline from Moranbah and the offstream storage near the mine site is not part of the Alpha Coal EIS and will be subject to a separate approvals process being undertaken by SunWater.

1C

Issue - The EIS states that ‘water in sufficient quantities... sourced from site bores and/or existing site storages’ will be accessed initially. No site storages exist at this time (Vol.2 p.2-49).

Response:

The reference to existing site storages is in relation to existing farm dams. There are limited farm dams on site and so this will be a limited component of the required early water source. The mining

pits will need to be dewatered prior to excavation and this water will be stored in yet to be constructed water storage dams. The location and size of these dams will be determined by the staging of the dewatering required and subject to the appropriate approvals.

1D

Recommendation - *The SEIS should provide greater clarity on water supply options and their impact assessment. Likely approval needs for water resources should be addressed prior to finalisation of the EIS for the Alpha Mine. All necessary water supplies should be accounted for and sourced in detail in the SEIS. The possible impacts of water infrastructure that may be outside other assessment processes should be detailed in the SEIS.*

Response:

Water supply for the project will rely on three sources:

1. Groundwater from mine dewatering;
2. Bulk raw water supplied by a third party; and
3. Recycled operational (tailings) water and water from environmental dams and sediment dams.

During construction and for initial operations, demand will be met from the groundwater (option 1 above) and recycled and other site water (option 3 above).

For the majority of the life of the mine, the bulk water supply will form the major source of supply for the Project. This will be delivered to a raw water dam on-site with a capacity of 500 ML, from where it will be distributed around the site by a network of tanks, pipes and pumps.

Comment 2.0 Section 0.15 – Relevant Legislation and Policy requirements (Page 0-25) and Volume 2 Section 1.10 and Section 1.11.1

2A

Issue - *Table 0-1 lists the legislation and key approvals for the project. Under the Water Act 2000 it lists “licensing for bores constructed as part of the groundwater monitoring network” which is incorrect. Licences are not required for monitoring bores, only production or dewatering bores. The requirement for a dewatering water licence has also been omitted.*

Response:

Revamped approvals tables have been prepared (SEIS Volume 1, Section 01 Introduction, Table 1-5 and Table 1-6) that set out:

- Approvals sought as an outcome of the Coordinator General’s report
- Subsequent or future approvals.

2B

Recommendation - *The SEIS should address this issue and remove “licensing for bores constructed as part of the groundwater monitoring network” from this table and replace with italicised text:*

A Water licence will be required to authorise the take of water by the proposed dewatering scheme. Permits will also be required for temporary take of groundwater for any construction purposes. Development permits will be required to authorise the construction of bores to take this water.

Response:

Table 0J-1 Water licence legislation

Legislation	Relevant Authority	Action/ Approval	Timing
Water Act 2000	DERM	Licensing of water course diversions and crossings <i>A Water licence will be required to authorise the take of water by the proposed dewatering scheme. Permits will also be required for temporary take of groundwater for any construction purposes. Development permits will be required to authorise the construction of bores to take this water</i> Hazardous dam approval	2011

Comment 3.0 Section 0.12.7 – Terrestrial Ecology (Page 0-11) and Section 3.5 – Cumulative Impacts

3A

Issue - These sections note that no protected areas are impacted by the project. In fact the proposed rail corridor cuts through a nature refuge (Eaglefield Creek).

Recommendation - The SEIS should recognise that the Eaglefield Creek nature refuge (and any others identified) will be impacted by the development. Impacts to these areas need to be addressed and fragmentation mitigation measures implemented for the construction of the rail line. It is desirable that the proponent propose a suitable offset for the impact to the Nature Refuge consistent with the environmental value of the land impacted.

Response:

The EIS states that no vegetation clearing is proposed within protected areas and that mitigation measures will be incorporated to protect protected areas with the potential to be impacted by the Project. It is recognised that the Project has the potential to impact two (2) protected areas namely Eaglefield Creek Nature Refuge (93 ha) and Nibbereena Creek Nature Refuge (202 ha) which are located within 2 km of the rail. Eaglefield Creek Nature Refuge is located approximately 220 m from the rail centreline at CH 225 km and Nibbereena Creek Nature Refuge is located approximately 600 m from the rail centreline at CH 220 km. As discussed in the cumulative impact section of the EIS, indirect impacts such as changes to hydrology, water quality and fauna movement away from the rail corridor and into these protected areas are a likely result. Mitigation measures are proposed to address these potential indirect impacts.

Comment 4.0 Volume 1 and Volume 6 Section F2 – Terrestrial Flora and Fauna Assessment**4A**

Issue - The fauna survey results are listed as a species list – with no cross reference via a matrix to sites or vegetation types and therefore it is impossible to spatially interpret these results.

Recommendation - That the fauna survey results be presented in a manner where the species form a column beside the vegetation types by sites (and therefore a clear correlation of species by site and vegetation type) is possible. Also necessary is information on the dates when sites were surveyed and whether they were surveyed in both the wet and dry seasons.

Response:

The location of fauna species recorded during surveys is detailed in Volume 2, Appendix AE of the SEIS, particularly Appendix C - Terrestrial Fauna Species Records. This appendix identifies which species were recorded at each site. The location of each numbered survey site can be found in Figure 2-1 while vegetation is mapped in Figure 3-4 of Volume 2, Appendix AE of the SEIS. Therefore the vegetation type that each species was found to occur can be determined through site specific information provided in these tables and maps. In addition, the distribution of fauna species was presented in a manner which described the species that occurred in particular habitat types (SEIS Volume 2, Appendix AE, Section 3.7). Due to the large number of species which have the potential to occur in the Project area, and the relatively large number of fauna species that were detected during field surveys; the most comprehensive presentation of the data was determined to be via group-specific descriptions. These discussions focus particularly on species of conservation significance, such as listed threatened species. Many of the common species were widely distributed and occurred in numerous locations regardless of vegetation type. Vegetation type was not considered as necessary information for inclusion in every species occurrence description as often it was not a reliable indicator that particular species may occur. For species which were commonly found in a certain vegetation type, this detail is provided. For example, bird species common to woodlands with grassy or complex understorey, and woodlands adjacent to water sources, are described in Volume 2, Appendix AE, Section 3.7.5 of the SEIS.

Comment 5.0 Section 0.12.7 – Nature Conservation and Biodiversity**5A**

Issue - The EIS spells out efforts to maintain biodiversity and where possible avoid or minimise biodiversity impacts in the landscape. However, given the scale and time span for the project, efforts to enhance regional biodiversity condition through weed and feral animal control together with research and monitoring is recommended. Volume 5 Section P 3.8 and Volume 3 outlines an intent to develop and implement EMPs for weed and feral animal management.

To prevent loss of biodiversity, maintain and enhance ecological processes, any clearing of native vegetation associated with the Project must develop and implement strategies to maintain a comparable level of connectivity provided by remnant vegetation.

Response:

The Proponent still commits to developing weed and feral animal management plans for the mine lease and railway corridor areas. These plans will be developed and implemented prior to any construction work associated with this project commencing.

On the mine site, large sections of the disturbance footprint on the western side of Lagoon Creek have historically been cleared for grazing. By the nature of the mine pits being approximately 24 km long and approximately 6 km wide at the end of mine life, there is expected to be disruption of connectivity between remnant vegetation communities.

The Proponent will be undertaking mitigation strategies on both the mine site and along the railway corridor, including limiting vegetation clearance as much as possible and undertaking rehabilitation trials to improve connectivity between communities as part of the Project goals.

5B

Recommendation - *The SEIS and EMP should further detail Environmental Management Plans for Management of Weeds, Biodiversity and Land, Flora and Fauna, and Feral Animals. Each plan will include: Plan objectives; tasks and actions; staffing and personnel requirements; management budget and financial commitment; timeframes; and performance indicators. Washdown facilities for the construction activities for the rail line should be considered.*

Response:

The development of more detailed environmental management plans will be undertaken prior to the commencement of construction activities. The EM Plan (SEIS Volume 2, Appendix V) commits to the development of such plans. At the current stage of the project is not feasible to include such details as staffing and financial commitments to such plans. Outlines of these plans are included in SEIS Volume 2, Appendix V, Sections 3.6.10. .

Comment 6.0 Section 0.12 – Nature Conservation Act

6A

Issue - *The EIS does not fully address nature conservation requirements. Requirements apply where the Nature Conservation Act 1992 provisions are relevant.*

Response:

The *Nature Conservation Act 1992* (NC Act) refers to subordinate legislation to which the Project may be subject. Activities such as clearing of plants, taking of fauna or disturbance of animal roosting places require approval and permitting prior to the action being carried out. These include, but are not limited to, the *Nature Conservation (Protected Plants) Conservation Plan 2000*, *Nature Conservation (Wildlife Management) Plan 2006* and *Nature Conservation (Wildlife) Regulation 2006*.

It should be noted that no flora species listed under the NC Act were identified inhabiting the Project site and therefore it is unlikely that the clearing of protected plants will occur. This information is provided within the flora results section of the Flora and Fauna Assessment (EIS Volume 5, Appendix E1, Section 6.0) and EIS Volume 2, Section 9.1.3.1.2 for each individual RE.

If a plant listed under the NC Act is identified in an area to be disturbed, permits will be required. The clearing of a plant must be conducted in a way that minimises damage to the soil and damage or injury to other wildlife (aside from the plant), or else as stated in the clearing permit. Certain floral families and all endangered plants have additional requirements when a specimen is taken. These requirements can be found in the *Nature Conservation (Protected Plants) Conservation Plan 2000* and the *Nature Conservation (Wildlife Management) Plan 2006*.

It should also be noted that the use of offsets should not replace or undermine existing environmental standards of regulatory requirements. Environmental impacts must first be avoided, then minimised,

before considering the use of offsets for any remaining impact. The Queensland Government Environmental Offsets Policy (DERM, 2009) provides the scope for using voluntary offsets; where the offset is not necessary for project approval, but the Proponent wishes to provide an offset as a sign of good environmental responsibility. All land-based offsets, including voluntary offsets, should be centrally registered with the Queensland Government. Additional information regarding the selection of offsets can be found in the Flora and Fauna Assessment (EIS Volume 5, Appendix E1, Sections 3.6 and 3.7).

Approval from DERM is mandatory for any disturbance to animal breeding places and where there is a need to take fauna. DERM may administer a wildlife authority, which allows for wildlife interaction (on a commercial basis) and wildlife movement. Activities carried out under this authority must not be likely to adversely affect the ecological sustainability of any wildlife, and the wildlife must be lawfully taken, kept or used. If animal breeding places are threatened by Project activities or fauna need to be taken, then the appropriate DERM approvals will be obtained, before any disturbance activities commence.

6B

Recommendation - *The SEIS should provide quantitative information on how the project will address the following requirements.*

The proponent must comply with the provisions of the Nature Conservation Act 1992 particularly in regard to the following:

1. *Where there is a requirement for clearing of plants protected under the Nature Conservation Act 1992:*
 - a) *clearing of protected plants must only occur in accordance with a clearing permit or an exemption under the Nature Conservation Act 1992*
 - b) *offsets must be provided for the permanent loss (take) of near threatened, rare, vulnerable and endangered plants to achieve an equivalent or better overall outcome at a regional scale in accordance with the Queensland Government Environmental Offsets Policy 2008 and generally in accordance with the Queensland Government Policy for Biodiversity Offsets (Consultation Draft)*
2. *Where the activities of the proponent may cause disturbance to animal breeding places the prior approval of DERM must be obtained.*
3. *Where there is a need to take fauna, the prior approval of DERM must be obtained.*

Response:

1. a) A clearing permit for the taking of least concern plants will be applied for if an exemption cannot be obtained under the *Nature Conservation Act 1992* (NC Act).

b) Based upon the detailed flora surveys undertaken across the study area no near threatened, rare, vulnerable and endangered plants (as listed under the NC Act) are expected to be present within the study area. Therefore no permanent loss to NC Act listed threatened plants is anticipated and no offsetting is proposed under the NC Act for flora species.
2. Field surveys characterised the habitat and faunal populations present on the study area. No areas critical to any fauna for breeding were identified during the field surveys. It is unlikely that the proposed mine development will significantly impact on breeding

opportunities for fauna in the context of central Queensland landscapes.

To reduce the opportunity for impacts to fauna and their breeding places, a number of mitigation strategies have been developed. These include:

- The clearing of vegetation in stages to ensure that isolated stands of vegetation are not created and the connectivity of habitat remains intact to allow for the dispersal of fauna;
- Clearing towards any adjacent contiguous vegetation that is not to be cleared to ensure connectivity of habitat is not disrupted; and
- Ensuring qualified fauna spotters are actively present during clearing of native vegetation.

If, during mine development it becomes apparent that animal breeding places will be affected by the proposed clearing, a species management program will be developed for the species affected prior to clearing.

3. A qualified fauna spotter will be actively present during clearing of all native vegetation. It is not anticipated that there will be a need to take fauna however if this is required prior approval from DERM will be obtained.

Two fauna species listed under the NC Act are known to occur in the study area. These species are discussed further below.

The little pied bat (*Chalinolobus picatus*), listed as near threatened under Schedule 5 of the *Nature Conservation Wildlife Regulation 2006*, was identified on the Project site.

The Little Pied Bat forages in a wide range of vegetation communities, ranging from dry sclerophyll forest, woodland, inland scrub and riparian areas. Therefore, the Little Pied Bat is unlikely to be impacted by the project due to the large regional extent of suitable foraging habitat.

The southern squatter pigeon (*Geophaps scripta scripta*) was recorded during the survey within the Non-remnant Grassland vegetation community and is listed as vulnerable under both the *Environment Protection and Biodiversity Conservation Act 1999* and Schedule 3 of the *Nature Conservation Wildlife Regulation 2006*.

Extensive areas of habitat suitable for the southern squatter pigeon exist on the Project site, and within the local region. It is likely some of the available Squatter Pigeon habitat will be disturbed by mining activities, however it is considered unlikely that there will be a significant impact on the regional population of the species due to the broad extent of habitat in the local region.

Comment 7.0 Vegetation Management***Volume 1, Section 1.11 – Approvals Process******Volume 3, Section 9.3 – Potential Impacts and Mitigation Measures******Volume 6, Section F2 – Terrestrial Ecology*****7A**

Issue - Volume 1, section 1.11 states that a MCU under the Sustainable Planning Act 2009 may be required. If a MCU is required for the Railway Corridor, DERM will be triggered as a concurrence agency for the Vegetation Management Act 1999. If a MCU is not required for the railway corridor, the proponent will require an operational works permit under the Sustainable Planning Act 2009 for clearing native vegetation, as noted in the EIS.

Clearing native vegetation for a MCU or an Operational Works permit will need to be conducted in accordance with Part S of the Regional Vegetation Management Code for Brigalow Belt and New England Bioregions and Regional Vegetation Management Code for Western Bioregions.

The EIS does not address how the proposed clearing meets the performance requirements of the aforementioned regional vegetation management codes.

The EIS does not show that suitable offsets are available in the landscape to meet the Policy for Vegetation Management Offsets.

The EIS does not clearly show the extent of clearing of regional ecosystems (suggest A3 mapping, suitable scale, with GDA94 datum or coordinates).

The Terms of Reference sets out requirements on mapping interconnectivity, wetlands, and aquatic biology such as the waterways to be diverted from the working pit. Not all of these requirements are shown in the EIS and EMP.

This information is required before decisions on how the proposed clearing of remnant vegetation along the railway corridor will meet the requirements of a MCU or an Operational Works permit for the clearing of remnant vegetation.

Recommendation - The SEIS should address the need for further information prior to finalising project design.

The further information is as follows:

1. Digital spatial data of the Railway Corridor in ESRI shapefile format
2. A statement outlining how any clearing as a result of the railway corridor meets Part S of the Regional Vegetation Management Code for Brigalow Belt and New England Bioregions and New England Bioregions and Regional Vegetation Management Code for Western Bioregions Version 2, dated 6 November 2009.
3. Where meeting a requirement of 2. above requires the proponent to supply an offset under the Policy for Vegetation Management Offsets –Version 2.4, dated 21 October 2010, the proponent will supply evidence that it will be possible for such offsets to be found and that it is practicable for the proponent to meet the requirements of the Offset Policy.
4. The description and map on the vegetation communities on the mine and rail line project sites do not accord with the Vegetation Management Act 1999 Regional Ecosystems and remnants mapping. This needs to be corrected.

5. *There are significant missing elements of the information on nature conservation, for instance, coordinate requirements for figures (these are incomplete and incorrect throughout EIS), detail on trapping and survey methodology and seasonality; the size of the project site and hence the survey area has not been mentioned. This includes the areas and vegetation to be cleared. Further detail on these matters can be accessed from DERM.*

Response:

1. Appropriate electronic data will be provided to DERM as part of this SEIS.
2. A detailed assessment against Part S of the Regional Vegetation Management Code will be provided as part of future development applications for clearing of assessable native vegetation under *Vegetation Management Act 1999* (VMA): The Project is declared to be a *significant project* under the SDPWO Act and therefore is deemed to be a relevant purpose under section 22A of the VMA.
3. A Vegetation Offsets Strategy for the Project has been prepared and included in Volume 2, Appendix X of the SEIS.
4. The Fauna Habitat and Vegetation Communities Map provided within SEIS Volume 2, Appendix AE has been prepared in accordance with field work observations. Accordingly this differs from the DERM regional ecosystems and remnants mapping.
5. The maps that have been updated for the SEIS have taken these items into account and updated where appropriate. While survey areas have not been identified precisely, the properties that were visited during field surveys and where sampling was undertaken is shown in the EIS. Refer to Updated Terrestrial Ecology Report in Volume 2, Appendix AE of the SEIS.

Comment 8.0 Section 1.11.1 – Relevant legislation and policy requirements (Page 1-15)

Section 0.15 (Page 0-25)

Volume 2 Section 1.10

8A

Issue - Table 1-1 lists the legislation and key approvals for the project. Under the Water Act 2000 it lists licensing of crossings. Crossings are not licensed through a water licence unless they interfere with water by diverting or impounding flows. The installation of a crossing that allows adequate flows to pass downstream can be authorised through a riverine protection permit or completed in accordance with the DERM guideline entitled "Guideline - activities in a watercourse, lake or spring associated with mining operations".

Response:

This comment is noted.

8B

Recommendation - The SEIS should reflect this issue e.g.by removing "licensing of watercourse diversions and crossings" and replacing with the italicised text:

A Water licence will be required to authorise the interference with the flow of water by diversion. Development permits under the Sustainable Planning Act 2009 will be required to authorise the construction of the diversion channel.

The installation of crossings can be undertaken in accordance with departmental guideline entitled "Guideline - activities in a watercourse, lake or spring associated with mining operations" or a riverine protection permit and would only require licensing if interfering with the flow of water by diversion or impoundment.

Response:

This comment is noted.

AJ.4 Coal Mine

Comment 1.0 Section 1.7.5 – Proposed mine waste management process – tailings storage facility and impacts on groundwater aquifers (Page various)

1A

Issue - The proponent proposes to construct a tailings storage facility (TSF) near the eastern margin of the proposed mine area on an outcrop of the Colinlea sandstone. The department has indicated to the proponent, through written and verbal communications in November 2009 and August 2010, that the recharge areas for the Colinlea sandstones must be protected and that this is a high priority.

The groundwater investigations that accompany the EIS indicate the proposed TSF will be located on part of the recharge intake areas for the Colinlea sandstone. This raises concerns about the depletion of the aquifer recharge area and the risk of contaminant entry to the aquifer. The groundwater reports also identify that;

1. The Colinlea sandstone contains a significant, regional sandstone aquifer, used extensively by a number of landholders for their water supply.
2. There is a possibility that water holes in Lagoon creek may be connected to groundwater in the Colinlea sandstone.
3. There is a risk of contaminated water migrating from the TSF into groundwater.
4. Section 8.3.1 identifies issues such as poor quality artificial recharge occurring from the TSF, acid mine drainage and salinity impacts on surface and groundwater - see volume 2 section 16.
5. The final coverage area of TSF was likely to be 19km² of the 175km² catchment, or about 11% which is a significant footprint on the recharge intake area for this aquifer from this single mine.
6. Groundwater migration patterns mean that over time 100% of the aquifer could become polluted by contaminated water from the mine.

The groundwater reports overlook the long timelines involved in the movement of groundwater. The aquifer in question is a confined aquifer meaning that water movement and recharge mechanisms occur very slowly over long timelines. Because of the very slow movement of groundwater in these aquifers potential problems may not become apparent for years or decades, i.e. they may not occur

until after mining ceases but will continue for decades afterwards. Permanent and long term mitigation measures are thus required to be put in place and these will require maintenance and an operations budget.

DERM officers have informed the proponents in previous communications, that, because of these issues, it is not desirable to locate facilities such as a TSF on recharge intake areas for these aquifers.

The rationale for the proposed location of the TSF is outlined in Volume 5 Appendix J2 section 3.1. The rationale for the proposed location is based solely on fitting in with the proposed mine layout. It does not take into account the likely serious impacts on groundwater (or the precautionary principle). Concerns of the department regarding groundwater contamination and reductions in the recharge rate of the aquifers were not considered in making the decision about the location of the site for the TSF.

Response:

Site specific data regarding geology and hydrogeology has been compiled, post-EIS, to assess the groundwater regime within the proposed TSF footprint. This data is included in SEIS Volume 2, Appendix N.

The potential impacts, especially with regards to reduction in recharge to the Colinlea Sandstone, have been considered. The initial findings, as additional studies are ongoing, indicate:

- Limited recharge potential to the underlying Colinlea Sandstone aquifers due to the thick clay-rich Tertiary cover, thin discontinuous Colinlea Sandstone aquifers (cross-sections indicate thin sub-E and sub-F sands), thick unsaturated zone (even though the site was subject to prolonged high rainfall events during 2010/2011), and no Colinlea Sandstone rock outcrop or shallow subcrop.
- Drilling results and blow yields recorded during rotary-air-percussion-below the TSF footprint indicate limited groundwater resources and potential.
- Discrete zones of enhanced groundwater potential occur to the west of the TSF footprint, which can be protected through the use of lining and seepage control measures down gradient of the TSF.
- The footprint is underlain by Tertiary age saprolite and laterite (Tertiary weathering of Colinlea Sandstone sediments) and Joe Joe Group sediments that are shown from drilling to be hydraulically tight and to have very low groundwater potential.

The data indicates that the Colinlea Sandstone, mapped on a regional scale, does not act as the recharge area depicted by DERM and thus the suitability of the site should be considered based on the available data.

1B

***Issue** - A number of mitigation measures are subsequently proposed in Volume 2 Appendix G, section 11.1 of the EIS report. However, the proponent has not given sufficient regard to the protection of the groundwater resource and has not adequately explored other mine layouts that would remove the TSF from any groundwater recharge intake beds. It would appear that an alternative location for the TSF away from the Colinlea sandstone aquifer would offer the least problematic solution.*

Note that the Standard Criteria set out in the Environmental Protection Act 1994 (see Schedule 4) require consideration of the principles of the National Strategy for ecologically sustainable development (ESD) including the precautionary principle in decision making.

DERM officers are aware that a number of other mines including the proposed Kevin's Corner Mine could also be located in this area. These projects are also likely to have footprints that affect the recharge areas for the Colinlea sandstone. A coordinated assessment of the effects on recharge areas will be required.

Response:

Geological and hydrogeological data compiled during a drilling program across the proposed TSF footprint does not indicate that the footprint area acts as a recharge intake bed, as conceptualized by DERM. The site suitability for a TSF needs to be considered based on the site specific data included in SEIS Volume 2, Appendix N.

1C

Recommendation – *The SEIS should present a review of the design strategy for the proposed TSF with particular regard to the recharge and contamination risk mitigation actions that would be implemented. The SEIS should demonstrate the technical and economic feasibility (or otherwise) of*

(a) locating the TSF at a site that could not impact on the recharge areas for the Colinlea sandstone; or

(b) designing a TSF that will not impact on the recharge areas for the Colinlea sandstone e.g. a TSF design that ensures the containment of contaminants and the protection of local groundwater should be considered. It should consider linings, internal under drainage and management of drainage waters.

Response:

Based on the results of the site specific data collection (SEIS Volume 2, Appendix N) the potential impacts of the proposed 30 year life of mine TSF includes possible seepage migration towards Lagoon Creek. The current TSF layout and design, which incorporates lining and seepage controls, is considered suitable to mitigate the seepage risk. Current consideration is that the seepage can be minimised and managed through detailed engineering.

The impact on possible recharge to the Colinlea Sandstone is considered minor as the nature of the geology (no outcrop or subcrop), thick clay-rich cover, and thick unsaturated zone above the Colinlea Sandstone reduces natural recharge. The main recharge mechanism to the Colinlea Sandstone is, as identified in the groundwater flow patterns, within the Great Dividing Range to the south west.

1D

Similarly in pit tailings disposal after a suitable development period should also be considered.

Response:

Noted and being investigated.

Comment 2.0 Section 1.7.6 – Creek Diversions and Levees (Page 1-13)**2A**

Issue - *The length of the Lagoon Creek Diversion varies between 7-9km within the document. Clarification of the approximate length should be provided.*

Response:

The length of the Lagoon Creek Diversion is now 9.6 km. The design of the diversion has undergone considerable debate to ensure it has the most appropriate stream morphological attributes. These attributes include length, slope, meander wavelength (how sinuous or curvy the creek is) and cross sectional profile amongst many others.

Modelling of the 9.6 km diversion has also been undertaken to assess the hydraulic parameters for the proposed diversion. References to a 7 or 9 km diversion is no longer made.

2B

Recommendation - *One accurate measurement should be referenced throughout the entire document. The SEIS should address this issue.*

Response:

Noted and corrected.

Comment 3.0 Section 1.7.7.3 – Raw Water (Page 1-15)**3A**

Issue – *Raw water supply from onsite storages is unclear. The capture of overland flow within the Mining Lease area is subject to the provisions of the Water Resource (Burdekin Basin) Plan 2007 and would need to comply with the provisions for the take of overland flow. Storages that are required to meet the requirements of an Environmental Authority (EA) need to comply with the self assessable code – “Code for self-assessable development for taking overland flow water to satisfy the requirements of an environmental authority or a development permit for carrying out an environmental relevant activity”.*

Response:

The raw water supply is gained from three primary sources:

1. Ground water;
2. On site environmental water (pit water and highly disturbed overburden runoff adjacent to the pits); and
3. SunWater Pipeline.

A further source of water supply may be from sedimentation dams, should the water quality from these dams be unsuitable for release, or should release conditions not be met (e.g. insufficient flow in Lagoon Creek to allow any releases).

If sedimentation dam water is unsuitable for release (e.g. some or all chemical parameters are outside the tolerable range for release), then the water in these dams will be released / pumped into the adjacent environmental dam, from where it is distributed on site for reuse.

In the longer term, sedimentation dams will take water from restored overburden areas. It is assumed that the water quality from these areas will be adequate for release. Upon mine closure, the sedimentation basins will be filled in and runoff from restored areas will drain direct into Lagoon Creek, as per the current natural condition.

3B

Recommendation – *The SEIS should address compliance with the Water Resource (Burdekin Basin) Plan 2007 when considering the design and capacity of storages and the take of water for mine supply.*

Response:

Refer to: SEIS Volume 2, Appendix I Surface Water Chapter, Section 1.2.1.1

Water Planning Provisions of Water Act

The Project is located within the Belyando-Suttor sub-catchment area covered by the Water Resource (Burdekin_Basin) Plan 2007 (Burdekin Basin WRP) – (refer Burdekin Basin WRP schedules 1 & 2). The Project site is excluded from declared Water Management Areas in Part 2 Section 6 of the Burdekin Basin WRP. Part 3 Section 12 (g) of the Burdekin Basin WRP has provisions to make water available in the Belyando-Suttor sub-catchment to support growth in irrigated agriculture.

All of the statutory EFO in the Burdekin Basin WRP apply to locations (nodes) that are a long distance downstream of the Project site. The closest WRP node for which some EFO apply is at the junction of the Suttor River and Burdekin River. As the Project location is a long distance upstream of the closest EFO location and the site area is a very small portion of the total catchment to the closest EFO location, the Project will not materially impact on the State's ability to achieve statutory EFO prescribed in the Burdekin Basin WRP.

3C

Issue – *This section includes the statement that SunWater is currently raising the crest of Burdekin Falls Dam. It is not clear that SunWater is currently raising the crest of the Burdekin Falls Dam, however the future raising of the dam is a possibility. Investigations for the raising of Burdekin Falls Dam are currently on hold.*

Response:

Noted - The provision of a stipulated volume of water to the Project site by SunWater is part of an agreement between the Proponent and SunWater. It is understood that the water for the Project will most likely be sourced by SunWater from the as yet to be completed Connors River Dam. The building or upgrading of other infrastructure to meet the SunWater commitment to the Project is the responsibility of SunWater not the Proponent.

3D

Recommendation - *The SEIS should clarify this issue.*

Response:

See above.

Comment 4.0 Section 1.10.2.4 Sustainable Planning Act 2009 (SPA) – (Page 1-34)**4A**

Issue – This section states that all aspects of development of a mining activity for which an EA (mining activity) applies are exempt from the SPA. Development Permits will be required for the diversion of a watercourse for operational works for the taking of or interfering with flow. This is identified in section 11.2.4 of the EIS.

In addition development permits will be required for construction of bores associated with a dewatering water licence.

Response:

It is acknowledged that the *Sustainable Planning Act 2009* (SP Act) will facilitate the approvals process for works and or operations administered under other legislation. One of the aspects of the Project that will require this will be the approval for operational works that take or interfere with water, under the *Water Act 2000*, which will be administered through the SP Act.

It is also acknowledged that development permits will be required for the construction of bores associated with a dewatering licence, also under the *Water Act 2000*, which will be administered through the SP Act.

4B

Issue – The SEIS should recognise that development permits under the SPA will be required for operational works that take or interfere with water.

Response:

See above in response 4A.

Comment 5.0 Section 2.5.4.2 – Operational Water Supply (Page 2-49)**5A**

Issue – Section 11.5.3.2 of the EIS states that the raw water dam will not take natural flows, however the dam will be designed with a spillway for a 1:1000 year flood event. It is unclear as to whether this storage will take overland flow.

Response:

The configuration of the Raw Water Dam has changed and it is now an in-ground impoundment dam located downstream of the new accommodation village location (SEIS Volume 1, Section 2, Section 2.1.4.5). Cut off drains are located upstream of the accommodation village to divert runoff around the village and dam. Therefore the raw water dam has a limited external catchment in addition to its own surface area, as the total catchment to consider for the spillway design.

The spillway is required to ensure the dam's safety in case prolonged or heavy rainfall within the dam's limited catchment and on the dam's footprint.

5B

Recommendation – The SEIS should clarify and quantify the take of overland flow by the raw water dam.

Response:

See above in response 5A.

Comment 6.0 Section 2.5.5.1.5 – Lagoon Creek embankment crossing – Mining Infrastructure Area (MIA) and Coal Handling and Preparation Plan (CHPP) Areas (Page 2-56)

6A

Issue – For the construction of this crossing it states that “where riparian vegetation is to be cleared or banks of a watercourse disturbed a waterworks licence will be obtained per the Water Act 2000”. Generally the installation of a crossing (including the destruction of native vegetation, excavation or placement of fill within a watercourse) can be addressed under a riverine protection permit or the guideline “Guideline - activities in a watercourse, lake or spring associated with mining operations”. A licence would only be considered if the crossing was going to interfere with the flow of water by impoundment or diversion.

Response:

A number of creek diversions and crossings are required for the proposed Project.

Where riparian vegetation is to be cleared or banks of a watercourse disturbed, a waterworks licence will be obtained per the *Water Act 2000* (EIS Volume 2, Section 2.5.5.1).

EIS Volume 2, Section 11.4.3 *Watercourses* states that the Project development and operation will need to:

- Obtain approvals to divert the watercourses (licensed stream diversion);
- Manage operations and any temporary works in the watercourse areas in accordance with the DERM Guideline – *Activities in a watercourse, lake or spring associated with mining operations* (DERM, 2008) within the provisions allowed under that guideline; and
- Obtain Riverine Protection Permits for other works or activities in the watercourse areas that do not fall within the provisions under the DERM guideline.

6B

Recommendation – The SEIS should recognise that clearing of riparian vegetation as part of the installation of this crossing should be dealt with under the riverine protection provisions of the *Water Act 2000*, by either a permit or by use of the guideline entitled “Guideline - activities in a watercourse, lake or spring associated with mining operations”.

Response:

See above in response 6A.

Comment 7.0 Section 05 – Soils, Topography and Land Disturbance (Page 5-1)**7A**

Issue – The EIS states that the soils investigations have been conducted in accordance with the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland – Land Suitability Assessment Techniques. The department is unable to verify the findings of the soils and land suitability assessment due to a lack of correlation between the laboratory results provided and the site identifications and locations detailed in Appendix C of Volume 5 – Coal Mine Appendices.

Response:

Mapping provided in EIS Volume 5, Appendix C, Appendix A identified the sample locations subjected to laboratory analysis. Original laboratory reports, provided in Appendix B of that report, detail the depth of each hole (indicated by the deepest samples sent for analysis) as well as the number and depth of samples sent for each sampling location. The outcomes of the laboratory analysis have been provided for all 297 samples analysed from 98 locations.

With over 555 locations sampled, basic shorthand field notes supported by several photo plates of each sampling site were used to help determine final soil descriptions and classifications. Combined with topographic and vegetation mapping as well as aerial imagery, these field notes and photos provided the report authors with a comprehensive overview of the distribution of soils within the Project area.

To ensure transparency, all soil logs of the 98 sites sampled for laboratory analysis have been provided in SEIS Volume 2, Appendix W, Section 5.

7B

Recommendation – The SEIS should clarify site identifications and the sample depths of laboratory analysis results provided so that they correspond with sampling locations displayed in Appendix A of Appendix C of Volume 5 – Coal Mine Appendices. Provide profile descriptions of all sites which were sampled for laboratory analysis.

Response:

Following discussions with DERM the soils information presented in the SEIS has been increased to assist with ease of interpretation. The additional information is presented in SEIS Volume 2, Appendix W, Section 5.

Comment 8.0 Section 11.2.1.1 Water Planning Provisions of Water Act (Page 11-2)**8A**

Issue – The Burdekin Basin Water Resource Plan 2007 is referenced within the EIS. The correct title of the subordinate legislation is Water Resource (Burdekin Basin) Plan 2007. The plan should be referenced as this initially and can in subsequent text be described as the Burdekin Basin WRP.

Response:

Changes will be made in the SEIS surface water technical report(s) and the corresponding references were changed in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.1.2).

8B

Recommendation – *The SEIS should refer to the Water Resource (Burdekin Basin) Plan 2007.*

Response:

See above in response 8A.

Comment 9.0 Section 11.5.5.3 Diversion Layouts and Lengths (Page 11-29)

9A

Issue – *The proposed Sandy Creek diversion is a total length of 26km comprising 13.4km of defined watercourse and 12.6km of overland flow diversion (catch drains). The Departmental guideline for watercourse diversions also be applied to the section of the Sandy Creek diversion that is upstream of the defined watercourse - i.e., the entire diversion should be designed in accordance with the guidelines.*

Response:

It is acknowledged that there was some ambiguity about the details of these sections of waterway. Both the 13.4 km of defined watercourse and the 12.6 km of overland flow diversion, a total of 26 km of diversion, will be designed in accordance with the requirements of the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions.

The entire diversion will include a low flow channel (2 year ARI equivalent) and where appropriate, depending on the magnitude of flows, a high flow channel (50 year ARI). A flood levy on the mine side of the diversion channel provides up to 3,000 year ARI flood immunity to the mine pits. In the event of a major flood event, low lying areas along the diversion and levee (located within the Alpha Mine site) will temporarily inundate, providing a natural storage effect similar to the existing creek system. Similarly a levee will be provided to ensure that the creek diversions do not impact on adjacent mine leases. A revised surface water geomorphology report is presented in SEIS Volume 2, Appendix J.

9B

Recommendation – *The SEIS should state that the 12.6km overland flow component of the Sandy Creek diversion be monitored in accordance with ACARP Project C9068 "Monitoring and Evaluation Program for Bowen Basin River Diversions". It is proposed that this would be a condition of the Environmental Authority.*

Response:

Noted and presented in SEIS Volume 2, Appendix J, Section 7.

9C

Recommendation – *The SEIS should apply the DERM guideline to the sections of the Sandy Creek Diversion that are not watercourses. i.e. the entire diversion should be designed in accordance with the guidelines.*

Response:

The entire length of the north western diversion channel, including the Sandy Creek Diversion from chainage 14,500 to Km 25,500 and the upstream section up to Km 14,500, is designed in accordance

with the DERM guidelines. In particular velocities, shear stress and stream power are taken into consideration. The channel size and shape is suited to the magnitude of flows for each respective channel.

Comment 10.0 Section 11.5.5.3 Diversion Layouts and Lengths (Page 11-29)

10A

Issue – *The proposed Spring Creek diversion includes part of a watercourse and then overland flow. The Spring Creek diversion will be considered to be a watercourse from the point of diversion downstream. The proposed diversion will have the characteristics of a watercourse. Therefore the design of the diversion will need to comply with the departmental watercourse diversion guideline.*

Response:

The full length of the Spring Creek diversion will be designed in accordance with the requirements of the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions.

The entire diversion will include a low flow channel and where appropriate (depending on magnitude of flow), a high flow channel and flood levy as part of its design. The flood levy will be designed to contain an event with a return period of 3,000 years. Where necessary a flood levee will be designed between the creek diversion and the adjacent mine lease to ensure that the diversion does not impact on adjacent properties.

10B

Recommendation – *The diversion of Spring Creek for its entirety will be considered a watercourse under the Water Act 2000 and licensed as such. The design of the diversion will need to comply with the regional departmental guideline for watercourse diversions (“Water Diversions – Central Queensland Mining Industry”).*

Response:

Noted. The information on Spring Creek is presented in SEIS Volume 2, Appendix J, Section 5.1.

10C

Issue – *There is a change to the confluence of Spring Creek 9km upstream of the current confluence. The EIS states that this is acceptable due to the geomorphic history of the stream. The EIS does not address what impacts there will be on Lagoon Creek over this 9km to where Spring Creek currently joins Lagoon Creek (except that peak flow increases). The SEIS should state whether there are any mitigation measures that will need to be undertaken within this reach of Lagoon Creek as a result of the change to the confluence. Any authorisation of the Spring Creek diversion will need to consider these downstream impacts.*

Response:

It is acknowledged that there will be a change to the confluence of Spring Creek and Lagoon Creek. Currently Spring Creek travels through an unconfined braided section of waterway and generally ends in a collection of *water melon holes*, with limited flows entering Lagoon Creek. As such the various

anabranches of Spring Creek combine with Lagoon Creek in a distributed formation over a distance of some kilometres.

It is proposed that Spring Creek would be diverted further to the south to enter Lagoon Creek 9 km upstream of the current confluence. The diversion would include a relatively confined waterway with allowance for a low flow channel, high flow channel and flood levy as part of its design. This will mean that some additional flow will travel down the 9 km of Lagoon Creek upstream of the existing confluence with Spring Creek.

Whilst the diversion will result in a concentration of flows from Spring Creek and the surrounding catchment; modelling results show that this will have very little impact on the hydraulic parameters that are used to assess stream stability. The reason for this is one of timing. The peak flow coming out of Spring Creek, with a much smaller catchment, will have come and gone prior to the peak flow coming down Lagoon Creek. As such the individual peak flows are not concurrent so the impact on flows in Lagoon Creek is negligible. In fact the reconfiguring of Spring Creek from an unconfined waterway to a relatively defined waterway will likely cause the peak flow from Spring Creek to enter Lagoon Creek even earlier thus further reducing the likelihood of concurrent flooding.

Each of these diversions will be designed in accordance with the requirements of the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions. All of the diversions and effected waterway reaches will be assessed using the appropriate hydraulic parameters to assess the requirement for mitigation measures. It is noted that there will be an increase in flow for the 9 km of Lagoon Creek downstream of the proposed confluence with Spring Creek and this will be noted when assessing the mitigation measures for this reach of waterway.

10D

Recommendation – *The SEIS should address the impacts on Lagoon Creek for the 9km reach from the proposed diversion outlet to the original confluence with Lagoon Creek. This should include any mitigation measures that may need to be undertaken within this reach of Lagoon Creek.*

Response:

The impact of the diversion of Spring Creek on Lagoon Creek is assessed. The confluence of the original Spring Creek with Lagoon Creek was not clearly defined as most of the flows from Spring Creek would disperse over a wide area, forming an inland delta and storing in shallow 'water melon' pools. There are some small channels that discharge into Lagoon Creek, although it cannot be confirmed whether this is from Spring Creek or as a result of local runoff.

The flows from the Spring Creek diversion channel are now more defined but still form only a small portion of the total flow at the confluence with Lagoon Creek. Peak flows from Spring Creek are 4.9 m³/s for a 2 year ARI event and up to 399 m³/s for the 3000 year event, while Lagoon Creek carries 19.7 m³/s and 2,029 m³/s respectively before the confluence, therefore contributing less than 20% of the combined flow.

It is also noted that the area over which the former Spring Creek discharged into Lagoon Creek, is the 'Murdering Lagoon' area, a wide floodplain area which typically floods with shallow water during both minor and major flood events. The floodplain in this area is in excess of 2 km wide and any afflux impact as a result of the diversion is therefore considered unlikely.

Spring Creek (diversion) will carry sediment with each flood event and this will be transported through the creek system (including diversions), in a similar fashion as occurs in the current natural system.

Comment 11.0 Section 11.5.5 Creek Diversions (Various) & 11.6.3 Impacts of Flooding Level (Page 11-67)

11A

Issues – *The EIS identifies that the width of the floodplain corridors for the diversions is critical for their stability. There needs to be adequate floodplain width in the design of the diversion channels. Changes to the catchments as a result of diversions and levees will increase peak flood levels off lease.*

The information within the EIS is conceptual and identifies that the design of the diversion structures will be refined during the licensing process. In granting approvals for the diversion of watercourses the department is attempting to achieve a diversion structure that appears and functions as a natural feature of the landscape largely indistinguishable from the pre-existing natural watercourse.

The proposed cross sections outlined within the EIS and Appendix F2 identify reductions in the floodplains which in some cases will cause increases in flooding upstream and downstream of the proposed mining lease. The design of the diversions will need to be negotiated with the department through the licensing process, however it should be noted that impacts of flooding should not extend off lease and the proponent may need to implement methods to mitigate these impacts. The proponent in the mine layout should ensure that enough space is provided for the diversion corridor to ensure appropriate design of the structure and in keeping with the principles of the water diversion guideline.

Response:

In accordance with DERM comments and independent (C&R Consultants) flood risk analysis, the floodplain has been widened, providing more storage and conveyance through the diversion / constrained channel.

This notwithstanding, it is impractical to assume that there will be no impact due to the diversion of Lagoon Creek or the redistribution of flows around the mine pits, particularly as the Mining Lease Application (MLA) 70426 boundary is immediately upstream and downstream of the mine works and the existing flood plain through the site is very wide in places. It would be unprecedented to have no impact as a result of a diversion.

The design aims to minimise impacts as much as reasonably possible, with any impacts being minor in nature and of short duration.

11B

Recommendation – *The SEIS should address the design of creek diversions in accordance with the information provided above.*

Response:

Noted and information presented in SEIS Volume 2, Appendix J, Section 5.1.

Comment 12.0 Section 11.6.4.6 Hydraulic impacts on stability of the proposed diversion channels (Page 11-69)

12A

Issues – *Hydraulic impacts on the stability of the proposed diversion channel are only provided for Lagoon Creek within the EIS and not the two other diversions*

Response:

It is acknowledged that limited information was included in the EIS chapter due to a need to keep the document to a reasonable size. A full assessment of the hydraulic impacts has been carried out as part of SEIS Volume 2, Appendix J, Section 6.

Hydraulic modelling has been undertaken for all reaches of the diversions and creeks within the mine lease area. The modelling shows that there are some reaches within Lagoon Creek that would require mitigation measures to account for an increase in some of the hydraulic parameters assessed. The modelling shows that the hydraulic parameters for the other two diversions, Spring Creek and Sandy Creek, are generally within the limits as specified in the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions.

As part of the SEIS, each of the reaches have been assessed and reported upon individually to provide all the modelling details.

Generally, the hydraulic modelling of the diversions will determine flow characteristics close to the limits as specified in the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions. Further refinement of the diversions will be carried out during detailed design and the adopted measures to achieve this are set out in the revised Geomorphology Technical Report.

12B

Recommendation – *The SEIS should describe the hydraulic impacts of all of the proposed diversions on site.*

Response:

A full assessment of the hydraulic impacts has been carried out as part of SEIS Volume 2, Appendix J, Section 6.

12C

Issues – *Hydraulic impacts exceed ACARP guidelines for Lagoon Creek. The capacity of the floodplain is crucial in reducing some of these impacts.*

Response:

Following the EIS and discussions with DERM, the Lagoon Creek floodplain and position of the levee and diversions has been revised, providing a larger channel to convey flows and increasing creek storage.

This notwithstanding, there are areas within Lagoon Creek, and in particular in the vicinity of the downstream end of the diversion, where there are naturally occurring high velocities, well in excess of the ACARP Guidelines, due to the constrained passage that currently exists through this area.

The diversion design, which is developed in accordance with the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions, aims to replicate the natural conditions as closely as reasonably possible.

12D

Recommendation – *The SEIS should describe how to provide floodplain width critical to the stability of the diversions and levees and provide a commitment to ensuring an adequate width when undertaking the detailed mine plan design (including design of levees and diversions).*

Response:

The creek diversions, diversion drains and levees are designed, based on the Queensland Government (2008), Natural Resources and Water, Central West Water Management and Use Regional Guideline: Watercourse Diversions – Central Queensland Mining Industry. As such the resulting channels are sized ensuring that the velocity, shear stress and stream power are within the guideline values, or alternatively, less than the existing values found in the natural creek system. The current design is confident that the creek / channel stability is not compromised anywhere; however during detailed design the creek stability will be reviewed and confirmed to be acceptable. This will be supported by detailed geotechnical investigations to ensure that ground conditions are fully understood.

The stability of the northern and southern diversions is not only defined by the width of the diversion channels and associated levees, but also by the distance between the levee and the highwall. Currently a surplus width of 100 meters is included in the northern and southern corridors. The offset of the pit highwall from the toe of the diversion levees will be confirmed, together with appropriate supporting information as part of the licensing application for the diversions and levees, in accordance with the water Act 2000.

Comment 13.0 Section 11.6.4.6 – Adequacy of Lagoon Creek floodplain corridor for extreme floods (Page 11-72/11-73)

13A

Issues – *The EIS identifies high velocities occurring within the floodplain and recommends further assessment and refinement of the width of the floodplain.*

Response:

Following the EIS and discussions with DERM, the Lagoon Creek floodplain and position of the levee and diversions has been revised, providing a larger channel to convey flows and increasing creek storage.

This notwithstanding, there are areas within Lagoon Creek, and in particular in the vicinity of the downstream end of the diversion, where there are naturally occurring high velocities, well in excess of the ACARP Guidelines, due to the constrained passage that currently exists through this area.

The diversion design, which is developed in accordance with the Queensland Department of Environment and Resource Management (DERM), Central West Water Management and Use Regional Guideline for Watercourse Diversions, aims to replicate the natural conditions as closely as reasonably possible.

13B

Recommendation – *The SEIS should describe floodplain width critical to the stability of the diversions and levees and provide a commitment to ensuring an adequate width when undertaking the detailed mine plan design (including design of levees and diversions).*

Response:

Refer 12D.

Generally the proposed diversion channel in Lagoon Creek provides a greater cross sectional area for the design flows (2 year and 50 year ARI) than the conveyance available under the existing conditions. The adopted flood immunity for the mine is set at 3000 years and hence the levees along Lagoon Creek are set back sufficiently to comfortably pass a 3000 year ARI flood event through the Project area.

Velocity, shear stress and stream power are all lower than the existing values; demonstrating that there is no worsening of the conditions.

During the detailed design process, additional geotechnical investigations will be carried out that will inform the design of any additional erosion protection measures necessary, typically along the levee toe.

Comment 14.0 Section 12.9.8 – Void water**14A**

Issues – *The proposed modelling of final void water quality needs to address all key issues relevant to proposed environmental values and uses of the final void.*

Section 12.9.8 describes how modelling will be undertaken to make predictions of final void water quality, but these predictions are only of salinity. Given the activities on site, it is likely that other water quality indicators will also be important. In particular, nitrogen may be an issue due to use of ammonia nitrogen in explosives.

Response:

Groundwater final void modelling (SEIS Volume 2, Appendix N) allowed for the estimation of the final void (pseudo steady state) water level based on groundwater ingress, surface water runoff, evaporation and direct rainfall.

Final void water levels were predicted. The levels, due to the high evaporation, small catchment area, and rainfall intensity (sufficient intensity is required to provide runoff) are recognised to be too deep for use / readily available.

The deep final void water level indicates little or no potential for decant as the void space is sufficient to accommodate extreme rainfall events over the small disturbed area footprint (all runoff over the rehabilitated backfill is modelled to enter the final void).

Final void water quality will be dominated by chloride and sodium from runoff, groundwater ingress, and direct rainfall. The dissolved salts will concentrate with time due to the negative climate balance, i.e. higher evaporation than rainfall will cause deterioration in void water over time.

The final void water will thus be too deep and too saline for use without pumping equipment and treatment. It is therefore predicted that the environmental values of the final void pit water, over time, will be limited thus the consideration of a raft of elements or chemical parameters is not necessary.

14B

Recommendation – *Ensure that modelling of final void water quality addresses all key issues relevant to proposed environmental values and uses of the final void. This should include nitrogen.*

Response:

An initial final void water level assessment was included in the SEIS document (SEIS Volume 2, Appendix N). The modelling provided predictions of the pseudo steady state level after mining ceases. No evaluation of the final void water quality has yet been conducted. Based on the comments received from DERM, nitrogen will be considered in the final void water quality assessment. The Proponent has committed to developing a Final Void Management Plan within 5 years of completion of mining (SEIS Volume 2, Appendix N).

Final void water quality will be dominated by chloride and sodium from runoff, groundwater ingress, and direct rainfall. The dissolved salts will concentrate with time due to the negative climate balance, i.e. higher evaporation than rainfall will cause a deterioration in void water over time.

The change in groundwater quality will be assessed over time. The suitability for use, based on the current groundwater use domestic and stock watering, will be evaluated over time.

Baseline ambient groundwater quality, collected from the groundwater monitoring points and during the bore survey, will be evaluated to provide representative concentrations of dissolved salts and metals into the final void. Consideration of ammonia (resulting from blasting) and land use (farming) will be included. Surface water components, run off quality, will be included in the evaluation of final void quality with time.

Comment 15.0 Figure 12.4 – Lagoon Creek Wetlands**15A**

Issues – *There is uncertainty as to what monitoring and management measures will be implemented to protect palustrine wetlands on Lagoon Creek*

The environmental management plan and proposed conditions do not address what monitoring and management measures will be implemented to protect palustrine wetland on Lagoon Creek (see Figure 12-4 in Volume 2).

Response:

Groundwater monitoring occurs and will continue at bore AMB04 (EIS Volume 2 Section 12 Figure 12-5), adjacent to the palustrine (modified ox-bow lake) wetland. Piezometric levels, associated with the underlying C-D sands aquifer and a combined piezometric level (from open exploration bores), are at 300 to 305 m AHD, respectively. The elevation of the modified ox-bow lake is at 311 m AHD.

Additional groundwater level data has been compiled adjacent to Lagoon Creek, all of which indicates no hydraulic connection between the confined Colinslea Sandstone aquifers and the overlying perched groundwater and surface water. SEIS Volume 2, Appendix N includes data and an evaluation of the interaction.

EIS Volume 2 Section 19, Table 19-1 indicates that the mapped palustrine wetland is known as Murdering Lagoon, which is a man-made water management feature. This was constructed on Hobartville station in the early 20th century. EIS Volume 2, Section 19.3.3.2.3 indicates that the site represents elements of a rural cultural landscape but has little heritage value (EIS Volume 2, Section

19, Table 19-4). The cultural heritage mitigation measures regarding Murdering Lagoon are compiled in EIS Volume 2, Section 19.4.2.4.

Surface water monitoring and mitigation measures are included in SEIS Volume 2, Appendix V, Section 3.4.7.1.

15B

Recommendations – *Incorporate measures in the environmental management plan and the proposed conditions to ensure protection of the palustrine wetland on Lagoon Creek.*

Response:

As outlined above, environmental monitoring of the Murdering Lagoon on Lagoon Creek will continue. Additional monitoring to be undertaken includes continued surface water and groundwater sampling and aquatic ecology survey (SEIS Volume 2, Appendix V, Section). The design of the mine levee and mine water system also take account of the Murdering Lagoon environment. These measures are incorporated into the EM Plan (SEIS Volume 2, Appendix V) or project commitments.

Comment 16.0 Figure 1.2 – Landfill Site

16A

Issues – *There is inadequate information to confirm that the proposed landfill is sited in an environmentally appropriate location.*

The proposal includes an onsite landfill to deal with wastes regenerated by the project and attendant workforce. The location of the landfill is marked as a small dot of a large scale map (Volume 2, Figure 1.2), but there is no analysis as to whether this site complies with the DERM landfill siting guidelines.

Response:

The current conceptual location and layout of the landfill considers the siting requirements of the DERM guideline. As the facility design progresses, the Proponent will validate addressing of the guidelines through avoidance, engineering and administration to ensure sound environmental and operational management of all relevant landfill features.

16B

Recommendations – *Review the proposed landfill site for compliance with the landfill siting recommendation in the DERM guideline “Landfill siting, design, operation and rehabilitation” See <http://www.derm.qld.gov.au/register/p01312aa.pdf>. Commitments relevant to the landfill also need to be reflected in the environmental management plan and proposed conditions.*

Response:

See above response 16A.

Comment 17.0 Figure 1.2 – Landfill Site

17A

Issues – *The EIS report does not specify proposed mitigation measures for the impacts of the project on groundwater. The EIS states that mitigation measures, including landholder agreements and*

groundwater monitoring measures will be specified in the Environmental Monitoring Program (EMP). There should be a statement and commitment to mitigation and monitoring in the SEIS.

Response:

EIS Volume 5, Appendix G contains details regarding mitigation, monitoring and assessment of groundwater. These principles were revised and outlined in the current EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.2).

The principles of mitigation and monitoring, including mitigation of impacts from infrastructure, have been included in the SEIS (SEIS Volume 2, Appendix V, Section 3.4.7.2). Additions to the commitments, as recommended by DERM, have been included. These are:

- A commitment that the project will be designed to ensure least possible impacts on the groundwater resource(s);
- A commitment to mitigate any adverse effects that may occur such as changes to water quality in both groundwater and surface water resources;
- Compliance with the terms of any water license conditions;
- A commitment to establish an integrated groundwater and surface water monitoring program;
- The trigger levels will be determined by the proponent before the commencement of mine operations and submitted to DERM for approval; and
- The trigger levels for water level and water quality will be those approved by DERM.

17B

***Issues** – The SEIS should include a commitment to operate a groundwater monitoring and reporting program.*

Response:

See above.

17C

***Issues** – The EIS fails to recognise that any water licence issued for dewatering will contain “make good” provisions to ensure that all impacts on landholder water supplies are rectified.*

Response:

It is acknowledged that any water licence issued for dewatering will contain “make good” provisions to ensure that all impacts on landholder water supplies are rectified. Comments to this effect are included in SEIS Volume 2, Appendix V.

17D

***Recommendations** – It is recommended that the SEIS and EMP includes sections dealing with the mitigation, monitoring and assessment of groundwater. The principles outlined in the EMP referring to mitigation and monitoring are supported and can be included in the SEIS.*

The principles of how mitigation and monitoring will be dealt with, including mitigation of impacts from infrastructure should be included in the SEIS building on Section 12.11 of the EIS. In particular it should contain the following:

- *A commitment that the project will be designed based on the precautionary principle to ensure least possible impacts on the groundwater resource*
- *A commitment to mitigate any adverse effects that may occur such as changes to water quality in both groundwater and surface water resources*
- *The proponent will enter into landholder agreements, before mining commences, with any landholder who is predicted to be adversely affected by the project.*
- *The landholder agreements will provide for a long term and equal alternative water supplies, or other agreed rectification methods, that are able to continue to supply water or equivalents after mining operations ceases*
- *How the proponent will comply with the terms of any water license in regards to the rectification of an affected water supply.*
- *A commitment to establish a groundwater and surface water monitoring program to monitor the impacts of the mine on groundwater and any connected surface water.*
- *The proponent will establish trigger levels for water level and water quality parameters which will be used to determine if an adverse impact has occurred on the groundwater resource.*
- *The trigger levels will be determined by the proponent before the commencement of mine operations and submitted to DERM for approval*
- *The trigger levels for water level and water quality will be those approved by DERM.*

Response:

As outlined above the principles of mitigation and monitoring, including mitigation of impacts from infrastructure, have been included in the SEIS (SEIS Volume 2, Appendix V, Section 3.4.7.2).

Comment 18.0 Section 12 – Acid Mine Drainage Potential**18A**

Issues – *The potential for acid rock drainage formation through dewatering of coal seams and carbonaceous shales and mudstones is not adequately addressed.*

There is expected to be a cone of depression in groundwater develop around the pit (section 12 Volume 2). In addition, dewatering of the D-E sandstone stratigraphic units is proposed to prevent hydraulic uplift of the pit floor.

Assessment of potential for acid mine drainage formation in the EIS points to coal seam roof and floor deposits and some other units e.g. carbonaceous shales and mudstones having acid potential. One way in which acid may form is by sulphidic rocks that are in a saturated situation being dewatered, allowing ingress of oxygen and onset of oxidation. There is no assessment of the potential to enhance oxidation of potentially acid forming rock by reducing groundwater elevations.

Response:

Available geochemistry information includes:

- EIS Volume 2, Section 16 (Waste);
- EIS Volume 5, Appendix J1 (Mine Waste); and
- Discussions with A. Robertson, RGS Environmental Pty Ltd, (pers. comm. 15.02.2011).

These data sources indicate that there is limited acid generation potential associated with the carbonaceous shale material and coal seam roof and floor. These units will be exposed within the mine voids and exposed to oxygen.

The groundwater resources associated with the low permeable coal seams and carbonaceous shale are limited and will be dewatered during mining. The voids are to be backfilled and rehabilitated (including the addition of lime to increase the buffer capacity) over time, as discussed in the EIS.

Based on the current envisaged mine plan, a final void will remain after the life of mine. Based on climatic data the final void will act as a sink and this will result in groundwater flow patterns towards the final void. Any potential poor quality groundwater will then move towards the final void, as conceptualised in Figure 12-11 (EIS Volume 2, Section 12).

The potential for contaminant plume migration off site, after mining ceases and rehabilitation is complete, is limited.

The management of acid mine drainage is discussed in the SEIS Volume 2, Appendices S and V, Section 3.7.3.5.

18B

Issues – *Potential for formation of acid rock drainage and its management is a prescribed matter for consideration under section 62 of the Environmental Protection Regulation 1998.*

Also see this submission's advice on Appendix J.

Response:

Noted.

18C

Recommendations – *The SEIS should review the location of samples identified as potentially acid forming (PAF) with respect to groundwater elevations and the extent to which changes in groundwater levels may promote oxidation of these materials. Where there is potential for oxidation, propose mitigation measures with a preference wherever possible for avoidance measures as opposed to treatment as required under section 62 the Environmental Protection Regulation 1998.*

Response:

HCPL has commissioned additional geochemical work on the Alpha Coal Project (SEIS Volume 2, Appendix S, Section 3.1.2), which clearly demonstrates that the small amount of PAF materials are located in close proximity to coal seams and only occur in the unweathered zone. (i.e. materials above the Base of Weathering (BoW) are NAF with excess Acid Neutralising Capacity (ANC). Open-pit mining geological control coupled with pre-mining and ongoing geochemical sampling and testing of overburden and interburden materials will be used to delineate the extent of any PAF materials close to coal seams in the unweathered zone and ensure that these are selectively handled and managed in a similar manner to PAF coarse coal reject materials from the coal handling and preparation plant (CHPP).

PAF coarse reject and any PAF overburden materials will be selectively handled, compacted and encapsulated in NAF overburden materials within a limited period of time (4 weeks) to avoid oxidation as described in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.6.12). Storage areas for these PAF materials will be located above long-term predicted groundwater elevations.

Comment 19.0 Section 16.2.5.1 – Landfill Leachate**19A**

Issues – *There is inadequate information to demonstrate that leachate from the on-site landfill will be effectively managed*

The proposal includes an onsite landfill to deal with wastes regenerated by the project and attendant workforce. This is expected to be similar to a municipal landfill serving a small town, with the addition of mining generated non-regulated waste.

Leachate is to be managed by collection and treatment within a wetland system, with treated leachate reused for on-site mining purposes e.g. dust suppression.

There are concerns over whether the proposed system for managing leachate will be environmentally effective due to the following reasons:

1. *There is no water balance provided to gauge what volume of leachate will be generated. This is especially relevant as a cover system is proposed (200 mm soil + 1800 mm general fill – see) that will likely allow much greater water entry and hence leachate production than the water shedding covers prescribed as minimum standards in the DERM guideline “Landfill siting, design, operation and rehabilitation” See <http://www.derm.qld.gov.au/register/p01312aa.pdf>.*

Response:

Currently, only a schematic water balance is practical. Figure 4-7 depicts a conceptual water balance diagram for the landfill and auxiliary features. The diagram endeavours to account for all sources of water that might influence the environmental performance of the landfill and immediate surrounds. The actual balance will vary through time (seasonal variations and long term climate trends), and a series of water balance iterations will better portray the long-term water balance. As the design develops, a detailed water balance model will assess relevant aspects of the water cycle, including rainfall, evapotranspiration, leachate management, surface water management, subsurface migration, water quality (pre and post treatment) and other relevant factors of water cycle management. Time-dependent iterations will illustrate the change in the balance through the operational life of the landfill and through its post-closure care period.

The post-closure period of water and leachate management will form an integral part of the overall mine rehabilitation and environmental management program. The proposed landfill location is conducive to relatively easy water management. The Alpha lease is, geographically, in a low-rainfall area (Mean Annual Precipitation ~ 500 mm/year); and the landfill is in a very small watershed, with the southern edge of the tailings storage facility (TSF) just a few hundred metres east of the eastern edge of the landfill. These location characteristics result in low surface runoff flows; and thus, a low potential for risk of adverse impact from surface waters, including leachate generation.

The current concept for leachate treatment at the on-site landfill includes a leachate holding tank, a natural vegetation reed bed of a coarse drainage medium and reeds (Monto vetiver grass) planted in the drainage medium, an effluent holding dam and a recirculation pumping system. Leachate from the landfill will flow into the leachate holding tank. The holding tank will discharge pre-determined batch volumes of leachate into the reed bed, filter the leachate through the reeds and drainage medium, and discharge into the collection dam. A recirculation pump within the dam will pump reed bed effluent back to the top of the reed bed for re-filtering, as necessary. Recirculation and re-filtering occurs until the effluent quality is of satisfactory quality for on-site beneficial reuse (e.g. dust control, irrigation) or other appropriate disposal method. Figure 16-3 of the original EIS submittal (Volume 2, Section 16) provides a schematic cross section of the leachate treatment system.

During the post-closure care period of the landfill, leachate management must be part of regular environmental monitoring, and some parts of the system might require automation to ensure continuous operation, even during periods without manual intervention.

The aim of the leachate treatment system is to provide treatment of leachate to the extent that the treated leachate is suitable for:

- Waste moisture conditioning and dust suppression at the active disposal face of the landfill. For dust control and moisture conditioning, leachate discharge only occurs in contained areas that will not allow discharge of any leachate to the environment (e.g. – discharge remains in the closed system of the landfill). Effluent quality limits do not apply to treated waters used for dust suppression and moisture conditioning of waste because discharges will remain in the confines of the closed landfill system.
- Irrigation and dust control on the rehabilitated areas and landfill roads, respectively. Effluent used for these purposes must meet ANZECC or other relevant standards for discharge as irrigation and dust control.
- Discharge to the environment. Treated effluent that discharges to the natural environment must meet all relevant quality guidelines for such discharge types. This is considered an unlikely option and is not pursued as part of the current approvals process.

At the end of the useful life of the leachate treatment system, the pumping system, leachate storage tank, reed bed and appurtenances will require removal, disposal and rehabilitation per relevant guidelines and regulations of the time.

Response to Coal Mine EM Plan comment 22A below includes details of the groundwater monitoring program to be enhanced on site. The monitoring program includes for three monitoring bores adjacent and down gradient of the proposed landfill site. Baseline information will be compiled for the site, which will aid in the optimum landfill design.

19B

Issues –

2. *There are no predictions of leachate quality;*

Response:

The expectation of leachate quality from the Alpha Landfill is quality (with regard to composition and concentrations) that is similar to typical municipal waste (MSW) leachate. Waste generation by the mine should comprise similar components of “household” waste, as generated by office and accommodation compounds and construction and industrial components as generated by the construction and operations phases of the mine site. The following table presents typical components and concentrations of MSW leachate:

Table 0J-2 Components and Concentrations of MSW leachate

Parameter	Range
Heavy Metals	
Arsenic	0.01-1
Cadmium	0.0001-0.4
Chromium	0.02-1.5
Cobalt	0.005-1.5
Copper	0.005-10
Lead	0.001-5
Mercury	0.00005-0.16
Nickel	0.015-13
Zinc	0.03-1,000
Inorganic Macrocomponents	
Total phosphorous	0.1-23
Chloride	150-4,500
Sulphate	8 - 7,750
Hydrogenbicarbonate	610-7,320
Sodium	70-7,700
Potassium	50-3,700
Ammonium-N	50-2,200
Calcium	10 - 7,200
Magnesium	30-15,000
Iron	3 - 5,500
Manganese	0.03-1,400
Silica	4 - 70
pH	4.5 - 9
Spec. Cond. (iS cm-1)	2,500-35,000
Total Solids	2,000-60,000
Organic Matter	
Total Organic Carbon (TOC)	30-29,000
Biological Oxygen Demand (BOD ₅)	20-57,000
Chemical Oxygen Demand (COD)	140-152,000
BOD ₅ /COD (ratio)	0.02-0.80
Organic nitrogen	14-2,500

* Units are mg/L, unless otherwise stated.

19C**Issues –**

3. *Given lack of knowledge of leachate volume and contaminant concentrations, there is no understanding of pollutant loadings being directed to the wetlands (e.g. hydraulic loads and detention times, organic loads, nutrient loads) and whether the wetland is reasonably likely to perform its expected treatment function;*

Response:

At this conceptual design stage, no formal estimate of leachate volume has been completed. On a similar type of landfill design (with regard to waste composition) with a fill capacity about 20% of the Alpha landfill and in a much wetter climate, the leachate generation estimate was a peak of about 5 CuM/day. In a very simplistic case, multiplying this volume by 5 for a similar landfill size estimate results in 25 CuM/day. This relates to a peak flow of about 0.3 L/sec. Speculating on a conservatively small wetland treatment system of 20m x 60m x 2m deep with battered side slopes and an available void in the wetland media of about 20%, yields a flow-through storage volume of about 384 CuM. Applying this available volume against the flow rate of 25 CuM/day (0.3 L/sec) yields a flow through residence time of about 15 days. Assuming a 300% recirculation rate still yields a residence time in the wetland of 5 days, which is adequate time for leachate in the wetland.

The following references serve as evidence of the capacity of Monto vetiver to treat leachate and / or sewage effluent:

- Landfill Leachate Disposal with Irrigated Vetiver Grass; Ian Percy and Paul Truong, September 2005.
- Monto Vetiver Grass Effectiveness In Treating Sewage Effluent, Codyhart Consulting Pty Ltd, November 2001.
- The use of Vetiver Grass for Sewerage Treatment, R Ash and P Truong, 7 April 2004.
- Monto vetiver grass for soil and water conservation; Queensland Governments, NRM facts (land series), P Truong, March 2002

19D**Issues –**

4. *Whilst wetlands are typically used for reducing organic matter (e.g. biochemical oxygen demand) and nutrients (e.g. nitrogen, phosphorus), landfill leachate is also often characterised by acidity (low pH) and elevated metal concentrations. There is uncertainty that these contaminants will be effectively treated by the wetland to a level that enables environmentally sustainable reuse of the water;*

Response:

The following table provides evidence of Monto vetiver's capability to survive in wide ranges of environmental conditions, and previously referenced publications provide evidence of the grass's successful use in coping with non-neutral pH and removal of metals from contaminated soils and waters. Monto vetiver also has strong physical characteristics, supportive of its ability to cope with 'hostile' environments and inability to spread without human intervention.

Table 0J-3 Monto vetiver's tolerance ranges

Characteristic	Level
Soil Condition	Range
Acidity	Min. pH 3.0
Aluminium level (saturated Al %)	Between 68 and 87 %
Manganese	> 578 mg/kg
Alkalinity (highly sodic)	Max. pH 9.5
Salinity	17.5 mS/cm (50% yield reduction) 47.5 mS/cm (survived)
Sodicity	48% (exchange Na)
Magnesium	2,400 mg/kg
Heavy Metals	
Arsenic	100 to 250 mg/kg
Cadmium	20 mg/kg
Copper	30 – 50 mg/kg
Chromium	200 – 600 mg/kg
Nickel	50 – 100 mg/kg
Mercury	> 6 mg/kg
Lead	> 1,500 mg/kg
Selenium	> 74 mg/kg
Zinc	> 750 mg/kg
Climate	
Annual rainfall	400 mm to 4 000 mm
Frost	-11 C (ground temperature)
Heat wave	45 C
Drought (without rain)	15 months

Source: P. Troung (2000), Application of the vetiver system for phytoremediation of mercury pollution in the lake and Yolo Counties, Northern California.

Additional characteristics of the Monto vetiver grass include;

- Sterility: Studies show that this particular cultivar of vetiver has an extremely low (considered sterile) potential to reproduce via seed production;
- Requires physical separation of plant matter (with root and grass in tact) from a “parent” plant for propagation;
- resistant to pests and fires;
- able to survive in an inundated state;
- can be grown on the ground (does not require a specific constructed wetland (CW) setup);
- able to re-grow at a fast rate after harvesting and does not require replanting;
- able to take up water at a rate of 280 m³/ha/day;
- able to grow up to 3.0 m per year under the right conditions

19E**Issues –**

5. *There is no water quality specification for leachate reuse e.g. dust suppression, so it is uncertain whether this is environmentally appropriate or may just lead to transfer of contaminants in leachate into the general environment where they may cause environmental harm e.g. contaminate stormwater; and*

Response:

Re-use of treated leachate is typically restricted to use within a closed system (e.g. – within the watershed of the active landfill such that runoff generated by such activities reports back to the leachate collection system). Most wastes are typically dry (e.g. – well below their saturation point), so a common means of leachate disposal is to spray leachate (treated or untreated) onto the waste prior to compaction and covering. This spraying aids compaction and waste decomposition, reduces dust generation and provides a means of permanent containment of a portion of the leachate (once decomposition is complete, the residue permanently holds a fixed amount moisture).

Discharge to the environment (outside the closed system of the landfill) will only occur after verification that the post-treatment quality of the leachate meets relevant discharge criteria (e.g. similar to discharge for treated grey water for irrigation). Appropriate guidelines for the design of the treatment system and discharges for appropriate uses (dust control, irrigation of vegetation, open discharge to the environment, etc.) will dictate the ultimate means of discharge.

19F**Issues –**

6. *Post closure care of landfills that have accepted putrescibles waste must occur for a significant period after closure of the facility e.g. decades. This is expected to be much greater than the 2 years mentioned in section EIS 16.2.5.1. In this time, leachate will still be generated due to rainfall infiltration into the waste mass. However, there is a concern that post mining, there will not be a use for the treated water and hence the long term fate of this waste stream is uncertain.*

Response:

The Alpha landfill, as with any responsibly operated landfill, will have an operations and environmental management plan, which will include appropriate measures for post-closure care and maintenance of the facility until evidence (typically environmental monitoring results) indicate environmental stability of the landfill. The post-closure care and maintenance period for the landfill is likely to be approximately ten years; however, environmental monitoring results should act as the basis for determining the cessation of post-closure care and maintenance activities, and without setting a definitive timeframe to that post-closure care & maintenance period.

Leachate generation typically begins to reduce significantly after final closure and capping of the landfill, and leachate extraction will continue until such time that leachate production is environmentally insignificant. Until that time, the system will require management, which might require ongoing operation and environmental monitoring of the leachate treatment system, or collection in the leachate holding tank (in the current concept) and transport of extracted leachate to a licensed off-site treatment / disposal facility. After closure, the facility might convert to solar voltaic power generation for necessary pumps and valves, or might use portable pumps and manual labour on a regular schedule to ensure ongoing operation of the system.

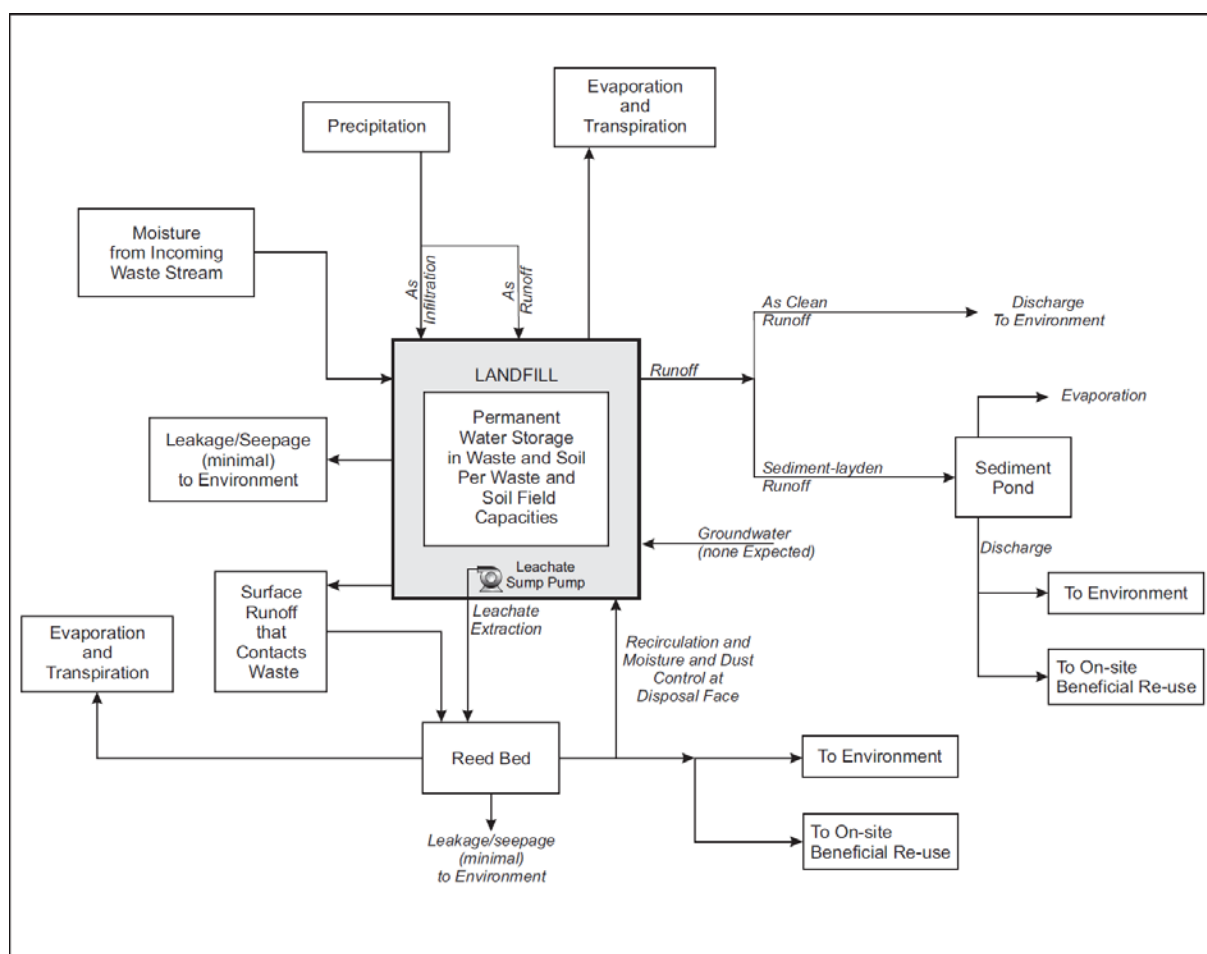
19G

Recommendations – The SEIS should provide a water balance for the landfill, taking account of the proposed higher infiltration cover system. The information on likely leachate volumes from the water balance, together with estimates of likely leachate quality and recognised treatment system design information (e.g. loadings, detention times) should be used to predict treated leachate quality for contaminants likely to be present e.g. organic matter, nutrients, metals, pH.

Response:

A basic water balance for the landfill is provided below in Figure AJ-1. This will be further developed as the facility progresses to detailed design.

Figure AJ-1 Alpha Coal Project (Mine) Conceptual Landfill Water Balance



19H

Recommendations – *The expected quality of the treated effluent should be compared to the water quality specifications for the intended reuse.*

Response:

Relevant guidelines will apply to all discharges of leachate (treated or untreated) from the landfill. Discharge and beneficial re-uses might include:

- Disposal at an off-site facility,
- Moisture conditioning of waste prior to compaction and covering,
- Dust control within the catchment (closed system) of the landfill,
- Dust control outside the catchment (this will require higher quality guidelines than within the closed system),
- Irrigation of areas under rehabilitation,
- Direct discharge of treated leachate directly to the environment (this will require the highest quality guidelines of these listed disposal / use methods).

19I

Recommendations – *Explain how leachate will be treated and managed to avoid discharge to the environment in the period of post closure care, which may last several decades.*

Response:

Leachate generation typically begins to reduce significantly after final closure and capping of the landfill, and leachate extraction will continue until such time that leachate production is environmentally insignificant. Until that time, the system will require management, which might require ongoing operation and environmental monitoring of the leachate treatment system, or collection in the leachate holding tank (in the current concept) and transport of extracted leachate to a licensed off-site treatment / disposal facility. After closure, the facility might convert to solar voltaic power generation for necessary pumps and valves, or might use portable pumps and manual labour on a regular schedule to ensure ongoing operation of the system.

If allowable (on the basis of environmental monitoring results), leachate use might include irrigation or direct discharge to environment. Alternatives might include off-site transport for disposal / treatment at a licensed facility or recirculation (injection) into the landfill, creating a closed flow loop for the leachate.

If off-site disposal is the best option, the current storage tank (or maybe more tanks, if post-closure leachate production warrants) will act as a reservoir to temporarily hold leachate before transport to a licensed treatment / disposal facility.

Comment 20.0 Landfill Closure**20A**

Issues – *It is uncertain whether there are sufficient materials available on site or within an economic distance to construct and close the proposed landfill facility*

The proposed landfill will require a large volume of suitable material for liner construction, cover material and capping. There is no information provided showing that such materials e.g. non-dispersive clays are available, taking account other likely needs such as rehabilitation, and hence that the proposed landfill management measures are practicable.

Response:

Landfill designs most typically incorporate a balance of cut and fill, and use the available materials for construction of liners, daily cover and capping. For cases where suitable natural (clay) material is not available from excavations, synthetic materials are readily available from a variety of suppliers at competitive prices for the development of liner systems. Thick (~ 40 m) weathered Cainozoic sediments, including saprolite, overlays the target Permian coal seams. This clay-rich material will be assessed for suitability when detailed landfill design is undertaken.

20B

Recommendations – *The SEIS should provide information which shows that materials suitable for constructing and managing the landfill are economically available for the project, taking account of any competing uses for such materials e.g. pond and tailings dam construction.*

Response:

See above.

Comment 21.0 Section 19.3.4.2 – Significance level of individual sites (Page 19-20)**21A**

Issues – *The EIS identifies the discovery of cultural heritage places which are assessed as being of potential State significance. Section 89 of the Queensland Heritage Act 1992 requires these sites to be formally reported to DERM.*

Response:

Archaeological places mentioned in the EIS that are of potential state significance will be formally notified to DERM as required by Section 89 of the *Queensland Heritage Act 1992*.

21B

Recommendations – *That archaeological places mentioned in the EIS be formally notified to DERM as required by section 89 of the Queensland Heritage Act 1992. Carl Porter (07 4936 0577) or Cameron Harvey (07 3330 5850) can provide 'Notification of Discovery' forms on request. The SEIS should provide an update on this information.*

Response:

See above in response 21A. The requested information will be forwarded to DERM following the completion of further investigations.

Comment 22.0 Section 19.4.2.2 – Further assessment of the 19th century coach route (Page 19-23)

22A

Issues – *From a partial survey of the study area, a range of heritage sites and artefacts that are of potential State significance have been identified.*

Response:

The NICH field survey is not a partial survey and is complete in regards to best practice requirements and legislation for heritage and the Project's TOR. The survey has identified the need to undertake further investigations and recording of sites (and potential sites) relating to the surviving aspects of the nineteenth century coach route within the study area and their management within a Cultural Heritage Management Plan.

The potential for further artefacts or sites has been determined and measures to protect further potential 'finds' managed within the Project's EM Plan (SIES Volume 2 Appendix V, Section 3.9.6.1).

22B

Recommendations – *Given the potential for further artefacts or sites to be found a comprehensive survey and recording of the study area should be undertaken. Detailed recording of identified sites should be undertaken, significance assessed and management strategy identified.*

Response:

See above.

22C

Issues – *This section identifies a range of activities to be undertaken under a cultural heritage management plan (CHMP) to manage the heritage of the coach route network. No timeframe is identified.*

Response:

Cultural Heritage Management Plan for the coach route network has been completed and is currently under review by the Proponent.

22D

Recommendations – *The CHMP for the coach route network sites should be included in the SEIS and management or mitigation actions incorporated in the EMP.*

Response:

A Cultural Heritage Management Plan for the coach route has been completed and is currently under review by the Proponent. Management and mitigation actions considered by the CHMP will be included in future editions of the Project's EM Plan (SEIS Volume 2, Appendix V).

Comment 23.0 Section 25.1.15 – Rehabilitation program (Page 25-18)**23A**

Issues – Acid mine drainage into surface waters and percolation of contaminated water into groundwater reserves are major legacies of coal extraction, which cause long-term costs for the public and aquatic ecosystems.

Therefore, any rehabilitation assessment should cover the mitigation and monitoring of these potential impacts. The report thus far has no clear commitments pertaining to the mitigation and monitoring program concerning these.

The EIS states:

“The proposed rehabilitation monitoring programme details are provided in the Environmental Management Plan (Vol. 5 Appendix P).”

These are not specified in the EMP.

1. Harries, J. (1997). *Acid mine drainage in Australia: its extent and potential future liability*. Supervising Scientist Report 125. Canberra, Supervising Scientist.

Response:

The Alpha Coal Project EIS and SEIS have made clear commitments to implement strategies to manage PAF materials, such that the potential for acid and metalliferous (AMD) to potentially impact surface and groundwater resources will be limited. For PAF coarse coal reject, for example, there is a commitment by the Proponent for compaction, alkaline amendment, and encapsulation of this material with NAF overburden within a limited period of time to mitigate potential impacts from any AMD.

The EM Plan included with the EIS (Volume 5, Appendix P, Section P.3.6.9.2) and with the SEIS (SEIS Volume 2, Appendix V, Section 3.6.9.2) also provides clear commitments by the Proponent to implement specific strategies for the management of any PAF overburden (most likely coal seam roof and floor materials), coarse coal reject and tailings that aligns with commitments made by the Proponent for managing these materials in the EIS at Section 16 (Volume 2). There is a clear commitment by the Proponent to return any PAF materials to the open pit as soon as is feasible.

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4) provides details of potential impacts to water resources (surface water and groundwater) for the site. Various control strategies for water resources are detailed in that section along with details of monitoring programs that include a range of parameters targeted towards monitoring potential impacts from AMD (e.g. Table V-10 includes monitoring of pH, EC, acidity, major cations and anions (including sulfate) and a range of total and dissolved metals.

The SEIS (SEIS Volume 2, Appendix S, Section 3.3) describes the findings of an extensive range of laboratory kinetic leach column tests (26 tests) on various NAF and PAF mine materials at the Alpha Coal Project. The results have been used to identify the risk of sulfide oxidation and potential impacts to water quality at the site from the release of acid, salts and metals. In the proposed operational phase of the Alpha Coal Project, the Proponent is committed to conduct larger-scale field trial kinetic tests to provide further validation of the effectiveness of the proposed mine material management strategies.

23B

Recommendations – *The SEIS should better identify risks that include but are not limited to long-term effects of:*

- Acid mine drainage. Assess risk of sulfidic oxidation and generation of contaminated water, including the transfer of sulphates and metals

Response:

The Alpha Coal Project EIS and SEIS has already identified where PAF materials may occur at the Alpha Project and has made clear commitments in the EM Plan (SEIS Volume 2, Appendix V, Section 3.6.12) to implement strategies to manage PAF materials, such that the potential for acid and metalliferous drainage (AMD) to potentially impact surface and groundwater resources will be limited. For PAF coarse coal reject for example, there is an HCPL commitment for compaction, alkaline amendment, and encapsulation of this material with NAF overburden within a limited period of time (4 weeks) to mitigate potential impacts from any AMD.

The SEIS (SEIS Volume 2, Appendix S, Section 3.3) describes the findings of an extensive range of laboratory kinetic leach column tests (26 tests) on various NAF and PAF mine materials at the Alpha Coal Project. The results have been used to identify the risk of sulfide oxidation and potential impacts to water quality at the site from the release of acid, salts and metals. In the proposed operational phase of the Alpha Coal Project, HCPL is committed to conduct larger-scale field trial kinetic tests to provide further validation of the effectiveness of the proposed mine material management strategies.

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4) provides details of potential impacts to water resources (surface water and groundwater) at the site. Various control strategies for water resources are detailed in that section along with details of monitoring programs which include a range of parameters targeted towards monitoring potential impacts from AMD (eg. Table V-10 includes monitoring of pH, EC, acidity, major cations and anions (including sulfate) and a range of total and dissolved metals).

In the EIS Volume 2, Section 16.6.3.4 there are a number of existing commitments to mitigating and monitoring potential impacts from any PAF coal and mining waste materials including:

- Surface water and leachate derived from, or in contact with, coal and mining waste materials will be monitored to ensure that water quality is being managed and not significantly compromised by proposed site management practices;
- Potentially impacted surface waters will be primarily managed by retaining water on-site. This water will be reused in the site water management system. This will be particularly important in the CHPP and open pit areas where stored materials may produce brackish run-off water;
- Coal and mining waste materials will be monitored for geochemical characteristics (pH, EC, acidity, alkalinity, sulphur species (total, organic, sulphide and sulphate) and ANC) on a monthly basis until such time as the variability of the geochemical characteristics of these materials is well defined (approximately 12 months); and
- Surface and seepage water at coal and mining waste storage areas will be monitored on a monthly basis and tested for pH, EC, Total Dissolved Solids (TDS), acidity and alkalinity. Major anions (sulphate, chloride, fluoride), major cations (calcium, magnesium, sodium and potassium) and trace metals (aluminium, arsenic, antimony, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, uranium, vanadium and zinc) will be included in the range of parameters tested in these water samples, initially on a quarterly basis (for 12 months) and then on an annual basis throughout the life of mine. Should the pH of the TSF seepage water

decrease below pH 5.5 or the EC increase by more than 100% from typical background values, the full range of parameters described above will be included in the test suite.

Comment 24.0 Section 25.2.2.3 – Dams and Surface Water Features (Page 25-18)

24A

Issues – *All sedimentation dams which assist in the water flow from the rehabilitated surface will be retained following mine closure.*

Response:

This submission relates to the take of overland flow after mining operations have ceased.

At mine closure, all sedimentation basins will be decommissioned as they will no longer need to perform a sediment deposition function.

Selectively, some dams may be retained to provide a temporary detention function rather than a sediment control function. This currently occurs naturally in the sandy beds of the creeks and in the *melon hole* area of Spring Creek.

It is envisaged that all areas ultimately draining towards Lagoon Creek, which will comprise the area west of Lagoon Creek up to approximately year 15 of mine life, will be fully restored and drain unhindered to Lagoon Creek. This will only occur after the water quality has reached an acceptable standard. Prior to this all poor quality runoff will be diverted to the final void until such time as monitoring indicates it is suitable for discharge to Lagoon Creek.

The area to the west of the year 15 of mine-life divide, will also be fully rehabilitated and drain to the final void.

24B

Recommendations – *The SEIS should address the take of overland flow post mine operation and the need to comply with the provisions of the Water Act 2000 and the Water Resource (Burdekin Basin) Plan 2007.*

Response:

As stated above in response 24A, it is envisaged that all areas ultimately draining towards Lagoon Creek, which will comprise the area west of Lagoon Creek up to approximately year 15 of mine life, will be fully restored and drain unhindered to Lagoon Creek. This will only occur after the water quality has reached an acceptable standard. Prior to this all poor quality runoff will be diverted to the final void until such time as monitoring indicates it is suitable for discharge to Lagoon Creek.

The area to the west of the year 15 of mine-life divide, will also be fully rehabilitated and drain to the final void.

A Final Void Management Plan (FVMP) will be developed within the fifth year after the commencement of the mine's operations. The FVMP will address all relevant statutory requirements. A Post Closure Management Plan will be developed as committed to in the Draft EA conditions. The Post Closure Management Plan will address all relevant statutory requirements relating to overland flow.

Comment 25.0 Section 25.2.3.2 – Final Void Management (Page 25-20)**25A**

Issues – Surface inflow directed into void. The take of overland flow post mine operation will need to comply with the provisions of the Water Act 2000 and the Water Resource (Burdekin Basin Plan 2007).

Response:

A Final Void Management Plan (FVMP) will be developed within 5 years of completion of the mine's operations. The FVMP will address all relevant statutory requirements.

Void management principles and objectives are provided in the EM Plan (SEIS Volume 2, Appendix V, Section 3.7.7.1), and cover void management objectives, water quality, low / high wall stability, spontaneous combustion, control of surface flow and safety.

25B

Recommendations – The SEIS should address the inflow directed to the final void.

Response:

See above response 25A. Groundwater predictions regarding groundwater flow patterns, toward the final void, post closure have been included in the EIS and SEIS groundwater sections. All runoff within the disturbed areas will be diverted into the Final Void. Clean water diversions will ensure that clean water will remain within the catchments.

Comment 26.0 Appendix J - Overburden**26A**

Issues – The SEIS should present the information relevant to geochemical characterisation of waste rock, and to a lesser extent coarse rejects and tailings, in a way that comprehensively demonstrates how the risk of acid and saline drainage can be mitigated. Mismanagement of wastes (such as waste rock, tailings, rejects) can cause ongoing environmental harm via stormwater contamination and poor rehabilitation outcomes.

There is a limited number of drill holes (35) and samples (277) used in the studies and the failure to better correlate these holes and samples with other data, especially considering that there were 484 drill holes from which coal samples were taken for coal quality testing.

Appendix J states that many of the drill holes in their database were not lithologically logged; therefore the quantities of various waste rock materials has been derived from geostatistical models rather than detailed geological data e.g. there appears to be a significant difference in identified potential acid producing materials (PAF) when calculated using NPR or AMIRA.

A geostatistical approach has also been used to extrapolate geochemical characteristics between the widely spaced sample points across the project area and this has led to a level of "generalisation" in the conclusions drawn from results.

The report concludes that the sample density (spacing between sample points) is likely to be deficient for some geochemical parameters, at least in the north-south aspect. Uncertainty is also introduced

by the fact that sample intervals do not appear to represent complete drill sections (although this is not explained).

In more detail, the following apparent deficiencies are noted:

- 77 samples were subjected to simple leach testing and multi-element analysis.
- five samples, none of which appear to represent the waste rock lithologies, have been subjected to kinetic column leach testing. However it is understood that further testing is underway.
- Some diagrams are unclear as units are missing or appear incorrect

Overall, the Appendix J conclusions, whilst possibly ultimately correct, are not really verified by the data presented.

The main points are:

- Saline run-off/leachate is likely to be released from some waste rock materials.
- The majority of the waste rock is NAF but 11% is PAF.
- Specific lithologies (eg carbonaceous material) are likely to be PAF
- Coarse rejects and tailings are PAF
- Some waste materials are clayey and dispersive.
- It is not known if PAF materials will be identifiable on the work face or if simple tests are available to identify the PAF materials. It is recognised though that the carbonaceous material is readily identifiable.

Although the suggestion is that the NAF and PAF materials can be co-disposed, either in pit or out of pit, without significant risk of acid leachate generation, this is not conclusively demonstrated by the data presented. The report acknowledges that additional geochemistry work is needed, including additional sampling. It is likely that selective mining of PAF units and their safe burial within NAF materials in the pit will be required to lessen the risk of contaminated runoff/leachate from waste rock piles.

Response:

The SEIS (SEIS Volume 2, Appendix S, Section 3.2) has presented the geochemical characteristics of mining materials in a way that comprehensively demonstrates how the risk of acid and saline drainage will be mitigated to provide acceptable water resource and rehabilitation outcomes.

The number of drill-holes (35 + 4) and samples (278 + 25) utilised in the EIS compares favourably with drill-hole and sample numbers used in recent EIS programs for subsequently approved coal mines in Queensland. The SEIS (SEIS Volume 2, Appendix S, Section 3) describes the generation and geochemical testing of a further 24 C Upper coal seam samples and 44 raw coal, washed coal, coarse coal reject and tailings samples from the C and D seam plies, which were sourced from some of the 15 geotechnical holes also utilised for geochemical sampling and testing in the EIS.

In the EIS sulphur speciation data for 988 coal samples from a wide range of drill-holes (252) across the Project area were used to demonstrate that the risk of AMD from coal and tailings materials was less than that of coarse reject due to the presence of organic sulphur, which does not generate acid. The SEIS (SEIS Volume 2, Appendix S, Section 3.5.3 and 6) contains a number of geological cross-section figures which correlate information from the geological model at the Project with geochemical information from material characterisation studies.

As described in the response to Submission Number CM226 (SEIS Volume 1, Section 5), the Proponent has highlighted the limitations of the Canadian Net Potential Ratio (NPR) material

classification criteria (especially for low sulphur materials) relied upon in the EIS (SEIS Volume 2, Appendix S, Section 3.5). Using alternative classification criteria that includes a low sulphur cut-off threshold provides greater confidence in the likely quantities of PAF material. The low sulphur cut-off threshold method has significantly reduced the amount of material identified as PAF and demonstrates that these PAF materials are located in or close to the coal seams. There is now no significant difference in the amount of PAF materials calculated using the NPR or AMIRA methods.

The Proponent has committed in the SEIS to completing an infill drilling program at the Alpha Coal Project to increase the drill-hole density in the north-south direction (SEIS Volume 2, Appendix S, Section 3.5.2). The additional drill-holes will be cored from surface and are designated solely for geochemical sampling, such that competing sampling interests (such as geotechnical and coal quality) do not result in incomplete drill sections being available for geochemical testing, as occurred for the EIS.

The number of samples (77) subjected to leach testing and multi-element analysis is again quite large compared to sample numbers used in coal projects located in similar Tertiary- and Permian-age geological environments in Queensland and in recent EIS programs for subsequently approved coal mines in Queensland. The SEIS (SEIS Volume 2, Appendix S, Section 3.3) describes the findings of an extensive range of laboratory kinetic leach column tests (26 tests) on various NAF and PAF mine materials at the Alpha Coal Project. The sampling strategy used for the kinetic leach column tests was intentionally skewed towards those materials where there is some tangible risk of acid generation or metals release.

It is not possible to respond to “*Some diagrams are unclear as units are missing or appear incorrect*” as the specific diagrams and relevant documents are not provided by the submission provider; however, the additional geochemical assessment data and methods included in the SEIS have generated additional figures and a revision of some existing figures, which may have improved the clarity.

The submission provider provides a summarised dot-point interpretation of geochemical information presented in the EIS. This information needs to be clarified in light of new information presented in the SEIS (SEIS Volume 2, Appendix S). The main points are:

- Saline run-off/leachate is likely to be released from some overburden materials (most likely from tertiary clay materials). Tertiary clay materials are also likely to be dispersive. These materials will not be placed on the final cover or batters of the overburden storage facilities.
- The overwhelming majority of the overburden is NAF and will not require selective handling. PAF material is located either in, or very close to, the coal seams.
- Specific lithologies (e.g. carbonaceous material) in, or close to, the coal seams are likely to be PAF. PAF materials will be selectively handled and managed in a similar manner to PAF coarse reject materials.
- Some coal, coarse rejects and tailings are PAF. For PAF coarse reject there is a commitment by the Proponent for compaction, alkaline amendment, and encapsulation of this material with NAF overburden within a limited period of time to mitigate potential impacts from any AMD. There is a clear commitment by the Proponent to return any PAF materials to the open pit as soon as is feasible.

In response to the submission provider's list of dot points for the suggested disposal of overburden materials, the Proponent has committed to the following:

- Overburden material will be progressively geochemically characterised in advance of mining using data from drilling and sampling programs described in SEIS Volume 2, Appendix S, Section 3.5.2.

- Drill-hole spacing and drill-hole sampling intensity will be as described in SEIS Volume 2, Appendix S, Section 3.5.2, on the basis of overall risk the materials pose to the environment and the outcomes of the geostatistical modelling undertaken in the EIS. This approach is sufficient to address any existing uncertainties associated with the geochemical characteristics and the distribution of the various overburden materials at the Alpha Project. The mining industry in Australia and Internationally has moved away from prescribing a specific number of samples per amount/weight of waste material as each mine site is different, especially those mining different commodities in different geological environments (DITR, 2007; and INAP, 2009).
- Records of the overburden disposal will be kept to indicate locations and characteristics of materials stored in the final landform;
- Where the acid producing potential of material indicates that the material is PAF, further kinetic testing at an appropriate sampling rate will be conducted to establish oxidation rates, potential reaction products and effectiveness of control strategies; and
- The maximum duration of surface exposure of potentially acid producing material to oxidising conditions is four weeks.

The revised EM Plan addresses the SEIS information presented above and provides relevant commitments to overburden management (SEIS Volume 2, Appendix V, Section 3.7.6.1)

26B

Recommendations – *The SEIS should detail commitments to the following management of overburden disposal:*

- *all material must be progressively characterised during disposal for net acid producing potential (NAPP) and key contaminants;*
- *characterisation should be undertaken at a nominated minimum rate of regularly spaced samples per 500,000 tonnes of waste material;*
- *records must be kept of the spoil disposal to indicate locations and characteristics of materials stored in the landform;*
- *where the acid producing potential of material indicates that the material is PAF, further kinetic testing at a nominated sampling rate should be conducted to establish oxidation rates, potential reaction products and effectiveness of control strategies; and*
- *maximum duration of surface exposure of potentially acid producing material to oxidising conditions is one (1) month.*

A revised EMP should address the SEIS information as above and provide relevant commitments to waste rock management.

Response:

- Overburden material will be progressively geochemically characterised in advance of mining using data from drilling and sampling programs described in Volume 2, Appendix S, Section 3.5.2 of the SEIS.
- Drill-hole spacing and drill-hole sampling intensity will be as described in Volume 2, Appendix S, Section 3.5.2 of the SEIS, on the basis of overall risk the materials pose to the environment and the outcomes of the geostatistical modelling undertaken in the EIS. This approach is sufficient to address any existing uncertainties associated with the geochemical characteristics and the

distribution of the various overburden materials at the Alpha Project. The mining industry in Australia and Internationally has moved away from prescribing a specific number of samples per amount/weight of waste material as each mine site is different, especially those mining different commodities in different geological environments (DITR, 2007; and INAP, 2009).

- Records of the overburden disposal will be kept to indicate locations and characteristics of materials stored in the final landform;
- Where the acid producing potential of material indicates that the material is PAF, further kinetic testing at an appropriate sampling rate will be conducted to establish oxidation rates, potential reaction products and effectiveness of control strategies; and
- The maximum duration of surface exposure of potentially acid producing material to oxidising conditions is four weeks.

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.6.12) addresses the SEIS information presented above and provides relevant commitments to overburden management.

Comment 27.0 Section 25.2.3.2 – Final Void Management (Page 25-20)

27A

Issues – *The bulk sample will potentially yield useful data on the waste rock characteristics at that site and its performance once excavated. It is recognised that further drilling and characterisation of waste rock is underway and that commitments to progressively sample/test waste rock will be put in place for the life of the project as required.*

An enhanced level of confidence in waste rock character and management strategies is sought in the SEIS.

Response:

The Bulk Sample Project is proceeding according to the Mining Waste Management Plan for that Project (HPPL, 2010). The Proponent has committed to further drilling and sampling at the Alpha Coal Project to allow geochemical characterisation of mine materials in advance of mining, as described in SEIS Volume 2, Appendix S, Section 3.5.2.

The SEIS (SEIS Volume 2, Appendix S) provides an enhanced level of confidence in coal and mining waste characterisation and management strategies. Information for the Bulk Sample Project and further drilling programs will provide further enhancement when available.

27B

Recommendations – *The SEIS should address these issues and include an update of the practical knowledge gained from the bulk sample and further drilling program.*

Response:

See response to 27A above.

AJ.5 Rail Line

Comment 7.0 Section – Alpha Rail Line EIS

9A

Environmentally Relevant Activity (ERA)

Issue - The EIS has not addressed the information required to condition ERAs to be carried out along the proposed rail line. It is likely that the following ERAs will be conducted (but not limited to): Chemical Storage, Extraction and Screening, Bulk Material Handling, Sewage Treatment, Concrete Batching, Motor Vehicle Workshop.

The minimum information requirement for the EIS is to allow determination of whether the ERAs can be located and operated in support of the rail line. There is an enhanced information requirement on the EIS stage if the ERAs are to be conditioned as part of the Co-ordinator General's report (and delegated to DERM). Alternatively further information can be provided after the EIS stage through a development application under the Sustainable Planning Act 2009.

Recommendation - The SEIS should clearly state the complete list of ERAs (including the location of each ERA) and the applications required under the Sustainable Planning Act 2009 for any material change of use approval for development involving an ERA that will be subject to and conditioned in any Coordinator General's Report.

On the basis that the Coordinator General's Report is to fully condition the project ERAs then information as described in the Terms of Reference for the EIS and supporting guidelines as well as proposed conditions for the required ERAs should be provided in the SEIS. The ERA conditions provided in the CG Report will then be delegated to DERM (e.g. ERAs 8,16,50,63,43,21).

Response 9A

Volume 3, Section 1. 11. 3. 4 of the EIS provides a general description of the MCU DAs for Environmentally Relevant Activities (ERA) that may be required during the construction and operation phases of the Project. In addition to this section, Table 5-1 provides a more detailed list of ERAs that may be required for the Project. Approximate location of works and description of likely works has also been provided. HPPL is not requesting that ERA's associated with the rail construction and operation be approved as part of the Coordinator Generals Report.

Further detail regarding location of works and thresholds will be determined during the detailed design stage of the Project and will be submitted to DERM for assessment and approval in accordance with the *Sustainable Planning Act 2009* and *Environmental Protection Act 1994*.

DERM has also advised the Proponent to submit development applications for ERA's in packages which are consistent with the sequence and on-going obligations of the Project scope. Accordingly mobile and temporary ERA's only required during the construction phase of the Project will be separated from permanent activities. The same will apply when assessing devolved ERA's to determine which activities will be best managed by the local authority or DERM. This approach will enable activities to be decommissioned and removed from registrations separately without having to reapply for continuing uses.

Table 0J-4 Environmentally Relevant Activities

Environmentally Relevant Activity (ERA)	Description of proposed trigger and approximate location of works
ERA 8 Chemical Storage	This permit may be required for the purposes of storing dangerous goods and chemicals on the marshalling yard, construction laydown areas, precast sleeper manufacture area, rail welding facility, and work camps along the Project corridor.
ERA 16 Extractive and Screening Activities	<p>Extracting other than by dredging and screening a total of 1000t or more of material from an area other than a wild river area triggers this permit.</p> <p>This ERA may be required for establishment and operation of new quarries necessary to provide capping and ballast for construction of the Project. Geotechnical investigations are yet to be undertaken to confirm if such activities will be required for the Project.</p>
ERA 17 Abrasive Blasting	<p>This permit is triggered for abrasive blasting activities which consist of cleaning equipment or structures on a commercial basis using a stream of abrasives in either a wet or dry pressure stream.</p> <p>This permit may be required for abrasive blasting to be undertaken within the marshalling yard.</p>
ERA 21 Motor Vehicle Workshop Operation	<p>This permit is triggered for operation of a workshop on a commercial basis or in the course of carrying on a commercial enterprise involving maintenance of mechanical components, engine cooling radiators or body panels, spray-painting body panels and detailing/washing. This permit is triggered if a fleet of 10 or more vehicles is to be operated.</p> <p>This permit may be required during construction and operation stages of the Project within the marshalling yard and construction depot.</p>
ERA 33 Crushing, grinding or screening, milling	<p>Required for crushing, milling, grinding or screening more than 5000t of material such as waste (other than putrescibles waste) in a year. This type of operation may occur within the marshalling yard, quarry areas and construction depot.</p> <p>This permit will not be required if the aforementioned activity is covered under the provisions of the ERA 16 Extractive and Screening Activities.</p>
ERA 43 Concrete Batching	<p>Required for production of 200t or more of concrete or concrete products in a year, by mixing cement with sand, rock, aggregate or other similar materials.</p> <p>This permit may be required for construction of the Project.</p>
ERA 50 Bulk Material Handling	<p>Required for loading or unloading of minerals at a rate of 100t or more a day or stockpiling 50,000t or more of minerals in connection with operations at a port and for stockpiling materials in connection with operations at a port.</p> <p>This permit will be required for the operation stage of the Project, which will involve transport of coal from the Alpha Coal Mine to the Port of Abbot Point.</p>
ERA 63 Sewage Treatment	<p>Required for operation of one or more sewage treatment works at a site that has a total daily peak design capacity of at least 21 EP or operating a sewage pumping station with a total design capacity of more than 40 KL in an hour.</p> <p>This permit may be required during construction and operation stages of the Project in areas such as construction camps, marshalling yard and the construction depot.</p>

Environmentally Relevant Activity (ERA)	Description of proposed trigger and approximate location of works
ERA 64 Water treatment	<p>For desalination of more than 0.5ML/day or treating more than 10ML/day of raw water.</p> <p>This permit may be required to be obtained for the purposes of these works occurring within the marshalling yard, construction depot and construction camps.</p>

Comment 8.0 Section 1 – Introduction (Pg 1-74)

10A

Issue - The section states that the railway loop ‘...crosses the most degraded part of the wetland.’ However, the palustrine section of the Caley Valley wetland is mapped as being of High Ecological Significance.

Recommendation - The SEIS should demonstrate how the design and mitigation methods protect the high ecological significance of these wetlands. Refer also comment on Section 2.4.

Response 10A

Additional aquatic assessments have been undertaken and relevant reporting is contained within Volume 2, Appendix AI of the SEIS. This reporting has identified additional management or mitigation required for waterbirds, fish and aquatic habitats.

Comment 9.0 Sections 1.3, 19.2.2.2, 19.2.2.7.1 and following: Also Vol 6. Appendix J (Various Pages)

11A

Issue - The existence of cultural heritage values and places has been established in the study area, as has the potential for further places of heritage significance to exist. No field survey has been conducted outside the mine area (e.g. in the rail corridor) to identify and locate known or potential places. For example, the old Bowen Downs Road is significant at a State level. Any features of the Old Bowen Downs Road in the vicinity of the rail corridor should be identified, accurately recorded and appropriate mitigation measures put in place.

Recommendation - The SEIS should detail a systematic field survey of the project areas (rail) as conducted by a suitably qualified professional to identify non indigenous cultural heritage. A report of the findings of field survey should be presented in the SEIS, including detailed recording of identified sites and their relationship to the project footprint, site impacts and proposed mitigation measures. Mitigation measures should also be reflected in the project EMP.

Response 11A

A field survey of the Project areas (Rail) has been completed by Converge Heritage + Community (a suitably qualified professional to identify non indigenous cultural heritage). The fieldwork has identified three sites of non-Indigenous Cultural Heritage significance. The report contained within Volume 2, Appendix AK of this SEIS represents the findings, including detailed recording of identified sites and their relationship to the Project area, potential for further sites to exist and the potential for

site impacts and proposed mitigation measures. If required mitigation measures, (in addition to those currently provided), will be reflected in the Project EM Plan (SEIS Volume 2, Appendix AC).

Comment 10.0 Sections 1.11.3.6 Transport Infrastructure Act 1994 (TI Act) (Page 1-21)
12A

Issue - The document states “unless the clearing is an exception under Part 1, Schedule 8 of the TI Act”. There is no such schedule.

Recommendation - The SEIS should properly identify the section of legislation referred to.

Response 12A

The legislative references in this section of the EIS are incorrect. The correct references are detailed in the following amended wording:

In general, development which is a MCU undertaken on strategic port land (SPL) and which is inconsistent with a land use plan approved under the *Transport Infrastructure Act 1994* (TI Act) triggers assessment under Schedule 3 of the *Sustainable Planning Regulation 2009* (SP Reg). Other development made assessable through Schedule 3 also applies on SPL. Reconfiguration of a lot on SPL is exempt development.

Comment 11.0 Section 2 – Figure 2.1 Sheet 3 of 14 (Page 2-2)

13A

Issue - No Flora or Fauna surveys have been conducted on the sections of the rail line that are to traverse through Lots 1 RU89 (St. Aubins) and Lot 5 RU81 (Beresford). This area has been assessed under the State’s Biodiversity Planning Assessment as a state significant remnant of re. 11.5.3 – the largest in the Northern Brigalow Belt bioregion and as such provides irreplaceable habitat to a range of woodland fauna species. The regional ecosystem 11.5.3 is not mentioned in the list on page 9-11.

Recommendation - The SEIS should address the above information and how the rail line is routed to avoid this area. Alternatively the nature conservation values of this area need to be surveyed and described and an impact mitigation plan submitted for the area as part of the SEIS and EMP. Mitigation should also include offsets.

Response 13A

Additional ecological field work has been scheduled however due to poor weather conditions and restrictions on site access they are yet to occur. It is expected that this additional terrestrial and aquatic fieldwork will be undertaken by the end of July 2011. Results and impact assessments from this fieldwork will be provided within an updated Terrestrial Ecology Report (SEIS Volume 2, Appendix AE) and Aquatic Ecology Report will be submitted to DERM for consideration and assessment by mid-August 2011.

Comment 12.0 Section 2.4 Preferred Rail Alignment (Page 2-16)**14A**

Issue - *The EIS states that the most suitable location of the rail loop adjacent to Abbot Point is within the Caley Valley Wetlands based on assessment of key economic, engineering, geographic, geotechnical, environmental and social factors.*

Policy 2.8.2 of the State Coastal Management Plan – Queensland's Coastal Policy provides that further loss or degradation of coastal wetlands is to be avoided and impacts on coastal wetlands prevented, minimised or mitigated. The location of the rail loop within the wetland will directly reduce the area of the wetland and has the potential to significantly impact on the values of the wetland.

The Caley Valley wetland is a wetland of high ecological significance in a Great Barrier Reef catchment. Temporary State Planning Policy 1/10 Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments provides:

“Development in or adjacent to wetlands of high ecological significance in Great Barrier Reef catchments is planned, designed, constructed and operated to minimise or prevent the loss or degradation of the wetlands and their values, or enhances these values.”

The EIS has not considered alternative locations for the rail loop that would not impact on the Caley Valley wetland, such as offsets and/or locating the loop and dump station further to the west and conveying coal to the stockpile site.

The EIS does not consider the cumulative impacts of multiple projects on the Caley Valley wetland. This comment also relates to parts of section 10.3.

Recommendation - *The SEIS should provide additional information to demonstrate that alternatives to locating the rail loop within the Caley Valley wetland were realistically considered. The SEIS should detail why such alternatives are not viable options, or detail the preferred alternative that better mitigates the impacts.*

Response 14A

Volume 3, Section 1. 7. 1 briefly describes the railway options process. During the selection of an alignment a variety of environmental, engineering and social factors were considered and alignment options investigated prior to aquatic ecology on ground assessment. Options for providing new transport infrastructure to the Port of Abbot Point are highly constrained. Various design options were provided to DEEDI (formerly DIP) as assessment managers of the Abbot Point State Development Area (APSDA).

Following the abovementioned consideration, two principal options for accessing the proposed coal terminal at the Port of Abbot Point were identified.

The two (2) options entering the APSDA and travel east, generally parallel to the Bruce Highway before turning north, and crossing the highway and North Coast Rail line. From this point Option 1 turns west, then north entering the proposed multi-user infrastructure corridor (being developed by the Department of Infrastructure and Planning), heading in a northerly direction before running due east to the coal out-loader at the coal terminal and then turning south to exit the APSDA. Option 2 turns west from the crossing to run parallel to the Abbot Point Rail line, to the coal out-loader and terminate in a balloon loop.

Each option involves impacts to the Kaili (Caley) Valley Wetland, however in terms of total impacts it is considered that option 2 results in a lesser overall impact:

- Option 1 bisects the wetland both east-west and north-south, whilst Option 2 has an edge effect;
- Option 1 would involve significant disturbance and excavation to areas of potential ASS and actual ASS;
- Option 1 has a reduced total footprint area of impact to the wetland than with Option 2; and
- Both options comprise earth embankments and elevated structures designed to minimise hydraulic impacts and changes to the tidal regime of the wetland.

The second option, having a balloon loop at the southern end of the coal terminal, was determined to provide a preferential outcome on engineering and environmental considerations.

Consultation with the Coordinator Generals Office is continuing with regards to the Kaili (Caley) Valley Wetlands Draft Environmental Management Plan (DEEDI, 2011) and how its mitigation and management strategies will impact the Project.

Additional aquatic assessments of this impacted area have been undertaken and relevant reporting is contained within Volume 2, Appendix AI of the SEIS. This reporting has identified additional management or mitigation required during the construction and operation of the Project to address potential impacts on waterbirds, fish and aquatic habitats.

Comment 13.0 Section 2.4 Preferred rail alignment – Future dam site

15A

Issue - A restricted area (RA8) under the Minerals Resources Regulation (2003) was created to preserve an identified dam site for future development when required. RA8 preserves 1 of several damsites that has been previously identified and investigated to some extent. It is a site in the vicinity of Eaglefield at AMTD 244.0 km on the Suttor River. A stream gauging station has been installed, operated and maintained by DERM at Eaglefield since August 1967.

Restricted areas created under the Minerals Resources Regulation (2003) are defined in terms of blocks and sub-blocks and it would appear that the upper limit of the ponded area planned is about AMTD 267.0 km on the Suttor River and that water would be ponded up Suttor Creek to about 5 km above the Boundary Creek Junction.

The Queensland Government is committed to identifying and preserving dam sites that may be required for future development and the Department of Environment and Resource Management is responsible for preservation of those sites in accordance with action 2.4 of the Queensland Water Plan 2005-2010 and under the Minerals Resources Regulation (2003).

"... Sites need to be protected from incompatible land uses that would hinder their suitability for water storage. These activities include construction, intensive land use, and activities that affect water quality ..."

In the recent past DERM has dealt with several Exploration Permits for Coal (EPC), Exploration Permits for Minerals (EPM), Exploration Permits for Coal (EPM) and a Minerals Development Licence (MDL) that encroach on RA8.

Recommendation- It is recommended that the rail corridor as shown in the SEIS is located so that it does not encroach within a 5m vertical buffer of the ponded area of the proposed Suttor River dam site preserved by RA8.

It is recommended that the SEIS and revised EMP recognise RA8 and a likely special condition in relevant permits or licences to protect the integrity of the dam site as follows:

Condition x – Future Dam Sites

The sub-blocks to which this condition applies contain all or part of a potential future dam site.

Exploration or works that involve any degree of surface or subsurface disturbance within the sub-blocks containing the dam site are not permitted unless specific approval is given by DERM in accordance with the following requirements:

- 1. Prior to carrying out any activities that entail subsurface disturbance within sub-blocks containing the dam site, the permit or licence holder will submit a full report of planned exploration and related activities in the sub-blocks to DERM, for approval. The report must contain a timetable and description of all activity to be carried out by the permit holder in the sub-blocks, referenced to a suitable map indicating where such activities will be carried out.*
- 2. Disturbance of the potential damsite and related spillways and ancillary works is prohibited except for small-scale sampling such as coring or percussion drilling. Seismic exploration is permitted provided any explosives do not result in ground disturbance below 2 m depth. Trenching or pitting is permitted, however it shall be limited to a maximum depth of 2 metres. Benching for drilling platforms is permissible provided that excavation depth shall be limited to 2 metres below natural surface. These limitations may be varied on application provided it can be conclusively demonstrated that such works will not degrade the damsite for its future intended use or make development of the dam site less economic.*
- 3. It is recommended that drill sites and disturbances are properly cleaned up to avoid contamination of land and water resources and rehabilitated as per guidelines to ensure the impacts from exploration activities to the environment are minimised.*

Response 15A

The Project corridor, which traverses Restricted Area 8 (RA8) under the Mineral Resources Regulation 2003 (MR Reg), has been declared by the Governor in council, under section 125 (I) (f) of the SDPWO Act, as an Infrastructure Facility of Significance (IFS). The EIS for this Project has been through public consultation with the supplementary EIS being the final stage of the process prior to consideration by the Coordinator General.

The Project rail alignment was determined following a rigorous multi-criteria analysis. Within the vicinity of RA8, the analysis considered among other things, the following:

- the potential alienation of existing mineral resources, noting that the area is covered in its entirety by EPCs and higher mining tenures,
- topography (running between Bulgonunna Peak to the northwest and Bovey's Lookout to the southeast),
- geology,
- geomorphology,
- hydrology,
- the remnant ecology, and
- native fauna species habitat and movement corridor surrounding the Suttor River.

The RA8 was a constraint to the alignment design to the extent that its development:

- was not identified or assessed as part of the EIS, CoG's Report or Community Infrastructure Designation for QR's Northern Missing Link project which also impacts this area,
- is at least 20-30 years into the future if not longer,
- would not proceed until future water supply demands exceeded known and unknown regional water management strategies,
- requires a level of community support which favored its development over the resulting impacts to the natural environment, and
- had a funding commitment consistent with priority infrastructure planning for the region.

Realigning the corridor to be above the ponded area of the proposed Suttor River dam buffer, as suggested, within the RA 8, would require a deviation which in itself may well conflict with a number of the above multi-criteria.

The engineering assessment that was carried out during the route selection phase identified the proposed alignment after taking all relevant matters into consideration. Should a realignment be necessary to circumvent RA8, it is estimated that the cost to implement a route change would be in excess of \$23 million in capital costs, taking into account the requirements for additional route length, bridge structures and related infrastructure. The new route will be at maximum grade, which together with the extra length, will result in additional operating costs. Additional to this would be the cost of works now completed such as preliminary engineering, land acquisition, the IFS process, native title and cultural heritage agreements, and environmental impact assessments. The overall additional cost is likely to exceed \$50 million. A realignment would also cause delay to the approval time line, project implementation and the Proponent's contribution to the States' development by way of jobs, goods and services, and coal royalties.

While the protection of restricted areas from inappropriate development is important, it is considered reasonable and supportable that the Project proceeds as currently proposed, on the basis that a deviation around the future dam site be constructed at such time that the economic, social and environmental benefits associated with the dam outweigh those associated with the proposed transport corridor.

Comment 14.0 Section 2.4.8 Water Supply and Storage (Page 2-19)

16A

Issue - Section 2.4.8 outlines that the rail project requires 11 000ML of water during the construction phase. The EIS does not outline details of where this supply is to be sourced. The EIS simply states that a combination of bores or existing water pipelines may be used. No consideration of the impacts is provided.

Recommendation - The SEIS should outline details of proposed water supply and sources to determine if the proponent may need to apply for resource entitlement under the Water Act 2000.

Response 16A

Current investigations indicate that there may be an opportunity to utilise groundwater for rail construction purposes in the northern section of the alignment (north of the Bogie River). In response to this submission, Volume 3, Section 12. 3. 2. 1 of the EIS has been updated as follows:

Potential Impacts

While groundwater is not anticipated to be a major construction water source for the rail, to fully encompass all potential groundwater issues, potential impacts caused by the abstraction of groundwater are listed below.

- lowering of groundwater table (impacting on local groundwater users and groundwater dependent ecosystems);
- disturbance of ephemeral water bodies and streams, and associated ecological impact;
- insufficient investigation into sustainable yields, resulting in over extraction of groundwater and potential failure of aquifers;
- decline in subterranean fauna populations;
- inadequate bore design, resulting in groundwater contamination of confined aquifers;
- restricted groundwater availability or viability for other groundwater users;
- positioning of abstraction bores in close proximity to existing abstraction bores for other land users, resulting if failure of bores due to lowering of water table, increased turbidity, reduced hydraulic conductivity (due to mobilisation of clay particles) and potential damage to bore screen or pump.

Potential impacts, not related to groundwater abstraction, include:

- potential for localised water logging as a result of groundwater level increases caused by construction of any embankments, or as a result of pre-loading, where pre-construction groundwater levels are relatively close to ground surface, particularly in the vicinity of the major rivers and within the low lying coastal flats of Abbot Point;
- potential for localised, temporary reduction in shallow groundwater levels in the vicinity of Suttor River, Bowen River and Bogie River as a result of temporary minor dewatering as a part of bridge pile construction works. The dewatering is unlikely to have any significant or long-term impact, the short duration, low volume and localised nature of the dewatering; and
- potential for localised degradation of groundwater quality within alluvial deposits or bedrock that intersect the Project site, directly beneath or down-gradient of the Project site if any leaks or spills occur during construction. Local water supply bores in Sections 1 and 3 are unlikely to be impacted from construction, given the distance to the bores. Bores within Sections 2 and 4 are the most likely to be impacted.

Comment 15.0 Section 2.4.9 Storage (Page 2-20)**17A**

Issue - This section states that water will be stored in purpose built tanks and dams.

Recommendation - The SEIS should detail how any storages constructed must be constructed in accordance with the overland flow provisions of the Water Resource (Burdekin) Plan 2007.

Response 17A

The *Water Resource (Burdekin Basin) Plan 2007* is identified in Volume 3, Section 1. 11. 3. 5 of the EIS. All relevant provisions of this plan will be complied within in relation to overland flow as part of the Project.

Comment 16.0 Section 5.2.1 – Soils (Page 5-1)**18A**

Issue - The soils have been discussed using the Atlas of Australian Soils Dataset. Whilst this provides a very broad indication of the soil and landscapes that may be encountered, it is inadequate for assessing the proposed project.

Soil profiles should be described according to the Australian soil and land survey field handbook (National Committee on Soil and Terrain, 2009), grouped according to their parent material and position in the landscape and classified according to the Australian soil classification (Isbell, 2002). Particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land should be included. Representative soils must be sampled down the profile for laboratory analysis as outlined in the Land Suitability Assessment Techniques.

Recommendation - The SEIS should provide a soil survey of the project area following the standards described in Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995). Ideally an investigation site should be described in each mapping unit intersected by the rail corridor.

The EMP should include commitments referencing the results above and how soils will be managed.

Response 18A

No soil surveys were conducted along the alignment as part of the EIS due to some site access impediments, environmental permit considerations and weather constraints. A soils investigation study of the rail corridor targeting the sensitive soil and landforms (including GQAL and SCL) will be conducted where 1:100,000 mapping is not available to quantify and clarify the Project's impact on GQAL. These investigations will be used to establish baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (calcium, magnesium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients).

The Proponent has developed a detailed Soils Survey Program methodology contained within Volume 2, Appendix AK of this SEIS. This includes the following:

- Review of desktop information of the soils and landscapes of the alignment. This includes existing DERM and CSIRO reports soil survey, land resource, and field manuals; spatial information from DERM's Soil and Land Information (SALI) database and Combined Soils database; mapping of topography, geology, good quality agricultural land, strategic cropping land; acid sulphate soils; regional ecosystems etc.
- Development of preliminary unique mapping areas (UMAs) for field investigation and description. These UMA's represent areas of land where one or more land soil types are predicted based upon the desktop study. Each one of these UMA's will be described during the field study and the boundaries validated and revised.

Other environmental soil testing will occur as part of a geotechnical program which will inform the design and management of detailed erosion and sediment control management plans required during construction. To further guide this aspect of the Project an Erosion and Sediment Control Criteria has been prepared for the Project. Refer to Volume 2, Appendix AD of the SEIS.

Comment 17.0 Section 5 Erosion and Sediment Control**19A**

Issue - The EIS fails to specify the environmental performance for stormwater discharge to be achieved in respect of sediment and erosion management.

The EIS advises that a Erosion and Sediment Control Plan (See Volume 3 Railway Corridor, page 5-32) will be developed and implemented for the Railway line part of the project. Whilst implementing such a plan is a reasonable approach to dealing with the erosion and sediment control issues, the EIS fails to specify the performance standards to be met by the plan.

These should include standards achievable with best practice environmental management e.g. maximum 20 mg/L suspended solids as recommended by the guideline "Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Site June 1996" (Institute of Engineers, Australia, Queensland Division 1996). Also, salinity and turbidity levels of the discharges should not create exceedances of water quality objectives for salinity and turbidity as mentioned in ANZECC 2000 water quality guidelines, or more ideally, based on local reference data obtained in accordance with the Queensland Water Quality Guidelines 2009 (DERM 2009)

In areas where acid sulfate soils may be disturbed, either by excavation or dropping groundwater elevations, appropriate release limits for dissolved iron, aluminium, pH would need to be met. These limits should be based on the degree of ecosystem protection relevant for affected waters e.g. high ecological value, moderately disturbed etc.

Recommendation - Propose best practice standards for stormwater discharges from disturbed areas. For pH, salinity and turbidity, these should be based on local reference values developed in accordance with the Queensland Water Quality Guidelines 2009 (DERM 2009). For toxicants such as iron and aluminium, these should be based on the appropriate level of ecosystem protection for the waters and the ANZECC 2000 water quality guidelines.

Response 19A

The management framework for stormwater discharge criteria has been specified within the Erosion and Sediment Control Criteria attached in Volume 2, Appendix AD of the SEIS. This document will inform the preparation of detailed erosion and sediment control management plans for construction.

Surface water and groundwater impacts associated with Acid Sulfate Soils (ASS) have been addressed within an ASS Framework attached in Volume 2, Appendix Z of the SEIS. This document will inform the preparation of a detailed ASS management plan that will be required during the design phase of the Project, prior to construction and included with MCU and Operational Works development applications.

Comment 18.0 Section 5.2.1.3 – Soils, Topography and Land Disturbance (Pages 5-4 & 5-26)**20A**

Issue - The section states 'The rail loop at Abbot Point is mapped as salt pans and salt water couch meadow merging into mangrove swamps, subject to tidal inundation...' DERM mapping shows that the rail loop covers a large section of palustrine wetland, as acknowledged elsewhere in the EIS.

Recommendation - The SEIS should include a statement to reflect actual typology affected by the rail loop.

Response 20A

The rail loop at Abbot Point is mapped as consisting of a large area of the Directory of Important Wetlands of Australia listed Palustrine wetlands and Estuarine wetlands. ATLAS mapping indicates the area includes salt pans and salt water couch meadow merging into mangrove swamps.

Comment 19.0 Section 5.2.1.5, 5.3.4 – Acid Sulfate Soils (ASS) (Various pages)**21A**

Issue - *The EIS states that it is expected that some actual and potential ASS will be encountered during construction of the Project in the Abbot Point area and that the proposed development will require an ASS assessment and, if required, preparation of an ASS Management Plan.*

An investigation of ASS for relevant areas of the proposal is not contained in the EIS.

Where undertaking development to which the State Planning Policy (SPP 2/02) Planning and Managing Development that Involves Acid Sulfate Soils applies a detailed ASS investigation and assessment must be undertaken in accordance with the SPP 2/02 before any works commence. Furthermore, a site specific ASS Management Plan must be prepared in accordance with the guideline to SPP 2/02.

In order to demonstrate that the proposed rail loop will not adversely impact on the high conservation value Caley Valley wetlands, and thereby support the proposed location of the rail loop, the EIS needs to demonstrate that water quality will not be adversely affected through oxidation of Potential Acid Sulfate Soils resulting from disturbance or changes to hydrology.

Recommendation - *The following information should be provided as part of the SEIS to support assessment of potential environmental impacts associated with the proposed rail loop at Abbot Point:*

- a study of the existing and post-construction freshwater and tidal hydrology of the area;
- a geotechnical survey to confirm design and construction methodology; and
- a site and construction methodology specific Acid Sulfate Soil Management Plan as required by the Terms of Reference (Section 3.2.2.1) for the proposal.

Sufficient information should be provided to demonstrate that the proposed location of the rail loop will not significantly impact on water quality by disturbing ASS and therefore compromise the values of the coastal wetland. Complete information should be provided to support any application for land use approval under the Abbot State Development Area Development Scheme.

Response 21A

The nature of the rail loop works within the APSDA with a potential to impact the Kaili (Caley) Valley Wetland is above ground. The design will minimise the extent of excavation of soils with a medium to high probability of ASS. Refer to the Project ASS Framework attached in Volume 2, Appendix Z of the SEIS. This document will inform the preparation of a detailed ASS management plan that will be required during the design phase of the Project, prior to construction and included with MCU and Operational Works development applications.

Comment 20.0 Section 5.2.2 – Good Quality Agricultural Land (Page 5-17)**22A**

Issue - Land suitability and GQAL have been assessed using existing DERM published reports and mapping. Much of this mapping is too broad scale to be used for assessment purposes in a project of this scale.

Land suitability and GQAL need to be assessed with respect to the detailed soil survey that is to be conducted along the proposed rail corridor.

Recommendation - The SEIS should provide an assessment of the suitability of the soils mapped in the project area for rain-fed broad acre cropping and beef cattle grazing according to the limitation and land suitability classification system in Attachment 2 Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995). For areas along the various rivers with potential access to irrigation water (eg within 5 km of the river), assess the soils for suitability for irrigation using the suitability scheme in Land suitability for irrigated agriculture along the Fitzroy River (Forster and Sugars, 2000).

Provide land suitability maps of the mapped soil units and an Agricultural Land Class map according to the Planning Guideline: The Identification of Good Quality Agricultural Land (DPI/DHLGP, 1993).

The SEIS should show how the proposed rail corridor has minimised impacts on GQAL.

Response 22A

Declared Projects of State Significance may be exempt from the GQAL process. Section 4.14 of the GQAL Planning Guidelines discuss proposals that have an "overriding need" and cites major infrastructure, including railways as a case where this may apply. Soil surveys will be conducted in accordance with the prepared Soils Survey Program methodology contained within Volume 2, Appendix AL of this SEIS.

Comment 21.0 Section 9 Terrestrial Ecology (Pages 9-25 & 9-26)**23A**

Issue - An area of 22,500ha is identified as to be cleared for the mine and infrastructural requirements. This is a significant impact. The National and State Biodiversity Offset policies endeavour to ensure that there is a no net loss in biodiversity. 22,500 ha in the Jericho subregion of the Desert Uplands bioregion is a significant impact. This subregion has only 61.3% remnant vegetation and this clearing will reduce this down by 2%. In a semi-arid environment, these remnants are critical landscape connectivity – 'stepping stones from the Great Dividing Range down to the Belyando river'. This is the first of several proposed coal mining projects in the Galilee Basin and the cumulative impact will be severe, especially as this project falls in the top of the Burdekin catchment. This project proposal severely impacts on the landscape linkage between two bioregions.

Under the Queensland Government Environmental Offset policy offsets should be developed where specific issue offset policies are triggered. The proposed area for clearing is likely to contain rare and threatened species and so would trigger the draft Policy for Biodiversity Offsets. There are also a number of Regional Ecosystems listed with "Of concern" as their Biodiversity status. This status would also be expected to trigger the draft Policy for Biodiversity offsets. It is also noted that offsets under the Commonwealth Environment Protection and Biodiversity Conservation Act should also be required if this area is to be cleared.

Recommendation - The SEIS should detail methods to reduce/minimise impacts on state significant remnant vegetation. Additionally, the proponent should provide a Biodiversity Offset Proposal to mitigate the likely impacts.

Response 23A

An Offsets Strategy has been developed for the Project which initiates investigations into offsetting requirements and likely options for the Project and incorporates relevant state and federal offset policies (SEIS Volume 2, Appendix X). As the mine will be exempt from VMA offset requirements, the Strategy will outline how biodiversity offsets apply.

Comment 22.0 Section 9.3.1.1.2 – Mitigation and Management Measures (Page 9-28)

24A

Issue - The third paragraph, last sentence of this section states that the proponent has 12 months to legally secure offsets after development approval if the project is gazetted as a state significant project. It should be noted that under the Policy for Vegetation Management Offsets –Version 2.4, dated 21 October 2010 there is provision for the proponent to have up to 18 months to legally secure offsets under a legally binding agreement after a development is approved. A legally binding agreement will also require financial assurance at the time of entering into the agreement.

It should also be noted that, prior to entering into a legally binding agreement, evidence that an offset area which meets the relevant requirements of the Offsets Policy is available within the landscape is required.

Recommendation - The SEIS should address the last sentence of the third paragraph in Volume 3, Section 9.3.1.1.2 of the EIS and replace with (for example):

If the Project is gazetted a State Significant Project, the proponent may enter into a legally binding agreement with DERM, which will allow the proponent 18 months to legally secure an offset area after development approval. Prior to entering into a legally binding agreement, evidence that offset areas are available within the landscape which meet the relevant requirements of the Policy for Vegetation Management Offsets –Version 2.4, dated 21 October 2010 is required. Any legally binding agreement must also provide financial assurance at the time of entering into the agreement.

Response 24A

Volume 3, Section 9. 3. 1. 1. 2 of the EIS has been updated as follows:

9. 3. 1. 1. 2 Mitigation and Management Measures

The area to be cleared has been minimised as far as possible in the design phase by locating the Project footprint in areas that have been previously cleared or degraded by past land use practices. However, 68 REs: 10 Endangered, 19 Of Concern, 39 Least Concern as well as regrowth vegetation will be affected by the Project. In addition (or concurrently), the Project footprint will require the disturbance of approximately 233 ha of REs listed under the EPBC Act as constituents of TECs, including a potential 110 ha of the Brigalow TEC REs, 108 ha of the Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin TEC REs, and 14 ha of the semi-evergreen vine thicket TEC REs.

Vegetation offsets will be required in most cases for proposed clearing of Endangered or Of Concern REs, where ecological connectivity will be cut through clearing of remnant vegetation, and where remnant vegetation associated with wetlands, watercourses and essential habitat will be cleared.

Under the current *Policy for Vegetation Management Offsets* (DERM, 2009b), areas offered as offsets must be ecologically equivalent to the area being cleared, and the total offset area required will be proportionate to the ecological value of the offset vegetation. The DERM Offset Policy no longer specifies ratios, and as a result it is impossible to state the total offset area that may be required. However, current indications are that offset proposals being accepted by the DERM are generally three to four times larger in area than the area being cleared (Alan Keys, Offsets Broker, pers. comm. 02. 07. 2010). If the Project has been declared (by gazettal) a state significant Project, the proponent has 18 months to legally secure offsets after development approval.

It should be noted that offsets will only be accepted when all reasonable attempts have been made to avoid clearing or to minimise impacts and that if offsets are required, that they be legally secured (i. e. protected from future development through a legal mechanism such as a covenant or Nature Refuge Agreement). The Project has been declared a State Significant Project. This enables the Proponent to enter into a legally binding agreement with DERM, which will allow the proponent 18 months to legally secure an offset area after development approval. Prior to entering into a legally binding agreement, evidence that offset areas are available within the landscape which meets the relevant requirements of the *Policy for Vegetation Management Offsets –Version 2. 4*, dated 21 October 2010 is required. Any legally binding agreement must also provide financial assurance at the time of entering into the agreement.

If the Project is gazetted a state significant Project, the proponent has 12 months to legally secure offsets after development approval.

Offsets of marine plants may also be required under the Fish Habitat Management Operational Policy FHMOP 005 (Dixon and Beumer, 2002). This would include areas mapped as RE 11. 1. 2 and 11. 1. 4. The Fish Habitat Management Operational Policy (FHMOP) 005 is recognised by the Queensland Government Environmental Offset Policy (QGEOP) (DERM, 2009c) as a specific-issue offset policy. In keeping with the QGEOP, marine fish habitat offsets are applicable when impacts cannot be avoided, minimised or mitigated, and only after the proposed marine fish habitat loss is determined as justifiable, unavoidable and acceptable under departmental legislation and policy.

Clearance of TECs listed under the EPBC Act will also carry offset obligations under the *Draft Policy Statement: Use of Environmental Offsets under the EPBC Act* (DEHWA, 2007). Despite three years elapsing since its release this policy is still a draft. Under the EPBC Act, environmental offsets can be used to maintain or enhance the health, diversity and productivity of the environment as it relates to matters protected by the Act. Offsets requirements under the EPBC Act differ significantly from those of the VM Act in that indirect offsetting, such as the provision of cash, the removal of a threatening process, or assistance in implementing a recovery plan or similar, are allowable (among other differences). However, environmental offsets are not applicable to all approvals under the EPBC Act, and they should not be applied where the impacts of a development are considered to be minor in nature or could reasonably be mitigated.

Determination of the Project's precise offset obligations under either the VM Act or the EPBC Act is impossible to calculate at this stage, as it depends to a large extent on the quality and landscape position of the offset vegetation, and the position of the respective departments in relation to their policies. The area of vegetation being cleared (which triggered the need for the offset) only serves as a starting point in the offset calculation process. Table AJ-5 provides indicative areas to be cleared and possible minimum areas required for VM Act offsets based on a likely requirement of three to four times offset to cleared area.

Rehabilitation methods of cleared areas are discussed further in Volume 3, Section 25 of this EIS.

Table 0J-5 Summary of area to be cleared and offset obligation

Conservation Status	Proposed Area to be cleared (ha)	Indicative Requirements (ha)	Offset
Endangered	111. 44	334 – 445	
Of Concern	104. 15	312 – 416	
Least Concern	1,322. 01	Nil	
Regrowth	61. 74	Exempt (to be confirmed)	
Total	1,599. 34	At least 646 – 861 ha	

Comment 23.0 Section 9 – Table 9-9 (Page 9-29)

25A

Issue - An area of 1537.6ha of remnant vegetation is to be cleared for the rail-line (Table 9-9, page 9-29). There is little assessment in the EIS of why this area could not be reduced by alternative alignment of the line. Additionally the EIS proposes no offset for the loss of this habitat. Under the Queensland Government Environmental Offset policy the co-ordinator general may propose offsets where specific issue offset policies are triggered. The proposed area for clearing is almost certain to contain rare and threatened species and so would trigger the draft Policy for Biodiversity Offsets. There are also a number of Regional Ecosystems listed with “Of concern” as their Biodiversity status. This would also be expected to trigger the draft Policy for Biodiversity offsets. It is also noted that offsets under the Commonwealth Environment Protection and Biodiversity Conservation Act should also be required if this area is to be cleared.

Recommendation-The SEIS should detail and justify why the rail route proposed could not be altered to avoid remnant vegetation areas. It is recommended that the proponent prepare an offset proposal related to the areas to be cleared provide relevant details in the SEIS.

Response 25A

An Offsets Strategy has been developed for the Project which initiates investigations into offsetting requirements and likely options for the Project and incorporates relevant state and federal offset policies as mentioned within this comment (SEIS Volume 2, Appendix X).

Comment 24.0 Section 9.3 and 26 – Terrestrial Ecology – Habitat Degradation (Page 9-31 & from 26-1)

26A

Issue - Noise, light and vibration during the construction and operation of the proposed rail line have the potential to impact on biodiversity and coastal wetlands of national importance.

Recommendation - The SEIS should state that where the proposal is likely to impact on biodiversity values an impact assessment and species management plan will be undertaken to avoid disturbance and demonstrate ongoing maintenance of biodiversity. The species management plan must address cumulative impacts, and include objectives, tasks and actions, personnel responsible, timeframes, and performance indicators.

The Environmental Management Plan (EMP) should provide for development of an Aquatic Fauna Species Relocation Plan for the Caley Valley Wetland that reflects the SEIS statement above and provide for monitoring programs that are implemented prior to works commencing.

Also see Section 0.12.7 Nature Conservation and Biodiversity of these comments on weeds, feral animals, and maintaining connectivity.

Response 26A

Where there is likely to be an impact on biodiversity values of significance an impact assessment will be undertaken and a relevant species management plan prepared to avoid disturbance and demonstrate ongoing maintenance of biodiversity. The species management plan will address cumulative impacts, and include objectives, tasks and actions, personnel responsible, timeframes, and performance indicators. Species management plans will also consider flora and fauna relocation / translocation where appropriate. With regards to the Caley Valley Wetland and Species relocation Plan is referenced within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

Comment 25.0 Section 10.3.2.2.3 – Lacustrine and Palustrine Habitats (Page 10-30)**27A**

Issue - *The proposal to construct the rail loop within the wetland using embankments and 'two sections of elevated structures located to maintain wetland flows' will have a significant impact on the area of high ecological significance (HES) wetland.*

Recommendation - *The SEIS should demonstrate that the impacts on the HES wetland are unavoidable and mitigated. The SEIS should reflect that the Department of Infrastructure and Planning is currently preparing a management plan for the Caley Valley wetlands.*

Response 27A

Since the compilation of the EIS, results of studies undertaken within the Kaili (Caley) Valley wetland have become publicly available and have been considered as part of a separate aquatic report (SEIS Volume 2, Appendix AI). This report identifies additional management or mitigation required for the management of the construction and operation of the Project infrastructure within the APSDA and wetland area. The design of the rail embankment in this area will aim to maintain flows to the wetland area which will fall within the rail loop and minimise impact on the surrounding environment.

27B

Issue - *The location and design options for the rail loop do not include options to locate the rail loop outside the Caley Valley wetland or justify the size of the rail loop. Also see earlier comment on Section 2.4*

Recommendation - *The SEIS should provide alternative proposals to the rail loop location. Consideration should also be given to the cumulative impacts of other proposed and potential development within the wetland protection area.*

Response 27B

Volume 3, Section 1. 7. 1 of the EIS briefly describes the railway options process. During the selection of an alignment a variety of environmental, engineering and social factors were considered and alignment options investigated prior to aquatic ecology on ground assessment. Options for providing

new transport infrastructure to the Port of Abbot Point are highly constrained. Various design options were provided to DEEDI (formerly DIP) as assessment managers of the APSDA. Consultation with the Coordinator Generals Office is continuing with regards to the Draft Kaili (Caley) Valley Wetland Environmental Management Plan (DEEDI, 2009) and how its mitigation and management strategies will impact the Project. This management plan has been considered within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

27C

Issue - *The design and mitigations of the rail loop in a 1ha estuarine area is discussed but not how the design will mitigate impacts on the 14.5ha of palustrine wetland.*

Recommendation - *The SEIS should demonstrate that the impacts on the HES wetland are unavoidable and suitably mitigated.*

Response 27C

Additional aquatic assessments have been undertaken within the wetland and relevant reporting is contained within Volume 2, Appendix AI of the SEIS. Recommendations from this further analysis will influence the rail design and assist in identifying additional management or mitigation required in this area in regards to water birds, fish and aquatic habitats.

Comment 26.0 Section 10.3 - Potential Impact and Mitigation Measures (Page 10-29)

28A

Issue - *A wetland of High Ecological Significance is found near chain 22000 on Lot 689 PH2015. The proposed rail alignment will pass through the buffer area for this wetland. This may trigger the Temporary State Planning Policy: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Wetlands if high impact earthworks are intended and assessment may be required.*

Recommendation - *The SEIS should demonstrate that the proposed alignment will provide an adequate buffer to the wetland in line with assessment criteria under the Temporary State Planning Policy: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Wetlands.*

Response 28A

An intersection with a wetland management area may trigger the Temporary State Planning Policy (SPP): Protecting Wetlands of High Ecological Significance in Great Barrier Reef Wetlands. This SPP has been reviewed and addressed as part of Volume 2, Appendix AI of the SEIS,

Comment 27.0 Section 11 – Surface Water (Page 11-1)

29A

Issue - *No detailed information has been supplied regarding watercourse crossings. Where there is significant re-alignment to watercourses as a result of crossings a water licence to interfere by diversion under the Water Act 2000 may be required. It is preferable that crossings are designed to minimise the diversion of any watercourses.*

If a major re-alignment resulting in diversion and a licence to interfere is required then the diversion must be designed constructed and monitored in accordance with the following ACARP reports relative to stream diversions within the Bowen Basin:

APPENDICES

- “Project C8030 (Stage 1) – Maintenance of Geomorphic Processes in Bowen Basin River Diversions”
- “Project C9068 (Stage 2) – Monitoring Geomorphic Processes in Bowen Basin River Diversions”
- “Project C9068 (Stage 3) – Design and Rehabilitation Criteria for Bowen Basin River Diversions”.
- The Departmental Regional Guideline entitled ‘Watercourse Diversions – Central Queensland Mining Industry’ dated 14 January 2008.

Recommendation - *The SEIS should provide details of crossing design to determine the level of approval required.*

Response 29A

The detailed rail design of watercourse crossings and associated modeling has not progressed to a point where a significant re-alignment of any watercourses has been identified. Accordingly the Proponent is not requesting that a water licence or approval for interfering with a watercourses associated with the rail construction and operation be approved as part of the Coordinator Generals Report. Further detail regarding proposed watercourse crossings will be determined during the detailed design stage of the Project and will be submitted to DERM for assessment and approval in accordance with the SP Act and *Water Act 2000*. A drainage report which provides further information regarding watercourse crossings has been included in Volume 2, Appendix Y of the SEIS.

29B

Issue - *The EIS states that cut and fill activities at Abbot Point have the potential to alter natural hydrology and sediment export to natural waters and that erosion and sediment control plans will ensure that impacts on environmental values are minor.*

The EIS identifies mitigation measures for increased sediment loads including a proposal to stabilise and rehabilitate completed areas as soon as possible; and stabilise bed and banks of streams immediately after construction. While the commitment to stabilise and rehabilitate as soon as practical after construction is supported, an indicative time frame should be stated. Due to the significance of the Caley Valley Wetland, if the rail loop is retained in the currently proposed location, clear commitments must be given to protection of the hydrology and water quality in the wetlands at all times during and after construction. This includes effective erosion and sediment control in design, in construction from the time of initial disturbance, and in operation through permanent erosion and stormwater management systems.

Recommendation - *If the rail loop is retained in the currently proposed location, clear commitments must be given in the SEIS to protection of the hydrology and water quality in the wetlands at all times during and after construction through appropriate design, construction methodology and ongoing management.*

Before works commence within the tidal area a detailed erosion and sediment control management plan and a stormwater management plan must be implemented.

Response 29B

An actual timeframe is difficult to provide since circumstances will differ for each location and the seasonality of the climate may require some flexibility. To further guide this aspect of the Project an Erosion and Sediment Control Criteria has been prepared for the Project (SEIS Volume 2, Appendix AD). This criterion will be applied in design, construction and operation phases of the Project. During construction ongoing erosion and sedimentation protection will be described in the construction management plan.

In relation to the Caley Valley Wetland environmental management measures to address the wetland hydrology and water quality has been considered within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

29C

Issue - *The EIS noted that a more detailed assessment of stream hydraulics will be carried out in the detailed design phase of the Project and this may affect the length and height of bridges.*

The proposed rail loop has the potential to significantly impact on the values of the Caley Valley wetlands both directly, through location of the rail line in the wetlands, and indirectly through changes in water quality resulting from changes in freshwater and tidal hydrology, and release of contaminants (sediment, coal, liquid hydrocarbons) to the wetland during and after construction.

Maintaining the natural hydrology of the wetlands is critical to maintaining salinity gradients (temporal and spatial), to prevent drying and subsequent oxidation of acid sulfate soils, and to maintain natural wet and dry cycling, all of which affect the flora and fauna assemblages and ultimately the value of the wetlands to shorebirds (including migratory shorebirds).

Recommendation - *A study of the existing and post-construction freshwater and tidal hydrology of the area should be provided as part of the SEIS to support assessment of potential environmental impacts associated with the proposed rail loop at Abbot Point.*

The potential effect of any changes to hydrology on water quality (salinity, suspended sediment, oxygen level), ecological functioning of the wetland (spatially and temporally), and on invasive (weed) species should be discussed and objective mitigation commitments provided.

The local flow velocity and scour potential as a result of new bridges or culverts, and the proposed bed and bank stabilisation to mitigate such impacts should be stated.

Response 29C

It has been identified that the Project load out loop options will create minimal increase in afflux (up to 0.05 m for the wetland) which does not significantly change the hydrological regime of the wetland or local creeks. This does suppose that a sufficient number and configuration of cross drainage structures are constructed along each alternative rail alignment. Additional peak depth inundation has been identified as short (less than 8 hrs). Invert levels of the proposed Alpha Rail culverts have been kept consistent with existing culverts along the access road in order that the permanent pool level of the wetland will remain the same.

The impacts of changes in hydrology on the ecological values of Kaili (Caley) Valley Wetland are discussed in Volume 3, Section 10 of the EIS. Additional field assessments of the Kaili (Caley) Valley Wetlands and assessments of recently published data has been considered within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

Comment 28.0 Section 12.3.1 – Overview of potential impacts and mitigation measures (Page 12-14)**30A**

Issue - The section states that no significant impacts on groundwater resources are expected and fails to note that groundwater may be a possible water supply for construction purposes; either taken from existing landholder bores or from new bores constructed by the proponent (see section 2.4.8).

Recommendation - The SEIS should include and assess potential impacts on groundwater by the take of any water from bores for the project. The proponent should discuss whether there are any short term and long term impacts and propose possible mitigation strategies.

Response 30A

Potential ground water impacts are noted within Response 16A. In response, Volume 3, Section 12. 3. 2. 2 of the EIS has been updated as follows:

Mitigation Measures

The following measures are proposed to monitor and mitigate the potential impacts identified for the construction phase, irrespective of groundwater abstraction:

- maintenance of regular groundwater monitoring (levels and quality) for a minimum 12-month period prior to the start of construction to establish baseline groundwater conditions at selected locations considered the most susceptible to impact (e. g. alluvium at river crossings). This will allow the confirmation of groundwater quality and level action criteria against which to monitor conditions during construction. This program should be agreed with the regulatory authority prior to project commencement;
- develop and implement a groundwater monitoring program to monitor groundwater levels and quality of unconfined shallow aquifers and deeper alluvial aquifers, at selected locations. The bore network and monitoring program should be established 12 months prior to construction, in order to gather natural baseline data that can be used to regularly assess ongoing monitoring data;
- regular assessment of groundwater monitoring results against baseline groundwater conditions during construction and review of monitoring program if necessary;
- if impacts on groundwater levels or quality are identified an assessment of potential mitigation measures will be conducted;
- storage areas for vehicles, machinery, equipment, chemicals etc. during construction should have appropriate facilities to contain spills, leaks and surface water run-off to reduce the potential for contamination of groundwater through infiltration from surface; and
- groundwater monitoring should be conducted by a suitably qualified and experienced professional in accordance with the AS/NZS 5667. 11:1998 Australian/New Zealand Standard for water quality – sampling Part 11; guidance on sampling groundwater's'.

In addition to the mitigation measures cited above (Volume 3, Section 12. 3. 2. 2 of the EIS), in the event that groundwater were to be used for rail construction, a preliminary groundwater investigation would be undertaken at all potential abstraction areas. The investigation would involve sampling the groundwater for water quality, and testing the aquifer to ascertain its hydraulic properties and potential drawdown effects. In areas suitable for groundwater abstraction, in addition to selected locations considered susceptible to impact (i. e. alluvium at river crossings), a twelve month monitoring program should be established to collect baseline water quality and water level data of target aquifers and any

aquifers that may be hydraulically connected to the target aquifers. The monitoring program should also encompass existing groundwater bores that may be impacted by groundwater abstraction.

Ongoing monitoring would be conducted by a suitably qualified and experienced professional, in accordance with the AS/NZS 5667. 11:1998 *Australian/New Zealand Standard* for water quality - sampling Part 11; guidance on sampling groundwaters. Groundwater monitoring data should also be regularly assessed against baseline groundwater conditions during Project construction, and can be used to model groundwater drawdown impacts.

Following preliminary site investigations, a Groundwater Management Plan would be established, outlining bore construction, monitoring, abstraction allocations, groundwater trigger levels, and reporting protocols.

Comment 29.0 Section 12.3.3.2 – Groundwater mitigation measure (Page 12-15)

31A

Issue - This section outlines measures for monitoring and mitigation of potential impacts for the operation phase. The opening sentence is incorrect as it refers to the construction phase.

Recommendation - The SEIS should amend first sentence in this section to remove construction and replace with operation.

Response 31A

In response, Volume 3, Section 12. 3. 3. 2 of the EIS has been updated as follows:

The following measures are proposed to monitor and mitigate the potential impacts identified for the operation phase:

- develop and implement a groundwater monitoring program to monitor groundwater levels and quality in shallow groundwater adjacent to the Project site.

Comment 30.0 Section 19.3.1 and 19.3.2.2 – Potential Impacts and mitigation measures (Page 19-8)

32A

Issue - Details of proximity of identified sites to project footprint have not been identified so it is not possible to assess what indirect impact there may be on the identified places from increased access, traffic and other impacts.

Recommendation - The SEIS should provide details of proximity of the project footprint to identified sites. describe (and preferably map) the sites, and provide strategies/commitments addressing indirect impacts (for example: machinery movement and access provision and potential impact to Old Bowen Downs road and associated sites; or, increased access to old hotel sites and coach stops likely to occur along Old Bowen Downs Road could affect the archaeological integrity of same).

Response 32A

A field survey of non-Indigenous cultural heritage matters within the Project area has been undertaken and is contained within Volume 2, Appendix AK of this SEIS.

Comment 31.0 Section 25.0 Decommissioning and Rehabilitation (Page 25-1)**33A**

Issue - A detailed plan should be included where clearing of vegetation and rehabilitation is required or decommissioning of any temporary works occurs within the Caley Valley Wetland area.

Recommendation - The SEIS should address how a decommissioning and rehabilitation plan must be developed before works commence within the tidal area. The plan should be implemented as works progress.

Response 33A

This section of the EIS proposes the overall strategy for the decommissioning and rehabilitation to be undertaken. Detailed decommissioning plans will be developed as required for the rehabilitation of any temporary working areas within the Kaili (Caley) Valley Wetland. Further discussion regarding this aspect is included within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

Comment 32.0 Section Vol 3 – 26.0 Environmental Management Plan – Surface Water**34A**

Issue - The commitments in the proposed EMP and EIS should reflect the need to protect the Caley Valley Wetland by ensuring all statements are auditable. Though the EMP recognises environmental values, protection objectives, performance criteria, control strategies and monitoring and corrective action, it remains unclear whether the management commitments consider relevant environmental values and variables for performance and monitoring.

Water quality management objectives have been proposed managing impacts of surface water for specific environmental values as outlined in the Environmental Protection (Water) Policy 2009. The EIS does not consider other water environmental values such as biological and ecological environmental values.

The EIS sets water quality management objectives for surface waters including variables for dissolved oxygen, turbidity and pH. The EIS does not consider other variables for performance and monitoring of the aquatic environment.

Recommendation - The requirements for water quality management within the EMP should be amended to include biological and ecological environmental values relevant to the proposal. In addition for the SEIS, the variables stated in the EIS for water quality management objectives may need to consider total suspended solids and dissolved oxygen during the construction phase and wet weather events, and the effect of spatial and temporal variability of water quality on the ecological functioning of the wetland and the value of the wetland to shorebirds.

The SEIS and revised EMP should address implementation of a water quality monitoring program before works commence. The water quality monitoring program should be submitted to support any application for a material change of use under the State Development Area planning scheme. Reference should be made to relevant water quality guidelines and legislation requirements.

Response 34A

Further field assessments (including water quality testing) of the Kaili (Caley) Valley Wetlands have been undertaken and relevant reporting is contained within Volume 2, Appendix AI of the SEIS. The recommendations from this reporting will consider further developing the Project EM Plan (SEIS Volume 2, Appendix AC) to incorporate variables for performance monitoring for the aquatic environment.

Comment 33.0 Wetlands**35A**

Issue - There is discrepancy in the documents as to whether the disturbance in the Caley Valley wetlands will be 13.5 ha or 14.5 ha.

Recommendation - The SEIS should confirm the proposed area of disturbance within the wetland.

Response 35A

Volume 3, Section 10 of the EIS refers to a Project disturbance footprint within the Kaili (Caley) Valley Wetland consisting of 1 ha of estuarine habitat due to the bridge crossing of Saltwater Creek and approximately 13.5 ha of palustrine habitat due to the port terminal rail loop footprint. This correlates with the 14.5 ha disturbance figure appearing in Volume 3, Section 9 of the EIS.

Since the EIS was prepared further engineering design has confirmed the following:

- Permanent development footprint impacting palustrine habitat due to the port terminal rail loop is 11.8ha. An additional 3.25ha will be temporarily disturbed and rehabilitated during construction phase.
- Permanent development footprint impacting estuarine habitat due to the bridge crossing at Saltwater Creek is 1.9ha. An additional 0.51ha will be temporarily disturbed and rehabilitated during construction phase.

Further discussion regarding this aspect is included within the additional aquatic reporting contained within Volume 2, Appendix AI of the SEIS.

AJ.6 Environmental Management Plan (EMP) – Appendix P (Coal Mine Only)

The following comments are provided to assist the development of the EMP to inform any decisions on the EIS outcome and assessment of any environmental authorities under the Environmental Protection Act 1994 (EP Act).

The EMP is generally deficient in not outlining commitments protecting all environmental values, and not specifying some performance criteria in accordance with section 8 of the Terms of Reference and DERM guidelines dealing with tailings, waste, waste rock, and rehabilitation.

A revised EMP based on the further information provided in a Supplementary Report to the EIS (SEIS) and in accordance with section 203 of the EP Act will be required to progress consideration of relevant environmental authorities.

All DERM guides referred to are available on line at www.derm.qld.gov.au

Comment 1.0 Section P.1.5 – Stakeholders (Page P-9)**1A**

Issue – *The stakeholder listed should be the Department of Environment and Resource Management (DERM).*

Response:

DERM is one of the listed stakeholders in Section P1.5 of the EIS EM Plan (EIS Volume 5, Appendix P).

1B

Recommendation – *The SEIS should address this changed stakeholder name.*

Response:

Noted.

Comment 2.0 Section P.2.2 – CHPP and Mine Infrastructure (Page P-11)**2A**

Issue – *The Coal Handling Preparation Plant (CHPP) and mine infrastructure has not included the proposed dewatering bore network which is required to keep the mine operating.*

Response:

No dewatering bores are to be installed in the infrastructure area, to the east of Lagoon Creek.

Aquifer hydraulic parameters for the D-E sands, identified to be depressurised to reduce floor heave potential, indicate heterogeneity. Hydraulic conductivity (K) of the D-E sands range from 0.1 to ~ 2 m/day. The implications of the low hydraulic conductivity are that active depressurisation using bores and borehole pumps would likely have a low success rate, and be prohibitively expensive, in areas of low K. Therefore, different dewatering strategies will be required for different areas of the mine pit.

Free draining near horizontal and vertical open holes could be included in the dewatering scheme, along with out-of-pit dewatering bores. JBT Consulting are designing a bore field to provide groundwater for construction and the accommodation camp. The performance of the bore field will allow for the design of the optimum dewatering scheme (layout, bore spacing, depths, etc.).

All proposed dewatering bores and camp water supply bores will comply with the relevant legislative requirements, which include:

- A Water licence required to authorise the take of water by the proposed dewatering scheme;
- Permits for temporary take of groundwater for any construction purposes; and
- Development permits required to authorise the construction of the proposed production bores.

The current groundwater modelling will be revised based on the design of the dewatering system, based on the results of the pilot bore field, to reassess the impacts of mine dewatering on the groundwater resources. Regular groundwater and surface water monitoring will be undertaken during dewatering to validate predictions and compare to agreed trigger levels (SEIS Volume 2, Appendix V).

2B

Recommendation – Include the dewatering bore network as part of the CHPP and mine infrastructure. Include appropriate commitments dealing with the environmental impacts from the bore network.

Response:

No dewatering bores are to be installed in the infrastructure area, to the east of Lagoon Creek.

A series of monitoring bores will be constructed adjacent and down gradient of the proposed ancillary infrastructure. Table AJ-6 provides the list of monitoring bores to be constructed.

Table OJ-6 Alpha Coal Project (Mine) proposed monitoring bores

Hole ID	Easting_GDA94	Northing_GDA94	Depth (m)	Type	Location
TSF4	449,368	7,428,188	Base of sub-E sands	VWP in C-D sands VWP in D-E sands VWP in Sub-E sands	TSF
TSF5	450,131	7,428,204	Base of sub-E sands	VWP in C-D sands VWP in D-E sands VWP in Sub-E sands	TSF
TSF6a - d	451,198	7,428,155	(To top of Joe Joe Formation) To bottom of Sub-F sands	Screen through C-D, D-E, E-F, and Sub-F sands	TSF
TSF7a - d	453,089	7,428,050	(To top of Joe Joe Formation) To bottom of Sub-F sands	Screen through C-D, D-E, E-F, and Sub-F sands	TSF
TSF8	448,357	7,423,195	Base of sub-E sands	VWP in C-D sands VWP in D-E sands VWP in Sub-E sands	TSF
TSF9	449,944	7,423,606	Base of sub-E sands	VWP in C-D sands VWP in D-E sands VWP in Sub-E sands	TSF
TSF10	451,420	7,424,005	Base of sub-F sands	VWP in C-D sands VWP in D-E sands VWP in E-F sands VWP in Sub-F sands	TSF

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project Supplementary Environmental Impact Statement | VOL 2 2011

APPENDICES

Hole ID	Easting_GDA94	Northing_GDA94	Depth (m)	Type	Location
TSF11	453,106	7,424,465	Base of sub-F sands	VWP in C-D sands VWP in D-E sands VWP in E-F sands VWP in Sub-F sands	TSF
AlphaWest1	440,789.70	7,433,355.61	100	Screen through D-E sands	Down dip
AlphaWest2	440,853.54	7,426,844.48	100	Screen through E-F sands	Down dip
AlphaWest3	440,853.54	7,420,444.59	100	Screen Sub-F sands	Down dip
Landfill1	450,887.03	7,421,756.26	60	Standpipe	Landfill site
Landfill2	450,887.03	7,421,689.07	50	Standpipe	Landfill site
Landfill3	450,466.35	7,422,311.32	50	Standpipe	Landfill site
MIA	449,692.18	7,430,082.79	40	Standpipe	Industrial area
CHPP1	449,081.22	7,431,729.39	40	Standpipe	Preparation plant
CHPP2	449,377.83	7,432,278.59	40	Standpipe	Preparation plant
EWT	453,924.17	7,433,249.33	60	Standpipe	Water storage dam
TLO1	449,582.76	7,432,592.94	40	Standpipe	Train loading area
RWD1	455,688.51	7,436,470.97	50	Standpipe	Water storage dam
ROM South	447,811.30	7,427,597.86	30	Standpipe	Coal storage
ROM North	448,391.99	7,433,657.92	30	Standpipe	Coal storage

All mine infrastructure water and waste storage facilities will be designed and constructed to minimise the risk of seepage. Should monitoring results indicate seepage then seepage control measures, which could include interception trenches or scavenger wells, will be installed.

Drilling and monitoring bore construction has been conducted post EIS within and adjacent to the proposed TSF. These monitoring bores augment the existing monitoring network and are detailed in SEIS Volume 2, Appendix N.

Comment 3.0 Section P.2 – Project Description (Page P-11)**3A**

Issue – The EMP is required to identify all mining activities – including all Environmentally Relevant Activities under schedule 2 and 6 of the Environmental Protection Regulation 2008, and all Notifiable activities under schedule 2 of the Environmental Protection Act 1994.

The EMP should identify and describe all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Alpha Coal Mine and define the affected environmental values. For each of the environmental values to be protected, commitments must be proposed and the EMP must identify the environmental protection objective(s), standard(s), measurable indicator(s) and control strategy(ies) to demonstrate how the objective(s) will be achieved.

3B

Recommendation – The EMP should include all relevant mining activities proposed to be undertaken as part of the Alpha Coal Mine.

Response:

Table 0J-7 Identified ERAs applicable to the Alpha Coal Mine

ERA Number	ERA Name	Description
8	Chemical storage	<p>(1) Chemical storage (the <i>relevant activity</i>) consists of storing—</p> <p>(a) 50t or more of chemicals of dangerous goods class 1 or class 2, division 2.3 in containers of at least 10m³; or</p> <p>(b) 50t or more of chemicals of dangerous goods class 6, division 6.1 in containers capable of holding at least 900kg of the chemicals; or</p> <p>(c) 10m³ or more of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3; or</p> <p>(d) the following quantities of other chemicals in containers of at least 10m³—</p> <p>(i) 200t or more, if they are solids or gases;</p> <p>(ii) 200m³ or more, if they are liquids.</p> <p>(2) The relevant activity does not include—</p> <p>(a) in-transit storage of chemicals; or</p> <p>(b) storing chemicals for carrying out an activity under section 7; or</p> <p>(c) transporting petroleum under the <i>Petroleum Act 1923</i> or the <i>Petroleum and Gas (Production and Safety) Act 2004</i>; or</p> <p>(d) carrying out an activity to which section 55, 56, 57 or 58 applies.</p>
15	Fuel burning	<p>(1) Fuel burning (the <i>relevant activity</i>) consists of using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour.</p> <p>(2) The relevant activity does not include burning fuel for—</p> <p>(a) carrying out an activity to which another section applies or would apply if it were carried out within a stated threshold under that section; or</p> <p>(b) operating a stand-by generator for fewer than 200 hours in a year; or</p> <p>(c) operating mobile equipment to respond, or for training to respond, to an emergency.</p>
16	Extractive and screening activities	<p>(1) Extractive and screening activities (the <i>relevant activity</i>) consists of any of the following—</p> <p>(a) dredging a total of 1000t or more of material from the bed of naturally</p>

APPENDICES

ERA Number	ERA Name	Description
		<p>occurring surface waters, in a year;</p> <p>(b) extracting, other than by dredging, material from a wild river area;</p> <p>(c) extracting, other than by dredging, a total of 5000t or more of material, in a year, from an area other than a wild river area;</p> <p><i>Examples—</i></p> <ul style="list-style-type: none"> extracting material for excavating a bund between existing waters and an artificial waterway being constructed on dry land extracting virgin rock from a quarry extracting rock, that has been previously broken, from a stockpile on the site from which the rock was originally extracted <p>(d) screening 50t or more of material, in a year, in a wild river area;</p> <p>(e) screening 5000t or more of material, in a year, other than in a wild river area.</p> <p>(2) The relevant activity does not include—</p> <p>(a) extracting material under an environmental authority (chapter 5A activities) or environmental authority (mining activities); or</p> <p>(b) extracting material from a wild river area if—</p> <p>(i) the primary purpose of extracting the material is not to gain the material; and</p> <p>(ii) no more than 1500m³ of materials is extracted or the surface area from which the material is extracted is less than 5200m²; or</p> <p>(c) extracting material from a road reserve in a wild river area if—</p> <p>(i) the material is to be used for constructing or maintaining a road; and</p> <p>(ii) no more than 5000t of material is extracted in the relevant year; or</p> <p>(d) extracting material from a road reserve, other than in a wild river area, if—</p> <p>(i) the material is to be used for constructing or maintaining a road; and</p> <p>(ii) the surface area from which the material is extracted is less than 10000m²; or</p> <p>(e) extracting material from a place for constructing a road or railway at the place; or</p> <p><i>Examples—</i></p> <ul style="list-style-type: none"> cutting and filling land for constructing a road or railway extracting material for constructing a tunnel for a road or railway <p>(f) extracting material from a place, other than by dredging, for constructing the foundations of a building at the place; or</p> <p>(g) extracting material for reshaping land if—</p> <p>(i) reshaping the land does not involve blasting; and</p> <p>(ii) the material is not removed from the site from which it is extracted; or</p> <p><i>Example—</i></p> <ul style="list-style-type: none"> cutting and filling land for creating building lots <p>(h) screening material on the site from which it has been extracted in the course of carrying out an activity mentioned in paragraphs (a) to (g).</p>
18	Boilermaking or engineering	<p>(1) Boilermaking or engineering (the <i>relevant activity</i>) consists of boilermaking, assembling, building or manufacturing a total of 200t or more of metal product in a year.</p> <p><i>metal product</i> includes agricultural equipment, electrical machines, heavy machinery, motor vehicles, trains and trams.</p>
31	Mineral processing	<p>(1) Mineral processing (the <i>relevant activity</i>) consists of processing, in a year, a total of 1000t or more of coke or mineral products.</p> <p>(2) In the following table, the aggregate environmental score for the relevant activity is the score stated opposite the threshold within which the relevant activity is carried out.</p>
33	Crushing, milling, grinding or screening	<p>(1) Crushing, milling, grinding or screening (the <i>relevant activity</i>) consists of crushing, grinding, milling or screening more than 5000t of material in a year.</p>

ERA Number	ERA Name	Description
		<p>(2) The activity includes crushing waste, other than putrescibles waste, to extract resources for reuse or recycling.</p> <p>(3) The relevant activity does not include—</p> <p>(a) crushing, grinding, milling or screening—</p> <p>(i) grain crops; or</p> <p>(ii) other agricultural products on a farm for use on the farm; or</p> <p>(b) an activity to which section 16, 55 or 61 would apply, if the activity were carried out within a stated threshold under that section.</p>
38	Surface coating	<p>(1) Surface coating (the <i>relevant activity</i>) consists of using, in a year, 1t or more of surface coating materials for—</p> <p>(a) anodising, electroplating, enamelling or galvanizing; or</p> <p>(b) coating or painting or powder coating.</p> <p>(2) The relevant activity does not include—</p> <p>(a) coating a surface using only a paintbrush, roller or sponge; or</p> <p>(b) coating or painting for marking pavements or roads; or</p> <p>(c) coating a surface in association with carrying out an activity to which section 17, 21, 48, 49 or 54 applies.</p>
43	Concrete batching	<p>(1) Concrete batching consists of producing 200t or more of concrete or concrete products in a year, by mixing cement with sand, rock, aggregate or other similar materials.</p>
60	Waste disposal	<p>(1) Waste disposal (the <i>relevant activity</i>) consists of only 1 of the following—</p> <p>(a) operating a facility for disposing of—</p> <p>(i) only regulated waste; or</p> <p>(ii) regulated waste and any, or any combination, of the following—</p> <p>(A) general waste;</p> <p>(B) limited regulated waste;</p> <p>(C) if the facility is in a scheduled area—no more than 5t of untreated clinical waste in a year;</p> <p>(b) operating a facility for disposing of, in a year, 50t or more of waste consisting of—</p> <p>(i) only general waste; or</p> <p>(ii) general waste and either, or a combination, of the following—</p> <p>(A) a quantity of limited regulated waste that is no more than 10% of the total amount of waste received at the facility in a year;</p> <p>(B) if the facility is in a scheduled area—no more than 5t of untreated clinical waste.</p> <p>(2) The relevant activity does not include using clean earthen material as fill.</p>
63	Sewage treatment	<p>Sewage treatment (the <i>relevant activity</i>) consists of—</p> <p>(a) operating 1 or more sewage treatment works at a site that have a total daily peak design capacity of at least 21EP; or</p> <p>(b) operating a sewage pumping station with a total design capacity of more than 40KL in an hour, if the operation of the pumping station is not an essential part of the operation of sewage treatment works to which paragraph (a) applies.</p> <p>(2) The relevant activity does not include—</p> <p>(a) carrying out works, other than operating a sewage pumping station mentioned in subsection (1)(b), involving only infrastructure for the collection of sewage, including for example, pipes; or</p> <p>(b) carrying out works involving either of the following—</p> <p>(i) operating or maintaining composting toilets;</p> <p>(ii) treating or recycling greywater.</p>

APPENDICES

ERA Number	ERA Name	Description
64	Water treatment	<p>(1) Water treatment (the <i>relevant activity</i>) consists of carrying out any of the following activities in a way that allows waste, whether treated or untreated, to be released into the environment—</p> <p>(a) desalinating 0.5ML or more of water in a day;</p> <p>(b) treating 10ML or more of raw water in a day;</p> <p>(c) carrying out advanced treatment of 5ML or more of water in a day.</p> <p>(2) The relevant activity does not include—</p> <p>(a) treating water in a way that allows liquid or solid waste to be released only to the following—</p> <p>(i) a local government's sewerage infrastructure;</p> <p>(ii) a facility mentioned in section 56, 58, 60 or 61; or</p> <p>(b) treating water if the only treatment is disinfection or fluoridation; or</p> <p>(c) treating water in association with carrying out an activity to which section 55, 56, 60, 61 or 63 applies.</p>

These have been included in the updated EM Plan (SEIS Volume 2, Appendix V, Section 2).

3C

Recommendation – *The EMP should include an identification of all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Alpha Coal Mine.*

Response:

The Proponent has reassessed the EVs and this has resulted in the EM Plan being reviewed and updated appropriately (SEIS Volume 2, Appendix V).

Comment 4.0 Section P.2 – Project Description (Page P-11)

4A

Issue – *The EMP does not include the proposed mining sequence for both proposed pits and seams.*

Response:

The EM Plan has been updated to include mining sequencing information (SEIS Volume 2, Appendix V, Sections 1.1,).

4B

Recommendation – *The EMP should be revised to include the following:*

- *The proposed sequencing and timing of mining of each seam within the mining lease;*
- *The use of different mining techniques in areas of different topographic or geo-technical character; and*
- *The estimated area to be disturbed at each major stage of the project.*

Response:

See above.

Comment 5.0 Section P.3.1.3.1 & P.3.4.9.1 – Monitoring of water storage quality**5A**

Issue – The proposed EA conditions fail to list all relevant constituents for monitoring of water storages.

Response:

The Water Quality Technical Report (SEIS Volume 2, Appendix M, Section 10.2) provides inputs on which constituents should be monitored.

There are four sedimentation dams from where water may potentially be released. These dams are more or less, evenly distributed along the length of the mine and discharge into Lagoon Creek.

The parameters identified in Table AJ-8 from the Water Quality Technical Report will be monitored either instantaneously on site or through event-based grab sampling.

5B

Recommendation – The following are example contaminants for onsite water storage parameters and contaminant limits. The SEIS should provide information on relevant contaminants and proposed limits. The revised EMP should update Table P-22:

Table 0J-8 Onsite water storage parameters

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9 ²
EC (µS/cm)	Maximum	5970 ¹
Sulphate (mg/L)	Maximum	1000 ¹
Fluoride (mg/L)	Maximum	2 ¹
Aluminium (mg/L)	Maximum	5 ¹
Arsenic (mg/L)	Maximum	0.5 ¹
Cadmium (mg/L)	Maximum	0.01 ¹
Cobalt (mg/L)	Maximum	1 ¹
Copper (mg/L)	Maximum	1 ¹
Lead (mg/L)	Maximum	0.1 ¹
Nickel (mg/L)	Maximum	1 ¹
Zinc (mg/L)	Maximum	20 ¹

Note:

¹ Contaminant limit based on ANZECC & ARMCAZ (2000) stock water quality guidelines.

² Page 4.2-15 of ANZECC & ARMCAZ (2000) "Soil and animal health will not generally be affected by water with pH in the range of 4–9". Note: Total measurements (unfiltered) must be taken and analysed.

Response:

Comments noted. The table has now been revised and is included in Volume 2, Appendix V, Section 3.4.10.1.

Comment 6.0 Section P.3.3 – Air Quality (Page P-19)**6A**

Issue – The EMP does not include environmental protection commitments or control strategies for greenhouse gases.

Section 51 of the Environmental Protection Regulation 2008 'Matters to be considered for environmental management decisions' states that:

- (1) The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—

(h) the quantity and type of greenhouse gases released, and the measures proposed to demonstrate the release is minimised using best practice methods that include strategies for continuous improvement.

The EMP does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that may release greenhouse gas and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Response:

The greenhouse gas section of the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.3.4 and commitments in Section 3.3.9) details the measures the Proponent will implement to manage their greenhouse gas emissions on the Alpha Coal Project.

6B

Recommendation – The SEIS should propose and assess greenhouse gas abatement measures and levels. This should include a description of the proposed measures to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the Alpha Coal Mine.

Response:

See above.

6C

Recommendation – The revised EMP should identify and describe the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Alpha Coal Mine with regards to greenhouse gas. For each of the environmental values to be protected, commitments must be proposed and identify the environmental protection objective(s), standard(s), measurable indicator(s) and control strategy(ies) to demonstrate how the objective(s) will be achieved.

Response:

The greenhouse gas section of the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.3.4 and commitments in Section 3.3.9) details the measures the Proponent will implement to manage their greenhouse gas emissions on the Alpha Coal Project.

Comment 7.0 Section P.3.3.7.2 – Dust Suppression Measures (Page P-23)**7A**

Issue – Dot point one states:

- ‘Watering haul roads to best-practice level’.

This section does not indicate what the Alpha Coal Mine references as ‘best-practice’.

Response:

The EM Plan for the Alpha Coal Project has been updated (SEIS Volume 2, Appendix V, Section 3.3.7.2). The update includes specification of levels of haul road water (i.e. level 2 which is greater than 2 litres of water per m² per hour as required), and includes detailed measurable indicators, standards, and control strategies.

7B

Recommendation – *The EMP should include detailed measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values associated with impacts on air quality.*

Response:

See 6C response above.

Comment 8.0 Section P.3.3.7.2 – Dust Suppression Measures (Page P-23)**8A**

Issue – Dot point two states:

- ‘Watering of ROM stockpiles using water sprays as required’.

This section does not indicate how the Alpha Coal Mine will determine when water sprays will be used.

Response:

The EM Plan for the Alpha Coal Project has been updated and is attached as SEIS Volume 2, Appendix V, Section 3.3.7.2. The updates include the operational procedures the site is proposing to undertake to meet the Environmental Protection Commitments proposed within the EM Plan, and includes detailed measurable indicators, standards, and control strategies.

8B

Recommendation – *The EMP should include detailed measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values associated with impacts on air quality.*

Response:

See 6C response above

Comment 9.0 Section P.3.3.7.4 – Operational Procedures (Page P-23)**9A**

Issue – The EMP states that 'Operational procedures set out how the Project is to be operated in order to meet targets for air quality performance. In relation to air quality, the following procedures may be incorporated into the site operational procedures'.

The EMP is required to outline all the 'operational procedures' the site is proposing to undertake to meet the Environmental Protection Commitments proposed within the EMP.

Response:

The EM Plan for the Alpha Coal Project has been updated (SEIS Volume 2, Appendix V, Section 3.3.7.4). The updates include the operational procedures the site is proposing to undertake to meet the Environmental Protection Commitments proposed within the EM Plan, and includes detailed measurable indicators, standards, and control strategies.

9B

Recommendation – The EMP should include detailed measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values associated with impacts on air quality.

Response:

See 6C response above

Comment 10.0 Section P.3.3.8 – Monitoring (Page P-24)**10A**

Issue – The EMP states that 'The outcomes of the ambient monitoring program outlined below and in Table P-2 will be used by the Proponent to determine whether the mine's operations are contributing to excessive dust levels at nearby sensitive receptors'.

The EMP does not outline an ambient monitoring program.

Response:

The EM Plan for the Alpha Coal Project has been updated and is attached as SEIS Volume 2, Appendix V, Section 3.3.8. The updates include the ambient monitoring program (SEIS Volume 2, Appendix P, Section 7) and measurable indicators linked to this program to assist in protecting or enhancing each of the environmental values associated with the impacts on air quality.

10B

Recommendation – The EMP should include detailed measurable indicator(s) linked to the monitoring program proposed to protect or enhance each of the environmental values associated with impacts on air quality.

Response:

See 6C response above

Comment 11.0 Section P.3.3.8 – Monitoring Air Quality (Page P-24)**11A**

Issue – The EMP states that 'The Proponent will take action to avoid adverse impacts on air quality at nearby receptor locations'.

The EMP does not state how the proponent will take action to avoid adverse impacts on air quality at nearby receptor locations.

Response:

The EM Plan for the Alpha Coal Project has been updated and is included as SEIS Volume 2, Appendix V, Section 3.3.8. The updates include the ambient monitoring program (SEIS Volume 2, Appendix P, Section 7), and measurable indicators linked to this program to assist in protecting or enhancing each of the environmental values associated with the impacts on air quality.

11B

Recommendation – The EMP should include detailed control strategy(ies)/actions linked to measurable indicator(s), standard(s) to protect or enhance each of the environmental values associated with impacts on air quality.

Response:

See 6C response above

Comment 12.0 Section P.3.4 – Water Resources (Page P-29)**12A**

Issue – The EMP does not outline the water management practices or water management system to be utilised for the Alpha Coal Project.

This section of the EMP is required to outline the water management practices of the site – i.e. the water management plan. This section of the EMP should examine and address all issues relevant to the importation, generation, use, and management of water on a mining project in order to minimise the quantity of water that is contaminated and released by and from the project.

A mining project water management plan systematically identifies the actual and potential risks of harm to natural water flows posed by mining activities; the actual and potential risk of environmental harm posed by water contaminated by the mining activities; and defines management actions that will effectively minimise these risks.

A mining project water management plan should be based on a comprehensive process that assesses the likelihood and consequence of risks to water quality values within and around the mining project. Effective management actions (controls) should then be identified to reduce these risks to acceptable levels.

Response:

The water management practices and systems are discussed in the Water Management Technical Report and are supported by the Water Balance modelling.

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.4.1) describes the water management practices and water management system to be utilised for the Alpha Coal Project in detail.

12B

Recommendation – This section of the EMP should detail the site water management system following the departmental guideline 'Preparation of water management plans for mining activities' (http://www.derm.qld.gov.au/services_resources/item_details.php?item_id=202713).

The guideline identifies that a water management plan should form an integral part of the EMP.

The EMP should:

- Determine the adequacy of the system to prevent unauthorised discharges during Average Recurrence Interval (ARI) 1 in 25, 1 in 50, 1 in 100 and 1 in 1000 year rainfall events considering both an operational water balance and the ability to deal with rainfall events that may occur on site at any time.

Response:

The water management system assumes that principally there will be no controlled releases from the Project to the environment. The Project has a critical shortage of water and any (dirty) mining affected water will be used as part of the mining process as first preference. After depleting that water source, water will be taken from the raw water dam, which is supplied from an external source.

All environmental dams are turkey nest dams and do not have an external catchment. The exception to this is the environmental dams located in the low lying area adjacent to the dump stations. These dams are controlled by automated high flow pump stations and include large buffer storage.

In the event that controlled releases are considered desirable (in case of threat of exceeding the DSA volume, in spite of pumping surplus water to other storages) the release would be conducted in accordance with the guidelines and as set out in the Water Quality Technical Report (SEIS Volume 2, Appendix M), based on available flows in the receiving waters and dilution factor. If release is not possible or constrained by the dam water quality, the surplus would spill back to the pit.

Comment 13.0 Section P.3.4 – Water Resources (Page P-29)**13A**

Issue – This section of the EMP is required to outline the management of any proposed releases of mine affected water to the environment.

The EMP 'proposes' conditions for an Environmental Authority that include release limits. The proposed release conditions and the proposed release limits are not linked to the environmental values identified or the environmental protection commitments.

Response:

In response to comments received on the EIS, an amended Water Quality Technical Report has been prepared for the Supplementary EIS. In addition, an amended Site Water Management System and Water Balance Technical Report has also been prepared. In summary, discharges from the site are unlikely to occur except perhaps during prolonged wet periods. Instead, discussions with DERM have confirmed that the preference is for water generated and captured on site (including sediment dam water) to be reused on site. Discharge release criteria have been identified in the event that discharges are required and these will be reflected in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.1).

13B

Issue – Section 51 of the Environmental Protection Regulation 2008 ‘Matters to be considered for environmental management decisions’ states that:

- a. The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—
 - i. the characteristics of the contaminants or materials released from carrying out the activity;
 - ii. the impact of the release of contaminants or materials from carrying out the activity on the receiving environment, including the cumulative impact of the release with other known releases of contaminants, materials or wastes;

The EMP does not provide the necessary information the administering authority is required to consider when making a decision regarding the likely release of contaminants and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Section 52 of the Environmental Protection Regulation 2008 ‘Conditions to be considered for environmental management decisions’ states that the administering authority must consider whether to impose conditions about:

- Ensuring an adequate distance between any sensitive receptors and the relevant site for the activity to which the decision relates;
- Limiting or reducing the size of the initial mixing zone or attenuation zone, if any, that may be affected by the release of contaminants;
- Treating contaminants before they are released;
- Restricting the type, quality, quantity, concentration or characteristics of contaminants that can be released;
- The way in which contaminants may be released; and
- Ensuring a minimum degree of dispersion happens when a contaminant is released.

The EMP should provide sufficient information regarding the operation of the activities with regards to how the release of mine affected water will be undertaken to allow the administering authority to set appropriate conditions within the environmental authority.

Response:**Section 51:**

Dirty water runoff from catchments disturbed by overburden management which is potentially affected by sediment only. Dirty water will be directed through Sediment Runoff Capture Dams (SRD).

The overburden units have an excess of ANC and will produce a neutral pH leachate. Hence, from a potential acid generation viewpoint, overburden materials have a high factor of safety and spoil piles pose a low risk to the immediate and downstream environment. The main environmental management activities for spoil materials generated from overburden removal will be placement of any saline and/or sodic materials within the core of the spoil pile away from the final cover and batters, before covering with less saline/sodic overburden materials, reshaping and adding topsoil and vegetation as part of rehabilitation

The overburden in the study area has been characterized as inert and non-acid forming. Potential metal contaminants in runoff from overburden stockpiles are not elevated and these are not readily soluble at the given pH (refer to the Geochemical Characterization technical report).

The overburden presents high salinity levels; including sulphates, chloride, and sodium concentrations. An increased in salinity, impacts causing physical-chemical stress on aquatic ecosystems, and impact on macro invertebrate communities. If salinity, or the concentrations of salt species is excessively increased, the surface water quality may impact on environmental values for primary industry and livestock drinking water supply.

Section 52:

No water users have been located directly downstream of the Project area, only one license to take water was identified on Lagoon creek 250–300 km downstream providing an adequate buffer distance with the sensitive receptors.

The Alpha Coal project water management system will operate in net water deficit and rely on imported water (pipeline) to make up the requirements for water demands that cannot be met from capturing on-site surface water. Therefore, reuse of mining affected water collected from within the MLA will be maximized and reuse if this water will be a priority over using imported raw water. In this context, release will be minimized and restricted to very high rainfall events during which long term inflows exceed demands.

In the unlikely event of any controlled discharge is possible from up to four locations, which will reduce the impact at the point of discharge and increase dispersion. Due to the likely nature of these releases, the water in the dams would be heavily diluted (due to excessive inflows) and flows in the receiving waters maximised, ensuring that any impact is minimal.

End-of-pipe (EOP) contaminant release limits have been developed based on a high dilution ratio of 1:10 restricting the quantity and concentration of contaminants that can be released

Discharges from declared dams would flow to Lagoon creek, which may have an impact on the water quality of its tributaries. However, with the proposed discharge management strategy, flow and dilution ratio, the extent of impacts would be reduced due to dilution and dispersion of sediments, nutrients and contaminants during rainfall events. As such, it is not expected that there would be a significant impact on the water quality of lagoon creek or waterways further downstream.

13C

Issue – *The Standard Criteria, defined in Schedule 4 of the Environmental Protection Act 1994, must be considered and includes:*

- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and*
- *The character, resilience and values of the receiving environment.*

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Section 3.2.4.2 provides some direction to make judgements about an acceptable level of change for the protection of various ecosystems. In the absence of clear information from which to set decision criteria, the guidelines recommend for sites of high conservation value, a default target for the size of the effect to be 10% of, or one standard deviation from a baseline mean, whichever is smaller.

To negotiate a value for 'end-of-pipe' EC limits, it will be necessary to have sufficient background water quality data from historical flow events, ideally above each discharge point. This data should be

used to demonstrate that there is sufficient 'assimilative capacity' in receiving waters to receive mine discharges.

Response:

The EM Plan (SEIS Volume 2, Appendix V) has been revised on the basis of comments received.

In doing so the following should be noted.

1. The existing condition of aquatic ecosystems in the Project area has been defined as slightly to moderately disturbed due to previous grazing activity and land clearing.
2. Additional background water quality analysis has been undertaken during the EIS including the analysis of additional project specific water quality data. This has enabled maximum receiving water limits to be revised for EC, Total Suspended Solids, and Sulphate
3. Additional hydrological analysis has been undertaken to identify an appropriate trigger flow for releases. The proposed trigger flow is 10m³/s which equates to one third of the 1 in 2 ARI peak flood flow in Lagoon Creek. Flow records for the DERM Native Companion Creen @ Violet Grove gauge show the recessions flows persist for 2 to 5 days following flow events of 10m³/s
4. Discharge flows will be restricted to 10% of the receiving water streamflow and therefore achieve a dilution rate of 1:10.

Contaminant release limits have been specified which will not cause receiving water EC levels to exceed the maximum receiving water trigger level of 400 µS. These limits are specified in the Water Quality Technical Report (SEIS Volume 2, Appendix M) The above notwithstanding, the current mine water balance demonstrates a critical water deficit, which makes the release of contaminated water both undesirable and unlikely, as this water is better reused on site. Discussions with DERM have confirmed that the Authority's preference is for all contaminated waters (environmental as well as sedimentation water) to be reused on site.

13D

Issue – Further, section 56 of the Environmental Protection Regulation 2008 'Release of water, other than stormwater, to surface water' states:

- a. *This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water, other than stormwater, to surface water.*
- b. *The administering authority must consider each of the following matters—*
 - i. *any available toxicity data relevant to the release and the receiving environment;*
 - ii. *if there is an initial mixing zone—*
 - I. *whether there is any practicable alternative that would reduce or eliminate the initial mixing zone; and*
 - II. *whether the size of the initial mixing zone is likely to adversely affect an environmental value or the ecological condition of the receiving environment, including, for example, a watercourse or wetland; and*
 - III. *whether concentrations of contaminants in the initial mixing zone are acutely toxic to the biota.*

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of water, other than stormwater, to surface water and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Response:

Dirty water runoff from catchments disturbed by overburden management which is potentially affected by sediment only. Dirty water will be directed through Sediment Runoff Capture Dams (SRD).

The overburden units have an excess of ANC and will produce a neutral pH leachate. Hence, from a potential acid generation viewpoint, overburden materials have a high factor of safety and spoil piles pose a low risk to the immediate and downstream environment. The main environmental management activities for spoil materials generated from overburden removal will be placement of any saline and/or sodic materials within the core of the spoil pile away from the final cover and batters, before covering with less saline/sodic overburden materials, reshaping and adding topsoil and vegetation as part of rehabilitation

The overburden in the study area has been characterized as inert and non-acid forming. Potential metal contaminants in runoff from overburden stockpiles are not elevated and these are not readily soluble at the given pH (refer to the Geochemical Characterization technical report).

The initial release from the designated release points will principally be diluted due to the already heavily diluted water in the dam (due to heavy rainfall and runoff). In addition releases will occur when the receiving waters are in flood, which again ensures further dilution as well as dispersion (due to velocities and volume of water. Release points will be located in channel sections where further dispersion can be maximized (e.g. in low / high flow channels).

The overburden presents high salinity levels; including sulphates, chloride, and sodium concentrations. An increased in salinity, impacts causing physical-chemical stress on aquatic ecosystems, and impact on macro invertebrate communities. If salinity, or the concentrations of salt species is excessively increased, the surface water quality may impact on environmental values for primary industry and livestock drinking water supply;

Discharges from declared dams would flow to Lagoon creek, which may have an impact on the water quality of its tributaries. However, with the proposed discharge flow and dilution ration, the extent of impacts would be reduced due to dilution and dispersion of sediments, nutrients and contaminants during rainfall events. As such, it is not expected that there would be a significant impact on the water quality of lagoon creek or waterways further downstream.

13E

Recommendation – *The SEIS should provide the relevant information outlined. A revised EMP should address the management of discharges, including justification for the possible release of specific contaminants to the environment and the management of the release to the environment.*

Response:

Noted. See information above and the revised EM Plan.

Comment 14.0 Section P.3.4 – Water Resources (from Page P-29)**14A**

Issue – The EMP does not outline the water containment structures to be utilised for the Alpha Coal Project.

Response:

The EM Plan has been amended to outline the water containment structures proposed to be utilised in the water management system for the Alpha Coal Project (SEIS Volume 2, Appendix V, Section 3.4.6.1).

14B

Recommendation – This section of the EMP should include a determination if any water storages onsite will be classified as a regulated dam following a hazard analysis. For any identified regulated dams, the following information is required to be submitted:

- Adequate design plans or conceptual design plans for the dams, together with certification (for final design plans) or endorsement (for conceptual design plans) of a suitably qualified and experienced person that the submitted final or conceptual design plan of the regulated dam will provide the performance stated in that submitted design plan.
- The design of the regulated dam should take into account:
 - That the dam is designed and located to have the smallest practical catchment;
 - That the dam is designed to accept waste inputs for the operation year and inputs from the critical wet season;
 - The spillway is designed and maintained to withstand the peak flow from the critical design storm (the critical design storm has a duration that produces the peak discharge for the catchment);
 - That the gradients of earth embankment batters should be stable;
 - That the dam should prevent any erosion of the downstream face of the dam and spillway to avoid surface scour which may lead to failure of the wall; and
 - The Department of Mines and Energy, Technical Guidelines of Environmental Management of Exploration and Mining in Queensland, January 1995.

Response:

See above.

14C

Recommendation – For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

Response:

Noted and this information will be supplied at the appropriate time.

14D

Recommendation – *For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore provide sufficient confidence to allow the administering authority to endorse the conceptual design plan for the regulated dam within the EMP.*

Response:**Design Status**

At this EIS phase of the project approval process, the Regulated Dams for water management and tailings disposal are at conceptual design level. The final design of the Regulated Dams remains subject to geotechnical investigations, and design interaction coordination with a range of other key mine infrastructure, mine planning, watercourse diversion and flood protection levee designs.

Hazard Categories of Regulated Dams

The preliminary hazard categories for the regulated dams are Significant Hazard for mine water dams including pit water dams (all of which are additionally protected by being located inside of flood protection levees), environmental dams and spoil runoff dams. The Significant Hazard category is appropriate for all of the mine water dams because the main contaminants of concern are slightly elevated salinity and evidence from the geochemical investigations to date that indicate that the mine waters from different sources of the mine would not contain significantly toxic contaminants.

The preliminary hazard category for the Tailings Storage Facility is High Hazard. The greater hazard associated with the Tailings Storage Facility is not due to higher concentrations of contaminants, as the investigations to date suggest that the tailings and tailings water would not contain significantly toxic contaminants. The high hazard category for the tailings dam for 'dam break' scenario which could potentially release moderate volumes of tailings water and potentially large volumes of tailings solids, and the corresponding physical environmental damage that could result from the tailings dam failure flows of solids and water.

Regulated Dam Detailed Design Commitments

The proponent is committed to ensure that the final design of the regulated dams for mine water dams will not be substantially different from the concept designs.

It is possible that minor changes to embankment layouts may be required subject to detailed geotechnical investigation and coordination of design with other parts of the project detailed design. Minor changes to spillway arrangements may also be required for optimal design, safety, and ensuring potential failure modes and probabilities of failure are minimised.

For the Tailings storage facility, a worst case scenario for 30 year mine life tailings disposal in an out-of-pit tailings dam is presented in the concept design. The final design of the tailings dam will not be substantially different to the concept design to the extent that a larger footprint of the dam would not be necessary. It is significantly possible that for detailed design of the tailings dam a substantially smaller footprint for the tailings dam may be possible when the in-pit tailings disposal option investigation confirms the viability of this preferred option. The concepts for the tailings dam embankment, spillway, diversion drains, seepage control and interception, and decant works will not be substantially different in the detailed design to the extent that any significant differences would be only for the benefit of improved dam safety and tailings disposal operations.

For all of the regulated dam detailed design the proponent is committed to ensure that:

- The hazard categories of each dam are reviewed in a detailed hazard assessment in accordance with DERM guidelines;

- The hazard category for each dam are inputs into the dam design for storage capacity and spillway capacity;
- The detailed design of the regulated dams are adequately documented in a design plan and certified by a suitably qualified and experienced person (as defined by DERM guidelines);
- The certified design plans include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures;
- The regulated dams are designed to have the smallest practical catchment;
- The regulated dams are designed to accept waste inputs for the operation year and inputs from the critical wet season;
- The spillway is designed with sufficient capacity and energy dissipation to minimise potential for erosion failure for the critical design flood flow from the dam catchment for an Annual Exceedance Probability corresponding to the hazard category criteria of the dam in accordance with DERM guidelines;
- The earth embankments of the regulated dams will be designed to be stable; and
- The regulated dams will be designed with erosion protection for embankments, spillways, and diversion drains including the potential for erosion from flows emanating from within the dam catchment and relevant external flows (such as creek flooding and overland flow).

Comment 15.0 Section P.3.4 – Water Resources (Page P-29)

15A

Issue – *The EMP does not outline the flood protection levee structures to be utilised for the Alpha Coal Project.*

Response:

The EM Plan has been amended to outline the creek diversion and levees proposed to be utilised in the water management system for the Alpha Coal Project (SEIS Volume 2, Appendix V, Section 3.4.6.1).

15B

Recommendation – *This section of the EMP should include a determination if any flood protection levee's proposed for the site are required to be authorised as a regulated structure under the environmental authority.*

Response:

The ultimate (year 30) mined area of the Alpha Coal Project will be protected against flooding by means of levees. The area located west of Lagoon Creek, including the out-of-pit and in-pit overburden areas, pit(s) and haul roads, as well as associated mining infrastructure will be protected against flooding to a 3000 year ARI event. This is achieved by providing levees along the existing Lagoon Creek and along the proposed diversion drains and creek diversions for Sandy and Spring Creeks. The western diversions are located west (upstream) of the year 30 mined areas and final void.

The levees run parallel to the existing creeks and proposed diversion channels; with the channels providing for the normal creek diversion flows up to the 50 year ARI event, as per the Queensland Government Natural Resources and Water, Central West Water Management and Use Regional Guideline: Watercourse Diversions – Central Queensland Mining Industry, (2008). Flood protection to a 3000 year ARI event is provided by levees between the creek / diversion channel and the mining activities. The western diversions allow the flood waters to break out from the channel onto upstream areas not affected by mining, temporarily flooding adjacent areas located within the mine's MLA. Along the northern and southern boundary, however, additional levees are provided to ensure that the diversions and flood protection provided to the mine, do not impact on adjacent tenements.

Flood levees for the Sandy and Spring Creek diversions channels are generally minor of nature with levee heights limited to a maximum of 3 metres above natural ground levels. Sections and details of the levees are provided in Appendix D of the Stream Morphology Technical Report. Levees adjacent to Lagoon creek have been located as far out of the flood plain as reasonably possible, with some low lying areas been traversed. Generally however, levee heights are minimal.

All proposed levees are deemed regulated structure under the environmental authority and together with the creek diversions, appropriate licensing will be sought once detailed design is completed.

15C

Recommendation – *Adequate design plans or conceptual design plans for the flood protection levee's should be included within the EMP. Either a final design plan or a conceptual design plan, together with the certification (for a final design plan) or endorsement (conceptual design plan) of a suitably qualified and experienced person that the submitted final or conceptual design plan for the flood protection levee's will deliver the performance stated in that submitted design plan.*

The design plan should adequately described the physical dimensions of the flood protection levee, the materials and standards to be used for construction of the flood protection levee and the criteria to be used for operating the flood protection levee.

Response:

The information currently available for the flood protection levee's is provided in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.6.1). Final design of these structures will be in accordance with the applicable regulatory requirements.

15D

Recommendation – *For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.*

Response:

Noted.

15E

Recommendation – *For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will*

therefore provide sufficient confidence to allow the administering authority to endorse the conceptual design plan for the flood protection levee within the EMP.

Response:

Design Status

At this EIS phase of the project approval process, the flood protection levees at conceptual design level. The final design of the flood protection levees remains subject to geotechnical investigations, and critical design interaction coordination with final watercourse diversion design, and detailed mine planning including pit stability assessments.

Flood Protection Levee Detailed Design Commitments

The proponent is committed to ensure that the final design of the flood protection levees will not be substantially different from the concept designs to the extent that hazards for mine flooding will not be increased, the flood protection levees will be stable, the design of watercourse diversions will be stable, and potential flood protection levee impacts on existing watercourses will be mitigated. The flood protection levee will be licensed through the Environmental Authority conditions as regulated dams, and design plans and certification will be to the same standard as regulated dams.

The proponent is committed to ensure that the flood protection levee design plan will adequately described the physical dimensions of the flood protection levee, the materials and standards to be used for construction of the flood protection levee and the criteria to be used for maintenance and surveillance of the integrity the flood protection levee.

The flood protection levee design plan will include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

The commitments for the design of the flood protection levees include reasonable allowance for refinement of the mine plan to reduce of the extents of the mine pits where this is determined necessary from detailed design investigations. This will ensure that the levee bank is stable, the watercourse diversion designs are stable, floodplain corridor widths are adequate to protect the stability of both the water course diversion and the levee, and the levee has adequate buffer distance from the pit highwall or endwall taking account geotechnical hazards of potential pit highwall or endwall slope failure.

The flood protection levees will be designed to provide 1 in 3000 AEP level of flood protection for the mine.

Comment 16.0 Section P.3.4 – Water Resources (Page P-29)

16A

Issue – *The EMP does not provide information regarding the management of stormwater on the proposed Alpha Coal Mine.*

Section 57 of the Environmental Protection Regulation 2008 ‘Release of stormwater’ states:

- 1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of stormwater to the receiving environment.*
- 2) The administering authority must consider the following matters—*

- a) *the topography of, and climatic conditions affecting, the receiving environment;*
- b) *if the activity involves exposing or disturbing soil—the soil type, its characteristics and the way it is managed;*
- c) *if the activity involves the storage of materials or wastes that are exposed to rainfall or stormwater run-off—the characteristics and containment of the material or waste;*

The EMP does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of stormwater and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Response:

The amended EM Plan (SEIS Volume 2, Appendix V, Section 3.4.9) outlines an Erosion and Sediment Control Plan (ESCP) that will be prepared prior to the commencement of construction. In addition, it outlines the mine water management system and Water Management Plan to be implemented. Stormwater controls for the accommodation village and light industrial area are also outlined.

Soil types and an assessment of erosion potential are described in Section 3.7.3.2 of the amended EM Plan (SEIS Volume 2, Appendix V).

Waste materials stored on site are described in the Waste Management Section 3.6 of the amended EM Plan (SEIS Volume 2, Appendix V).

As mentioned in response CM283, the current mine water balance demonstrates a water deficit, which makes the release of contaminated water both undesirable and unlikely, as this water is consigned for reused on site. Discussions with DERM have confirmed that the Authority's preference is for all contaminated waters (environmental as well as sedimentation water) to be reused on site.

16B

Recommendation – *The SEIS and EMP should provide descriptions of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Maps (A3) should be provided in latitudes and longitudes in the Geodetic Datum of Australia 1994 and include contours at a scale suitable to allow contributing catchments for rainfall runoff to be determined. Maps should include a contour plan with superimposed site layout showing all relevant facilities and infrastructure. Watercourses, drainage lines and contributing catchments must be identified and marked on the map.*

Response:

The mechanisms for stormwater management for the site are presented as part of the Erosion and Sediment Control Plan (ESCP) EM Plan (SEIS Volume 2, Appendix V, Section 3.4.9). The proposed drainage system around the infrastructure area will be developed as part of detailed design and will be integrated into the applicable water management plans prior to any ground disturbance. Similarly the stormwater management for around the mine area (levees and diversions) is presented as part of the EIS and will be further developed as part of detailed design and the approvals process. This information can be added into the EM Plan once this information becomes available.

Comment 17.0 Section P.3.4.2.1 Appendix P – Aquatic environmental values (Page P-29)

17A

Issue – *The EIS appraisal and characterisation of aquatic environmental values and ecology is lacking. While the EIS suggests: “aquatic fauna are limited to hardy species that tolerate variable water quality, and macro invertebrate assemblages are not pristine.”, there are substantial issues with the information currently available:*

1. *There are no wet season surveys and results are based on two dry season periods (16 to 21 March 2009, and 15 to 22 March 2010). Mining discharges generally occur in wet seasons, so wet season information is critical and would provide vital information about environmental values that may be impacted. The project area contains ephemeral waterways where seasonal variability is a major driver and therefore it is critical to examine seasonality.*

Response:

The AARC aquatic flora and fauna fieldworks were conducted in March 2009 and March 2010 when the Project site was wet and the impact of rainfall upon the local aquatic community was fully expressed in terms of aquatic species diversity. For example, it takes a number of weeks for frogs eggs (once hydrated) to develop into adults that are recognisable species. Note that the month of January proved to be too wet to conduct any aquatic surveys in both 2009 and 2010. Rainfall for the months of February and March is provided in the AARC EIS Aquatic Ecology Assessment Appendix Report (Volume 5, Appendix E2, Section 2.4). This data is also presented in the Introduction to the Aquatic Ecology section of the EIS (Volume 2, Section 10.1).

Please also note that recent ToR for Mining Projects now refer to “*the beginning of February to the end of March*” as a suitable time period, within which, wet-season aquatic surveys should be conducted. Therefore, AARC consider that March is a suitable month in which to conduct aquatic surveys.

An additional dry season aquatic flora and fauna study has been completed this year. The survey included a riparian flora and habitat assessment, vertebrate sampling (fish trapping and frog call playback), macroinvertebrate sampling and assessment of water and stream sediment quality.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.0 Survey Methodology.

17B

Issue –

2. *Methods in general are uninformative and ambiguous. The QA protocols are either non-existent or not reported in the EIS and this gives a low level of confidence about the results presented.*

Response:

Descriptions of the aquatic sampling methods have been clarified and strengthened. Protocol Quality Assurance (QA) details will be generated for future reports and include macroinvertebrate sampling quality assurance methods, duplication of water quality sampling locations, laboratory quality control methods and the confirmation of flora species by the Queensland Herbarium.

The survey maintained a QA plan detailing information on all elements of field sampling, laboratory processing and testing, data entry and statistical analysis of data. Standardised pro-formas were utilised to minimise the bias included in each assessment.

Field staff are well trained in data storage and transparent referencing of collected field samples, so independent analyses of waters, floral specimens and invertebrates can be conducted.

Internal Quality Assurance / Quality Control (QA/QC) checks on field picking for macroinvertebrates are performed on each sample. At each round of QA / QC, a person is assigned to analyse a sample field picked by another. At least 10% of the retained sample was selected at random and were field picked without reference to the original sample. A comparison was then made of the original selection versus the second selection, indicating any anomalies in sampling. Error rates greater than 10% in identification and counting are not considered to be acceptable.

To facilitate statistical analysis and enhance QA for surface water and stream sediment sampling, both replicate and spilt duplicate samples will be collected and analysed for future surveys. The laboratory also conducts QA / QC testing on samples, with a report provided for each sample lot. To ensure impartiality, the labeling supplied to the testing laboratory did not indicate which samples came from impact sites or reference sites, or which samples are replicates and / or split duplicates.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.3.2 Surface Water Quality Sampling to 5.4.3 Habitat Assessment

17C

Issue –

3. *The sites surveyed are not representative of habitats within the project area. They appear to be 'accessible areas' that 'were broadly surveyed from a vehicle'. This implies sampling sites are adjacent to roads. Hence, they are biased by edge effects and are unrepresentative of the main project area.*

Response:

The location of each aquatic survey site was based upon database searches (DERM wetland maps and DERM RE mapping), location of Project site infrastructure (upstream / midstream / downstream of impacts), diversity in aquatics habitat (riffle / run / pools) and accessibility to the survey site. All habitat types were aimed to be sampled and not based purely on site access. Therefore, AARC consider that the aquatic flora and fauna site selection process was representative of the Alpha Coal site. Detailed information on site selection is provided within the methodology sections of the EIS Appendix Report (Volume 5, Appendix E2, Section 5.1) and the EIS (Volume 2, Section 10.2.2). DERM's comments regarding frog calls and electro-fishing are acknowledged. These techniques will be used for the future dry season aquatic survey.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.3 Field Survey Methods

17D

Issue –

4. *The EIS fails to mention whether ANY waterholes were surveyed or considered at all. This is a serious deficiency. Waterholes are the main refuge in any ephemeral system.*

Response:

No permanent waterholes were encountered during the dry season survey and this has been noted in the report.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.1 Survey Timing.

17E**Issue –**

5. The macro-invertebrate indices used are inappropriate for an ephemeral system such as this. PET and SIGNAL have both been shown to be inappropriate for use in arid dry-land rivers (Chessman et al 2005 <http://www.springerlink.com/content/w8lx22l553rhk676/fulltext.pdf>). Quantitative assessments would have been more appropriate.

Response:

The limitations of PET and SIGNAL analysis for ephemeral systems are acknowledged. Future assessments will focus upon a quantitative analysis of variance approach to aquatic flora and fauna data assessment.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.4.2 Macroinvertebrate Sampling and Section 6.5 Macroinvertebrates.

17F**Issue –**

6. Mitigation measures are inadequate as they don't consider the broader potential influence of mining operations on the species present, e.g. increased sediment will affect many filter feeding invertebrates; increased salinity could invariably kill out many resident taxa (i.e. most crustaceans, gastropods and etcetera).

Response:

Mining impact mitigation measures for aquatic flora and fauna have been enhanced in the revised Appendix report.

Report Reference: SEIS Volume 2 Appendix AM, Section 7.0 Impact Risk Assessment and Section 8.3 Mitigation Strategies.

17G**Issue –**

7. The fish sampling methods were inferior. Better methods exist which would have provided more encompassing results (e.g. electro-fishing)

Response:

The use of electro-fishing as a fish sampling method was not possible, because none of the survey sites contained sufficient water.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.3.5 Aquatic Vertebrate Fauna Sampling

17H**Issue –**

8. Frog surveys were inferior. Frogs can be rather cryptic. Frog calls would have been a better way of identifying species.

Response:

The use of a Song Meter SM2 digital field recorder was used to identify frog species for the dry season aquatic fauna survey. However no frog calls were recorded.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.3.5.4 Call Recording

17I**Issue –**

9. Stygo-fauna sampling: The temporal sampling of the stygo-fauna was insufficient. The sampling of most bores only once doesn't account for any seasonal variance. Hence, the statement 'therefore it is not considered that significant stygo-fauna populations exist...' is not supported.

Response:

As per WA EPA Guidance Statement 54a (EPA 2007) a Stygofauna pilot study was conducted for on and off-lease groundwater bores (refer to pages 4 and 5 of the AARC Stygofauna Survey report). As discussed with DERM, since no significant subterranean fauna populations were identified on or off the Project site during the pilot study, a more intensive Stygofauna survey was not considered to be necessary.

17J**Recommendation –**

The SEIS should provide information on the above matters to allow a proper assessment of aquatic ecology.

Information necessary for a proper assessment includes:

- A complete list of macro invertebrate species per site per survey is needed to make adequate judgment on the environmental value assessments for aquatic ecology

Response:

A complete list of macro invertebrate species per site per study is included in Appendix F of the AARC Aquatic Ecology Assessment EIS Appendix Report (Volume 2, Appendix AJ). This report will be updated following the dry season aquatic flora and fauna survey.

17K**Recommendation –**

- *Two extra surveys of aquatic flora and fauna are needed to cover wet season periods and provide meaningful information for this ephemeral system. Similarly for stygo-fauna populations two extra surveys are necessary to cover seasonal variations.*

Response:

Two wet season surveys have already been conducted in March 2010 and March 2011. An additional dry-season aquatic flora and fauna survey has been conducted in June 2011. Refer to response 17I concerning Stygofauna sampling.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.0 Survey Methodology.

17L**Recommendation –**

- *Improved fish and frog sampling methods as suggested above. Site selection needs improvement to provide representativeness of the area.*

Response:

Improved fish and frog sampling methods were used in the June 2011 dry-season aquatic flora and fauna survey, however, electro-fishing was not conducted for this survey, as water levels were insufficient for this method. AARC consider that the aquatic sampling sites currently selected are appropriate, Please refer to Response **17C** for further details.

Report Reference: SEIS Volume 2, Appendix AM, Section 5.3 Field Survey Methods, Section 5.3.5 Aquatic Vertebrate Fauna Sampling and Section 5.3.5.4 Call Recording.

17M**Recommendation –**

- *Record and report locations of waterholes of the system – add to maps.*

Response:

No permanent waterholes were encountered during the dry season survey and this has been noted in the report.

Report Reference: SEIS Volume 2 Appendix AM, Section 5.1 Survey Timing.

17N**Recommendation –**

- *Appropriate QA protocols need to be adhered and reported.*

Response:

As discussed in response **17B** appropriate aquatic flora and fauna QA protocols will be adhered to and reported.

17O**Recommendation –**

- *Once this information is obtained, a risk type assessment of impacts on the complete set of environmental values will be needed. Such a report must consider the broader potential influences that mining and the mining operations may have on species.*

Response:

A qualitative risk assessment has been undertaken for key species potentially impacted by the Project (including the species identified during the additional aquatic flora and fauna survey that will be conducted in the dry season this year). Species' distribution, preferred habitat and sensitivity to habitat change will be assessed against proposed infrastructure plans, to determine the risk of impact from the Project.

The risk assessment will pivot around a biodiversity assessment; has been reflected by habitat or keystone-species indicators where these have been closely linked to ecosystem-level effects. Information on the ecological importance of effects will best be met in programs that have regional coverage and encompass a full disturbance gradient.

Report Reference: SEIS Volume 2 Appendix AM, Section 7.0 Impact Risk Assessment

17P**Recommendation –**

The EMP should be revised to address the further information provided in the SEIS.

Response:

The response to DERM's query is in the form of a revised appendix report (SEIS Volume 2 Appendix AM) and the EM Plan (SEIS Volume 2, Appendix V) in relation to aquatic ecology will not be updated as part of the SEIS submission.

Comment 18.0 Section P.3.4.2.1 – Surface Water Environmental Values (Page P-30)**18A**

Issue – *The EMP does not provide statements clearly identifying each environmental value potentially affected by the project. The EMP does not provide sufficient detail regarding ecosystem values. The EIS and EMP does not include background receiving water and sediment monitoring data as appropriate to enable the administering authority to establish release limits.*

Response:

The EM Plan states the identified Surface Water EVs for protection of water quality and quantity, as follows:

- *Biological integrity of slight to moderately disturbed ecosystems;*
- *Cultural and spiritual values; and*
- *Suitability for primary industry uses, including irrigation and stock drinking water.*

Ecosystem values are clearly identified as *slightly to moderately disturbed ecosystem*. However, the following sentence was added:

"The ecosystem condition that is considered to be most appropriate for the receiving waters in the vicinity of Project, is slightly to moderately disturbed system."

Water quality data from field sampling have been added to the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.1.2). Findings will be updated in subsequent revisions of the EM Plan.

18B

Recommendation – The EMP should include a description of all environmental values – including ecosystem values. These values should be clearly linked to water quality data as provided by the SEIS.

Response:

See above - EM Plan (SEIS Volume 2, Appendix V, Section 3.4.1.2).

18C

Recommendation – Descriptions must include background receiving water and sediment monitoring data as appropriate to enable the administering authority to establish release limits.

Response:

See above - EM Plan (SEIS Volume 2, Appendix V, Section 3.4.1.2)

Comment 19.0 Section P.3.4.2.2 – Groundwater Environmental Values (Page P-30)**19A**

Issue – This section refers to groundwater environmental systems but does not clearly define groundwater dependent ecosystems as an environmental value.

Recommendation – The SEIS and EMP should include groundwater dependent ecosystems as an environmental value.

Response:

No groundwater dependant ecosystems were identified from field assessments, the Project groundwater report or from the DERM wetland mapping. The SEIS (Volume 2, Appendix N) and EM Plan (Volume 2, Appendix V) have been revised to include details of environmental values based on post EIS groundwater studies and the evaluation of potential impacts on the groundwater Environmental Values.

Comment 20.0 Section P.3.4.3.1 – Surface Water Impacts**20A**

Issue – This section does not provide sufficient information regarding the potential impacts of the activities on the environment. The EMP provides broad overviews of potential impacts however does not detail how these impacts will in turn effect the surrounding environment, including aquatic ecosystems and ecosystems that depend upon the waters. i.e. on page P-33 the EMP makes the following statements:

The potential impacts of stream diversion and/or floodplain constriction can include instability of stream channel with consequent impacts including:

- *Excessive erosion leading to water quality impacts, unsustainable downstream sediment loads, and impacts on aquatic ecosystems; and*
- *Excessive lateral migration of the stream channel with risk to valuable infrastructure, riparian vegetation loss, and impacts on terrestrial ecosystems near the stream.*

The EMP does not detail what the impacts on the ecosystems may be

Recommendation – *The SEIS should provide the above information. A revised EMP is required to identify all potential impacts the activity may have on ecosystem quality.*

Response:

The EM Plan has been updated to include more information on the potential ecosystem impacts. EM Plan (SEIS Volume 2, Appendix V, Section 3.4.4.1).

Comment 21.0 Section P.3.4.3.2 – Groundwater Impacts (Page P-32)

21A

Issue – *This section describes the predicted groundwater impacts and belongs in the SEIS under section 12.9 of the EIS, not the EMP.*

Recommendation – *Remove section P.3.4.3.2 from the EMP and insert into section 12.9 of the SEIS.*

Response:

Section 3.4.3.2 included in the EM Plan is a summary of the information presented in Section 12.9 of the EIS. The summary was included to facilitate the reader as this negates the need to read two separate EIS volumes when considering the EM Plan.

SEIS Volume 2 Appendix V includes the revised groundwater EM Plan input. Modifications to Section 3.4.3.2 have been included based on submissions received, which include a request for the addition of impacts on Groundwater Environmental Values.

Comment 22.0 Section S 8.3.1, App G. & P.3.4.3.2 – Leachate migration (Various Pages)

22A

Issue – *Potential impacts to Lagoon Creek and groundwaters through migration of leachate are not addressed. This is a likely cause of environmental harm. Adequate mitigation measures are not proposed. The EIS refers to this in the section on “Artificial Recharge”. The project site is in a recharge area for an important regional aquifer (S 12.0; App G).*

S 8.3.1 identifies the problem:

“Artificial recharge impacts are considered to potentially occur below the major facilities that will be constructed for the Project. These include the tailings storage facility (TSF), landfill site, CHPP water and waste management system, discard and reject rock dumps, TLO facility, sewage system, and environmental dams.”

P.3.4.3.2. (section in “Artificial Recharge”) states that continuous seepage is likely from the TSF and this would affect both groundwater resources and Lagoon Creek. The TSF stores mine-water affected by metals, metalloids, sulfates and numerous other contaminants. Hence the reason the EIS states:

“impacts are considered unacceptable as any discharge of seepage to the surface water and groundwater environment would possibly constitute environmental harm” .

The EIS goes on to state that not only the TSF but other facilities in other areas of the project will have the same impact: “For the other facilities the majority of mine infrastructure will be located to the east of Lagoon Creek, where geotechnical investigations have shown that, in general, weathered rock (Colinlea Sandstone) occurs at shallow depths of one to five metres. Therefore the potential

contamination issues for all infrastructure areas (groundwater seepage leading to discharge to surface water bodies, or deeper drainage into groundwater resources) are similar to those identified above for the TSF.”

The mitigation measures proposed are lacking as those mentioned for the TSF have no guarantee to last the duration of the impacts and there are no measures proposed to mitigate similar impacts from other facilities.

The lining or under drainage proposed as mitigation measures for the TSF appear to be superficial because the life of the project is expected to be 30 years and the TSF will remain post mining (refer to last paragraph P.3.4.3.2). Mitigation measures need to safeguard receiving waters from mine pollution for the duration of the problem and it is not evident that this is the case for this project e.g. no estimates of the life expectancies of the lining or under drainage proposed as mitigation measures for the TSF have been given. Nor are there risk assessments regarding failure of the system.

If relevant measures are not proposed and implemented the project in its present design would be unacceptable because of the risk of material environmental harm to groundwater resources.

Response:

All water and waste storage infrastructure will be designed, constructed, and maintained to ensure least possible impacts on the groundwater resources.

The existing EIS groundwater monitoring network has been and will be enhanced to monitor the effectiveness of the infrastructure designs. SEIS Volume 2, Appendix N contains details of the new monitoring bores within the proposed TSF area, which will allow for the monitoring of any potential seepage. Additional bores, to be located adjacent / down gradient of possible sources of artificial recharge (mine water and waste storage facilities) include those listed in Table AJ-9. These bores are to be constructed within at least 6 months of any mining.

Table 0J-9 Additional groundwater monitoring network bores

Monitoring Bore	Easting	Northing	Depth	Target
TSF1	450,907.49	7,427,020.03	40	TSF
TSF2	450,548.43	7,428,041.38	40	TSF
TSF3	451,011.22	7,428,959.01	40	TSF
AlphaWest1	440,789.70	7,433,355.61	100	Down dip
AlphaWest2	440,853.54	7,426,844.48	100	Down dip
AlphaWest3	440,853.54	7,420,444.59	100	Down dip
Landfill1	450,887.03	7,421,756.26	60	Landfill site
Landfill2	450,887.03	7,421,689.07	50	Landfill site
Landfill3	450,466.35	7,422,311.32	50	Landfill site
MIA	449,692.18	7,430,082.79	40	Industrial area
CHPP1	449,081.22	7,431,729.39	40	Preparation plant
CHPP2	449,377.83	7,432,278.59	40	Preparation plant
EWT	453,924.17	7,433,249.33	60	Water storage dam
TLO1	449,582.76	7,432,592.94	40	Train loading area
RWD1	455,688.51	7,436,470.97	50	Water storage dam
ROM South	447,811.30	7,427,597.86	30	Coal storage
ROM North	448,391.99	7,433,657.92	30	Coal storage

The revised EM Plan (SEIS Volume 2, Appendix V) includes a commitment to design and construct all hazardous facilities (not just the proposed TSF) for the mitigation from impacts of leachate for the life of the Project and beyond (a period to be decided in any consideration of relevant environmental authorities).

22B

Recommendation – *The SEIS and revised EMP should outline measures needed for all facilities (not just TSF) to guarantee mitigation from impacts of leachate for the life of the project and beyond (a period to be decided in any consideration of relevant environmental authorities).*

Response:

See above.

Comment 23.0 Section P.3.4.4 – Environmental Protection Objectives (Page P-35)**23A**

Issue – *The EMP identifies a number of important objectives and performance criteria for the watercourse diversions. The commitments in the EMP do not reflect the criteria or objectives. For example a criterion for ensuring stability would be the provision of a floodplain corridor of sufficient width.*

Response:

The proposed watercourse diversions are designed to comply with the Queensland Government Natural Resources and Water, Central West Water Management and Use Regional Guideline: Watercourse Diversions – Central Queensland Mining Industry, (2008).

The Proponent's design for the watercourse diversions shows a moderate reduction of the critical velocities, stream power and shear stress values and based on these outcomes, the channels are deemed to be stable.

During the detailed design of the diversions (and as part of the proponent's application for creek diversion licensing under the water Act 2000), further geotechnical investigation will be undertaken to confirm that the proposed diversions and levees are stable, and that sufficient reservation width is adopted between the diversions / levees and the mining activities, to ensure stability of the infrastructure.

23B

Recommendation – *A revised EMP should provide commitments that ensure the performance criteria are met for the diversion channels.*

Response:

The Proponent's commitments, including the commitment that the performance criteria for the diversion channels as per the Queensland Government Natural Resources and Water, Central West Water Management and Use Regional Guideline: Watercourse Diversions – Central Queensland Mining Industry, (2008) are clearly set out in the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.1).

23C

Issue – *This section sets out the environmental protection objectives however it does not adequately deal with all the identified impacts of the project on the groundwater resource. In particular the*

groundwater report identified possible adverse affects on the groundwater resource from structures such as the tailings dam as well as the pit itself.

Response:

The groundwater section of the revised EM Plan (SEIS Volume 2 Appendix V, Section 3.4.7.2) includes the following management objectives, with regards to the possible adverse affects from structures such as the tailings dam:

- Mine infrastructure will be designed and constructed to manage any potential seepage from water and waste storage facilities in order to minimise the potential impact on groundwater aquifers during the life of the mine and after mining ceases.
- Ensure no impact on the major recharge mechanism, diffuse recharge in the Great Dividing Range, such that there will be continued recharge for the life of the mine and after mining ceases.

23D

Recommendation – The SEIS should include the following additional dot points

- *Protect the physical integrity of the groundwater aquifers from contamination caused by mining for the life of the mine and after mining ceases.*
- *Protect the physical integrity of the aquifer such that it is able to continue to receive recharge for the life of the mine and after mining ceases.*
- *Ensure that where multiple groundwater aquifers are present that contain different water quality and/or hydraulic heads that there is no interconnection of water between these aquifers for the life of the mine and after mining ceases*

The revised EMP should also address these issues.

Response:

These objectives have been considered in the response 23C.

Comment 24.0 Section P.3.4.4 – Environmental Protection Objectives (Page P-36)

24A

Issue – The EMP states the environmental protection objectives as:

- *Control all active discharges of waters from the mine water management system, including timing controlled by flow rates in receiving waters, rate of discharge is controlled and measurable and discharge waters comply with end-of-pipe discharge criteria.*
- *Monitor and assess the impacts of the controlled discharges.*

The EMP does not include measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values to match these environmental protection objectives. The environmental protection objectives are not directly linked to the environmental protection commitments.

Recommendation – The EMP should include measurable indicator(s), standard(s) and control strategy(ies) to protect or enhance each of the environmental values to match these environmental protection objectives. The environmental protection objectives should be directly linked to the environmental protection commitments.

Response:

The EM Plan has been revised to include measurable indicators, standards and control strategies to protect the environmental values that have been defined for watercourses in the Project areas (SEIS Volume 2, Appendix V, Section 3.4.1.5).

Comment 25.0 Section P.3.4.5 – Performance Criteria (Page P-36)**25A**

Issue – *The performance criteria for groundwater are insufficient and not comprehensive. It is unclear that groundwater in the project area will be protected from the risks identified in the EIS.*

Recommendation – *The revised EMP should address the following additional dot points*

- *There will be no adverse changes to groundwater quality as a result of the mine project.*
- *Recharge areas for the aquifers in the area such as those in the Colinlea Sandstone are protected from the impacts of mining such that:*
- *The aquifers are able to continue to receive recharge during the life of the mine and after mining ceases.*
- *Mining does not result in the interconnection of water between aquifers with different characteristics for the life of the mine and after mining ceases*
- *Landholders concerns over impacts on their water supplies are dealt with in a timely and prompt manner.*

Response:

Considering the above the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.6) has been revised to include the following performance criteria:

- There will be no adverse changes to groundwater quality, outside the predicted zone of influence around the mine, as a direct result of the mine Project;
- Alteration of recharge to the Colinlea Sandstone unit is to be kept to a minimum;
- No alteration of the diffuse recharge areas along the Great Dividing Range so as to ensure recharge during the life of the mine and after mining ceases;
- A final void will remain at the end of mining to ensure the zone of influence, both groundwater level changes and hydrochemistry, will be managed and maintained and after mining ceases; and
- Landholders concerns over impacts on their water supplies are dealt with in a timely and prompt manner.

Comment 26.0 Section P.3.4.6.2–Groundwater Specific Control Strategies (Page P-39)**26A**

Issue – *The control strategies for groundwater are lacking in detail and structure and do not deal with all the risks to the resource identified in the EIS. They currently deal only with impacts on landholders' bores and do not deal with other resource protection issues.*

Recommendation – *The revised EMP should address the following additional dot points under the paragraph “Water level Impacts”:*

- *The provision of replacement bores for affected landholders will be such that the new bores are able to continue to supply water for the maximum predicted impacts of mining on water level.*

Response:

The section “Water level impacts” of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.2) has been revised to include consideration and strategies for impacts on:

- Neighbouring groundwater users;
- Groundwater dependent ecosystems and vegetation communities;
- Registered springs; and
- Recharge to the Colinlea Sandstone.

26B

Recommendation – *This section should also include the following additional dot points under the paragraph “Groundwater Quality Impacts”:*

- *Mine infrastructure, in particular the proposed Tailings dam, will be designed and constructed in such a way that it does not adversely impact on the groundwater resources, in particular;*
 - *Ensuring that there is no possibility of leakage from the materials in the dam into the groundwater system or any connected surface water systems.*

Response:

The section “Groundwater Quality Impacts” (SEIS Volume 2, Appendix V, Section 3.4.7.2) has been revised to include:

- Mine infrastructure, in particular the proposed TSF, will be designed and constructed in such a way that it does not adversely impact on the groundwater resources. The design is to include leak detection and monitoring to ensure the effectiveness of the seepage controls.
- Remediation measures, should seepage be detected, such as scavenger wells or cut-off trenches will be implemented to ensure any potential leakage from the TSF will not enter the groundwater system or any connected surface water systems.

26C

Issue – *The paragraph titled “mine closure” should be included in section 12.11 of the EIS as it relates to impacts of the mine. The control strategies should relate to the actions required at mine closure to ensure the continued integrity of the groundwater resources, i.e. mitigation of impacts, and ensure that impacts on landholders are also mitigated.*

Recommendation – *The paragraph titled Mine Closure should be removed from the EMP and inserted into section 12.11 of the EIS (as part of an SEIS).*

This section should be written to include actual control strategies that will be undertaken prior to the cessation of mining, e.g.

- *Update of groundwater model and monitoring network*
- *Provision of long term monitoring to assess long term impacts on water level and water quality*

- *Provision of agreements with landholders who are predicted to be affected after mining ceases for alternative water supplies or other agreed rectification measure*
- *Strategies to ensure that any long term adverse impacts on water quality are mitigated*

Response:

The impacts of the proposed mining operations on groundwater resources are discussed in Section 12.9 of the EIS Volume 2, Section 12. Section 12.9.8 includes impacts associated with the final void. These are the same points, as presented in the paragraph Mine Closure in the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.2). It is, therefore, not considered suitable to insert these points again into Section 12.11 of the EIS (as suggested by DERM).

The groundwater input section of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.7.2) has been revised to include control strategies that will be undertaken prior to the cessation of mining, these include:

- Assess drawdown predictions from the groundwater model, to be refined every 3 years. This process will allow increasingly accurate predictions regarding potential impacts to local and regional groundwater resources.
- Ensure that the impacts of groundwater drawdown on existing groundwater users and other identified environmental values is minimised through cause identification, optimum responses (SEIS Volume 2, Appendix N), consultation and in the case of existing groundwater users, through the negotiation of alternative water supply agreements.
- Evaluate and assess the groundwater monitoring network, validity and enhancement, on an annual basis.
- Compilation and interrogation of long term groundwater monitoring data to facilitate long term impact predictions and assessment.
- Provision of agreements with landholders who are predicted to be affected after mining ceases for alternative water supplies or other agreed rectification measures.
- Strategies to ensure that any long term adverse impacts on water quality will be mitigated and managed.
- Mine infrastructure will be designed and constructed to manage any potential seepage from water and waste storage facilities in order to minimise the potential impact on groundwater aquifers during the life of the mine and after mining ceases.
- Ensure no impact on the major recharge mechanism, diffuse recharge in the Great Dividing Range, such that there will be continued recharge for the life of the mine and after mining ceases.
- Develop a final void management plan within 5 years of completion of mining.

Comment 27.0 Section P.3.4.7.6 – Measurement Parameters – On-Going Monitoring (Page P-49)

27A

Issue – The EMP states that the riparian revegetation zone will occupy an area 3m either side of, and including, the active channel.

The existing natural streams in the area have existing riparian corridors much greater than 3m either side of the active channel.

No justification is provided that 3m either side of the active channel will be sufficient to allow protection of the watercourse and the continued succession of planted species.

Recommendation – The revised EMP should nominate a more realistic riparian corridor or a detailed justification of the 3m revegetation area.

Response:

A Vegetation Management Plan (VMP) will be developed for the active channel prior to construction. The VMP will address:

- Staging the ecological management of the site in three phases: pre-construction, construction and post-construction;
- Collection, propagation and installation of local provenance native tube stock;
- Management of ecological threats such as weeds and feral animals;
- Management of threats to the site such as natural hazards; and
- Monitoring and performance evaluation measures that are practical.

The riparian revegetation zone will be extended where possible from 3 m to 20 m either side of the active channel. The width of the riparian revegetation zone will in some areas be restricted by the natural occurrence of exposed rock or similar restricting strata.

Comment 28.0 Section P.3.4.7.6 – Monitoring (groundwater)(Page P-52)

28A

Issue – The paragraph titled “Groundwater Monitoring” is not an EMP matter and can be part of the EIS (eg inserted into section 12.11 of Volume 2 of the EIS as part of the SEIS).

There are a number of issues in the section on Groundwater Assessment and Monitoring Program that do not meet accepted practice nor deal adequately with the identified impacts of the mining operation on groundwater.

It is also likely a water licence for dewatering issued for the project will contain groundwater monitoring, assessment and reporting conditions. It is likely that these terms will differ from the monitoring program proposed in the EMP. Generally the monitoring, assessment and reporting terms of a water licence relate to water level impacts whilst the similar terms in an Environmental Authority relate more to water quality issues, primarily from a pollution of resource aspect.

It is important that there be no confusion about the monitoring, assessment and reporting terms between a water licence and an Environmental Authority and the subsequent responsibilities of the proponent to comply with the terms of each approval.

Response:

The paragraph titled “Groundwater Monitoring” has been edited in the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.8.6). Section 12.11 of Volume 2 of the EIS. Section 12.11 includes:

Groundwater Monitoring

Groundwater monitoring is being undertaken in the existing and expanded groundwater monitoring network to allow assessment of the potential water level and water quality impacts on the local and regional groundwater and surface water regimes. The groundwater monitoring will ensure compliance with water licence (for dewatering) conditions with regards to water level impacts, and groundwater

quality compliance with Environmental Authority (EA) conditions resulting from the EIS and EM Plan processes.

The groundwater monitoring program will include:

- Monthly groundwater level and currently monthly groundwater quality monitoring. Sampling will be undertaken in accordance with the current edition of the Department of Environment and Resource Management's Water Quality Sampling Manual, or subsequent updated versions;
- Annual reporting of groundwater level and groundwater quality results; and
- Notification to the regulating authority within one month of receiving water quality analysis results, should any parameters tested exceed agreed trigger (water level and quality concentration) levels.

The groundwater modelling will be undertaken and validated by an independent suitably qualified hydrogeologist. The monitoring data will be compiled into annual reports for submission to the relevant authorities.

The monitoring data will be used to:

- Assess drawdown predictions from the groundwater model on an annual basis and provide data for model updates (to be conducted every 3 years). This process will allow increasingly accurate predictions regarding potential impacts to local and regional groundwater resources;
- Ensure that the impacts of groundwater drawdown on existing groundwater users and other identified environmental values is minimised through cause identification, response implementation, consultation and in the case of existing groundwater users, through the negotiation of alternative water supply agreements;
- Assess and validate the groundwater monitoring network, and guide appropriate expansion of the monitoring network during the life of the mine;
- Assess compliance with Water Licence and EA conditions; and
- Where issues of non-conformance have been recorded, the monitoring will allow for an assessment of mitigation and remediation measures installed.

Based on the revised mine plan, compiled for the SEIS, the existing groundwater monitoring network will be further enhanced to ensure all potential seepage sources and mine dewatering will be effectively monitored. The details of the existing and proposed monitoring bores for the Alpha Coal Project (Mine) are presented in Table AJ-10.

Table 0J-10 Alpha Coal Project (Mine) existing and proposed monitoring bores

Hole ID	Easting_GDA94	Northing_GDA94	Depth (m)	Type	Location
Existing					
AVP-01	446725.181	7441096.55	55	VWP	C-D sands
			77	VWP	D-E sands
AVP-03	447700.515	7435935.65	42.5	VWP	D-E sands
AVP-04	439677.103	7431710.26	80	VWP	B-C sands
			132	VWP	C-D sands
			143	VWP	D-E sands
AVP-07	445862.01	7430684.68	63.5	VWP	C-D sands
			79	VWP	D-E sands
AVP-08	446280.871	7430685.25	57.5	VWP	D Upper
			67	VWP	D-E sands
AVP-10	445920.65	7422776.91	61	VWP	DLM seam
			84	VWP	D-E sands
AVP-13	434456.875	7430044.11	70	VWP	Sandstone above A1
			112	VWP	A-B sands
			182	VWP	B-C sands
			229.3	VWP	D-E sands
AMB-01	446180	7430035		Standpipe	D-E Sands
AMB-02	446314	7427417		Standpipe	E-F Sands
AMB-03	439653	7431658		Standpipe	D-E Sands
AMB-04	447682	7427212		Standpipe	C-D Sands
1315D	445052.296	7433185.69	49	VWP	C Upper
			65	VWP	C-D sands
			80	VWP	D-E sands
1336D	446510.39	7431957.19	48.5	VWP	C-D sands
			70	VWP	D-E sands
1338DG	445607.245	7428456.96	61	VWP	C-D sands
			73	VWP	D-E sands
1357D	438634.272	7436473.393	58.5	VWP	A-B sands
			108.5	VWP	B-C sands
			134.5	VWP	C-D sands
			149.5	VWP	D-E sands
Proposed					
TSF1	450,907.49	7,427,020.03	40	Standpipe	TSF
TSF2	450,548.43	7,428,041.38	40	Standpipe	TSF
TSF3	451,011.22	7,428,959.01	40	Standpipe	TSF
AlphaWest1	440,789.70	7,433,355.61	100	Standpipe	Down dip
AlphaWest2	440,853.54	7,426,844.48	100	Standpipe	Down dip
AlphaWest3	440,853.54	7,420,444.59	100	Standpipe	Down dip
Landfill1	450,887.03	7,421,756.26	60	Standpipe	Landfill site
Landfill2	450,887.03	7,421,689.07	50	Standpipe	Landfill site
Landfill3	450,466.35	7,422,311.32	50	Standpipe	Landfill site
MIA	449,692.18	7,430,082.79	40	Standpipe	Industrial area
CHPP1	449,081.22	7,431,729.39	40	Standpipe	Preparation plant
CHPP2	449,377.83	7,432,278.59	40	Standpipe	Preparation plant
EWT	453,924.17	7,433,249.33	60	Standpipe	Water storage dam
TLO1	449,582.76	7,432,592.94	40	Standpipe	Train loading area
RWD1	455,688.51	7,436,470.97	50	Standpipe	Water storage dam
ROM South	447,811.30	7,427,597.86	30	Standpipe	Coal storage
ROM North	448,391.99	7,433,657.92	30	Standpipe	Coal storage

The proposed bores will be installed within a minimum of 6 months prior to any mine construction. This will allow for the compilation of sufficient baseline data to compile representative trigger values.

Baseline Hydrochemistry

The initial baseline groundwater quality monitoring, required to increase current hydrochemistry data, includes:

- Field parameters, pH and electrical conductivity (EC);
- Major cations and ions, including total dissolved solids (TDS), calcium, magnesium, potassium, sodium, chloride, sulphate, alkalinity (hydroxide, carbonate, bicarbonate, total), and fluoride;
- Metals/metalloids, including aluminium, arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, mercury, manganese, molybdenum, nickel, selenium, silver, uranium, and zinc; and
- Nutrients (total N, NO_x, ammonia, phosphorous).

It is anticipated that the parameter list will be modified based on the compilation of at least 12 data sets. This will allow for the identification of ambient hydrochemistry, natural fluctuations, and seasonal trends.

Groundwater Level

The groundwater level monitoring currently includes:

- The groundwater monitoring bores equipped with automated groundwater level monitoring loggers, set to record groundwater level data at 12 hour intervals. These data are compiled on a monthly basis;
- Groundwater level trends and natural fluctuations will be determined; and
- Trigger Levels.

Trigger Levels

Once sufficient groundwater quality and level data (from a statistical perspective) has been compiled trigger levels will be determined. These trigger levels will be based on arithmetic mean and standard deviations, set to facilitate in assessing possible mine related impacts on the groundwater resources.

Currently there is insufficient data to determine trigger levels, both water level and quality. A minimum of 12 hydrochemical datasets and 12 months of water level data within a 24 month period is required to determine the optimum trigger levels.

EA Conditions - Hydrochemistry Trigger Levels

Once sufficient data is compiled then a mean value will be calculated for each of the hydrochemical monitoring parameters as well as the standard deviation.

Depending on the spread of data the trigger values could be as follows:

- Compare the monitoring results to 2 times standard deviation of the mean (95% of data captured);
- If groundwater quality data exceeds trigger value (2 times standard deviation) then resample and submit for analysis;
- If elevated concentrations (above trigger) are recorded on two consecutive sampling runs then an investigation into the possible cause, development of appropriate response, and the potential for environmental harm is to be conducted; and
- If elevated concentrations are recorded on two consecutive sampling runs then the administering authority will be notified within 1 month of receiving the analysis results.

Should trigger levels be exceeded, investigations will be undertaken to establish:

- Whether actual environmental harm has occurred;

- If required, immediate measures that should be taken to reduce the potential for environmental harm; and,
- Long-term mitigation measures required to address any existing contamination, and to prevent recurrence of contamination.

Envisaged trigger levels for groundwater level is presented in Table AJ-11 below. The trigger levels are to be revised and discussed with DERM once groundwater modelling provides sufficiently accurate predictions regarding dewatering impacts.

Table 0J-11 Groundwater trigger levels

Aquifer	Trigger Level
Quaternary alluvium and Tertiary perched water tables	Limited storage in alluvium and limited seasonal nature of the perched water tables naturally range from saturated (wet season) to dry (dry season and droughts). Therefore no trigger value is proposed.
Fracture Rock Aquifers – (within Mine Area)	No trigger value for areas overlying mine workings (dewatered due to mining). Monitoring of groundwater to aid with model refinement and predictions.
Fractured Rock Aquifers Interburden Sandstone and Coal Seam - Off-site	Variation in water level of greater than 5 m compared to previous corresponding season (i.e. dry season to dry season, wet season to wet season) and comparison to cumulative rainfall departure curve.

28B

Recommendation – The paragraph titled “Groundwater Monitoring” should be removed from Appendix P and inserted into section 12.11 of Volume 2 of the EIS (as part of the SEIS).

Response:

See above.

28C

Recommendation – In the paragraph titled Groundwater Assessment and monitoring program the first paragraph should include a statement to the effect that monitoring, assessment and reporting will also be required as part of the terms of any water licence issued for the mine and that monitoring, assessment and reporting will be undertaken in accordance with any water licence terms.

Response:

In the paragraph titled Groundwater Assessment and monitoring program the first paragraph was revised to include a statement to the effect that monitoring, assessment and reporting will also be required as part of the terms of any water licence issued for the mine and that monitoring, assessment and reporting will be undertaken in accordance with any water licence terms.

“Groundwater monitoring will be undertaken in the existing and expanded groundwater monitoring network to allow assessment of the potential water level and water quality impacts on the local and regional groundwater and surface water regimes. The groundwater monitoring will ensure compliance with water licence (for dewatering) conditions with regards to water level impacts, and groundwater quality compliance with Environmental Authority (EA) conditions resulting from the EIS and EMP processes”.

28D

Issue – *The section also contains a dot point on trigger levels. It needs to be recognised that any trigger levels set will have to be approved by DERM.*

Response:

It is noted that the proposed trigger levels will be developed once sufficient information and predictions are available. Proposed trigger levels will depend on the spread of baseline data and groundwater modelling predictions for different aquifers.

For hydrochemical parameters, for compliance to EA conditions, trigger levels will be suggested for approval with DERM based on parameter arithmetic values and standard deviations. The trigger levels would be used to determine potential impacts of mining on the groundwater quality, where:

- Compare the monitoring results to 2 times standard deviation of the mean (95% of data captured);
- If groundwater quality data exceeds trigger value (2 times standard deviation) then resample and submit for analysis;
- If elevated concentrations (above trigger) are recorded on two consecutive sampling runs then an investigation into the possible cause, development of appropriate response, and the potential for environmental harm is to be conducted; and
- If elevated concentrations are recorded on two consecutive sampling runs then the administering authority will be notified within 1 month of receiving the analysis results.

For groundwater level variation, for compliance to water licensing for dewatering, the trigger levels will depend on groundwater model (SEIS Volume 2, Appendix N) predictions. Where modelling predictions relate to:

- Aquifer;
- Distance from mine void;
- Timing; and
- Seasonal variation.

All of these factors will be considered when assessing the baseline data and groundwater model predictions. Suitable variations in groundwater levels will then be suggested.

It is noted that:

- The trigger levels will be determined by the Proponent before the commencement of mine operations and forwarded to DERM for approval; and
- The trigger levels for water level and water quality will be those approved by DERM.

28E

Recommendation – *The dot point on trigger levels in a revised EMP should include the following:*

- *The trigger levels will be determined by the proponent before the commencement of mine operations and forwarded to DERM for approval*
- *The trigger levels for water level and water quality will be those approved by DERM.*

Response:

See above. Changes have been made and included in EM Plan (SEIS Volume 2, Appendix V, Section 3.4.8.6).

Comment 29.0 Section 11.5.7.5 of Volume 2 & P.3.4.9.1 Volume 5: Contaminant release limits (Pages 11-37/P-57)

29A**Issue –**

1. *The electrical conductivity (EC) discharge limit of 2,000 micro Siemens per centimetre (µS/cm) is not acceptable. (EC is a measure of in-stream salinity).*

Response:

The proposed EC discharge limit has been developed based on the current understanding of instream EC levels and its relationship with streamflow. It should also be noted that this proposed discharge limit is based on discharge flow being restricted to 10% of streamflow and that discharges will only occur when streamflow exceeds 10 m³/s.

The data available from the DERM gauge at Violet Grove on Native Companion Creek shows that the maximum recorded EC level has been 392 µS/cm, and it is reasonable to specify a downstream maximum of 400 µS/cm based on this (as commented by DERM). It is also apparent in the data from the Violet Grove gauge that EC falls below 220 µS/cm when flows exceed 10 m³/s.

The proposed release limit was then calculated using the following formula.

- $$\text{Upstream flow} \times \text{Upstream EC} + \text{Discharge flow} \times \text{Discharge (EOP) EC} = (\text{upstream flow} + \text{discharge flow}) \times \text{Downstream Target EC}.$$

Accordingly when the discharge flow is limited to 10% of the upstream flow and the upstream EC levels are 220 µS/cm or less, a discharge level of 2000 µS/cm, will not cause receiving water EC levels to exceed the maximum receiving water trigger level of 400 µS/cm.

29B**Issue –**

2. *The sulfate discharge limit of 1,000 mg/L allows impacts beyond natural levels.*

Response:

The proposed discharge limit presented in the EIS was based on a limited dataset to determine appropriate background water quality parameters. The proposed limit of 1000 mg/L was selected based on achieving the water quality objective for livestock watering, which has been proposed as an environmental value applying to the downstream receiving waters.

Additional data has been sourced through project specific water quality monitoring and other sources for inclusion in the Supplement. The analysis of this data is presented in the Surface Water Technical Report and a revised limit for sulphate has been proposed.

29C

Issue –

It is not demonstrated in the EIS why a 2,000 µS/cm end-of-pipe limit for EC is needed. Also, the EIS incorrectly calculates downstream EC after dilution with receiving waters, as it uses a mixing ratio of 1:5 to provide 20 % dilution (paragraph 4 in section 11.5.7.5) when in fact the correct mixing ratio for this dilution is 1:4.

The EIS suggests the 2000µS/cm end-of pipe limit will achieve a 1000µS/cm downstream limit, which is based on the limit used for the conditions of mining releases in the Fitzroy Basin. What is applicable in the Fitzroy Basin is not necessarily applicable for this project region.

Comparing background levels in this project region to those of the Fitzroy Basin:

- *Fitzroy Basin = up to and beyond 1000µS/cm*
- *Project area = max 392µS/cm (best available data: Native Companion Creek, 30 year record).*

Ultimately, because background levels of the project area are low, a 1000µS/cm downstream limit allows the proponent to discharge at much higher levels than were applicable in the Fitzroy Basin. The proposed discharge limit of 2000µS/cm in the EIS allows the proponent to pollute the system far beyond natural conditions. A downstream limit of 400µS/cm for EC is more realistic for the protection of downstream aquatic ecosystems in the project area.

Response:

The proposed EC discharge limit has been developed based on the current understanding of instream EC levels and its relationship with streamflow in the Project area. It should also be noted that the proposed discharge limit is based on discharge flow being restricted to 10% of streamflow and that discharges will only occur when streamflow exceeds 10 m³/s.

The data available from the DERM gauge at Violet Grove on Native Companion Creek shows that the maximum recorded EC level has been 392 µS/cm, and it is reasonable to specify a downstream maximum of 400 µS/cm based on this (as commented by DERM). It is also apparent in the data from the Violet Grove gauge that EC falls below 220 µS/cm when flows exceed 10 m³/s.

The proposed release limit was then calculated using the following formula.

- $$\text{Upstream flow} \times \text{Upstream EC} + \text{Discharge flow} \times \text{Discharge (EOP) EC} = (\text{upstream flow} + \text{discharge flow}) \times \text{Downstream Target EC}.$$

Accordingly when the discharge flow is limited to 10% of the upstream flow and the upstream EC levels are 220 µS/cm or less, a discharge level of 2000 µS/cm, will not cause receiving water EC levels to exceed the maximum receiving water trigger level of 400 µS/cm.

29D

Issue –

Similarly, the use of the 1000 mg/L discharge limit for sulfate is contentious because background sulfate levels in this project region are very low in comparison, i.e. 0 - 20 mg/L (Table 10-1). The 1000 mg/L limit is based on results of testing adverse effects in cattle and are not related to the local environment. The indirect effects of increases in sulfate on the local aquatic ecosystem can be detrimental, and include:

- *Changes to the composition of primary producers of waterways and loss of biodiversity*

- *Dominance of sulfate-reducing microbes that ameliorate the uptake of mercury through the food chain and lead to greater biomagnification of mercury in higher order fish and humans (Jeremiason et al. 2006 Environ. Sci. Technol., 40, 3800-3806), and*
- *Increasing production of sulphide, which associates with anoxic waters and sediments. Sulfide is more toxic than sulphate and its product, H₂S (“rotten-egg” gas), can be lethal to humans and animals. This is particularly concerning because the project area lies within an area that experiences prolonged dry periods (refer to Maplecroft.com) when waters are likely to display anoxic layers.*

A downstream limit of 20 mg/L for sulfate is recommended for the protection of downstream aquatic ecosystems in the project area.

Response:

The proposed discharge limit presented in the EIS was based on a limited dataset to determine appropriate background water quality parameters. The proposed limit of 1000 mg/L was selected based on achieving the water quality objective for livestock watering, which has been proposed as an environmental value applying to the downstream receiving waters.

Additional data has been sourced through project specific water quality monitoring and other sources for inclusion in the Supplement. The analysis of this data is presented in the Surface Water Technical Report and a revised limit for sulphate has been proposed.

29E

Issue – Other considerations:

While the EIS cites the review of “Fitzroy River Water Quality Issues” by Hart (2008) to support the use of 1,000 µS/cm as a downstream EC limit to protect macro-invertebrates, it fails to recognise Hart’s comments (page 32 of his review) that biotic species adapted to low salinities (i.e. < 300 µS/cm), as in this case, can be adversely affected by rapid increases in salinity.

Apart from possible adverse effects on macro-invertebrates, the potential effects on other biota are a concern as Hart (2008) recognised: “there is insufficient information available to make an assessment of potential adverse effect on other biota, such as frogs, platypus and turtles”. The terrestrial and aquatic fauna surveys for the EIS located nine native amphibian species, one turtle, seven fish species and 14 birds listed under the EPBC Act in the project area that could be affected by degradation of water and/or food sources. Note that this is likely understated given the flaws in survey designs (see previous comments).

The precautionary principle applies in this case, as there is no information available concerning the impacts of increases in EC and sulfate on biota in this area. The size of the mine and the length of the project coupled with the strong likelihood of further major projects¹ in adjoining areas also substantiate a more conservative approach to setting discharge limits. The high discharge limits proposed in the EIS do not allow for cumulative impacts of other activities.

Response:

The proposed downstream EC limit has been revised based on further analysis of available water quality data. The data available from the DERM gauge at Violet Grove on Native Companion Creek shows that the maximum recorded EC level has been 392 µS/cm, and a downstream maximum of 400 µS/cm has now been specified as the revised downstream limit.

29F

Issue – Note 1: The EIS (S 3.4) advises the following adjacent projects, which will presumably also require releases of salt and other pollutants in discharges:

- *Kevin's Corner Project (Kevin's Corner)*, a proposed 30 Mt/annum open cut and underground coal mine located on mining lease application (MLA) 70425, immediately north and adjoining the Alpha MLA;
- *Waratah Galilee Coal Mine (Waratah)*, which is a proposed 25 Mt/a open cut coal mine adjoining Alpha MLA to the south;
- *Galilee Basin Power Station*, a proposed coal-fired power station producing 900 MW (net) immediately to the south of the Alpha MLA;
- *South Galilee Coal Project (SGCP)*, which is a proposed 15-20 Mt/a open cut and underground mining operation located to the south west of the Alpha township;

Response:

Noted.

29G

Recommendation –

The SEIS and revised EMP should address these issues. Example maximum end-of-pipe discharge limits for EC and sulphate follow. Note that other quality characteristics may need to be stipulated :

W3 The release of contaminants to waters must not exceed the release limits stated in Table AJ-12 when measured at the monitoring points specified in Table AJ-13 for each quality characteristic.

Table 0J-12 Quality Characteristic and release limits

Quality Characteristic	Release limits for all release points	Monitoring frequency
Electrical conductivity ($\mu\text{S}/\text{cm}$)	An end of pipe EC discharge limit in the range of 0 to 400 $\mu\text{S}/\text{cm}$ in the receiving waters. (Must have natural flow i.e. the 20th percentile flow trigger and achieve a 1:4 dilution)	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Sulfate (SO_4^{2-}) (mg/L)	An end of pipe sulfate discharge limit in the range of 0 to 20 mg/L in the receiving waters. (Must have natural flow i.e. the 20th percentile flow trigger)	Daily during release (the first sample must be taken within 2 hours of commencement of release)

Table AJ-13 Details of proposed water quality monitoring sites

Number	Monitoring site	Code	Coordinates		Comment
			Easting	Northing	
Lagoon Creek					
1	Lagoon Creek upstream	LCU	447249.7	7418923	For conditions prior to entering the mine site
2	Lagoon Creek - Murdering Lagoon	LCL	448159	7426371	Murdering Lagoon monitoring
3	Lagoon Creek downstream	LCSCD	449480.3	7444277	For conditions after point of discharge from the final SRD
4	10 km downstream Lagoon Creek	FDP	449557	7453981	For conditions 10 km downstream of the mine.
Sandy Creek					
5	Sandy Creek upstream	SCU	440745.8	7438237	For conditions prior to entering the mine site
Spring Creek					
6	Spring Creek upstream	SPU	438988.9	7424345	For conditions prior to entering the mine site
Well Creek –Cudmore National Park					
7	Well Creek	WC	441888	7429149	Within the Cudmore National Park
Native Companion Creek					
8	Native Companion Creek	NCC	470132	7384603	Existing Native Companion Creek

If the proponent requires discharge limits for EC or sulfate other than that listed in the table, they need to provide explicit technical explanation as to why such limits are necessary and stipulate frequencies, durations and/or volumes of releases or other actions to mitigate impacts of any higher discharge levels. The effects of climate e.g. lack of rainfall and evaporative losses, on waterways also need consideration.

Response:

End-of-pipe (EOP) contaminant release limits for pH, electrical conductivity, TSS, and sulphate have been proposed. These limits have been developed based on a high dilution ratio of 1:10 and calculated using the formula below (example provided for EC).

Upstream flow x Upstream EC + Discharge flow x Discharge (EOP) EC = (Upstream flow Discharge flow) x Downstream Target EC.

The available data from the DERM gauge at Violet Grove on Native Companion Creek for EC versus flow (~5,445 readings) indicates that when streamflow exceeds the proposed flow trigger of 10 m³/s, EC is approximately 220 µS/cm. With an upstream EC of 220 µS/cm, the calculated EOP contaminant release limit is 2,020 µS/cm.

Therefore, a discharge level of 2,000 µS/cm, will not cause receiving water EC levels to exceed the maximum receiving water trigger level of 400 µS/cm.

The available data from the DERM Violet Grove gauge shows that the maximum TSS level recorded has been 1,500 mg/L. Analysis of the available data on TSS versus flow for the site shows that TSS levels are highly variable with flow. Therefore, a conservative approach was adopted and the

maximum reading (~862 mg/L) above 10 m³/s was used as the upstream value for the calculation. A contaminant limit of 7,242 mg/L was obtained.

It is expected that the sediment dams would achieved a lower TSS level. Therefore, based on professional experience it is proposed to adopt a TSS level of 2,000 mg/L to ensure an appropriate level of protection of the aquatic ecosystem.

The available data from the DERM Violet Grove gauge shows that the maximum sulphate level recorded has been 17 mg/L. Analysis of the available data on sulphate versus flow for the site shows that sulphate levels are highly variable with flow. Accordingly the release limit equivalent to the maximum recorded. Therefore, a conservative approach was adopted and the maximum reading (~4 mg/L) above 10 m³/s was used as the upstream value for the calculation. A contaminant limit of 163 mg/L was obtained.

Release frequencies: The Alpha Coal project water management system will operate in net water deficit and rely on piped external water supply to makeup the requirements for water demands that cannot be met from capturing on-site mining affected surface waters. Therefore, reuse of mining affected water will be maximized and have first preference above the use of imported raw water. In this context, releases from internal water dams will be minimized and restricted to very high rainfall events during which long term inflows exceed the consumption on site over the same period.

Durations and/or volumes of releases: Volume and duration of the release will be minimized to the largest extent practical. That is the mine water will only be released so that the stored volume in declared dams will not exceed their full supply level and compromise the dam's integrity.

29H

Issue –

The flow criterion for discharge of a minimum of ≥ 1 m³/s (paragraph 6 of S 11.5.7.5 and Table P-20) is not supported by data or modelling and hence can not be assessed as adequate for permitting significant post-discharge flushing.

Response:

Subsequent to the EIS additional hydrological analysis has been undertaken to refine the flow trigger for release. An analysis of flow records from DERM's Native Companion Creek Violet Grove gauge shows that the flow recession period for flows of 10m³/s, extends for 2 to 5 days, which is sufficient to provide post-event flushing. This flow equates to approximately one third of the flow rate for a 1 in 2 ARI peak flood flow for Lagoon Creek, and has been selected as the revised flow trigger for controlled releases.

The latest water management plan assumes that there will be no controlled release from the mine site, except under critical conditions (as determined by the water balance assessment). When discharges must occur, the discharge flow will be restricted to 10% of the river flow and only occur once stream flow exceeds the flow trigger of 10m³/s

29I**Issue –**

An adequate flow trigger is essential to avoid making releases in times of poor mixing.

This is especially important in this case because the project area has an extremely high annual evaporation rate (median evaporation of 2290 mm compared to 477 mm for rainfall; Table 11-1), inferring the area experiences substantial net loss of water and very intermittent flushing of waterways.

Furthermore, the project area lies within an area of extreme water stress risk (refer to Maplecroft.com) and this has implications for how projects in the area should operate. For example; salts from contaminated releases have the potential to concentrate in downstream waterholes. This would have a negative impact on aquatic ecosystem health. Osmotic stress due to increasing water salinity and toxicity resulting from concentration of contaminants can devastate life in the waterholes that are refugia for biota during the prolonged dry periods.

Releases should only be made when natural upstream flows of the receiving stream are sufficient to flush the system. Generically, this is defined as < 20th percentile flow¹.

Note 1: “20th percentile flow” means the 20th percentile of all measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th percentile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

Response:

It is proposed to adopt a flow trigger based on one third of the 1 in 2 year ARI peak flood flow for Lagoon Creek. The Flooding Technical Report (SEIS Volume 2, Appendix K) indicates that the 1 in 2 year ARI peak flood flow for Lagoon Creek is ~30 m³/s. Therefore, a practical flow trigger for controlled releases from the Alpha Project is 10 m³/s.

For events with flows exceeding 10 m³/s, Native Companion Creek Violet Grove gauge station data shows that flow recession periods, after the flow falls below 10 m³/s, extends typically for two to five days. Therefore, the 10 m³/s flow trigger allows sufficient post-event flushing of the creek.

29J

Recommendation – *The SEIS should provide supplementary information to assess an adequate flow trigger.*

Response:

See response to 29I above.

29K

Recommendation – *The flow triggers proposed by the proponent require technical explanation based on modeling of flow in this part of the catchment to determine the best flow trigger for adequate flushing. Where discharge cannot be linked to sufficient natural flow, detailed risk assessment is needed for the waterways potentially affected by the discharge as the likelihood of impact is significantly increased. Any permanent water bodies (e.g. weirs or water holes) or locations of other environmental values potentially affected by the discharge should be identified.*

Response:

The proposed flow trigger is based on one third of the 1 in 2 year ARI peak flood flow for Lagoon Creek.

Comment 30.0 Section P.3.4.9.1 – Contaminant release trigger levels (Page P-57)**30A****Issue –**

1. Level of reporting (LOR) and analytical methods should be specified
2. High trigger levels and some contaminants missing.

Level of reporting (LOR) varies with analytical method. Trigger levels for certain metals and metalloids are based on LORs for ICPMS or CV FIMS (mercury). Certain parameters identified in Section 11.6.2.2 of the EIS are missing.

Trigger levels (e.g. zinc, aluminium) listed in Table p-19 of the EIS are much higher than ANZECC guidelines. In some situations such as may occur in highly mineralised mining catchments, natural or historical effects can produce higher background levels and guidelines are adjusted for these, e.g. aluminium, copper, iron and zinc for this reason. The information in the EIS does not support this however. The levels in the EIS are presumably based on water quality sampling done in the aquatic ecology assessment and appear to be on one off samples (Appendix E2, Table 7). This is inappropriate as it does not adequately assess the background condition. Also, the sampling and analytical techniques are questionable. The QA protocols are either non-existent or not reported in the EIS and there is no information concerning the analytical procedures used or whether the results are for total or dissolved concentrations. This gives a low level of confidence about the results presented.

This is supported by the Surface Water Quality Technical Report (Appendix F4; 3rd paragraph S 7.1.2.) which states:

“In summary, the data quantity and sampling rationale does not allow for conclusive assessment of the condition of the watercourses in comparison to recognised standard assessment methodologies, included in the ANZECC (2000), and Queensland Water Quality Guidelines. Therefore, the Project specific data has not been presented in this technical report for assessment.”

Response:

Additional water quality data has been collected which will enable a more informed decision on contaminants discharge limits.

The LOR and associated analytical methods are set out in the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.1.3).

Refer to the revised water quality technical report (WQTR) (SEIS Volume 2, Appendix M, Section 9.1) for the recommended trigger levels and rationale. The LOR will be specified where relevant in the WQTR.

The WQTR sets out:

- Metal limits are for dissolved concentration of the respective metals; and
- The sampling methodology and associated QA protocol.

30B

Recommendation – It is recommended that the revised EMP address the above issues on monitoring of contaminants. An example contaminant monitoring condition follows:

W4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 1 for each quality characteristic and at the frequency specified in Table 2 and Table 3.

Table 0J-14 Release point quality characteristic and trigger levels

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Level
Aluminium	100	For aquatic ecosystem protection, based on LOR for ICPMS
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline
Chromium	1	For aquatic ecosystem protection, based on SMD guideline
Copper	2	For aquatic ecosystem protection, based on LOR for ICPMS
Lead	3.4	For aquatic ecosystem protection, based on SMD guideline
Iron	300	For aquatic ecosystem protection, based on low reliability guideline
Lead	10	For aquatic ecosystem protection, based on LOR for ICPMS
Mercury	0.2	For aquatic ecosystem protection, based on LOR for CV FIMS
Nickel	11	For aquatic ecosystem protection, based on SMD guideline
Zinc	8	For aquatic ecosystem protection, based on SMD guideline
Boron	370	For aquatic ecosystem protection, based on SMD guideline
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline
Molybdenum	34	For aquatic ecosystem protection, based on low reliability guideline
Selenium	5	99% aquatic ecosystem protection, based on SMD guideline
Uranium	1	For aquatic ecosystem protection, based on LOR for ICPMS
Fluoride (total)	2000	Protection of livestock and short term irrigation guideline
Vanadium	10	For aquatic ecosystem protection, based on LOR for ICPMS
TPH (C6-C9)	20	
TPH (C6-C9)	100	

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The list of quality characteristics required to be monitored as per Table 3 will be reviewed once the results of the monitoring data is gathered for the interim period until XXXXXXXX or an earlier date if the data is, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table 3.
3. SMD – slightly moderately disturbed level of protection, guideline refers to ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. . Inductively coupled plasma mass spectroscopy (ICPMS) Cold Vapour-Flow Injection Mercury System (CV-FIMS) – analytical method required to achieve LOR.

Response:

The above comment has now been included in the EM plan as part of the proposed environmental authority condition (Volume 2, Appendix V, Section 3.4.10.1)

Comment 31.0 Section P.3.4.9.1. – Notifying the administering authority about the releases (Page P-60)

31A

Issue – *The proposed EA conditions in the EIS/EMP are mismatched in placement regarding the need to notify the administering authority about releases.*

Response:

Condition W15 of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.10.1) has been relocated under “Notification of release event” and is now included as condition W14:

The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours) of the cessation of a release notified under condition W13 and within 28 days provide the following information in writing:

- *release cessation date/time;*
- *natural flow volume in receiving water;*
- *volume of water released;*
- *details regarding the compliance of the release with the conditions of this authority (i.e. contamination limits, natural flow, discharge volume);*
- *all in-situ water quality monitoring results; and*
- *any other matters pertinent to the water release event.*

New condition W15 has been added under “Notification of release event exceedance” and reads as follows:

The authority holder must, within 28 days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

- a) *the reason for the release;*
- b) *the location of the release;*
- c) *all water quality monitoring results;*
- d) *any general observations;*
- e) *all calculations; and*
- f) *any other matters pertaining to the release event.*

31B

Recommendation – *The revised EMP should address notification of the administering authority. Example conditions for notifications about release events follow:*

W14 *The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under Condition W12 and within 28 days provide the following information in writing:*

- a) *release cessation date/time;*
- b) *natural flow volume in receiving water;*
- c) *volume of water released;*

- d) details regarding the compliance of the release with the conditions of Agency Interest: Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);
- e) all in-situ water quality monitoring results; and
- f) any other matters pertinent to the water release event.

Response:

The above comment has now been included in the EM plan as part of the proposed environmental authority condition (Volume 2, Appendix V, Section 3.4.10.1)

31C

Recommendation – Add the following to conditions for notifications about release event exceedances:

W16 The authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

- a) the reason for the release;
- b) the location of the release;
- c) all water quality monitoring results;
- d) any general observations;
- e) all calculations; and
- f) any other matters pertinent to the water release event.

Response:

The above comment has now been included in the EM plan as part of the proposed environmental authority condition (Volume 2, Appendix V, Section 3.4.10.1)

Comment 32.0 Section F4-S 9.2.3 & P.3.4.9.1 – Receiving monitoring locations (various pages)

32A

Issue – Monitoring locations in the EIS/EMP will not adequately assess compliance impacts on the receiving environment. Also the flow gauging details need to be specified e.g.

1. The post-mixing water quality downstream needs to be monitored to adequately assess impacts on receiving environment. This requires a monitoring location some distance downstream of the discharge point.

Response:

Lagoon Creek d/s - Sandy Creek d/s LCSCD should be suitable to access the post-mixing water quality downstream.

32B**Issue –**

2. *Upstream sites LCU RCU SCU and LSCU in the EIS are not suitable as background monitoring points because they will be affected by adjoining projects. Waratah Coal Mine, Galilee Basin Power Station and South Galilee Coal Project will affect LCU, while Kevin's Corner (a proposed 30 Mtpa open cut and underground coal mine) will likely impact RCU SCU and LSCU. They will still be necessary to differentiate effects of adjoining activities.*

Response:

Upstream background monitoring points are suitable to monitor the water quality **entering** the mine. As long as the adjoining projects are at a development stage, no agreement has to be developed to monitor water quality upstream of these locations. The REMP should allow for the assessment of cumulative impacts from adjoining projects when it is required. Then, potential additional monitoring points will be necessary to monitor cumulative impacts but not as background monitoring points for the purpose of controlling the Alpha mine impacts on the receiving environment.

32C**Issue –**

3. *the flow monitoring point is not identified with enough details*

Response:

Two flow monitoring gauging stations will be installed at LCU and LCSCD and to monitoring the flow entering and exiting the mine lease area. Velocity monitors will be fitted to the respective gauges as well as on each of the Sediment Runoff Catchment Dams (SRD) outlet pipes.

32D

Recommendation – *The revised EMP should address monitoring locations conditions using the following examples:*

W18 *Specify at least one far-field monitoring point much further downstream to represent post-mixing water quality. It should also specify background sites that are not affected by any impacts of mining or power station activities.*

(NB: the far-field monitoring point may be off the mining lease but should remain located within the nearest major flowing stream. If suitable upstream background sites are not possible, the least affected site, or unaffected site from another nearby sub-catchment should be identified for the purpose of collecting reference or "background" data. Collaborative monitoring programs involving more than one mining company may be applicable for monitoring such sites for local creek catchments.)

Response:

The far-field monitoring point is located on the main flowing stream (Sandy creek). The monitoring point is as below:

Table AJ-15 Characteristics of the surface water quality monitoring points

Number	Monitoring site	Code	Coordinates		Comment
			Easting	Northing	
Lagoon Creek					
4	10 km downstream Lagoon Creek	FDP	449557	7453981	For conditions 10 km downstream of the mine.

All the following upstream monitoring points were assessed appropriate to collect reference and background during the planning phase of the mine. All points match to the following criteria:

- No intensive agriculture within 20 km upstream (irrigation, widespread soil disturbance, use of agrochemicals and pine plantations).
- Dry-land grazing does not fall into this category No major extractive industry within 20 km upstream.
- No major urban area (>5,000 population) within 20 km upstream
- No significant point source wastewater discharge within 20 km upstream Seasonal flow regime not greatly altered.

Table AJ-16 Characteristics of the surface water quality monitoring points

Number	Monitoring site	Code	Coordinates		Comment
			Easting	Northing	
Lagoon Creek					
1	Lagoon Creek upstream outside MLA	A1	447250	7418923	For conditions prior to entering the mine site
2	Lagoon Creek, upstream	PT2	449098	7421413	For conditions prior t to disturbance from mine activities
Sandy Creek					
9	Sandy Creek upstream	A5	440746	7438237	For conditions prior to the creek diversion and disturbance from mine activities
Rocky Creek					
10	Rocky Creek Upstream	11	440351	7443800	For conditions prior to entering the mine site
Little Sandy Creek					
11	Little Sandy Creek upstream	13	440262	7441831	For conditions prior to entering the mine site
Spring Creek					
13	Spring Creek upstream	A9	438989	7424345	For conditions prior to disturbance from mine activities
Native Companion Creek					
14	Native Companion Creek	NCC	470132	7384603	Reference site
Well Creek					
15	Well Creek	PT1	441888	7429149	Reference site

At the time of the EIS and SEIS study, all the upstream monitoring points located on Lagoon creek were considered acceptable to established the background water quality baseline as the no significant activities were carried out at future Galilee Power station site, located upstream of Lagoon creek. The Galilee Power station project is still at an EIS stage.

32E

Recommendation – W20 Replace “10 km” with “50 km” for extent of downstream receiving waters:

For the purposes of the REMP, the receiving environment is the waters of Lagoon and Sandy Creeks and connected waterways within fifty (50) kilometres downstream of the release.

Response:

A 50 km extent of downstream receiving water, would include a reach of the sandy Creek into the receiving waters that receives most of its flow from catchments unaffected by the Alpha Coal Project. The location, 50 km downstream of the Project is therefore deemed to not be representative of the impacts due to the Project

32F

Recommendation – W8 Stream flow gauging stations need specifications. Recording frequency should be continuous (minimum daily) eg. replace Table P-20 with table as below:

Table 0J-17 Stream flow gauging station

Receiving water description	Release Point	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Lagoon Creek			XXXX	XXXX	Depending on individual catchment this minimum flow trigger will be either the release comprising less than 20% of the natural flow or any natural flow in the receiving environment. The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure. Example: > or = 10 m ³ /sec	Continuous (minimum daily)

Response:

The above Table AJ-17 has been used to revise the existing table in the EM Plan as part of the proposed environmental authority condition W8 (Volume 2, Appendix V, Section 3.4.10.1). The wording of the proposed environmental authority W8 has also been amended to include the other headings now present in the revised table.

Comment 33.0 Section P.3.4.9.1 – Receiving waters monitoring during all flows – W18 (Page P-61)

33A

Issue – Upstream and downstream receiving environment monitoring should occur during all flow events, not just during periods when discharges are taking place. This requirement is necessary to allow for:

- condition assessment of these waterways
- potential assessing of impacts before and after discharge
- assessment of background to assist with limit setting
- monitoring of discharges

Response:

Condition W18 is intended to monitor the potential impacts associated with controlled releases only. Other conditions (e.g. W20 – W22) are related specifically to REMP requirements. Due to the fact that upstream sites are also monitored, background conditions will be assessed.

The suggested solution is to monitor all flow events daily at the nine upstream and downstream monitoring points included in Table P-24 (EIS Volume 5, Appendix P). This is contrary to the intent of condition W18. Accordingly, it is not considered necessary to adopt the suggested changes to condition W18 to include daily monitoring of all flow events.

33B

Recommendation – The revised EMP should address monitoring. For W18 “controlled releases” could be replaced with “all flow events” (as indicated by italicised text) and “from dam/s” could be deleted as this is not relevant e.g.

W18 The quality of the receiving waters must be monitored daily during all flow events for each quality characteristic in Table P-23 at the locations specified in Table P-24.

Response:

As it is the sites intention to minimise the amount of water releases to the environment and reuse as much as possible on-site the sampling of the quality of all flow events on a daily basis is seen as excessive to requirements. The site will be undertaking sampling as part of the release conditions and the as part of the REMP.

Comment 34.0 Section P.3.4.9.1 – Receiving Environment Monitoring Program (REMP) and contaminant trigger levels – W20 (Page P-62)

34A

Issue – A copy of the REMP needs to be provided to DERM before implementation

Recommendation – The revised EMP should address the REMP availability eg by adding the following italicised text to the condition given at W20 for the REMP:

A REMP must be implemented by (3 months from the date of issue) to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse

impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

Response:

Condition W20 has been amended and now reads as follows:

A REMP must be implemented by (3 months from the date of issue) to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aim of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

For the purposes of the REMP, the receiving environment is the waters of (Lagoon and Sandy Creeks) and connected waterways within ten (10) kilometres downstream of the release.

Comment 35.0 Section P.3.4.9.1 – REMP and physical-chemical parameters – W21 (Page P-63)

35A

Issue – Specific physical chemical parameters are important and of particular interest are dissolved oxygen and sulphide. Mining operations may release sulfate to receiving waters and in an area that experiences prolonged droughts (refer to Maplecroft.com) when waters are likely to be oxygen-depleted. The implications include increased risks from production of sulfide, which is more toxic to biota than sulfate and its product, H₂S (“rotten-egg” gas) can be lethal to both humans and animals.

Response:

Condition W21(h) has been amended and now reads as follows:

“Monitoring of physical chemical parameters specified in Table V-26, as well as dissolved oxygen saturation, concentration of sulphide and temperature.”

35B

Recommendation – *The revised EMP should address chemical parameters for the REMP e.g. by adding the following italicised text to section h) of W21:*

h) Monitoring of physical chemical parameters specified in Table P-18 and dissolved oxygen saturation, concentration of sulfide and temperature;

Response:

See response above in 35A.

Comment 36.0 Section P.3.4.9.1 – REMP reporting – W22 (Page P-63)

36A

Issue – *The condition concerning the REMP report needs specific details to ensure enough information is provided in the REMP report for an appropriate assessment by the administering authority.*

Recommendation – *The revised EMP should address REMP reporting e.g. for W22 Include the following:*

A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions W20 must be prepared and submitted in writing to the administering authority by (date to be determined). This should include an assessment of background water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Response:

Condition W27 has been amended and now reads as follows:

“The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each Annual Return or upon request:

- *the date on which the sample was taken;*
- *the time at which the sample was taken;*
- *the monitoring point at which the sample was taken;*
- *the measured or estimated daily quantity of the contaminants released from all release points;*
- *the release flow rate at the time of sampling for each release point;*
- *the results of all monitoring and details of any exceedances with the conditions of this environmental authority; and*
- *water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.*

”

Comment 37.0 Section P.3.4.9.1 – Annual water monitoring reporting – W27 (Page P-64)

37A

Issue – *The condition concerning annual water monitoring reporting requires specific details about when to submit the details and the format in which to submit it.*

Recommendation – *The revised EMP should address annual water monitoring reporting by e.g. adding italicised text as following:*

W27 *The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return or upon request:*

- a) *the date on which the sample was taken;*
- b) *the time at which the sample was taken;*
- c) *the monitoring point at which the sample was taken;*
- d) *the measured or estimated daily quantity of the contaminants released from all release points;*
- e) *the release flow rate at the time of sampling for each release point; and*
- f) *the results of all monitoring and details of any exceedances with the conditions of this environmental authority,*

- g) *water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.*

Response:

Condition W27 has been amended and now reads as follows:

“The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each Annual Return or upon request:

- the date on which the sample was taken;*
- the time at which the sample was taken;*
- the monitoring point at which the sample was taken;*
- the measured or estimated daily quantity of the contaminants released from all release points;*
- the release flow rate at the time of sampling for each release point;*
- the results of all monitoring and details of any exceedances with the conditions of this environmental authority; and*
- water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.”*

Comment 38.0 Section P.3.4.9.3 – Groundwater – Proposed EA terms W42, W43 and W44 (Page P-70)

38A

Issue – Proposed groundwater monitoring program.

It will be necessary to review any groundwater monitoring program on a regular basis to ensure impacts are able to be monitored and assessed. It is very likely therefore that monitoring sites will be subject to amendment as will the parameters to be monitored.

The SEIS should include a reference to an “approved monitoring report” to contain monitoring data. Such a report can then be regularly reviewed and sites and parameters amended if necessary. Table P-29, the proposed groundwater monitoring program currently would form the basis for this report

Recommendation – The proposed groundwater monitoring program should be included in a report to the Administering Authority. The revised EMP should address this issue by e.g. rewording W42 to:-

W42 *A groundwater monitoring program must be designed and submitted to the relevant authority for approval before the commencement of mining operations. The monitoring program must include the following criteria;*

- Allow for the compilation of representative groundwater samples from the aquifers potentially affected by mining activities;*
- Comprise at least twelve (12) sampling events, no more than two (2) months apart over a 2 year period, to determine background groundwater quality as far as practicable;*
- Obtain background groundwater quality in hydraulically isolated background bore(s) that have not been affected by any mining activities, and*
- Allow for the establishment of groundwater water level and contaminant trigger levels.*

- *The monitoring report will be subject to review and amendment from time to time as considered necessary by the relevant authority*

Response:

Section W42 of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.10.1) has been changed to include:

W42

A mutually agreed upon groundwater monitoring program has been implemented prior to the commencement of mining operations, which will:

- Allow for the compilation of representative groundwater samples from the aquifers potentially affected by mining activities;
- Comprise at least twelve (12) sampling events, no more than (2) two months apart over a 2-year period, to determine background groundwater quality as far as practicable;
- Obtain background groundwater quality in hydraulically isolated background bore(s) that have not been affected by any mining activities (once mining activities begin),, and
- Allow for the establishment of groundwater water level and contaminant trigger levels.

The monitoring report will be subject to review and amendment from time to time as considered necessary by the relevant authority.

38B

Issue – *Term W43 sets out the proposed trigger levels, which will be used to determine if there has been an impact on groundwater quality. The term lists dissolved metals as a parameter. However it is unclear as to exactly what type of metals are proposed to be monitored.*

In addition, it does not deal with water level impacts that may adversely impact on any surface water connected body or on land holders water supplies, surface or groundwater.

Recommendation – *The SEIS and revised EMP should clearly identify the dissolved metals that will be monitored and identify groundwater level trigger levels that will be used to determine if there has been impacts on groundwater levels*

Response:

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.4.10.1) includes the dissolved metals (from Table V-40) that will be monitored. The list of proposed hydrochemical trigger levels is shown below in Table AJ-18.

Table 0J-18 Groundwater contaminant limits and trigger levels

Parameter	Units	Contaminant limits
Dissolved metals	µg/L	Arithmetic mean + 2 standard deviations
Aluminium (Al)		
Antimony (Sb)		
Arsenic (As)		
Barium (Ba)		
Beryllium (Be)		
Boron (B)		
Cadmium (Cd)		
Chromium (Cr)		
Cobalt (Co)		
Copper (Cu)		
Iron (Fe)		
Lead (Pb)		
Manganese (Mn)		
Mercury (Hg)		
Nickel (Ni)		
Selenium (Se)		
Vanadium (V)		
Zinc (Zn)		
TDS	mg/L	Arithmetic mean +10%
EC	µS/cm	Arithmetic mean +10%
Sulfate	mg/L	Arithmetic mean + 2 standard deviations
pH	unit	Average and maximum ± 1 pH unit

Note: For baseline value +10% means for measured groundwater quality, arithmetic means are not to vary above the reference baseline average by more than 10% and measured groundwater maximum values are not to exceed the reference baseline maximum by more than 10%.

Baseline value ± 1.0 for pH means the corresponding variation allowed is 1.0 pH unit above and below average and maximum pH values.

Based on the comments generated by DERM it is likely that any water licence for dewatering issued for the Project will contain groundwater monitoring, assessment and reporting conditions. Generally the monitoring, assessment and reporting terms of a water licence relate to water level impacts whilst the similar terms in an Environmental Authority relate more to water quality issues, primarily from a pollution of resource aspect.

Groundwater Level

The groundwater level monitoring does and will include:

- The monitoring of hydrostatic pressures associated with coal seams and the sandstone interlayers (the vibrating wire piezometers);
- The groundwater standpipe monitoring bores are to be equipped with automated groundwater level monitoring loggers, set to record groundwater level data at a maximum 12-hour intervals. These data will be compiled on a monthly basis; and
- Groundwater level trends and natural fluctuations will be determined.

Groundwater level trigger levels have been proposed:

The triggers for groundwater levels are as suggested above in Submission Response CM 302-303, Table AJ-14). The trigger levels are to be revised and discussed with DERM once groundwater modelling provides sufficiently accurate predictions regarding dewatering impacts.

It is noted that the trigger levels for water level and water quality will be those approved by DERM.

38C

Issue – *Reporting and assessment of monitoring data.*

The proposed EA terms do not address how the monitoring information will be reported or assessed.

Recommendation – *The revised EMP should set out how often the monitored data is reported to the relevant authority and how it is assessed. For example a new proposed condition should contain the following criteria:*

- *Data collected under the monitoring program will be forwarded to the relevant authority within 30 business days of being collected and in a format approved by the relevant authority*
- *The proponent shall undertake an assessment of the impacts of mining on groundwater after the first 12 months of dewatering commencing and thereafter every subsequent calendar year.*
- *The report will be forwarded to the relevant authority by the first of March each calendar year.*
- *The report will include an assessment of impacts, any mitigation strategies as well as any recommendations for changes to the approved monitoring program.*
- *If there is a requirement to submit a similar groundwater report as part of any term issued under a water licence under the Water Act 2000 then the proponent and the relevant authorities may agree for the reports to be combined.*

Response:

EIS Volume 5, Appendix P, Section P.3.4.8 provides the following commitments regarding groundwater monitoring and reporting:

- Groundwater monitoring and sampling will be conducted by a suitable qualified and experienced professional in accordance with the current edition of the DERM Water Quality Sampling Manual, or subsequent updated versions; and the AS/NZS 5667.11:1998 Australian/New Zealand Standard for water quality – sampling Part 11; guidance on sampling groundwater.
- An annual review of the monitoring data will be conducted. The review will be conducted by a suitably qualified and experienced hydrogeologist and will include assessment of groundwater level and quality data, and the suitability of the monitoring network.
- All groundwater-based complaints will be investigated and a register kept of the nature of the complaint, the results of assessment, and any actions taken. The register will be made available to the regulating authority upon request.

The groundwater component of the EM Plan (SEIS Volume 2, Appendix V, Section 3.4.10.3) has been revised to include the following commitments regarding monitoring reporting:

- Data collected under the groundwater monitoring program will be forwarded to the relevant authority on a quarterly basis and in a mutually agreed format;
- The annual review report will be forwarded to the relevant authority by the first of March each calendar year;
- The report will include:
 - *An assessment of groundwater level and quality impacts (if any);*
 - *An update of the groundwater model to ensure accurate predictions regarding potential impacts to local and regional groundwater resources;*
 - *Validation of the groundwater monitoring network, during the life of the mine;*

- An assessment of compliance with Water Licence and EA conditions;
- Where issues of non-conformance have been recorded, details of any mitigation strategies and an assessment of the mitigation and remediation measures installed.
- If there is a requirement to submit a similar groundwater report as part of any term issued under a water licence under the Water Act 2000 then the proponent and the relevant authorities may agree for the reports to be combined.

Comment 39.0 Section P.3.6 – Waste Management (Page P-87)

39A

Issue – Figure P-5 identifies a landfill to be constructed as part of the mining activities. The EMP does not provide adequate information regarding the undertaking of ERA 60 Waste Disposal as part of the Alpha Coal Mine.

Section 55 of the Environmental Protection Regulation 2008 'Release of water or waste to land' states:

- (1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the relevant land).
- (2) The administering authority must consider the following matters—
 - a) the topography, including the flooding potential of the relevant land;
 - b) the climatic conditions affecting the relevant land;
 - c) the available land on which the water or waste can be released;
 - d) the storage of the water or waste in wet weather;

Example—

storage of water or waste in ponds or tanks

- a) (e) the way in which the water or waste will be released to the relevant land;
- b) (f) the need to protect soil and plants on the relevant land from damage;
- c) (g) the potential for infiltration of the water or waste to groundwater;
- d) (h) the potential for generation of aerosols or odours from the water or waste;
 - (i) the impact of any transfer or run-off of contaminants from the relevant land to surface waters;
- e) (j) the ongoing availability of the land for the release of the water or waste.

The EMP does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of waste to land and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994 with regards to the undertaking of ERA 60 as part of the Alpha Coal Mine.

Recommendation – The EMP should detail the operation of the waste disposal facility considering the departmental guideline 'Waste Disposal – Landfill siting, design, operation and rehabilitation' (see www.derm.qld.gov.au).

Response:

As part of the approvals process the Proponent is (during the EIS stage) pursuing approvals to facilitate gaining a mining lease. At this point in time the Proponent does not have the detailed design information to adequately answer the component of the comment outlined above. The Proponent will be able to develop responses to address each of these issues, developing a conceptual management plan for the landfill facility in due course. The developing landfill facility design will mature the concepts and support and validate management of each item with a detailed operations and environmental management plan. A detailed plan is not part of an EIS, but is part of the development of the management plan. Operational details do not typically mature until design details mature. Having said this, the management of the landfill along with all of the other ERA activities on site will have to be undertaken in accordance with the EA conditions stipulated in the site licence. This will include emissions to land, groundwater, surface water and air. It will be up to the site through adequate site location, engineering and management to make sure that those conditions are not breached.

39B

Issue – *The commitments within the Water section of the EMP identifies that a sewage treatment plant is to be constructed as part of the mining activities. The EMP does not provide any information regarding the undertaking of ERA 63 Sewage Treatment as part of the Alpha Coal Mine.*

The EMP does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of waste or water to land and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994 with regards to the undertaking of ERA 63 as part of the Alpha Coal Mine.

Recommendation – *The EMP should detail the operation of the sewage treatment facility considering the following departmental guidelines.*

- *Queensland water recycling guidelines*
- *Framework for managing sewerage infrastructure to reduce overflows and environmental impacts*
- *Information to be provided with an application for an environmentally relevant activity (ERA)*
- *The EMP should include details of the process of disposal of sewage sludge and waste waters.*

Response:

Section 3.6.5 of the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.6.5) addresses sewage treatment for the Alpha Coal Project (Mine).

Comment 40.0 Section P.3.6.5 – Mining Waste (Page P-97)**40A**

Issue – The EMP is required to detail the finalised plans for the tailings waste. The EMP states a possibility of tailings being disposed of 'in pit'. The environmental authority is a 'life of mine' approval and must be issued to authorise adequate tailings disposal for the proposed 30 years of mine life. The finalised management of tailings needs to be identified within the EMP. The environmental authority is able to be amended should another viable alternative for tailings disposal be identified. Research proposals could be identified and detailed in the EMP as a milestone.

Recommendation – The EMP should detail the finalised management of tailings at the Alpha Coal Mine, including (if required):

- Undertaking the chemical analysis of tailings material.
- The availability or leachability of metals from the tailings.
- The placement strategies of tailings material within the Tailings Storage Facility.
- The placement strategies of tailings 'in pit' or within other mine waste emplacement areas to enable successful rehabilitation outcomes.

Response:

The proponent acknowledges the concerns expressed in relation to the 'worst-case scenario' tailings disposal strategy outlined in the original EIS. As outlined in EIS Volume 2, Section 16.4.2.4 and in EIS Volume 5, Appendix J2, Section 3.4, the Proponent is undertaking further detailed assessment with a view to reducing the out-of-pit footprint and associated potential impacts.

The *Alpha Coal Tailings Storage Facility – Concept Design Report* (EIS Volume 5, Appendix J2) has been amended to better address the design philosophy and design parameters related to seepage control (SEIS Volume 2, Appendix T). In addition, it has also included more detail on the potential for in-pit tailings disposal once suitable void space has been developed.

The proponent will continue to refine the tailings management strategy and identify appropriate EA conditions in consultation with DIP, DERM and other relevant agencies as soon as the findings of the detailed assessment are finalised.

Comment 41.0 Section P.3.6.5 – Mining Waste**41A**

Issue – The EMP does not outline the tailings storage facility to be utilised for the Alpha Coal Project.

Recommendation – This section of the EMP should include information regarding the design and operation of any tailings storage facility. It should also be noted how the tailings storage facility is managed in conjunction with the sites water management systems. The following information is required to be submitted for tailings storage facilities:

- Adequate design plans or conceptual design plans for the tailings storage facility, together with certification (for final design plans) or endorsement (for conceptual design plans) of a suitably qualified and experienced person that the submitted final or conceptual design plan of the regulated tailings storage facility will provide the performance stated in that submitted design plan.
- A risk assessment based on the design plans or conceptual design plans.
- The design of the regulated dam should take into account:

- *That the dam is designed and located to have the smallest practical catchment;*
- *That the dam is designed to accept waste inputs for the operation year and inputs from the critical wet season; and*
- *The spillway is designed and maintained to withstand the peak flow from the critical design storm (the critical design storm has a duration that produces the peak discharge for the catchment);*
- *That the gradients of earth embankment batters should be stable.*
- *An operational plan setting out procedures and criteria to be used for operating the tailings storage facility.*

For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore inspire sufficient confidence to allow the administering authority to endorse the conceptual design plan for the regulated dam within the EMP.

Response:

The tailings storage facility is described in Section 3.6.5.1 of the draft EM Plan (EIS Volume 5, Appendix P).

As outlined in EIS Volume 2, Section 16.4.2.4 and in EIS Volume 5, Appendix J2, Section 3.4, the Proponent is undertaking further detailed assessment with a view to reducing the out-of-pit footprint and associated potential impacts.

The *Alpha Coal Tailings Storage Facility – Concept Design Report* (EIS Volume 5, Appendix J2) has been amended to better address the design philosophy and design parameters related to seepage control (SEIS Volume 2, Appendix T). In addition, it has also included more detail on the potential for in-pit tailings disposal once suitable void space has been developed.

The amended draft EM Plan (SEIS Volume 2, Appendix V, Section 3.6.6.1) provides more detail on the tailings storage facility.

However, it should be noted that the proponent will continue to refine the tailings management strategy. Accordingly, further amendments to the draft EM Plan may be required to identify appropriate descriptions and EA conditions. This will be undertaken in consultation with DIP, DERM and other relevant agencies as soon as the findings of the detailed assessment are finalised.

Comment 42.0 Section P.3.6.9 – Control Strategies (Page P-99)

42A

Issue – *The EMP does not contain sufficient detail regarding general waste management at the proposed Alpha Coal Mine.*

Recommendation – *The EMP should include waste management control strategies that consider:*

- *The types of wastes;*
- *The segregation of wastes;*

- *The storage of wastes;*
- *The transport of wastes;*
- *Monitoring and reporting matters concerning the waste;*
- *Emergency response planning;*
- *Disposal, reuse and recycling options;*
- *Processes to be implemented to allow for continuous improvement of the waste management systems;*
- *Staff awareness and training.*

Response:

The Waste Management Plan (EIS Volume 2, Sections 16.2.8 and 16.2.9) details waste management strategies nominated for each of the anticipated waste streams from construction and operation of the Project. Characterisation of the Project's construction and operation waste streams, including type, source and anticipated volumes, is presented in Tables 16-1 and 16-2, respectively.

Waste minimisation and resource recovery has been considered throughout the initial planning and conceptual design stages of the Project and will continue to inform detailed design, construction and operation. Provision will be made for waste materials to be segregated for recovery or disposal during handling and storage on-site. Where materials such as metals, solvents, oils and wood products can be re-used, then this will occur where practicable. An engineered landfill will be constructed on-site at the start of the construction phase following grant of the mining lease. Only recyclable, regulated or hazardous waste would be transported off-site for either recycling or final disposal.

A detailed Waste Management Plan will be prepared as part of the Project-specific Environmental Management Plan prior to the commencement of construction and operation phases of the Project. The Waste Management Plan will address:

- Identification of waste streams;
- Environmental management and monitoring;
- Waste transport;
- Monitoring and reporting matters concerning the waste;
- Emergency response planning;
- Disposal, reuse and recycling options;
- Processes to be implemented to allow for continuous improvement of the waste management systems; and
- Training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation, collection and disposal.

Comment 43.0 Section P.3.6.9 – Control Strategies (Page P-99)**43A**

Issue – *The EMP does not contain sufficient detail regarding mine waste management at the proposed Alpha Coal Mine. Also see this submission's advice on Appendix J and Volume 2 of the EIS.*

Recommendation – The EMP should include mine waste management control strategies that consider:

- Undertaking the chemical analysis of tailings material.
- The availability or leachability of metals from the tailings.
- The placement strategies of tailings material within the Tailings Storage Facility.
- The placement strategies of tailings 'in pit' or within other mine waste emplacement areas to enable successful rehabilitation outcomes.

Response:

The Alpha Coal Project EIS and SEIS have identified clear commitments to implement specific strategies to manage PAF and saline/sodic mine waste materials, such that the potential for acid and metalliferous (AMD) and sediment to potentially impact surface and groundwater resources will be limited. For PAF coarse coal rejects for example, there is a commitment by the Proponent for compaction, alkaline amendment, and encapsulation of this material, with NAF overburden within a limited period of time to mitigate potential impacts from any AMD.

Comment 44.0 Section P.3.6.9 – Control Strategies (Page P-100)

44A

Issue – The EMP does not include environmental protection commitments for mine waste management.

Recommendation – For the revised EMP, environmental protection commitments must be proposed for mining waste management including environmental protection objectives, standards, measurable indicators and control strategies to demonstrate how the objectives will be achieved.

Response:

The EM Plan (SEIS Volume 2, Appendix V, Section 3.6.10.2) has been updated to contain clear and specific environmental protection commitments for mine waste management.

Comment 45.0 Section P.3.6.12 – Proposed Environmental Authority Conditions (Page P-102)

45A

Issue – The EMP proposes Environmental Authority conditions to authorise the disposal of waste tyres within spoil emplacements. The content of the EMP does not detail the management of waste tyres as a Notifiable activity under schedule 2 of the Environmental Protection Act 1994.

The departments Operational Policy 'Disposal and storage of scrap tyres at mine sites' identifies that best practice environmental management for scrap tyres generated by mining activities provides for a waste management strategy according to the following hierarchy in decreasing order of preference and desirability: avoidance, recycling, waste-to-energy, and disposal. Adoption and implementation of this hierarchy reflects the economic cost of handling and transporting large mine tyres in Queensland and the considerable energy and material resource embedded in the tyres.

Recommendation – The EMP should include further information regarding the management of waste tyres.

Response:

Landfill (i.e. disposing of waste excluding inert construction and demolition waste) is identified as a notifiable activity likely to cause land contamination in Schedule 3 of the *Environmental Protection Act 1994* (EP Act). Under the EP Act, land that has been or is being used for a notifiable activity is recorded on the Environmental Management Register (EMR) maintained by the Queensland Department of Environment and Resource Management (DERM).

Waste tyres are considered regulated wastes to be tracked from the point of generation to the point of final processing, recycling or disposal. The Project will manage tyres in accordance with the Operation Policy titled *Disposal and storage of scrap tyres at mine sites* (DERM, 2010) – refer to EIS Volume 2, Section 16.2.6.

- Where practical, tyres will be removed by the tyre supplier for reprocessing or used on-site for road barriers and demarcation.
- Otherwise tyres will be stored and appropriately disposed of once mining operations commence by burying in the mine overburden in a designated location identified on the EMR managed by DERM.
- Tyres stored for disposal or transport will be stockpiled in volumes less than 3 m in height and 200 m² in area. Fire precautions will include removal of grass and other flammable materials within a 10 m radius of the tyre store. Tyres will be stored in a way that minimises water retention and mosquito breeding events.
- Scrap tyres buried in spoil emplacements will be buried deep within the spoil as possible but not directly on the pit floor. Placement will ensure scrap tyres do not impede saturated aquifers and do not compromise the stability of the final landform.

Note that all items of waste (excluding inert construction and demolition waste) buried on-site will be identified on the EMR managed by DERM. Post-mining, potential future landowners can discover the location and details of any tyre disposal sites through a search of the EMR as part of the conveyancing process when purchasing property. Land can only be removed from the EMR following an investigation by a member of a prescribed organisation (as listed in the *Environmental Protection Regulation 2008*) and the preparation of a report that satisfies the DERM that the land is not contaminated.

Comment 46.0 Section P.3.7 – Land Management (Page P-105)**46A**

Issue – The EMP does not sufficiently detail the management of top soils for the project to ensure rehabilitation requirements are met as outlined in the Terms of Reference.

Recommendation – The EMP should detail the management of top soil to ensure rehabilitation requirements are met.

Response:

A detailed Topsoil Management Plan (TMP) will be developed prior to any land being disturbed during the construction and operation phases of the Project.

Specific conditions relating to Topsoil Management in the Terms of Reference include:

- A description of Topsoil Management should consider transport, storage and replacement of topsoil to disturbed areas; and
- The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed.

These conditions have been addressed in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.7.6.1).

Comment 47.0 Section P.3.7 – Land Management (Page P-105)

47A

Issue – The EMP does not sufficiently detail the management of overburden for the project to ensure rehabilitation requirements are met. Also see comments in this submission on Section 1.7.5 Volume 2 of the EIS.

Recommendation – The EMP should detail the management of overburden to ensure rehabilitation requirements are met.

The EMP should describe and show the location, design and methods for constructing dumps of waste rock and subsoil. The location of the dumps should be mapped relative to topography and other natural features of the area. The following should be detailed and discussed:

- Management of the waste rock dumps to ensure material is not deposited or otherwise moves off the lease boundary;
- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually;
- Measures to ensure stability of the waste rock dumps, particularly the management of drainage;
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance; and
- The proposed distance from the waste rock dumps to the mining lease boundary.

Response:

The EM Plan has been updated as part of the SEIS process to further detail the management of overburden and ensure rehabilitation requirements are met (SEIS Volume 2, Appendix V, Section 3.6.12). These mine waste requirements were developed with the final landform in mind.

Comment 48.0 Section P.3.7.7.1 – Rehabilitation and Decommissioning (Page P-120)

48A

Issue – This section does not provide information regarding the backfilling and reinstatement of mine voids.

Recommendation – The EMP is required to detail how the rehabilitation and backfilling of pits will be undertaken and the measures to ensure rehabilitation targets are met.

Response:

As part of the EM Plan (SEIS Volume 2, Appendix V, Section 3.7.7) there is a commitment to undertake a final void management plan. This plan will be reviewed over the life of the mine and be an important component of the site closure plan. At this point in time there has been no commitment to backfill the final void. Final void rehabilitation is one aspect of final closure that will be discussed with all appropriate stakeholders and addressed in light of rehabilitation, slope stability, etc. information learned over the life of the mine.

Comment 49.0 Section P.3.7.7.1 – Objectives (Page P-120)**49A**

Issue – The first objective dot point states (page P-120, paragraph 7):

- *Achievement of acceptable post-disturbance land use suitability – Mining and rehabilitation will aim to create a stable landform with land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed. This will be achieved by setting clear rehabilitation success criteria and outlining the monitoring requirements that assess whether or not these criteria are being accomplished;*

The departmental guideline ‘Rehabilitation requirements for mining projects’ (DME 1995) states that indicating that the land will achieve a specific land capability class is not a sufficient description of the proposed land use.

Recommendation – The EMP should be developed in consideration of the departmental guideline ‘Rehabilitation requirements for mining projects’

http://www.derm.qld.gov.au/services_resources/item_details.php?item_id=200536

The proposed post mining land use must be clearly specified using terms such as grazing (up to a particular intensity), cropping (including type of crop), forestry plantation (for a specified type of wood), habitat (for a nominated species), or return to native vegetation.

When establishing native vegetation as one of the rehabilitation objectives for the mine site, the EMP must specify the ecosystem(s) or habitats that are intended to be developed on the rehabilitated domains. The EMP may also nominate reference/analogue sites that will be used for comparison.

Response:

The pre-mining land use is predominately Good Quality Agricultural Land (GQAL) Class C2 with some Class C1. For further details on the definitions of these classifications, as they have been applied to the pre-mining landscape, refer to Section 6.5 of the Soil and Land Suitability Assessment (EIS Volume 5, Appendix C).

The post-mining EM Plan land use objective, in accordance with Sections 201 to 203 of the EP Act, has identified the land to be rehabilitated as a mosaic of:

- A re-instatement of the main previous land use which is GQAL Class C2 land. Approximately 80% of the rehabilitated site has been nominated for this land use; and
- A reinstatement of a natural ecosystem as similar as possible to the original ecosystem prior to clearing for the remaining 20% of the site (Refer to in EIS Volume 2, Section 25 Figure 25.1; SEIS Volume 2, Appendix V, Section 3.7.3.1). These rehabilitation strategy objectives are acceptable in accordance with the strategy hierarchy (Guideline 18: rehabilitation requirements for mining projects; QEPA, 2008). Note that although some pre-mining GQAL Class C1 is present, the available topsoil resources and the post-mining landform have been assessed as ultimately having a long-term sustainability of Class C2 land rather than Class C1 land. As discussed in EIS Volume 5, Appendix P, Section P.3.7.6.1 a detailed Topsoil Management Plan (TMP) will be prepared prior to construction to ensure that all available topsoil resources are treated appropriately.

The re-instatement of GQAL Class C2 is for moderate quality grazing land. This land will be appropriate for beef cattle breeding stock under a light grazing intensity regime. As per its pre-mining land use this class of land is not appropriate for fattening beef cattle and precludes cropping. Grazing on native pastures is preferred due to the site's native moderate edaphic limitations of low nutrients,

moderate erodibility, variable sodicity and low plant available water content making this land marginally to moderately suitable for pasture improvement.

The re-instatement of native ecosystem(s), per Figure 25.1 (EIS Volume 2, Section 25) and SEIS EM Plan Volume 2, Appendix V, Section 3.7.7, is to use species based on the EIS flora assessment (EIS Volume 5, Appendix E1). The species list based on the existing field survey work undertaken as part of the EIS, ensures that a native species composition will be utilised (SEIS Volume 2, Appendix V, Table V-48). This species mix will also provide for short-term soil stability using stoloniferous grasses to minimise erosion whilst slower growing native species are establishing. The post-mining ecosystem re-construction objective includes species from the regional ecosystems of the Brigalow Open Woodland, Gidgee Open Woodland, Thozet's Box Open Woodland, Lancewood Woodland, Queensland Yellowjacket Low Open Woodland and Silver-leaved Ironbark / Poplar Box Mixed Woodland.

The use of reference sites to enable a comparison of the rehabilitation success/progress with the post-mining objectives has been nominated as a requirement in the revised EM Plan (SEIS Volume 2, Appendix V, Section 3.7.8).

Further information is contained within a detailed Rehabilitation Management Plan that is to be incorporate strategies and monitoring programs (SEIS Volume 2, Appendix V, Section 3.7.7).

Comment 50.0 Section P.3.7.7.1 – Objectives (Page P-120)

50A

Issue – *The rehabilitation objectives do not provide a clear description of proposed rehabilitation outcomes within the individual domains of the mine site.*

The EMP is required to describe the proposed rehabilitation of the mining disturbance and how it will control future environmental harm to an acceptable level.

Recommendation – *The rehabilitation outcomes for the Alpha Coal Mine should be developed considering the departmental guideline 'Rehabilitation requirements for mining projects'. The EMP should include appropriate outcomes.*

Response:

Guideline 18: Rehabilitation requirements for mining projects (QEPA, 2008) require the EM Plan to describe the proposed rehabilitation of mining disturbance and how it will control future environmental harm to an acceptable level. During mine planning, the post-mining land use must be identified as this is the controlling factor which sets both rehabilitation objectives that are consistent with rehabilitation goals and defines how rehabilitation success will be measured.

The EM Plan defines the site's rehabilitation objectives (refer to submission 49A). The EM Plan (SEIS Volume 2, Appendix V, Section 3.7.7) describes both the measurable indicators and standards (called completion criteria) to ensure that rehabilitation success is appropriately measured and monitored. This aims to ensure that future environmental harm is controlled to an acceptable level (refer to submission 53A).

Comment 51.0 Section P.3.7.7.1 – Objectives (Page P-123)

51A

Issue – The EMP states that rehabilitation 'will be progressively undertaken on areas that cease to be used for mining or mine related activities within two years of becoming available'. The EMP does not state how an area will be identified as 'becoming available'.

Recommendation – The EMP is required to detail how the rehabilitation will be undertaken on the site, and how areas available to be rehabilitated will be identified.

Response:

Guideline 18: Rehabilitation requirements for mining projects (QEPA, 2008) does not require detail on how areas become available for rehabilitation in the EM Plan (SEIS Volume 2, Appendix V). This information is contained in Section 25 of the EA titled *Rehabilitation and Decommissioning* and rehabilitation areas become available once they are re-graded to design gradients and can be topsoiled. Refer to EIS Volume 2, Sections 25.1.6 and 25.1.7 for further information.

Comment 52.0 Section P.3.7.7 – Rehabilitation and Decommissioning (Page P-123)

52A

Issue – The species list for the native species list is very repetitive – e.g. False Sandalwood is listed twice, Currant Bush listed four times, silver-leaved ironbark listed twice, popla box listed twice, soft spinifex listed twice.

Recommendation – The EMP should include only native species for the rehabilitation program and a more compatible list of species – i.e. species that will grow well in a duplex soil in dry conditions.

Response:

The native species list for rehabilitation is as an example only but does contain some replication that has been corrected. Also in this table Buffel grass is listed as native and has been removed. The EM Plan Rehabilitation and Decommissioning section has been updated to include more location-specific species for revegetation including, for example, those listed in Table AJ-19 below.

Table 0J-19 Suggested species for use in rehabilitation of areas identified before clearing as Thozet's Box Woodland (RE 10.7.5)

Scientific name	Common name
<i>Archidendropsis basaltica</i>	Dead Finish
<i>Bursaria incana</i>	Prickly Pine
<i>Carissa ovata</i>	Currant Bush
<i>Cleistochloa subjuncea</i>	Sandstone Panic
<i>Enchylaena tomentosa</i>	Ruby Saltbush
<i>Enneapogon oblongus</i>	Purple-head Nineawn
<i>Eremophila latrobei</i>	Crimson Turkey Bush
<i>Eremophila mitchellii</i>	False Sandalwood
<i>Eucalyptus thozetiana</i>	Thozet's Box
<i>Gossypium australe</i>	Rose Cottonbush
<i>Heteropogon contortus</i>	Black Speargrass
<i>Petalostigma pubescens</i>	Quinine Bush
<i>Salsola kali</i>	Soft Roly-poly
<i>Themeda triandra</i>	Kangaroo Grass
<i>Triodia pungens</i>	Soft Spinifex

Comment 53.0 Section P.3.7.8.1 – Rehabilitation (Page P-130)**53A**

Issue – *The rehabilitation success criteria within the EMP do not include clearly measurable rehabilitation indicators.*

Paragraph 4, page P-130 states that based ‘on the generic indicators in Table P-47, each criterion will be further developed to be specific, measurable, achievable, realistic and outcome based, and to reflect the principle of sustainable development’.

Section 203(3)(b) of the Environmental Protection Act 1994 requires that the indicators will be measured to establish when rehabilitation is, by reference to specific completion criteria, complete. This should be included within the EMP.

Recommendation – *The rehabilitation indicators to be associated with the criteria identified in Table P-47 for the Alpha Coal Mine should be developed considering the departmental guideline ‘Rehabilitation requirements for mining projects’ (DME 1995).*

Response:

The EM Plan (SEIS Volume 2, Appendix V) has been prepared in accordance with *Guideline 18: rehabilitation requirements for mining projects* (QEPA, 2008) whereby all Level 1 mining projects are required to state the measurable indicators and standards (called completion criteria). This guideline specifies that the discussion of rehabilitation indicators must:

- State what objective(s) the indicator relates to;
- Justify the selection of the indicator, including how the relationship between the indicator; and the objective has been established;
- State how the indicator is to be measured; and
- State how the results will be reported and interpreted.

The EM Plan defines the rehabilitation objections (refer to submission response CM326 and SEIS Volume 2, Appendix V, Section 3.7.8, specifically Table V-49). This table defines the indicators that are used to meet the post-mining ecosystem objectives, states how these indicators are to be measured as well as how these indicators are to be interpreted.

The proposed indicators are linked to the objective outcomes, for example, plant species composition, evidence of plant reproduction and percentage of ground cover. The proposed monitoring indicators specify the use of the industry accepted Landscape Function Analysis (LFA) monitoring system (as developed by the CSIRO) Reference sites on un-mined areas, that are deemed to be representative of the target post-mining ecosystem, are to be used to compare rehabilitation success. There is also a requirement for skilled persons to undertake the monitoring work to ensure that the proposed indicators are monitored appropriately.

Guideline 18: rehabilitation requirements for mining projects (QEPA, 2008) also specifies that the discussion of rehabilitation indicators must provide clear definition for each domain at the mine site in the form of a set of measurable benchmarks against which rehabilitation indicators can be compared to determine whether objectives are being met.

The revised EM Plan (SEIS Volume 2, Appendix V, Section 3.7.8, Table V-49) provides the completion criteria for each domain as per the guideline requirement. This table details completion criteria for each indicator (note that with regards to ecosystem development the use of reference sites for a comparative dataset is again specified).

The completion criteria and feedback role of indicators for measuring rehabilitation success over time has been proposed to be further developed to be specific, measurable, achievable, realistic and outcome based, and to reflect the principle of sustainable development. This is to ensure that the rehabilitation monitoring process is progressive and dynamic rather than being static in nature.

AJ.7 Volume 6

Comment 1.0 Railway Corridor Appendices Volume 6 Appendix D

1A

Issue - Section 1.3 of the EIS report refers to this appendix as “containing the geology and groundwater assessment”. However no actual assessment was undertaken in Volume 6 Appendix D – the appendix only contains bore data and geology maps. The actual assessment is undertaken in Volume 3 section 12 of the EIS.

This is a minor issue but clarification is needed to state that volume 6 Appendix D only contains data and does not contain any assessment

Recommendation - The SEIS should clarify that Volume 6 Appendix D only contains bore data and geology maps and does not contain any assessment of groundwater.

Response 1A

Please note that in Volume 3, Section 1. 3 of the EIS, Volume 6 Appendix D only contains reference material (bore data and geological maps). Please refer to Volume 3, Section 12 of the EIS for assessment of groundwater.