

EIS Assessment Report for the Codrilla Coal Mine Project

October 2011

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Prepared by:

[Insert business unit or group here]

Department of Environment and Resource Management

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Contents

1	Introduction	i
2	Project details	2
3	The EIS process	3
3.1	Timeline of the EIS process	3
3.2	Environmental Approvals	4
3.3	Consultation program	4
3.4	Matters considered in the EIS assessment report	5
3.5	Environment Protection and Biodiversity Conservation Act 1999	8
4	Adequacy of the EIS in addressing the TOR	9
4.1	Introduction	10
4.2	Project need and alternatives	10
4.3	Project description	11
4.4	Climate	11
4.5	Land	11
4.6	Transport	14
4.7	Waste	20
4.8	Water resources	24
4.9	Air quality	30
4.10	Noise and vibration	32
4.11	Nature conservation	35
4.12	Matters of National Environmental Significance	39
4.13	Cultural heritage	42
4.14	Social issues	43
4.15	Health and safety	46
4.16	Hazard and risk	48
4.17	Rehabilitation	49
5	Adequacy of the environmental management plan	51
6	Suitability of the project	51
7	Recommended conditions	51
8	Completion of this EIS process	52

List of tables

Table 4.1 - Summary of the adequacy of the EIS in addressing the TOR	9
Table 4.2 - Approvals for the Codrilla Coal Mine Project	10
Table 4.3 - Notifiable activities	13
Table 4.4- Sensitive Locations	30
Table 4.5 - Recommended Noise Limits	33
Table 4.6 - Predicted Noise Limits for All Years of Operation	33
Table 4.7 - Extent of clearing REs required for the project	35
Table 4.8 - Risk Assessment Table	48

1 Introduction

This report provides an evaluation of the environmental impact statement (EIS) process pursuant to Chapter 3 of the *Environmental Protection Act 1994* (EP Act) for the Codrilla Coal Mine Project (Codrilla Project) proposed by the Coppabella and Moorvale Joint Venture

The Department of Environment and Resource Management (DERM) as the administering authority for the EP Act, coordinated the EIS process. This assessment report has been prepared pursuant to Sections 58 and 59 of the EP Act. Section 58 of the EP Act lists the criteria that the DERM must consider when preparing an EIS assessment report, while section 59 of the Act states what the content must be.

The Act requires that this EIS assessment report must:

- (a) address the adequacy of the EIS in addressing the final terms of reference (TOR)
- (b) address the adequacy of the draft environmental management plan (EM plan)
- (c) make recommendations about the suitability of the project
- (d) recommend any conditions on which any approval required for the project may be given.

In providing the required content, this assessment report will summarise key issues associated with the potentially adverse and beneficial environmental, economic and social impacts of the project. It will discuss the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project. It will also discuss those issues of particular concern that were either not resolved or require specific conditions for the project to proceed.

Chapter 2 of this EIS assessment report outlines the project to provide context for the findings of the report. Chapter 3 outlines the EIS process that has been followed for the project and the approvals that will be necessary for its commencement. Chapter 4 addresses the adequacy of the EIS, discusses the main issues with regard to the environmental management of the project, and outlines the environmental protection commitments made in the EIS. Chapter 5 of this EIS assessment report assesses the adequacy of the environmental management plan (EM plan) for the project in incorporating the environmental protection commitments, and meeting the content requirements of section 203 of the EP Act. Chapter 6 discusses the suitability of the project and chapter 7 makes recommendations for conditions to be included in the draft environmental authority.

The giving of this EIS assessment report to the proponent completes the EIS process under the EP Act.

2 Project details

Initially the Codrilla Project was proposed by the Bowen Basin Coal Joint Venture (BB Coal JV), which was a joint venture arrangement between Bowen Basin Investments Pty Ltd (85 per cent) and CITIC Bowen Basin Pty Ltd (15 per cent). BB Interests Pty Ltd is a 100 per cent owned subsidiary of Macarthur Coal Limited and CITIC Bowen Basin Pty Ltd is a 100 per cent subsidiary of CITIC Australia Pty Ltd.

On 30 June 2011, the joint venture parties entered an arrangement to sell the Codrilla Project to the Coppabella and Moorvale Joint Venture (CMJV). The sale involved Macarthur Coal and CITIC's subsidiaries selling a 19.7% interest in the project to the CMJV, with Macarthur Coal retaining a 73.3% ownership of the Codrilla Project and CITIC retaining a 7% ownership through their subsidiaries' participation in the CMJV (reflecting the ownership of the Coppabella and Moorvale mines).

The proposed mine, located approximately 120 km south-west of Mackay, involves two mining lease (ML) applications. The main lease (Codrilla A ML) containing the mining operations and infrastructure would be located within Exploration Permit Coal 676 (EPC) tenement. The second lease (Codrilla B ML) would be for infrastructure and would contain the haul road from the Codrilla Coal Mine to the Moorvale Mine on ML 70290 (EPCs 676, 1044, 1146 and 649).

The proposed project involves development of a conventional truck and excavator open cut coal mine producing an average of approximately 4 million tonnes a year of Run of Mine Coal (ROM) which following processing would produce an average of 3.2 million tonnes a year of pulverised coal injection product for export. Run of mine coal would be processed on-site using conventional coal handling and preparation plant technologies. Process waste would be co-disposed with tailings, slurry and course rejects at on-site facilities. Product coal would be transported approximately 31 km to the existing Moorvale Mine train loading facility using road trains on a purpose built private haul road. Coal would then be railed to Dalrymple Bay Coal Terminal for export. The expected life of the project is 13 and a half years although that may be extended if the ongoing exploration program identifies additional resources.

It is anticipated that the project would involve significant associated civil works, including:

- realignment of the Fitzroy Developmental Road to enable full recovery of the economic coal resource,
- relocation of the Valkyrie School and school residence,
- a grade separated crossing of the Fitzroy Developmental Road by an internal mine haul road, and
- crossing of Devlin Creek and minor tributaries by the haul road.

The Codrilla Project is a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The State's environmental impact statement (EIS) process has been accredited for assessment under Part 8 of the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth of Australia and the State of Queensland (2009). The controlling provisions are sections 18 and 18A (listed threatened species and communities).

3 The EIS process

3.1 Timeline of the EIS process

The EIS for the Codrilla Project was conducted under Chapter 3 of the EP Act. The EIS process was initiated by the proponent on 29 June 2009 by application to DERM to prepare a voluntary EIS under section 70 of the EP Act. DERM approved the application to undertake a voluntary EIS on 3 July 2009.

DERM issued a notice of publication of the draft TOR to the proponent on 24 July 2009. DERM placed a public notice on the DERM website on Friday 31 July 2009, in the Courier Mail and Mackay Daily Mercury on Saturday 1 August 2009 and the Emerald Central Queensland News on Wednesday 5 August 2009. The draft TOR were made available for public comment from Monday 3 August 2009 to Monday 14 September 2009. The proponent issued copies of the TOR notice to affected and interested persons.

Twenty six submissions were received by DERM on the draft TOR within the public comment period. These submissions, together with one from DERM, were forwarded to the proponent on 25 September 2009.

On 8 October 2009, the proponent requested an extension to the deadline for responding to comments on the draft TOR to 16 November 2009 and this was granted on 13 October 2009. DERM considered all submissions received on the draft TOR and the proponent's response, prior to issuing the final TOR on 17 December 2009.

On 30 September 2010, the proponent submitted the EIS to DERM for review prior to public notification. DERM compared the EIS to the final TOR and on 11 November 2010, DERM issued the proponent a notice of decision to proceed with the draft EIS. The public notification and submission period was set at 30 business days.

DERM placed a public notice on its website on 19 November 2010 and advertised in the Courier Mail and Mackay Daily Mercury on 20 November 2010 and the Central Queensland News on 19 November 2010. The EIS was made available for public comment from 22 November 2010 to 19 January 2011. The proponent also provided copies of the public notice of the EIS to affected and interested persons.

DERM received nine submissions on the EIS within the submission period. Three late submissions were also received and accepted by DERM. Six submissions were received from State Government Departments, one from the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), one from Isaac Regional Council, two from non-government organisations and two from land holders. These submissions, together with a submission from DERM, were forwarded to the proponent on 3 February 2011. On 14 March 2011 DERM also provided a late submission to the proponent. The late submission by DERM resulted from DERM being unable to provide a full submission due to the exceptional circumstances caused by flooding and cyclones between December 2010 and January 2011.

On 1 March 2011, the proponent held a meeting with DERM to give an update on the project status and discuss outstanding issues with the EIS.

On 2 March and again on 21 April 2011, the proponent requested an extension to the period required to provide responses to submissions. DERM agreed to these requests, seeking a final period ending on 30 June 2011.

On 16 March 2011, the proponent applied for an environmental authority for their mining lease application (ML 70450) that would cover the mining infrastructure area. On 2 June 2011, the proponent applied for ML 70455 that would cover the haul road for the project. DERM approved the application to be assessed as a Non-code Compliant Level 1 mining project requiring an Environmental Impact Statement (EIS). Consequently, the EIS process ceased to be voluntary and became required.

On 29 June 2011, the proponent held a meeting with DERM to give an update of the project. On 30 June 2011, DERM received a response to submissions for the project from the proponent. Copies of the response to submissions were forwarded to the advisory group and public members who commented on the EIS.

On 11 July 2011, DERM received a notice of amendment of EIS from the proponent under section 66 of the EP Act.

A review of the response to submissions by DERM showed that the proponent needed to provide additional information that would comprise part of the EIS. An extension notice was issued on 28 July 2011 with the deadline for making a s56A decision under the EP Act extended to 29 August 2011.

On 18 August 2011, the proponent held a meeting with DERM to discuss their proposed response to outstanding EIS issues.

On 24 August 2011, the proponent lodged a response to the DERM Notice of extension of decision dated 28 July 2011, that included a supplementary EIS V2 and an amended EM plan.

DERM decided under s56A of the EP Act on 29 August 2011 that the submitted EIS should proceed under Division 5 (EIS assessment report) and Division 6 (Completion of process) of the EP Act. A notice of the decision to allow the submitted EIS to proceed was issued to the proponent on 12 September 2011.

During the preparation of this EIS assessment report, DERM advised the proponent of its concerns with the contents of the EM plan as submitted. Consequently, on 7 October 2011 and again on 12 October 2011, the proponent provided DERM with revised EM plans.

In the preparation of this EIS assessment report, DERM considered submissions and comments from members of the advisory body and other interested parties made throughout the EIS process. This EIS assessment report will be made available on DERM's website (www.derm.qld.gov.au).

3.2 Environmental Approvals

The Codrilla Project will require a mining lease for the mining infrastructure area (Codrilla A ML) and for the haul road (Codrilla B ML).

The project will also require an environmental authority under Chapter 5 of the EP Act. The environmental authority will need to cover the following activities that are directly associated with, or facilitate or support, the mining activities, and which would otherwise require approval under the *Sustainable Planning Act 2009*:

- ERA 8 (1)(c) - Chemical Storage
- ERA 21 - Motor Vehicle Workshop
- ERA 63 (1) - Sewage Treatment.

3.3 Consultation program

3.3.1 Public consultation

In addition to the statutory requirements for public notification of the TOR, the EIS, and identification of interested and affected parties, the proponent undertook community consultation with the affected landowners and government agencies during the public submission period on the EIS. The proponent also circulated information on the project to the community.

3.3.2 Advisory Body

DERM invited the following organisations to assist in the assessment of the TOR and EIS by participating as members of the advisory body for the project:

- Department of Communities
- Department of Community Safety
- Department of Education and Training
- Department of Employment, Economic Development and Innovation
- Former Department of Infrastructure and Planning
- Former Commonwealth Department of Environment, Water, Heritage and Arts
- Commonwealth Department of Sustainability, Environment, Water, Population and Communities

- Department of Transport and Main Roads
- Queensland Health
- Queensland Police Services
- Queensland Rail
- Queensland Treasury
- Isaac Regional Council
- North Queensland Land Council Native Title Representative Body
- Barada Barna People
- Construction, Forestry, Mining & Energy Union, Mining & Energy Division
- Fitzroy Basin Association
- Capricorn Conservation Council.

Advisory body meetings were held in Brisbane on 14 December 2010 and in Mackay on 11 January 2011 during the EIS public submission period.

3.3.3 Public notification

Due to Machinery of Government changes from 21 February 2011 (see Public Service Department Arrangements Notice No.1 2011), changes occurred to a number of Queensland Government departments. Consequently, the functions of the Coordinator General in the Department of Infrastructure and Planning (DIP) transferred to the Department of Employment, Economic Development and Innovation. Also the Planning Unit of DIP was separated from that department and became the Department of Local Government and Planning.

3.3.4 Public notification

In accordance with the statutory requirements, advertisements were placed in the Courier-Mail, Mackay Daily Mercury and Emerald Central Queensland News to notify the availability of the draft TOR and EIS for review and public comment as stated in Section 3.1. In addition, notices advising the availability of the draft TOR and the EIS for public comment were displayed on the DERM website.

The draft TOR and draft EIS were placed on public display at the following locations during their respective public notification/submission periods:

- DERM website
- DERM Customer Referral Centre, 400 George Street, Brisbane
- DERM Mackay Office, Level 1, 22-30 Wood Street
- Moranbah Town Library
- Macarthur Coal Limited, 100 Melbourne Street, South Brisbane.

The EIS was also made available for public viewing on the Macarthur Coal's website at <www.macarthurcoal.com.au>.

Copies of the EIS were made available from the proponent's consultants McCollum Environmental Management Services.

3.4 Matters considered in the EIS assessment report

Section 58 of the EP Act requires, when preparing an EIS assessment report, the consideration of the following matters:

- the final TOR for the EIS
- the submitted EIS
- all properly made submissions and any other submissions accepted by the chief executive

- the standard criteria
- another matter prescribed under a regulation.

These matters are addressed in the following subsections.

3.4.1 The final TOR

The final TOR document, issued on 17 December 2009, was considered when preparing this EIS assessment report. While the TOR was written to include all the major issues associated with the project that were required to be addressed in the EIS, they were not exhaustive, nor were they to be interpreted as excluding all other matters from consideration.

Where matters outside of those listed in the final TOR were addressed in the EIS, those matters have been considered when preparing this EIS assessment report.

3.4.2 The submitted EIS

The “submitted EIS” was considered when preparing this EIS assessment report. The “submitted EIS” comprised the following:

- the EIS that was publicly released on 22 November 2010
- the proponent’s response to submissions report (supplementary EIS & amended EM plan) received by DERM on 30 June 2011 that was provided to relevant advisory body members
- the proponent's response to DERM Notice of extension of decision dated 28 July 2011 received by DERM on 24 August 2011 that included a supplementary EIS V2 and an amended EM plan,
- additional information provided by the proponent on 28 September 2011
- amended EM plans submitted to DERM on 7 October and 12 October 2011.

3.4.3 Properly made submissions

DERM received nine submissions on the submitted EIS within the submission period and three after the submission period ended. However, all twelve of the submissions were accepted under section 55 of the EP Act. Those submissions were received from the following stakeholders:

- Capricorn Conservation Council
- Department of Communities
- Department of Community Safety
- Department of Employment, Economic Development and Innovation
- The former Department of Infrastructure and Planning
- Department of Sustainability, Environment, Water, Population and Communities
- Department of Transport and Main Roads
- Eungy Pastoral Co
- Fitzroy Basin Association
- Isaac Regional Council
- Queensland Police
- Mr Ron Pullen.

DERM provided two submissions on the EIS to the proponent, including a late submission made on 14 March 2011. This lateness was due exceptional circumstances, whereby DERM was required to respond to major flooding and a cyclone events during early 2011.

In addition, there has been correspondence from stakeholders regarding the proponent’s response to submissions on the EIS and supplementary information. All submissions and other comments made by stakeholders on the EIS documents were considered when preparing this EIS assessment report.

3.4.4 The standard criteria

Section 58 of the EP Act requires that, among other matters, the standard criteria listed in Schedule 3 of the EP Act must be considered when preparing the EIS assessment report. The standard criteria are:

- a. the principles of ecologically sustainable development as set out in the *National Strategy for Ecologically Sustainable Development*; and
- b. any applicable environmental protection policy; and
- c. any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and
- d. any applicable environmental impact study, assessment or report; and
- e. the character, resilience and values of the receiving environment; and
- f. all submissions made by the applicant and submitters; and
- g. the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows:
 - i. an environmental authority;
 - ii. a transitional environmental program;
 - iii. an environmental protection order;
 - iv. a disposal permit;
 - v. a development approval; and
- h. the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and
- i. the public interest; and
- j. any applicable site management plan; and
- k. any relevant integrated environmental management system or proposed integrated environmental management system; and
- l. any other matter prescribed under a regulation.

DERM has considered the standard criteria when assessing the project.

3.4.5 Prescribed matters

In addition, section 58 of the EP Act requires that the following prescribed matters, under the Environmental Protection Regulation 2008, are considered when making an environmental management decision for this project:

- Section 51, matters to be considered for environmental management decisions
- Section 52, conditions to be considered for environmental management decisions
- Section 53, matters to be considered for decisions imposing monitoring conditions
- Section 55, release of water or waste to land
- Section 56, release of water, other than stormwater, to surface water
- Section 57, release of stormwater
- Section 60, activity involving storing or moving bulk material
- Section 62, activity involving acid-producing rock
- Section 64, activity involving indirect release of contaminants to groundwater.

3.5 Environment Protection and Biodiversity Conservation Act 1999

On 11 May 2009, the Codrilla Project was referred (EPBC 2009/4892) for consideration under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the (then) Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA). On 4 June 2009, DEWHA decided that the project was a controlled action and the controlling provisions are sections 18 and 18A (Listed threatened species and ecological communities) of the EPBC Act. The State's EIS process was accredited for the assessment under Part 8 of the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth of Australia and the State of Queensland (2009). DEWHA, and subsequently the Department of Sustainability, Environment, Water, Population & Communities (SEWPaC), was included in the advisory body for the project and provided comments on the draft TOR and the EIS documents.

This EIS assessment report is required to contain sufficient information about the relevant impacts of the action and the proposed mitigation measures to allow the Commonwealth Environment Minister to make an informed decision on whether to approve the taking of the action pursuant to the provisions of the EPBC Act.

A copy of this EIS assessment report will be given to the Commonwealth Environment Minister for consideration when deciding, under section 133 of the EPBC Act, whether to approve the taking of the action. Matters of national environmental significance are discussed in section 4.13 of this EIS assessment report.

4 Adequacy of the EIS in addressing the TOR

Table 4.1 lists the main aspects of the Codrilla Project addressed in the EIS and highlights the significant issues associated with those aspects. The table notes whether the submitted EIS adequately addressed the matters described in the TOR. The subsections of this chapter enlarge on some of those significant issues, discuss the findings of the EIS in regard to them and outline the environmental protection commitments made by the proponent.

Table 4.1 - Summary of the adequacy of the EIS in addressing the TOR

Matters included in the TOR	Significant issues	Were issues adequately addressed in the EIS?
Introduction	Overview of the project, its objectives and scope. Outline of the necessary approvals and their assessment processes.	Yes to both.
Project need and alternatives	Project justification and any alternatives.	Yes
Project description	Location of the project in the regional and local contexts. Description of the construction phase of the project. Description of the operational phase of the project.	Yes to all.
Climate	Climatic conditions at the site	Yes
Land	Topography & geomorphology Geology Mineral resources Soils Land contamination Land use Existing infrastructure Sensitive environmental values Landscape character and visual amenity.	Yes to all.
Transport	Transportation of personnel by road. Impacts on air traffic of fly-in, fly-out workforce. Transportation of ore concentrates by road.	Yes to all.
Waste	Waste Waste rock characterisation Regulated and other waste	Yes to all.
Water resources	Groundwater Surface watercourses and overland flow	Yes to both.
Air quality	Dust Greenhouse gases Other air emissions	Yes to all.
Noise and vibration	Noise at sensitive receptors Noise impacts on wildlife Vibration due to blasting	Yes to all.
Nature Conservation	Terrestrial plants Terrestrial animals Aquatic ecology Groundwater dependent ecosystems	Yes

Cultural heritage	Indigenous cultural heritage Non-indigenous cultural heritage	Yes to both.
Social issues	Impacts on local community, housing and services Impacts due to fly-in, fly-out workforce	Yes to both.
Health and safety	Air and water emissions. Road haulage, and traffic regimes	Yes to both.
Economy	Alienation of grazing land Effects on the local and regional economy Effects on the state economy	Yes to all.
Hazard and risk	Unplanned discharges to air, water or land Transportation, storage and use of hazardous substances Emergency response	Yes to all.
Rehabilitation	Rehabilitation of areas affected by mining activities	Yes

4.1 Introduction

The EIS provided an adequate introduction to the Codrilla Project, its objectives and scope. It adequately identified the necessary approvals and outlined the assessment and approval processes.

4.1.1 Regulatory approvals

The EIS provided an adequate summary of the purpose of legislation and regulatory approvals required for the project.

Table 4.2 - Approvals for the Codrilla Coal Mine Project

Approval	Legislation
Environmental authority (mining activities)	<i>Environmental Protection Act 1994</i> (Department of Environment and Resource Management)
Mining Leases (for the mining and infrastructure area and the haul road)	<i>Mineral Resources Act 1989</i> (Mines and Energy, Department of Employment, Economic Development and Innovation)
Cultural Heritage Plan for land within the boundaries of the project	<i>Aboriginal Cultural Heritage Act 2003</i> (Department of Environment and Resource Management)
Clearing permits for endangered, vulnerable or near threatened species	<i>Nature Conservation Act 1992</i> (Department of Environment and Resource Management)
Permit for works in a state controlled road corridor for the diversion of the Fitzroy Developmental Road	<i>Transport Infrastructure Act 1994</i> (Department of Transport and Main Roads)
Riverine Protection Permit for proposed Codrilla to Moorvale Haul Road crossing of Bundarra and Devlin Creek tributaries. Required if the Project is unable to comply with DERM Departmental Guideline – Activities in a watercourse lake or spring associated with mining operations. However, it is expected that the project activities will comply with the Departmental Guideline.	<i>Water Act 2000</i> (Department of Environment and Resource Management)
Development approval (Operational work for a referable dam by constructing a Water Storage Facility) may be required for the 2,600 ML temporary dam.	<i>Water Supply (Safety and Reliability) Act 2008</i>

4.2 Project need and alternatives

The EIS adequately described the need for the project, and briefly outlined the social, economic and environmental benefits and costs, which were addressed in more detail in later sections of the EIS. This section of the EIS considered the principles of Ecologically Sustainable Development (ESD) which were further considered in the design and planning of the project.

Also, this section briefly discussed a number of options that were considered for the project, including:

- open cut mining methods and underground mining, with open cut truck shovel being the selected option
- water supply, with the preferred option being the use of the existing Sunwater allocation that would be piped from the Moorvale Coal Mine
- waste management processes for the Coal Handling and Preparation Plant (CHPP) with codisposal the selected option
- transporting product coal to the rail transport system, with the selected option being a dedicated haul road to the Moorvale Coal Mine train loadout facility
- road alignment configurations for the Codrilla to Moorvale haul road, with the selected road alignment being the Northern Option 3
- alignment of the Fitzroy Developmental Road (FDR), with the selected option involving realigning the FDR to the west so that it passes between the east and west pits.

Additional information on the above selected options was contained in the EIS.

4.3 Project description

The EIS adequately described the location, scope and phases of the project. No submissions on the EIS requested additional information to describe the project. An outline of the project is provided in section 2 of this report.

4.4 Climate

The EIS adequately described the local climate with regard to how the climate could affect the potential for environmental impacts and the management of operations at the site.

The climate of the area is monsoonal, with relatively dry winters and wet summers with over two thirds of the 756 mm average annual rainfall occurring in the wet season months from December to March. The average daily maximum temperature range in summer is 33.1°C to 34.1°C and in winter is 23.7°C to 25.5°C. The winds are predominantly from the east.

4.5 Land

The final EIS adequately described those aspects of the site and project related to the existing and proposed qualities and characteristics of the land. The following subsections address those qualities and characteristics in more detail.

4.5.1 Land disturbance

Key features of the land disturbance for the project, include:

- two residual voids would be about 150 m deep with a total area of about 130 ha
- out of pit overburden dumps would reach a maximum of 50 m above natural ground level with a footprint of approximately 974 ha
- elevated codisposal facility, being up to 10m high and with a footprint of approximately 79 ha
- elevated run of mine [ROM] pad, being 15 to 18m high and approximately 16 ha in area
- areas of similar gradient to the surrounding undisturbed landform such as backfilled pits and areas from where infrastructure is removed with an area of approximately 836 ha.

4.5.2 Land use

The existing land uses within the project area are predominantly cattle grazing and mining. Typically the cattle grazing properties of the area are in the order of 5,000 to 20,000 ha in size. Codrilla Station, on which the proposed mining operation, processing facilities and associated infrastructure are to be located, is 4,359 ha in area and is one

of the largest producers of Romagnola cattle in Queensland. The cattle station has been in operation for the last 26 years.

The land on Codrilla Station consists primarily of improved pasture with some small isolated areas of remnant vegetation remaining, much of which is associated with significant drainage channels.

The areas within and adjacent to the haul road corridor are a combination of cleared areas consisting of improved pastures and remnant native vegetation with an understorey of native and introduced grasses. Other land uses in the vicinity of the project include, coal and gas exploration, public road infrastructure (including the Fitzroy Developmental Road (FDR)), and the Valkyrie School and school residence which are located approximately 800 m to the north of the proposed ML boundary. The FDR is also a designated stock route.

No Good Quality Agricultural Land occurs on or near the project site. The areas that would be disturbed by mining activities and the haul road were classified as Land Suitability Class 4 and 3 (grazing). [NB: Land Suitability Class 1 is the highest, while Land Suitability Class 5 is the lowest.]

Some disturbed land will be rehabilitated to support grazing. However, approximately 130 ha of land, comprising the residual voids, would be permanently alienated from productive grazing.

4.5.3 Soils and land suitability

The proponent undertook a soil survey over the extent of the proposed Codrilla A and Codrilla B MLs. A total of 59 samples were collected from the various horizons within 24 of the 28 profile excavations to a depth of between 1.2 m to 1.5 m.

DERM advised the proponent that it considered the soil survey to be below the minimum intensity of 1 site per 100 ha, as set out in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995). In response, the proponent provided further details and clarification on the soil survey work undertaken for the project. DERM was satisfied with the proponent's response regarding the soil survey.

DERM considered the estimated rooting depth (ERD) used to calculate plant available water capacity (PAWC) in the EIS conflicted with data provided within some soil profile descriptions. As a result of this, DERM advised the proponent to recalculate the PAWC using deeper rooting depths as per soil profile descriptions or provide further evidence to demonstrate that shallow ERDs would be appropriate. In response to this issue, the proponent reviewed the PAWC and confirmed that the land covered by the Brown Duplex soil has Land Suitability Class 4¹ and Agricultural Land Class of C3. However, the review brought about an amendment for the land covered by the Yellow Duplex soil with Land Suitability increasing from Class 4 to Class 3², and Agricultural Land Class increasing from C3³ to C2⁴. Amendments were made by the proponent to the Land Suitability and Agricultural land classes.

4.5.4 Resource utilisation

The EIS adequately addressed resource utilisation.

The EIS provided the following adequate strategies to minimise potential sterilisation of coal and coal seam gas resources which may be economically viable in the future:

- consultation with the Authority To Prospect (ATP) holder in relation to potential impacts of the Codrilla Project on future coal seam gas resources
- mine and processing design optimising the recovery of coal resources and minimising coal loss
- overburden dumps and infrastructure have been located up dip of the coal weathering zone
- the provision of final voids in the final landform provides potential coal seam access for highwall mining or underground activities which may become economically viable in the future.

¹ Land Suitability Class 4 is marginal lands with severe limitations which make it doubtful whether the inputs required achieving and maintaining production outweigh the benefits in the long term (presently considered unsuitable due to the uncertainty of the land to achieve sustained economic production)

² Land Suitability Class 3 is land with moderate limitations which either further lower production or require more than those management practices of Class 2 land to maintain economic production.

³ Agricultural Land Class 3 means low quality grazing, grazing of native pastures with limited suitability for pasture development.

⁴ Agricultural Land Class 2 means moderate quality grazing and or moderately suitable for pasture improvement.

The proponent adequately addressed a concern raised by DEEDI in relation to resource sterilisation.

4.5.5 Land contamination

The EIS included a preliminary site investigation (PSI) for contaminated land as required by the TOR. The PSI suggests that a low risk of past and present potentially contaminating activities exists within the project area. Potentially contaminating activities identified in the EIS include above ground bulk hydrocarbon storage tanks, chemical storage areas, cattle dips, machinery/vehicle maintenance areas, and a domestic rubbish dump.

The PSI included a desk top search of the Environmental Management Register (EMR) and Contaminated Land Register (CLR). The PSI identified activities on background tenures which will be impacted by the project, including:

- lot 20 on KL 168 contains an abandoned cattle dip which is listed on the EMR. However, the specific location was not described in the EMR search result;
- lot 16 on RP845112 contains an abandoned cattle dip which is not listed on the EMR; and
- minor contamination observed at the base of the hydrocarbon and fuel storage tanks on Lot 16 on RP845112 limited to the surface soil.

The EIS states that, due to the low risk of the identified sites, no further investigation was undertaken.

The construction and operation of the project will involve a series of notifiable activities as listed in Schedule 3 of the EP Act. Therefore the locations where these activities will occur will be required to be entered onto the EMR. The notifiable activities and locations on site are listed below in Table 4.3.

Table 4.3 - Notifiable activities

Notifiable activity	Lot on Plan	Description
7. Chemical storage (>10 tonnes)	16 RP 845112	Storage of chemicals in the CHPP
15. Explosive production or storage	16 RP 845112	Storage of explosives on site
24. Mine wastes	16 RP 845112	Overburden dumps and codisposal facility
29. Petroleum product or oil storage - (iii) combustible liquids in class C1 or C2 - more than 25,000 L capacity	16 RP 845112	Storage of diesel and lubricating oils for use in fixed and mobile mining equipment

The proposed mining activities will potentially result in some contamination of land. The EIS proposed a range of mitigation measures to reduce the potential negative impacts to land and waters from operational activities, including accidental spills of hydrocarbons and chemicals.

The EM plan included an adequate commitment that any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the EP Act.

4.5.6 Landscape character and visual amenity

The project will consist of a number of visually prominent structures that will impact on the character of the landscape. These will include:

- waste rock and overburden dumps
- administrative buildings and infrastructure
- dams and water storages
- coal handling preparation plant
- the realignment of the Fitzroy Developmental Road (FDR).

The EIS states that whilst the project will alter the visual characteristics and amenity of the immediate area from the outset, the existence of numerous open cut coal mines in the regional landscape indicates that the visual impact of the project will not be unique or unusual when viewed at a regional level.

The project will be visible from traffic travelling along the FDR. Following realignment of the FDR, the current vegetation screening by mature trees will be further reduced. In the EIS, the proponent commits to manage the visual impact from the project by the replanting of roadside vegetation once realignment is complete. Furthermore, the rehabilitation and revegetation of disturbed areas progressively throughout the life of the project will assist in reducing the visual impact of the project when viewed from the roadside.

The EIS states that whilst the proximity of the Codrilla Homestead to the project site indicates a major impact on the visual amenity when viewed by the occupants, it is intended that the Codrilla Homestead will be vacated during the project development and will remain unoccupied throughout the mine life. Similarly it is anticipated that the Valkyrie School and school residence will be relocated some distance from the project site, removing the potential for the project to impact upon views from either place.

The EIS states that the project is unlikely to be visible from other surrounding residences, given distance, topography and natural view obstruction.

4.6 Transport

The EIS assessed four key means of transport that will be utilised for the project, being road, rail, air and sea.

4.6.1 Existing road network

Road links

The initial access to the project site will be from the FDR. The existing road network will form the primary mode of transport to and from the project site during the construction phase. The majority of vehicles travelling to and from the project site will utilise the:

- Peak Downs Highway (PDH) – a State controlled road (SCR) connecting Clermont to Mackay and functioning as a link for a number of towns and existing mines
- Fitzroy Developmental Road (FDR) – a SCR providing a north-south connection between the Peak Downs Highway and the Capricorn Highway
- Capricorn Highway (CH) – a SCR connecting the east coast to western Queensland, in particular Rockhampton to Emerald
- Moorvale mine and accommodation access road – a privately owned access connecting the Moorvale mine and accommodation camp to the Peak Downs Highway.

It is proposed in the EIS that a dedicated haul road will be constructed between the project and the Moorvale Mine with the main purpose of transporting product coal to the train load out facility. It will also serve as the primary site access point to the project, facilitating the transport of personnel, equipment, plant and materials to and from site.

Key Intersections

Three intersections were identified in the traffic impact assessment (TIA) as key to the project road network:

- Peak Downs Highway/FDR intersection
- Capricorn Highway/FDR intersection
- Peak Downs Highway/Moorvale Mine & Moorvale accommodation camp access road intersection.

4.6.2 Construction or alteration to existing transport infrastructure

The road transport infrastructure to be constructed or altered specifically to accommodate the project requirements includes:

- the construction of the dedicated Codrilla to Moorvale Haul Road
- the construction of a site access intersection on the FDR
- the realignment of the FDR and construction of the Haul Road underpass.

Codrilla-Moorvale haul road

The EIS states that based on an annual average production of 3.2 Mtpa of product coal, the haul road will carry approximately 16,000 loaded trips per annum. This figure is based on 200 tonne trucks, operating two eight hour shifts per day, 363 days per year.

FDR Project access

The EIS states that an intersection on the FDR will be constructed for the purpose of access to the Mine Infrastructure Area (MIA) of the project. This access point to the MIA will serve as the main access during the construction phase of the project. During the operational phase it will serve as a secondary access point, in particular for emergency vehicles, over-dimensional loads and site visitors.

FDR realignment and haul road underpass

Construction work associated with the realignment of the FDR would be expected to commence during the initial construction phase of the project to allow for the east pit development. A permanent 5.02 km long relocation of the FDR would need to be constructed to allow development of the mine. The existing length of the FDR between the deviation start and end point is 4.8 km, thus the actual increase in length of the road would be relatively insignificant (0.4 km) to road users.

In conjunction with the realignment, it is anticipated that a haul road underpass would be constructed, linking the eastern pit to the MIA and CHPP located on the western side of the mine.

Changes to the use of the existing road network

There would be changes to the use of the roads through increased traffic and transportation of materials, particularly wastes and hazardous materials. The EIS mentions that various liquid and solid wastes will be generated by the project and will be transported off site by a licensed contractor for disposal. Wastes such as sewage are expected to be transported via truck once or twice per fortnight. Other potentially hazardous materials to be transported may include further regulated wastes, fuels and other hydrocarbons and explosives.

4.6.3 Impacts to road network

Construction and operation traffic

The majority of the construction and operation personnel would be housed at the Terowrie Camp, or alternatively at a local commercial accommodation camp. Rostered personnel would be transported from the camp accommodation, via an internal Moorvale-Codrilla haul road (once constructed), to site by bus thereby reducing the number of vehicles utilising the SCRs.

The TIA indicates that the increase in traffic volumes on the SCRs during the construction phase of the project would be less than 5% of the overall predicted Annual Average Daily Traffic (AADT), with the exception of the FDR between the project and the Peak Downs Highway which has been predicted to experience an increase in daily traffic flow of 8.75%. The EIS considers the impacts of the heavy vehicle component of the additional traffic (the main contributor to pavement degradation) by considering the increased loading in terms of Equivalent Standard Axles (ESA). The results of this analysis was that the increase in ESA loading would be less than 5% of the existing ESA on any road link.

The Queensland Government's Department of Transport and Main Roads (DTMR) Guidelines for Assessment of Road Impacts of Development (the Guidelines) stipulates that increases in traffic volume (determined by either number of vehicles or ESA) of below 5% are considered to be insignificant impacts that do not require further impact assessment. However, DTMR stated in its submission to DERM that the DTMR Guidelines also stipulate that traffic volume increases above 5% do require impact assessments. The EIS mentions that, as the 8.75% increase in traffic volume on the FDR is mainly made up of light vehicular traffic rather than heavy commercial vehicular traffic (the major contributor to adverse impacts to road pavement surfaces), adverse impacts to roads would be unlikely.

Also the TIA indicates that the increase in traffic volumes on the SCRs during the operational phase of the project are less than 5% of the overall predicted AADT. When focusing on the heavy vehicle component of the additional traffic, the increased loading was also converted to Equivalent Standard Axles (ESA).

The results of which were that all ESA loading increases would be less than 5% of the existing ESA on any road link. Therefore the EIS states that the impacts on these road link networks during the operations phase of the project are likely to be insignificant and no further assessments of this aspect of the mine development are necessary.

However, DTMR will require the proponent to review and reassess the road impact on the FDR as stated in section 4.6.4, Department of Transport and Main Roads requirements, of this Assessment Report.

Impacts to intersections

Two of the three intersections identified in the TIA as relevant to the project were analysed using a desktop traffic analysis package which uses traffic volume data to calculate the intersection performance based on the level of service and the degree of saturation. The level of service is an assessment of the impact an intersection has on the flow of traffic whereas the degree of saturation is a 'volume to capacity' ratio which is calculated for each movement through the intersection. A degree of saturation of 0.80 or more for an un-signalised priority intersection indicates the movement is approaching practical capacity. The intersection for the Moorvale Mine and Terowrie Accommodation Camp access was not assessed due to the lack of available data for this intersection. However, the EIS predicts that the intersection for the Moorvale Mine and Terowrie Accommodation Camp is expected to be performing adequately in its current form.

The analysis undertaken indicates that during the construction and operational phase of the project, both the Peak Downs Highway/FDR and Capricorn Highway/FDR intersections would not be expected to exceed the 0.80 degree of saturation limit and the level of service is anticipated to be below the capacity for the intersections. Therefore, the proponent concludes that no road intersections are likely to be significantly impacted during either the construction or operational phases of the project.

The proponent will be required to upgrade the Fitzroy Developmental/Mine Access Road as mentioned in section 4.6.4 of this EIS assessment report.

Impacts associated with project road infrastructure construction or alteration

The EIS identified that the construction, alteration or changed use of road transport infrastructure associated with the project has the potential to impact the road link network through:

- obstructions and delays to traffic flow
- changes to general road safety
- obstructions to the operation of the stock route along the FDR
- disruption to school bus services
- obstructions to emergency access vehicles
- contamination of land and water resources, though minimal, through the transportation of hazardous materials.

The EIS states that obstructions or delays to traffic flows caused by project activities will be mitigated through the implementation of management procedures to ensure disruption is minimal. In particular, the construction of the project access intersection and the realignment of the FDR will be undertaken in close collaboration with DTMR, to ensure that the works are carried out pursuant to the relevant guidelines and regulations.

The proponent makes planning commitments in the EISs to ensure that obstructions are minimised through:

- timing of construction activities to ensure that road works do not coincide with peak traffic periods where practicable
- scheduling works around existing planned road disruptions such as those described in the Road Implementation Program
- ensuring that the works are undertaken by suitably qualified contractors and that all legislative requirements are met with the appropriate approvals in place.

To address impacts to road safety as a result of the increase in traffic from the project, particularly heavy vehicle movements, the proponent proposes the following adequate strategies in the EIS:

- the provision of traffic management controls which will facilitate the safe movement of goods, people and pedestrians, in particular throughout the FDR realignment works
- provision of appropriate signage to identify haul routes and the project boundaries (where access restrictions may apply)
- requirement for appropriate driver training for handling heavy vehicles and oversize loads
- operational procedures for activities undertaken during wet weather periods.

Also consultation with the local communities (including the nearby schools) will occur prior to any additional changes to the road network.

Stock route operation

The EIS states that realignment of the FDR will be designed to ensure that the stock route capacity is maintained. Detailed design considerations will include the continuation of the stock route through the maintenance of the road corridor width or alternatives if required.

Rail

The project will utilise the existing coal transport contracts held between the proponent and QR National and Pacific National, and will not require an additional allocation as the capacity of the current contract will accommodate the project product coal.

As the project output will form part of the existing contractual allocation, impacts to the existing rail infrastructure are expected to be minimal.

4.6.4 Department of Transport and Main Roads requirements

DTMR provided submissions on the EIS and subsequent supplementary EIS information, stating the EIS had adequately addressed the TOR with regard to transport issues. The DTMR will require a permit for works in a state controlled road corridor for the diversion of the Fitzroy Developmental Road under the *Transport Infrastructure Act 1994*.

The proponent agreed to continue liaising with the Assets and Operations Division of the DTMR to discuss and resolve the outstanding issues associated with the project in a timely manner. In order to address outstanding issues, the proponent agreed to discuss the following work with DTMR.

State Controlled Road Access

Prior to the commencement of construction on site, the proponent shall be required to undertake the following:

- upgrade the following intersection/access as determined and agreed upon with DTMR Mackay/Whitsunday Regional Office:
 - Fitzroy Developmental /Mine Access Road to provide a minimum Channelised Right Turn (CHR) and Basic Right Turn (BAR) as per Figures 13.60 and 13.80 of the DTMR Road Planning and Design Manual (RP&DM)
 - provide all necessary access to the SCR to a standard agreed upon by DTMR
- provide to DTMR: rehabilitation, bring forward, and maintenance contributions and/or works associated with project traffic as calculated and agreed upon with DTMR Mackay/Whitsunday Regional Office
- prior to undertaking any works, obtain the relevant licenses and permits under the *Transport Infrastructure Act (Qld) 1994* for works within the SCR corridor.

In the EIS the proponent commits to constructing a CHR as a minimum access for the Fitzroy Developmental/Mine Access intersection.

In addition the proponent commits to obtaining the relevant licenses and permits under the *Transport Infrastructure Act 1994* as necessary prior to undertaking works related to state controlled road corridors.

The proponent commits to ongoing consultation with DTMR in relation to these issues.

Fitzroy Developmental Road Realignment - Infrastructure Agreement

The mining lease boundary includes a section of the Fitzroy Developmental Road. As described in the sEIS, the proponent is proposing to construct a realignment of the Fitzroy Developmental Road by providing a diversion road on the western side along with a haul road overpass. Figure 2.2.2 of the supplementary EIS shows the proposed realignment of the Fitzroy Developmental Road.

DTMR advised that any deviation from the direct route would increase travel times. DTMR's preference was for an overpass to be constructed on the existing highway alignment, so as to retain optimal travel time. However, DTMR agreed to accept a permanent deviation subject to a review of the vertical and horizontal geometry and provided there would be no significant increase in road length/travel time. DTMR requested that the proponent continue to liaise with its Regional Office to ensure a design that would satisfactorily address this issue as well as any road safety issues.

Prior to the commencement of project construction the proponent shall enter into Infrastructure and Compensation Agreements with the State of Queensland (DTMR) to address all aspects of the design, construction and maintenance of the overpass, deviation and new intersections.

The Infrastructure Agreement is to address funding, construction and maintenance of key infrastructure that impacts on the SCR network and will specifically address:

- provision of the proposed overpass that crosses the haul road
- deviation of the Fitzroy Developmental Road during construction of the mine haul overpass
- temporary access and state-controlled road crossings
- dealing with utilities in the road reserve
- ongoing maintenance of the overpass
- access intersections to the mining operations
- maintenance contributions associated with project traffic
- traffic management plan
- approval for works under the *Transport Infrastructure Act 1994*.

This infrastructure agreement between the proponent and DTMR shall be concluded prior to commencement of any project construction.

In the supplementary EIS the proponent commits to enter into an Infrastructure and Compensation Agreement with the State of Queensland (DTMR) prior to commencement of any SCR-related project construction.

Road Impact Assessment and Road Use Management Plan Requirement

DTMR drew attention to the section of the supplementary EIS showing that a section of the State Controlled Road (SCR) Network (on the Fitzroy Developmental Road, north of the Capricorn Highway) where there may be an increase of more than 5% in pavement loadings from project traffic related to the construction phase of the project.

DTMR requires that, prior to the commencement of construction, when further information is available on vehicle types and numbers, the impact on the SCR Network, such as pavement loadings on the Fitzroy Developmental Road, shall be reassessed. DTMR also requires that, 6 months prior to the commencement of any project construction works, the proponent shall:

- review and finalise the road impact assessment (RIA) to include details of all project transport impacts on the safety and efficiency of state controlled roads in accordance with Guidelines for Assessment of Road Impacts of Development (2006) in consultation with the Manager of DTMR Mackay/Whitsunday Regional Office, then submit the updated RIA to the Manager of DTMR Mackay/Whitsunday Office for review and approval.
- prepare a road-use management plan (RMP) which updates and summarises all use of state-controlled and other roads for each phase of the project. The RMP must receive DTMR's approval prior to its implementation and must include:
 - latest traffic generation (vehicle numbers etc.)

- finalised assessment of impacts on safety and efficiency at intersections, on road links and on pavements etc.
- updated impact mitigation strategies such as road maintenance or necessary improvements
- provide any necessary road maintenance contributions identified in the finalised RIA and RMP to ameliorate any adverse impacts of the road use by the project on State-Controlled Roads
- reassess any effect of changes to the method of operation of the mine involving a significant change in traffic from that stated in the EIS, especially heavy vehicle movements, and address mitigation of impacts.

The proponent has committed in the EIS to developing a RMP in conjunction with DTMR. Also, in the response to comments dated 28 September 2011, the proponent commits to ongoing liaison with DTMR in relation to:

- road maintenance requirements which may potentially occur as a direct result of the project
- undertaking further assessments of the road impact
- pavement loading assessments.

Traffic Management Plan (TMP)

Prior to commencement of any project construction works, the proponent shall prepare detailed drawings and traffic management plans to ensure safe undertaking of all construction and other activities in the state-controlled road corridor.

The proponent shall present detailed drawings and traffic management plans for review by DTMR, the Queensland Police Service, and Isaac Regional Council, and take account of the reviews.

The proposed plan shall incorporate a provision that, prior to commencing any program of oversize transport movements that may be required for the construction of the project, the proponent will consult with DTMR, the Queensland Police Service, and Isaac Regional Council.

The proponent shall obtain the necessary permits for any excess mass or over-dimensional loads associated with the project as required under the *Transport Operations (Road Use Management) Act (Qld) 1995*.

The proponent shall implement the traffic management plan during construction and commissioning of the project and construction of all access road intersection/s.

In the EIS, the proponent commits to developing a TMP prior to the construction of the project and being undertaken in conjunction with DTMR and Queensland police Service (QPS). Additionally, the proponent agrees to consultation with the Isaac Regional Council (IRC) in relation to the TMP.

In the response to comments dated 28 September 2011, the proponent agrees:

- to incorporate into the TMP a notification process in relation to oversize transport movements which will include DTMR, QPS and IRC
- the TMP will be implemented during construction and commissioning of the project and construction of all access road intersections/s
- undertaking further assessments of the road impact
- pavement loading assessments.

Valkyrie School Access Requirement

The proponent is committed to funding the relocation of Valkyrie School in order to avoid dust and noise nuisance impacts on the school, although the decision on relocation is a matter for the Department of Education and Training. Once the school is to be relocated as outlined in the sEIS, this will require a new access/intersection with the Fitzroy Developmental Road. The proponent will be required to obtain all necessary permits and approvals from DTMR to approve the location and design of the access and to undertake the works.

All intersection/access works to the school shall be undertaken at no cost to DTMR and in accordance with its standards and specifications. The relocation of the access/intersection shall be undertaken at a time which is acceptable to Department of Education and Training. If agreed to by the proponent and DTMR, provisions to

undertake the design and funding of the relocated school access/intersection may be included as part of the Fitzroy Developmental Road Realignment Infrastructure Agreement.

4.7 Waste

The EIS discussed excavated and process wastes generated by the Codrilla Project that includes overburden, interburden and processing waste from the CHPP.

Overburden production (includes interburden) is expected to total approximately 695 million tonnes (Mt) over the life of mine, of which approximately 283 million loose cubic metres will be placed in out-of-pit overburden dumps, with the balance being placed within in-pit overburden dumps.

Processing (codisposal) of wastes from the Coal Handling Preparation Plant (CHPP) will be disposed of in a codisposal facility on site to ensure containment. The EIS states that the project will produce 10.39 Mt (dry) of codisposal waste over the life of the mine.

Other waste streams to be generated by the project and identified in the EIS, include: regulated waste, general waste, recyclable waste, scrap metal, used tyres and sewage effluent.

The proponent has committed to managing all waste generated by the project in accordance with the waste management hierarchy (i.e. avoidance, recycling, waste to energy and disposal) and in accordance with relevant legislation, including the Queensland Environmental Protection (Waste Management) Policy 2000 (EPP Waste). The proponent has committed to incorporating a program of best practice waste management, including the ongoing assessment of cleaner production and waste management opportunities for the life of the project. Regulated waste will be removed off site by an appropriately licensed waste contractor for disposal at a facility that is appropriately licensed to accept such waste.

The proponent is committed to developing a Waste Management Plan to manage and reduce the potential environmental impacts that may result from generation and disposal of waste.

Recommended waste management conditions have been provided in Appendix 1.

4.7.1 Waste Rock Characterisation

Overburden and interburden waste

The EIS includes a baseline overburden and interburden characterisation study that involved a total of 26 samples from seven bore holes within the east and west pit areas.

The proponent made the following assessment regarding the waste rock characterisation of overburden and interburden material:

- all 26 overburden and interburden samples are classified as Non Acid Forming (NAF)
- the total sulphur content of all samples was below 0.1% and is considered inert relative to acid producing potential
- the concentration of metals in overburden and interburden solids is unlikely to present any significant environmental issues associated with rehabilitation of the materials or water quality
- the pH of leachate from overburden material at the Codrilla site is likely to range from slightly acidic to moderately alkaline, however the majority of material is likely to be neutral
- the range of EC values in the samples is considered slightly to moderately saline
- the overburden material is within the Moderate to High ranges for Cation Exchange Capacity (CEC) and should therefore provide a reasonable growth medium for vegetation
- overburden material is considered to be extremely sodic
- the overburden and interburden material is not expected to require specific management strategies in relation to PAF, metals, pH, Electrical Conductivity (EC) and Cation Exchange Capacity (CEC)
- the overburden and interburden material is expected to require specific management strategies in relation to Sodicity.

DERM raised issues with the management of overburden dumps due to the extremely sodic nature of the material and this is discussed in section 4.17 Rehabilitation, of this EIS assessment report.

Codisposal waste and coarse reject

The characterisation of codisposal waste for the EIS involved the sampling of material from above coal seams (roof), within coal seams and below coal seams (floor), during exploration drilling and groundwater bore construction. These samples were composited to form two roof samples, one coal sample and two floor samples. The five roof and floor, coal, and floor samples analysed for acid producing characteristics were classified as either 'Uncertain' or 'Uncertain–Potentially Acid Forming', the total sulfur results being in excess of 0.2% for each of the samples analysed.

The EIS states that, due to the limited characterisation of coal and partings (coal seam roof and floor) undertaken (samples that were taken were inconclusive for potentially acid forming material), it is assumed that the codisposal material may be potentially acid forming (PAF). Due to this limitation in available material characterisation results, the conceptual design and operation of the codisposal facility is based on the assumption that the codisposal material will be acid forming.

DERM advised the proponent that the geochemical properties of the codisposal material were not well characterised overall due to the insufficient number of samples and the compositing of samples. The proponent was also advised that the compositing of samples could have masked variability and may have led to an underestimation of the need for special handling of reject material, particularly for excess coarse rejects. The proponent was advised of the need to provide a more detailed geochemical characterisation of waste reject material before commencing mining operation. This is consistent with commitments given by the proponent in the EM plan.

In the response to submissions, the proponent states that no additional sampling opportunities have been available since submission of the draft EIS. The proponent states that a resource definition drilling program is proposed to be undertaken and additional samples of material which may be indicative of codisposal and coarse reject material will be obtained. Sampling and analysis will be undertaken in accordance with industry practice.

The proponent will need to meet the commitment made in the EM plan of ongoing characterisation of overburden, interburden and partings materials to enable selective handling. Also it is recommended that the draft EA contains conditions on ongoing waste rock characterisation and the management of acid producing material.

The proponent will also need to meet the commitment of treating codisposal waste as acid forming and disposing this material in an approved codisposal facility.

The EIS states that process anomalies may occasionally result in coarse reject being required to be managed separately. Industry experience has determined coarse reject has the potential to generate acid seepage and runoff and also runoff containing salts and metals, as with the codisposal material discussed above. Characterisation of coarse reject material was undertaken through coal and partings analysis. The results of the characterisation of coarse rejects indicates that the material may be PAF. The supplementary EIS version 2 (v2) contained adequate management strategies for the handling miscellaneous coarse rejects so as to minimise the potential for land contamination. Coarse rejects requiring management separate to the codisposal stream will be stockpiled in the CHPP area, loaded onto rear dump trucks and directed to the codisposal facility for disposal. The mass balance for the Codrilla deposit does not indicate excess coarse reject material. In the situations where coarse reject material is required to be placed into the codisposal facility, (for example following a plant upset) it would be placed in such a manner that it would form a small embankment upon which regular feed to the facility would encapsulate the coarse material within the codisposal matrix and aid in dewatering and management of the facility.

4.7.2 Codisposal facility

The EIS proposes the disposal of fines and coarse rejects from the Coal Handling Preparation Plant in a dedicated codisposal storage facility. DERM advised the proponent that the EIS inadequately described the design, construction and operation of the codisposal facility. In particular the EIS did not provide sufficient information for an assessment of whether the proposed design would be suitable to contain the codisposal material and any leachate. DERM also raised additional concerns about the proposed codisposal storage facility, including:

- that the EIS did not identify the optimum ratio of fine to coarse rejects in the codisposal material, nor how much coarse reject material would be likely to be in excess of that needed for the optimum codisposal mixture
- while the EIS mentions that excess coarse rejects would be deposited in the codisposal cells, it does not assess how feasible it would be to encapsulate that material in a way that would mitigate the oxidation of any sulfides in those coarse rejects that were not embedded in the matrix of fine rejects
- that more information is required on the proposed management of decant water from the codisposal cells.

In the supplementary EIS and supplementary EIS v2 the proponent did adequately address DERM's issues with the management of codisposal waste. The proponent provided additional information, including:

- That the detailed design of the codisposal facility will be undertaken by an experienced and RPEQ qualified engineering consultant, and comply with relevant engineering guidelines. Liaison with DERM will be undertaken throughout the detailed design process to ensure the facility meets with the relevant regulatory requirements. DERM will require the codisposal facility to be regulated as a hazardous dam. Subsequently, DERM will require the facility to be designed, approved and operated in accordance with the appropriate regulatory guidelines.
- The mass balance for the Codrilla Project on the finest feed suggests coarse to fine disposal ratios between 1.2:1 and 3.2:1. The supplementary EIS v2 mentions the Moortvale codisposal facility is currently operating successfully with coarse to fine ratios varying from 1.2:1 to 2.2:1. Thus the proponent claims that the Codrilla codisposal facility is expected to operate effectively with adequate beach formation and water drainage, as well as retention of fines within the material matrix.
- The fines retention in the codisposal facility will aid in the PAF management by minimising void space in the matrix which would provide potential reaction sites.
- In situations where coarse reject material is required to be placed into the codisposal facility (for example a plant upset), it will be placed in such a manner that it forms a small embankment upon which regular feed to the facility will encapsulate the coarse material within the codisposal matrix and aid in dewatering.
- The proponent states in the EIS that the proposed codisposal facility will only have storage capacity for approximately six years based on expected average codisposal production rates. To cater for the post six year storage requirements, a number of options were proposed by the proponent. DERM advised the proponent to discuss the selection and timing of the preferred option for the codisposal facility. In response to DERM's issue on the preferred option for the codisposal facility, the proponent provided the following commitments in the EM plan:
 - the best post year 6 codisposal option will be determined during the first six years of operation, based on site specific data collected including codisposal materials and volumes
 - a management option will be collated, reviewed and assessed (including construction details and ongoing management plans) to determine one proposed codisposal option
 - the preferred codisposal option will be presented to DERM no later than 2 years prior to the new management option being required.

4.7.3 Partings

The proponent was advised that the EIS did not propose adequate mitigation measures for the disposal of partings. The method proposed in the EIS consisted of collection and burial of partings exposed on overburden dumps during progressive regrading and rehabilitation activities. This approach was considered by DERM to be unacceptable as acid production from partings may be an issue and the management proposed could leave some partings at or near the surface of the dump.

The EIS mentions that some partings materials have the potential to generate acid seepage and runoff, runoff containing salts and metals, and sediment laden runoff.

In response to DERM's issues, the proponent provided a satisfactory response and made amendments to the supplementary EIS.

The EM plan, received by DERM on 24 August 2011, contained commitments to manage partings including:

- identified partings to be excavated and selectively placed in overburden dumps to ensure encapsulation to avoid surface exposure
- ongoing characterisation of partings materials to enable selective placement within dump structure to enhance landform stability.

DERM advised the proponent that due to the risk of partings producing acid drainage, this material should be preferably disposed and encapsulated within in-pit overburden dumps. Consequently, in the EM plan dated 7 October 2011, the proponent provided an adequate commitment to encapsulate the majority of partings within in-pit overburden dumps or, should this not be possible, the material to be encapsulated deep in the out of pit overburden dumps. The partings are to be buried and encapsulated deep so that when contour profiling occurs for rehabilitation, this material is not near to the surface.

4.7.4 Overburden and interburden material

The proponent provided adequate commitments to manage overburden and interburden material, including

- ongoing characterisation of overburden materials to enable selective placement within dump structure to enhance landform stability
- ongoing overburden rehabilitation trials
- out of pit dumps will be constructed as water shedding landforms with slopes less than 5.7° (10%) to minimise erosion potential
- out of pit dumps will be constructed in lifts of 10 m to a maximum height of 50 m. Each progressive lift will be stepped back a minimum of 85 m from the crest of the underlying lift, to provide for the proposed final landform batter gradient. The dumped batter of each lift will remain at the angle of repose until regrading commences in the rehabilitation process
- encapsulate materials within overburden dumps with at least 1m of cover limiting infiltration of water and oxygen to the materials and reduce the potential for acid production
- coarser unweathered materials will be directed to upper and surface sections of the dumps
- constructing spaced and sloped graded banks and rock lined water ways on batters thereby limiting surface runoff velocities and infiltration opportunities
- cover surface of overburden capping with topsoil to limit exposure of overburden material to runoff and rainfall, and support revegetation
- shallow surface ripping
- limiting cattle access on slopes exceeding 4.6°.

4.7.5 Regulated and other waste

The EIS adequately addressed the management of regulated waste and other waste generated by the Codrilla Project that includes:

- general waste such as food waste, packaging and food containers will be temporarily stored on site in appropriate containers and transported off site by a contractor to a licensed landfill site
- recyclable waste such as paper, cardboard, plastics, glass and aluminium cans will be segregated and temporarily stored on site in appropriate containers and transported off site by a contractor to a licensed recycling facility
- wood waste such as timber, pallets, and off-cuts will be limited by procurement policies. Undamaged pallets will be returned to the supplier for reuse. Also the proponent proposes to store any excess wood on site for future requirements

- used tyres will be collected and temporarily stored on site. Light and medium tyres will be transported off site by a licensed regulated waste contractor for recycling or disposal. Heavy earthmoving tyres will be disposed of within in pit overburden dumps and the locations recorded
- scrap metal and off-cuts such as drums, cans, scrap, containers, nails and screws will be minimised by limiting the quantity required and excess will be segregated and temporarily stored on site. Metal waste will be transported off site by a contractor to a licensed recycling facility
- concrete waste will be minimised by procuring only the amount required and excess will be disposed of in the waste rock dump
- sewage effluent and sludge will be treated on site in a waste water treatment plant designed to meet Class A+ recycled water effluent quality, treating up to 15 kL/day. Following treatment, the sewage effluent will be removed from site and disposed of by a licensed waste contractor as required
- grease trap waste will be collected and stored, and transported off site by a licensed regulated waste contractor for recycling
- paint and resin waste will be minimised by procuring only the amount required. Excess will be segregated and stored on-site. Transport off site will be by a licensed regulated waste transporter, and disposal at a licensed facility
- waste oil and containers will be collected and stored on-site in a bunded area in accordance with AS1940, The Storage and Handling of Flammable and Combustible Liquids. Transport off-site will be by a licensed regulated waste transporter to a licensed facility for recycling
- oil contaminated wastes including oil sludge, oily rags and oil filters will be segregated and stored in a bunded area in accordance with AS1940: The Storage and Handling of Flammable and Combustible Liquids. Transport off-site will be by a licensed regulated waste transporter to a licensed facility for recycling.

4.8 Water resources

The EIS was adequate with respect to the TOR requirements in relation to water resources.

4.8.1 Groundwater

The EIS assessed four aquifer systems within the proposed mining lease that are associated with the following strata:

- Shallow alluvium along Devlin Creek
- Regolith zones in Tertiary sediments
- Deeper Permian and Triassic overburden/interburden units
- Coal seams.

The EIS discussed the following groundwater issues:

- aquifer drawdown and regional impacts
- impacts to mining operations from groundwater
- groundwater quality and potential contamination
- impacts to surrounding groundwater users
- impacts to aquatic ecology.

As a result of proposed changes to the mine plan that included changes to the progression of mining, the proponent repeated the groundwater modelling and results were included in the sEIS v2.

The EIS claims that the mine development and operation will depressurise the Tertiary, deeper Triassic/Permian and Coal Seam aquifers by groundwater inflows into the East and West Pits which will lower the elevation of the piezometric surface of these aquifers and create a cone of depression around the mine. The cone of depression is predicted to extend approximately 3.5 km north, 3.5 km south, 4.5 km east and 5 km west for the Tertiary aquifer.

The supplementary EIS v2 states that drawdown depths at the western extremity of the cones of depression are expected to be between one and two metres with corresponding depths in the order of 50 m to 100 m in both the East and West Pit final voids. Therefore, it is considered by the proponent that the drawdown effect on the regional aquifer will remain localised and within 6 km of the nominal centre point of the mining operations.

The proponent claims that there are no operational domestic or stock bores located within or adjacent to the mining lease area and that no water supply bores will be affected by the lowering of the water levels predicted. Any significant impacts on groundwater levels would be detected through the groundwater monitoring program. Also in the EM plan dated 12 October included a commitment that should unexpected impacts to groundwater users occur, the proponent will explore appropriate “make good” measures (as defined in the *Water Act 2000*) in consultation with the impacted user and regulatory authority.

The supplementary EIS v2 predicted higher groundwater inflows than the previous mining scenario modelling predictions. Groundwater inflow predictions include:

- inflows to the East Pit are predicted to be in the order of 3.1 ML/day during the early stages of pit operations, increasing to approximately 5.6 ML/day as operations progress towards the year 4 stage following which inflows steadily decrease to 2.6 ML/day as the pit approaches its final stages
- inflows to the West Pit are predicted to increase to in the order of 5.3 ML/day, sharply decreasing to 1.2 ML/day as backfilling of the East Pit is completed and dewatering of that pit ceases.

Groundwater inflow to the open working highwall sections of the mine should be controlled by sumps located in the pit for pumping pit water to surface storages to be used as water in the CHPP.

The EIS identified that there is the potential for contamination of the groundwater to occur from spills and contamination by metals and hydrocarbons from the mine workshop, waste disposal and fuel storage areas. Any spills from these areas are typically very localised and not regionally significant. The proponent’s commitments to provide adequate bunding and immediately cleaning up of spills are considered adequate to prevent contamination of the shallow groundwater system. The proposed ground water monitoring program is considered adequate by DERM for detecting any previously unforeseen impact due to mining on the groundwater.

In considering the geochemistry of the overburden and reject material, the EIS states that it is unlikely any leachate generated from these materials will adversely impact groundwater quality. The EIS states that groundwater quality in the overburden and coal seam aquifers is of poor quality (saline) and would only be suitable for limited use. The proponent states that, based on the results of this geochemical characterisation, interaction between in pit disposal of overburden, interburden and potential coal rejects material with recovering (rising) groundwater levels and surface water (rainfall) runoff is not considered likely to result in poorer quality water in the Tertiary and Permian aquifer systems following cessation of mining. DERM considers the risk of impacts from any leachate generation should be minimised through the proponent implementing the mitigation measures proposed in the EM plan.

The EIS states that the water of the alluvial aquifer has aquatic ecosystem values of significance to the local ecology. As no mining activities are planned to intersect the alluvium associated with the aquifer, impacts to water levels within the aquifer are not expected. No potentially contaminating activities are proposed to be constructed or undertaken in areas of the project containing alluvium. The only potential impact the project could have on the alluvium would be the discharge of water to Devlin Creek which may be of lesser quality to the groundwater in the aquifer.

The EIS included adequate mitigation measures to prevent potential impacts to groundwater quality through contamination, including:

- the appropriate design and construction of the codisposal facility in accordance with statutory requirements, standards and codes, and industry best practice
- monitoring of groundwater bores for potential seepage and contamination as part of the groundwater monitoring program, including installation of additional monitoring bores immediately surrounding the codisposal facility
- inclusion of codisposal material, coarse reject and overburden in an operational waste characterisation program
- designated storage areas for hydrocarbons, chemicals and waste materials

- appropriate design of hydrocarbon and chemical storage facilities, in accordance with AS 1940, The Storage and Handling of Flammable and Combustible Liquids, 2004
- development and implementation of appropriate procedures for servicing and shutdown activities (both within workshop and in field), including spill management and waste management protocols
- development and implementation of an appropriate water management system that includes environmental dams for retention of mine water from pit dewatering activities; sediment dams for retention of sediment contaminated stormwater runoff from disturbed areas, overburden dumps and rehabilitated landforms
- levees to protect pits, overburden dumps and infrastructure from inundation during flood events
- drains to direct runoff away from the pits.

Residual void

Following completion of mining operations, water levels are expected to recover to equilibrium within the first 120 years post mining and water levels will remain more than 50 m below the crest of the pits. The final water level in the voids will remain between 10 m to 19 m below the base of the Tertiary sediments for the West and East pits respectively and therefore, as the base of the Tertiary sediments is the upper level of the regional aquifer system, the voids will create a groundwater sink. Due to the hydraulic gradient associated with the final void groundwater sink, recharge of the aquifer system from the final void is not expected.

The supplementary EIS v2 states that the principle reason that the water levels within the overburden and voids will recover to levels below pre-mining conditions is that average daily evaporation is around four times the average daily rainfall within the area. Given the evaporative influences, the saline nature of groundwater recovering to pits and salt leaching from backfilled overburden, it is expected that over time, the water within the final voids will progressively become more saline and eventually approach salinities similar to those observed within the regional aquifer system.

No active mitigation strategy is proposed by the proponent in relation to the post mining recovery of groundwater. Monitoring will be undertaken as part of the groundwater monitoring program.

Furthermore, the proponent commits to developing a residual void plan that is discussed in section 4.17 Rehabilitation of this EIS assessment report.

The recommended groundwater conditions for the draft environmental authority are outlined in Appendix 1.

4.8.2 Surface waters

The Codrilla Project footprint covers approximately 230 km² of the Devlin Creek catchment, with Devlin Creek, Bundarra Creek, the unnamed tributary of Bundarra Creek and a tributary of Swampy Creek flowing through the project areas. Devlin Creek and its tributaries are ephemeral and only flow for short periods following significant rainfall. Devlin Creek is the primary watercourse in the vicinity of the project. The EIS mentions that due to the flat topography of the Devlin Creek floodplain, flow paths for local stormwater drainage are poorly defined. Also the proponent claims that there are no well defined watercourses across the floodplain.

The Wetland Protection Area on Swampy Creek is a constructed dam and will not be impacted by mining activities and will continue to receive inflow of diverted clean water from the project.

There are currently no formal water use entitlements along Devlin Creek. However, owners of Lot 9 on K1119 located about 23 km south east of the proposed MLs hold a permit to source water from Devlin Creek for stock and domestic supply.

DERM advised the proponent that the Water Resources (Fitzroy Basin) Plan 1999 is currently under review and that potential changes to the review may impact on the overland flow provisions for the mine development.

DERM advised the proponent of a number of issues with the description of surface water including:

- the maps showing the stormwater management structures were inadequate
- lack of information on stream flow at the time of sampling, using old (1971 to 1988) water quality data from the Bombandy gauging station

- inadequate assessment of seasonal variation of water quality or variation of water quality with flow of water quality samples due to the short period between the sampling occasions (end of January to end of March)
- lack of monitoring of sites in permanent and semi permanent waterholes, known aquatic habitats or reservoirs weirs
- not correctly comparing the physio-chemical indicators using the medium value of parameters for comparison to guidelines values, not using the 95th percentile of results for toxicants to compare with guideline values
- not supporting the claim that the project will not contribute to cumulative impacts of mining in the Fitzroy Basin
- not identifying the downstream users of the water for drinking purposes.

The above issues were adequately addressed by the proponent including:

- modifying stormwater maps in the sEIS to improve contour visibility and reflect mine footprint changes
- additional water sampling during stream flow events during the 2010/2011 wet season was undertaken to provide further information on seasonal variations which was presented and discussed the sEIS
- providing cross referencing in the sEIS regarding the monitoring of waterholes as part of the fauna survey.

Also the proponent revised the water balance to include data for 2010 which was the wettest year on record. The results of the revised modelling indicates that there should be no need to discharge water from the mine water management system. Based on the water balance results, the proponent claims that the mine should not contribute to cumulative impacts in the Fitzroy Basin.

However, as a result of the revised water balance the proponent proposes an additional 2,600 ML dam required to ensure adequate capacity for East Pit dewatering following an extreme event. This dam is proposed to be a temporary dam and located within the West Pit footprint. DERM raised a concern in relation to the management of water from this dam on completion of mining. The proponent provided an adequate response regarding the management of water from the temporary dam.

The description of the temporary mine dewatering dam was inadequate with no structural details due to the dam being only conceptual. In the detailed design of the temporary dam, the proponent will need to consider whether the dam requires a development approval for operational work for a referable dam (constructing a Water Storage Facility under the *Water Supply (Safety and Reliability) Act 2008*).

4.8.3 Surface water impacts and mitigation measures

The EIS states that potential impacts of the Codrilla Project on surface waters are likely to include impacts on watercourse structure and flow rates, flood depths, and water quality.

4.8.3.1 Watercourse structure

The EIS identified project activities that may impact on the structure of watercourses and drainage lines including:

- construction activities related to the proposed Codrilla to Moorvale Haul Road, incorporating clearing of vegetation and construction of concrete floodways over Devlin Creek, Bundarra Creek and the unnamed tributary of Bundarra Creek
- construction activities associated with the site water management system, incorporating construction of drainage channels, culverts, dams and levees around the site to separate mine affected water from clean water
- discharge of dams during flow events.

4.8.3.2 Flow rates

The proposed mining pit and overburden dump locations for the project are outside the banks of the Devlin Creek and Swampy Creek main channels. The EIS claims that the proposed mine will not affect the geomorphology or flow dynamics of Devlin Creek or Swampy Creek. The proposed development will obstruct flow paths for local stormwater runoff. However, it is considered that there will be no measurable impact on the quantity of water available to downstream users.

The proposed mine water management system has been sized to contain runoff from disturbed areas for reuse within the Coal Handling and Preparation Plant (CHPP) and a low risk of off site discharge. As a consequence the EIS claims that the project will have an impact on flow volumes only within poorly defined minor tributaries leaving the site.

As a result of mine plan changes with resulting changes to the mine footprint, the proponent remodelled the impact on flows in the watercourse immediately downstream of the project. The sEIS v2 states that at Devlin Creek, immediately downstream of the Swampy Creek confluence, the modelled median annual flow is predicted to be reduced by 7.0% in 2015 and by 10.8% when the mine footprint is largest.. However, at Reporting Point C situated on a Tributary of Swampy Creek at the mining lease boundary, flows will be increased in the order of 57%, due to the diversion of flow from undisturbed catchments around the disturbed areas.

4.8.3.3 Flooding

Existing flood levels modelled in the project area indicate the requirement for construction of a flood levee around the West Pit and out of pit overburden dump. Modelling indicates that there is potential for areas where infrastructure may be located in proximity to East Pit to be impacted by flooding. Therefore, flood levees are proposed to protect pits, overburden dumps and mine infrastructure. Levee heights are proposed which would ensure protection against flood levels of a 2,000 year Annual Recurrence Interval (ARI⁵).

To examine impacts of the project on flood levels in the area, TUFLOW modelling was repeated with the inclusion of site infrastructure and proposed levee. Flood modelling showed that impacts of levee construction on flood levels in the vicinity of the project will be minimal, with increases in flood levels over 0.1 m restricted to just upstream of the western levee. The proponent claims that the project will have no impact on regional flooding in waterways downstream of the mining lease.

4.8.3.4 Water quality

The EIS identified activities associated with the project that may impact on the water quality of Devlin Creek and smaller drainage lines in the project area including:

- runoff from rainfall events in areas subject to construction, earth moving activities, vehicle movements and dust suppression
- erosion of drainage lines, overburden dumps, stockpiles or other open areas
- leaching of contaminants from fuel, chemical or waste storage areas, overburden dumps or codisposal
- discharges of mine affected water from environmental dams
- overflows of sediment and environmental dams during significant rainfall events
- spills of hydrocarbons or chemicals
- failure of the project's proposed Water Management System.

In the supplementary EIS v2 it is stated that the simulation of the site water balance indicates that, under the range of historical rainfall conditions used in the modelling, there should be no need to discharge water from the mine water management system. For this reason, assuming the mine water management system performs in accordance with the modelling assumptions, the mine should have no downstream impacts. The mine water balance modelling has been revised to include data for 2010 which was the wettest year on record. The results of the revised modelling also indicate that no discharges should be required.

However, it is possible that discharges from the mine water management system may occur should scenarios beyond the range of conditions used in the model simulation prevail. For this reason, the revised surface water assessment in the supplementary EIS v2 includes recommended discharge criteria to ensure that any emergency releases that are required will occur at a time of high flow in the receiving watercourse when substantial dilution of mine water discharges and post discharge flushing will occur.

⁵ ARI is a measure of the rarity of a rainfall or flood event

4.8.3.5 Receiving environment monitoring program (REMP)

DERM raised a number of issues with the proposed REMP in the EIS that was available for public viewing, including:

- discharge locations were not specified so it was not possible to determine the appropriateness of monitoring locations
- no suitable background monitoring sites downstream of the project site
- upstream and downstream receiving environment monitoring should occur during all flow events, whether or not discharges are taking place to allow for assessing the condition of the waterways
- maximum height indicators and gauge boards should be installed as a back up for estimating maximum stream heights should the loggers fail
- not all the likely affected downstream areas of the mine were included in the monitoring locations.

The proponent provided an adequate response in the sEIS v2, including:

- discharge locations from all dams and an emergency release point in Environmental Dam 3 were included in the figure showing proposed surface water management
- additional reference sites have been proposed for other local creeks, including Swampy Creek, to provide further information on water quality from local streams which are located in catchments not containing mining activities [check]
- identification of the flow measurement locations for the REMP
- proposing to monitor flow events regardless of discharge status
- monitoring of minor streams proposed to provide additional data collection relevant? to reference water quality
- additional downstream monitoring locations.

DERM was satisfied with the response on issues in relation to receiving environment (water). However, the proponent will be required to provide the exact location details of all contaminant release points prior to operating.

4.8.3.6 Mitigation measures

In order for potential impacts from surface water contamination to be satisfactorily mitigated, the proponent will need to meet their commitments in the EM plan, including:

- establishing and implementing a site water management plan that includes a description of the water management system, operating rules, water monitoring and infrastructure inspection requirements
- investigating all substantial water related complaints
- implementing corrective action resulting from complaint investigations as required
- separating runoff from disturbed and undisturbed areas
- minimising the contamination of surface water on site
- monitoring activities conducted in accordance with the DERM Water Quality Sampling Manual and laboratory analysis conducted by a NATA accredited laboratory
- storing and handling of chemicals, fuels and hazardous wastes will comply with regulatory requirements and applicable Australian Standards
- containing, treating and reusing surface water on site in preference to discharge
- managing unavoidable releases in accordance with DERM conditions to protect downstream environmental values, such as stock water.

Furthermore, the proponent will need to meet their commitment to developing a controlled release procedure as part of the site water management plan that includes release rules, release locations, monitoring and analysis requirements, stakeholder notification, reporting requirements and positional responsibilities.

The recommended surface water conditions for the draft environmental authority are outlined in Appendix 1.

4.9 Air quality

The EIS was adequate with respect to the TOR regarding air matters. The proponent adequately addressed air issues during the EIS process, including dust emissions and greenhouse gas emissions.

The proponent was advised that DERM was not satisfied with the EIS presenting 6th highest values for predicted PM₁₀ concentrations on the basis that the EPP (Air) goal allows for five exceedences of the goal per year. The proponent was advised that the intent of the five exceedences was to recognise elevated PM₁₀ levels from extreme, natural meteorological events rather than project related causes.

In the EIS that was available for public viewing, the predicted 24 hour average (6th highest) PM₁₀⁶ and the 24 hour average PM_{2.5}⁷ concentration exceeded respective EPP(Air) goals at a number of receptor sites, for all three mine operations scenarios investigated. Consequently, DERM advised the proponent that dust mitigation must be reviewed and additional measures proposed that would maintain acceptable air quality.

The proponent proposed changes to mining schedule and fleet composition and the air quality model was rerun with the results included in the response to submissions. The supplementary EIS received by DERM on 30 June 2011, states that the predicted impacts from the project on sensitive locations have reduced significantly from the predictions of the initial modelling presented in the EIS available for public viewing.

In the response to submissions on the supplementary EIS dated 30 June 2011, the proponent remodelled air emissions using the following three modelling scenarios:-

Year 1 - Pit cutting face at the eastern end of the eastern pit

Year 6 - Pit cutting face at the western end of the eastern pit

Year 11 - Pit cutting face at the western end of the western pit

Each scenario was modelled using the highest annual run of mine (ROM) coal and overburden production rates from within the schedule, being 5.25Mt of ROM coal and 54.7Mt of overburden. Years 1 and 6 are expected to have the highest potential impact on sensitive locations (listed below in Table 4.4) due to proximity of the mining activity within the eastern pit to the sensitive locations.

Table 4.4- Sensitive Locations

Location Identifier	Location Name	Distance from nearest mining pit (km)	Distance from CHPP (km)
L1	Devlin Creek Homestead	15.3	16.5
L2	Lillianvale Homestead	10	13.7
L3	Regalo Homestead	4.6	8.4
L4	Weamber Homestead	7.0	9.4
L5	Codrilla Homestead	4.9	4
L6	Moorpeth Homestead	13.6	16.7
L7	Valkyrie School building	2.9	2.8
L8	Valkyrie School residence	2.8	2.7
L9	Bundarra Homestead	15.1	13.3
L10	Iffley Homestead	19.0	21.7
L11	Deveril Homestead	18.2	20.5
L12	Valkyrie Homestead	12.2	11.3

From the air modelling, the predicted air emissions were compared against the air criteria under the Environmental Protection (Air) Policy 2008 (EPP Air) that indicated the following:

⁶ PM₁₀ means particles in the air environment with an equivalent aerodynamic diameter of not more than 10 microns.

⁷ PM_{2.5} means particles in the air environment with an equivalent aerodynamic diameter of not more than 2.5 microns.

- annual average PM_{2.5} concentrations are within the air quality criteria values determined for the project at all sensitive locations during all three modelled years. The predicted maximum annual average PM_{2.5} concentration is 4 µg/m³ which occurs at Locations 5, 7 and 8 during years 1 and 6
- PM_{2.5} 24 hour concentrations are within the air quality criteria values determined for the project at all sensitive locations during all three modelled years. The highest predicted PM_{2.5} 24-hour concentration is 21 µg/m³ which occurs at Locations 7 and 8 during years 1 and 6
- maximum 24 hour average PM₁₀ concentrations are within the air quality criteria values determined for the project for all locations during all three modelled years except at locations 3, 4, 5, 7 and 8 during year 1; locations 3, 5, 7 and 8 during year 6 and Locations 5, 7 and 8 during year 11
- maximum 24 hour average PM₁₀ concentration is 129 µg/m³, which occurs at Location 7 during year 11 operations
- 6th highest 24 hour average PM₁₀ concentrations are within the air quality criteria values determined for the project for all locations during all three modelled years except at Locations 7 and 8 during years 1 and 6 and Locations 5, 7 and 8 during year 11
- maximum 6th highest 24 hour average PM₁₀ concentration is 79 µg/m³, which occurs at Location 7 during year 11 operations
- annual average TSP concentrations are within the air quality criteria values determined for the project for all locations during all three modelled years. The predicted maximum annual average TSP concentration is 43 µg/m³ which occurs at Locations 7 and 8 during year 1
- monthly dust deposition rates are within the air quality criteria values determined for the project for all locations during all three modelled years. The predicted maximum monthly dust deposition rate is 3 g/m²/month which occurs at Locations 7 and 8 during year 1.

To address air impacts, the proponent is committed to relocating the Valkyrie School and school residence and to having the Codrilla Homestead vacated throughout the life of the mine project.

DERM's submission on the supplementary EIS asked the proponent to expand on commitments in the EM plan in relation to dust monitoring and dust control actions to ensure the project meets the air quality objectives under the EPP (Air).

Mitigation measures that are proposed in the EM plan to manage potential air impacts from the project include:

- haul road watering, watering of stockpiles and dump areas
- managing blasting operations
- minimising disturbed areas
- progressive rehabilitation
- water sprays throughout the Coal Handling Preparation Plant
- enclosure of transfer points within the coal processing system.

Also in the EM plan, the proponent commits to providing air monitoring that will include:

- Five depositional dust gauges located at the Regalo Homestead, around the Codrilla A ML and along the Codrilla to Moorvale Haul Road
- Two Tapered Element Oscillating Microbalances (TEOM), will be installed at the relocated Valkyre School and residence site and the Regalo Homestead to monitor PM₁₀ and PM_{2.5} concentrations during the construction phase and the first year of operations
- The EIS also commits to locating a weather station adjacent to the Regalo Homestead.

The proponent has adequate commitments in the EM plan to engaging with all residents and users of sensitive locations which do not meet the EPP (Air) goals. The proponent commits to liaison with these parties in relation to potential impacts, mitigation measures and monitoring outcomes throughout the life of the project.

The EIS states that information received from dust monitoring and the weather station will enable mitigation strategies to be further developed based on actual site specific conditions. Such mitigation measures include:

- modifying mining operation under certain meteorological conditions, for example overburden dumping to an alternative area of a dump from which a particular potentially affected location is shielded
- additional emission attenuation at a source
- attenuation measures at sensitive locations.

The proponent needs to implement the EM plan commitments to address air issues, including:

- Dust management measures will be implemented during construction activities and the operational and rehabilitation phases
- Nuisance complaints will be investigated and resolved in a reasonable and practicable manner, and the proponent will respond to complaints within 48 hours
- All monitoring and sampling techniques will be consistent with the DERM's Air Quality Sampling Manual and applicable Australian Standards
- Regular consultation with the residents of Regalo and Weamber homesteads will be ongoing to address the potential air quality impacts
- Engaging with Queensland Rail in relation to the potential for dust mitigation of product coal loading to trains at the Moorvale load out facility and rail transport of coal.

Wheel generated dust associated with trucks travelling on unpaved haul roads is a major source of particulate matter emissions. According to Table 9 of the EM Plan, wheel generated dust from unpaved roads contributes about 83.6% of the total suspended particulate emissions. A commitment is made, in the EM Plan dated 7 October 2011, to further address dust emissions from the haul road in the event that monitoring indicates additional mitigation measures are necessary to comply with conditions of the environmental authority.

The EIS included a satisfactory assessment of potential Greenhouse gas (GHG) emissions using the National Greenhouse Accounts Factors published by the Commonwealth Department of Climate Change and Energy Efficiency.

The direct and indirect GHG emissions generated from the project include:

- Fuel consumption by mining equipment
- Fuel consumption of stationary sources (pumps, generators and lights)
- Combustion of Ammonium Nitrate/Fuel Oil Emulsion for blasting
- Electricity purchased from the grid
- Fugitive methane emissions.

The recommended conditions for management of environmental impacts of air emissions are outlined in Appendix 1.

4.10 Noise and vibration

The EIS adequately addressed the TOR in regard to noise and vibration matters.

The area within and surrounding the Codrilla Project can be described as a quiet rural setting with the primary noise sources being from traffic travelling the Fitzroy Developmental Road (FDR), cattle, farm machinery and natural influences such as rustling trees and native fauna. The EIS found that background noise levels were very low at the project site.

The EIS assessed the potential impacts from noise and vibration from the project on 12 sensitive locations (listed in Table 4.4). The closest sensitive locations were the Valkyrie School and school residence about 2.8 km from the project and the Codrilla Homestead about 4 km from the project.

The noise assessment in the EIS included the development of a predictive model that considered different meteorological conditions and mining scenarios. Also the predictive model considered proposed control strategies

to be incorporated into the project. The predictive model indicated exceedences of the Environmental Protection (Noise) Policy 2008 (EPP Noise) and DERM guidelines that may occur at up to seven of the sensitive locations during operation of the project. Exceedences were found highest during stable night time meteorological conditions. The three most significantly impacted sensitive receptors were the Valkyrie School and school residence and the Codrilla Homestead.

DERM advised the proponent of a number of noise issues from the EIS study that needed to be addressed, including:

- use of the noise levels at the Valkyrie School for the assessment and proposal of noise limits that appeared highly irregular and possibly spurious with the very high values of LAeq for three time periods compared to relatively low values for LA90⁸
- elevation of the relatively low values of background level to higher values by using the superseded E3 guideline that dealt with noise from extractive industries
- noise limits proposed for the project in the EM plan could be exceeded by 5 dB(A) or more
- the provision of only general recommendations for noise mitigation.

Furthermore, the proponent was advised to reassess and improve the proposed noise mitigation measures so that substantial specific noise reductions can be achieved.

In response to DERM's issues and changes to the mine schedule, the proponent provided a revised noise and vibration assessment for the project in the response to submissions received by DERM on 30 June 2011. DERM considered that the revised noise and vibration assessment adequately addressed DERM's issues.

In the response to submissions, the proponent repeated the noise modelling incorporating changes to mining schedule and fleet composition. The predicted impacts from the operation on sensitive locations were found to be reduced compared to predictions in the EIS that was available to the public. The proponent proposed the noise limits for the project in Table 4.5 Recommended Noise Limits below. These limits assumed a minimal 5 dB(A) reduction through a light weight building façade with open windows.

Table 4.5 - Recommended Noise Limits

Leq, adj,T9 (T=15 minutes to 1 hour) dB(A10)		
Daytime	Evening	Night time
40	40	35

A comparison of the proposed limits in Table 4.5 Recommended Noise Limits above to the predicted noise levels for all years of operation indicates that exceedences will occur at locations 3,5,7 and 8 under the noisiest conditions and some median meteorological conditions (shown highlighted below in Table 4.6).

Table 4.6 - Predicted Noise Limits for All Years of Operation

Highest Noise Level Predictions - years 1,6 & 11 Leq, dB(A)							
ID	Location	Noisiest 10%			Median Case		
		Day	Eve	Night	Day	Eve	Night
1	Devlin Creek	15	25	25	9	14	14
2	Lillianvale	29	30	30	15	17	18
3	Regala (N3)	33	40	36	27	32	29
4	Weamber	26	35	34	23	28	27
5	Codrilla	36	40	39	32	35	34
6	Morpeth	25	28	27	12	20	13

⁸ L90 means the noise level exceeded for 90% of the measurement period. This is commonly referred to as the background.

⁹ L_{Aeq,add,T} means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a measuring period (T) has the same mean square sound pressure as a sound level that varies over time.

¹⁰ dB(A) means decibels measured on the 'A' frequency weighting network.

7	Valkyrie School	42	46	45	38	40	40
8	School House	43	46	46	38	41	40
9	Bundarra	9	27	26	5	14	13
10	Iffley	2	22	22	1	11	11
11	Deveril	3	23	23	1	12	12
12	Valkyrie	11	29	29	6	19	14

The proponent recommends that a night time limit of 35 dB(A) and a daytime and evening limit of 40 dB(A) be applied to the project. DERM is satisfied with the proposed noise limits for the Codrilla Project and these limits are included in the recommended conditions in Appendix 1 for the draft environmental authority (EA).

The EIS states that exceedences of the proposed noise limits will occur at the Codrilla Homestead, Valkyrie Homestead and Valkyrie school and residence. Also noise levels at the Regalo Homestead may just exceed the proposed noise limit during the night time under the noisiest and worst case meteorological conditions. The proponent will need to meet their commitments made in the EM plan to address noise impacts, including:

- relocation of Valkyrie School and school residence
- having the Codrilla Homestead vacated during the life of the project
- modifying mining operation under adverse meteorological conditions
- a complaints register and an investigation and response procedure will be implemented and maintained as part of the site Environmental Management System (EMS)
- all machinery on site will be properly maintained and operated in accordance with manufacturers specifications
- speed limits will be imposed onsite
- all mobile equipment to be fitted with appropriate silencing equipment
- additional noise attenuation at the source in the event that monitoring indicates levels are in exceedence of the EA conditions for the project
- noise attenuation measures at sensitive locations in the event that monitoring indicates levels are in exceedence of the EA conditions for the project
- regular consultation with the local residents will be ongoing in relation to the potential noise impacts
- information from noise monitoring equipment and the weather station will be correlated to enable mitigation strategies to be further developed based on actual site specific conditions as they develop.

The EIS states that vibration from blasting activities will not affect any of the sensitive locations in excess of levels in DERM guidelines. However, air blast levels from blasting were predicted to exceed DERM criteria at up to six sensitive locations. The proponent will need to meet the commitments made in the EM plan to minimise the impacts of blasting activities including:

- incorporation of measures into blast design to minimise ground vibration and airblast
- monitoring of initial blasting activities at selected locations to establish the accuracy of the predicted vibration and airblast levels
- consultation with surrounding landholders in relation to developing protocols for notification of blasts
- consultation with the Isaac Regional Council in relation to the use of the camping and water reserve located adjacent to the Valkyrie School and potential management strategies to minimise impacts of blasting on users of the reserve
- reconnaissance of the stock route which runs concurrent with the Fitzroy Developmental Road (FDR) for travelling stock within the potential impact zone
- traffic control on the FDR when blasting is undertaken within a nominated distance of the road.

Furthermore, it is important that the proponent maintain ongoing consultation with the Department of Transport and Main Roads regarding issues of traffic control during blasting and appropriate design of the FDR realignment to incorporate any necessary criteria relative to ground vibration.

The EIS states that low frequency noise was expected to exceed the legislative goal at the Valkyrie School and school residence and at the Codrilla Homestead. The EIS further states that the Valkyrie School and school residence will be relocated and the Codrilla Homestead will be vacated. DERM considers low frequency noise should be managed through the EA conditions that will require the proponent to investigate any complaint about low frequency noise by conducting noise monitoring and implementing any necessary mitigation measures.

The recommended EP Act noise conditions for the draft environmental authority are outlined in Appendix 1.

4.11 Nature conservation

4.11.1 Impact on vegetation communities

The EIS identified potential impacts on vegetation communities, including:

- clearing of vegetation for the construction of mine infrastructure within the Codrilla Project area including a number of dams, sediment basins, the initial open cut pits and the haul road to Moorvale Coal Mine
- clearing of vegetation progressively during operation of the mine for open cut pit extensions and stockpile extensions.

The project will require the disturbance of approximately 2,056 hectares (ha) over the life of the project. However, 2,004 ha has been previously cleared for agricultural use, the remaining 52 ha comprises of remnant regional ecosystems detailed below in Table 4.7 Extent of clearing REs required for the project. Seven regional ecosystems (REs) will be impacted by the project. The Vegetation Management status of one of these REs is listed as endangered (11.4.9 Brigalow) with the remaining six being listed as of 'Least Concern'.

The remaining issues relating to the removal of vegetation are covered by the controlling provision for the Codrilla Project under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) as well as by the provisions of the Environmental Authority under the EP Act. Impacts on vegetation communities are covered in section 4.12, Matters of National Environmental Significance, of this EIS assessment report.

Table 4.7 - Extent of clearing REs required for the project

Regional Ecosystem	VM Act Status	Description	Proposed area to be cleared (ha)
11.11.1	Least Concern	<i>Eucalyptus crebra</i> ± <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding	2.9
11.3.25	Least Concern	<i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> and <i>Casuarina cunninghamii</i> with a grassy understorey on creek banks	1.7
11.3.27	Least Concern	Freshwater wetlands with variable vegetation, including open water with or without aquatic species and fringing sedgeland and Eucalypt woodlands.	0.05*
11.11.9	Least Concern	<i>Eucalyptus populnea</i> or <i>E. brownii</i> woodland on deformed and metamorphosed sediments and interbedded volcanics	1.0
11.4.9	Endangered	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	3.8
11.5.2	Least Concern	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> on lower slopes of Cainozoic sand plains/remnant surfaces	15.8

11.5.3	Least Concern	<i>Eucalyptus populnea</i> open forest with grassy or shrubby understorey	25.9
Total			51.29

* 11.3.27 is likely to not be cleared or impacted during the construction of the Codrilla to Moorvale Haul Road if a 35m running surface is implemented.

Source – Table 4.10.17 in the EIS.

4.11.2 Impacts on flora

Two hundred and fifty nine plant species were recorded in twelve vegetation types including non-remnant status communities.

The Black Orchid (*Cymbidium canaliculatum*) was the only plant species of conservation significance found at the site.

The proponent provided adequate mitigation commitments, including:

- *Cymbidium canaliculatum* – If any specimens were to be salvaged a permit from DERM would be required
- other Conservation listed species – If any populations are located, avoid disturbance if it is reasonably possible and make provision for relocation of individuals if necessary.

4.11.3 Impacts on fauna

One hundred and sixty three terrestrial vertebrate species were found over the duration of the two surveys including eleven amphibians, sixteen lizards, six snakes, one turtle, ninety eight birds, seventeen microchiropteran bats and fourteen other mammals.

Significant fauna species

One conservation listed mammal (Little Pied Bat -'near threatened') and one 'vulnerable' bird species (Squatter Pigeon) were found at the project site and another five mammal species have been identified as possibly in the area. Also two migratory species were found in the proposed mining lease.

One vulnerable listed reptile (Ornamental Snake) was found at Codrilla and a number of near threatened and threatened reptiles listed as possibly in the area included:

- Brigalow Scaly-foot ('vulnerable' under the NC Act)
- Short-necked Worm-skink ('non threatened' under the NC Act)
- Yakka Skink ('vulnerable' under the NC Act)
- Dunmall's Snake ('vulnerable' under the NC Act).

A small loss of potential habitat for these species may occur due to the mining operations, but would not be significant in the regional context.

The impacts on the Squatter Pigeon, Ornamental Snake, migratory species and the above reptiles are discussed in section 4.12 on Matters of National Environmental Significance, of this EIS assessment report.

Little Pied Bat (*Chalinolobus picatus*)

The Little Pied Bat ('near threatened' under the NC Act) was found in the proposed ML area at the Brigalow and Poplar Box sites. Minor impact is anticipated to occur to the habitat of the Little Pied Bat as a result of the very small loss of woodlands associated with the project site.

4.11.4 Loss of habitat for significant fauna

The EIS states that the very small loss of woodlands associated with the Codrilla Project would not significantly reduce regional habitat of fauna species identified in the project area.

The EIS contained adequate commitments to address impacts on the loss of habitat for significant fauna that are mentioned in section 4.12.3 Mitigation measures in this EIS assessment report.

4.11.5 Loss of important microhabitats

The EIS mentions that many hollow nesting birds and bats were recorded at the project's study area, including fourteen microbat species, and at least 18 bird species. Brown Treecreepers were observed nesting, and a Southern Boobook roosting, in hollows at the Poplar Box site. The EIS states that the moderate to high densities of hollow-bearing trees in small remnant woodland habitats at the project site provide ample nesting and denning opportunities for hollow-dependent fauna. These hollow bearing trees are concentrated along the riparian zones and in the open *Eucalyptus populnea* woodlands in the north-east of the area. Other woodland areas are low in mature hollow-bearing trees, and continuity across the landscape is limited. Eucalyptus and Corymbia trees take more than 150 years to form hollows. This time frame means replacement of hollows during rehabilitation can only occur through the installation of nest-boxes onto regrowth trees, an expensive process that can only be done when the trees reach a reasonable size (approx. 20 years old). The EIS states that it is more practical to preserve the existing hollow-bearing trees where possible and maturing trees should also be retained to ensure continuity of habitat.

The EIS states that ground litter and logs are an important microhabitat for a wide range of fauna (reptiles and small mammals) and would require lengthy time periods to be replaced by the normal processes during rehabilitation. These processes include the growth of overstorey tree species and understorey shrubs, the fall of leaves and small branches from trees, the falling of trees, and the deaths and decay of small shrubs.

The Fitzroy Basin Association (FBA) raised an issue in its submission on the supplementary EIS documents about the loss of important microhabitat due to the project. This issue was addressed by the proponent providing further commitments in the supplementary EIS relating to the development of a Species Management Program prior to any clearing as per the Nature Conservation (Wildlife Management) Regulation 2006.

4.11.6 Impacts on habitat corridors

The vegetation along Devlin Creek provides an important state corridor linking the vegetation remnants along the waterway to the large areas of remnant vegetation associated with Mount Orange and Mount Marion in the north to the Isaac River and Connors Rivers. These vegetation corridors have several small gaps already from road easements within the study area. The linkage values of the above corridors will be impacted by the construction of the haul road to Moorvale by isolating vegetation patches from the north of the proposed routes and the corridors along Devlin Creek.

The proponent provided adequate commitments in the EIS to address impacts on habitat corridors that are mentioned in section 4.13.3 Mitigation measures of this EIS assessment report.

Also the proponent has provided an adequate commitment of developing an offset for clearing.

4.11.7 Weed species

The Codrilla Study Area contained a total of 32 exotic pest species. Of the 32 species, nine are declared pest species under provisions of the *Land Protection (Pest and Stock Route Management) Act 2003* and/or require management indicated by the Local Government Management Plan. These species included:

- Parthenium - *Parthenium hysterophorus*
- Harrisia Cactus - *Eriocereus martinii*
- Prickly Pear - *Opuntia stricta*
- Velvety Tree Pear - *Opuntia tomentosa*
- Parkinsonia - *Parkinsonia aculeata*
- Flannel Weed - *Sida cordifolia*
- Giant Rat's Tail Grass - *Sporobolus natalensis*
- Lantana - *Lantana camara*

- Blue Snakeweed - *Stachytarpheta jamaicensis*.

The EIS mentions that the management options for weed control will include those in the Isaac Regional Council pest management plans (Nebo Shire Council, 2005) and by the Capricorn Pest Management Group (Capricorn Pest Management Group, 2006).

4.11.8 Aquatic ecology

Three waterholes were chosen as sample sites on Devlin Creek (DC1-3) in the May 2009 survey and two major dams were sampled in April 2010 survey to assess the freshwater biota.

There was no flowing water at the time of the May 2009 survey, with the creek bed and edges predominately sandy. There was 10-30m of riparian vegetation on each side of the creek, with little or no weed infestation. All of the sites showed evidence of siltation.

Water quality parameters were similar over the three sample sites. Water quality parameters did not exceed the ANZECC guidelines for water for livestock but some water quality parameters were outside the limits set by the Queensland Water Quality Guidelines including:

- turbidity at the Devlin Creek sampling site DC1
- suspended solids at all sites
- total Nitrogen at all sites
- total Phosphorous at the Devlin Creek sampling sites DC2 and DC3.

The aquatic ecology section in the EIS states:

- five species of macroinvertebrates were identified within the Codrilla Project Study area
- of the ten aquatic plant species identified in the Queensland Herbarium database search three species were identified as present by the aquatic assessment: *Ludwigia*, *Cyperus* and *Potamogeton* species.

The EIS states that no aquatic species of conservation significance were identified in waterways and dams within the project area and it is unlikely that any conservation significant species occupy the project area.

4.11.9 Impacts on stygofauna

The EIS states that *Bathynella*, *Cyclopidae* and *Harpacticoid* spp collected from monitoring bore 4 (MB4) near Devlin Creek confirms that Stygofauna occur in the Alluvial aquifer inside the proposed Codrilla A ML boundary. The EIS claims that no stygofauna have yet been found in the deeper aquifers of Codrilla Project, therefore the only threat would have come from diverting Devlin Creek. As diversion of Devlin Creek is not proposed as part of the project, there are no impacts predicted to the identified stygofauna species. Mining operations are not predicted to intersect the alluvium of Devlin Creek in which the Stygofauna are located, and the Alluvial aquifers are not hydraulically connected to the underlying Regional aquifer system. Therefore the predicted drawdown of the Regional aquifer as a result of mining operations is not expected to impact the Alluvial aquifers.

DERM advised the proponent that there is inconsistency in the EIS between the statement made that the main threat to stygofauna would come from diverting Devlin Creek (which is not proposed) and the information about alluvial groundwater resources provided. The EIS notes some variable connectivity between the Quaternary alluvial sediments of Devlin Creek and the adjacent Tertiary sediments, and that the Tertiary aquifer receives some recharge from the overlying perched aquifer associated with Devlin Creek. The pit will intersect and drain groundwater from the Tertiary sediments, and because of the connection between the aquifers there is the potential for the groundwater level in the Quaternary alluvial sediments of Devlin Creek to be lowered by in-flow into the pit through the Tertiary sediments. That appears to be the main potential impact on stygofauna, and it may occur despite Devlin Creek remaining undiverted. The proponent was advised to reassess the potential impact of mining operations at Codrilla on stygofauna due to the lowering of groundwater levels in nearby sediments, and propose mitigation measures.

The proponent provided an adequate response to DERM's issue on stygofauna. The proponent advised that the Alluvial aquifers were assessed as being perched aquifers located above a thick clay layer of tertiary sediments with low permeability. During groundwater monitoring bore construction, the clay layer remained essentially dry

and the tertiary aquifer is confined below this layer. The hydraulic regime in the alluvial aquifer is not expected to alter, provided there is no intersection by mining activities. Drawdown of the Regional aquifer (inclusive of the Tertiary aquifer) is not expected to impact the water levels within the Alluvial aquifers and impacts to Stygofauna associated with the Alluvial aquifer are not expected. Ongoing monitoring of water levels within the Alluvial aquifer is proposed throughout operations. The ongoing monitoring results will be reviewed as they are received and annual formalised review will also be undertaken.

The EIS proposes the following adequate mitigation measures to address potential impacts on stygofauna:

- to keep the alluvial aquifer intact, Devlin Creek will not be diverted
- additional Stygofauna assessment will be undertaken in the Alluvial aquifers with sampling from the existing bores and three new alluvial bores that are yet to be constructed
- a groundwater monitoring program will be implemented to encompass alluvium water quality parameters where any Stygofauna species are located from past and future surveys

4.12 Matters of National Environmental Significance

The controlling provisions for the Codrilla Project are sections 18 and 18A (Listed threatened species and communities) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The project area contains endangered ecological communities listed under the EPBC Act, namely Brigalow (*Acacia harpophylla* dominant and subdominant communities). The ornamental snake (*Denisonia maculata*) and Squatter Pigeon (*Geophaps scripta scripta*), species listed as 'vulnerable' under the EPBC Act, were identified by surveys as being present in the project area. Also, two listed migratory species were identified within the project area including Great Egret (*Ardea alba*) and Rainbow Bee-eater (*Merops ornatus*).

A coastal Ramsar wetland is located approximately 60km to the north of the Fitzroy River mouth and 170km to the south east of the project. Lake Elphinstone located 70km to the north west is listed as an important wetland under the EPBC Act. The EIS states that the project will not impact on any Wetlands of International Importance.

4.12.1 Impact on vegetation communities

The project area contains the following Brigalow REs, 11.4.9 (*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains) and 11.4.8 (*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains) that are listed as endangered ecological communities under the EPBC Act. The EIS states that RE 11.4.8 will not be impacted by mining operations or the recommended Northern Haul Road Option 3.

Minor impacts on RE 11.4.9 were identified in the EIS. The total area of Brigalow community proposed to be cleared is 3.8 ha. The impacted areas of RE 11.4.9 within the Codrilla mining area include two small isolated and degraded patches. The EIS mentions that there will be a loss of some vegetation along the preferred Northern Haul Road Option 3. However, vegetation impacts will be minimised by the utilisation of existing cleared areas bypassing the significant vegetation with the exception of encroaching on some thin strips (<40m) of RE 11.4.9. The total area of RE 11.4.9 to be impacted along the haul road route is 1.28 ha.

The EIS states that the clearing procedures will ensure that any clearing of remnant vegetation will be restricted to the minimum necessary to enable the safe construction, operation and maintenance of the project. Also the clearing procedures have measures to deal with any encountered threatened species under the EPBC Act and NC Act. These measures include obtaining any necessary permits under the NC Act for relocating any threatened species.

4.12.2 Impacts on listed species of flora and fauna

The EIS states that no threatened flora species listed under the EPBC Act were recorded within the project area during the field surveys in May 2009 and April 2010.

The Ornamental Snake and the Squatter Pigeon are listed 'vulnerable' under the EPBC Act and were recorded within the project area during the field surveys.

Rainbow Bee-eater and the Eastern Great Egret are species listed as migratory under provisions of the EPBC Act and were recorded within the Codrilla study area during the field surveys.

Also a number of reptiles listed as near threatened under the EPBC Act possibly occur in the area including Brigalow Scaly-foot; Short-necked Worm-skink; Yakka Skink and Dunmall's snake.

Ornamental Snake (*Denisonia maculata*)

Two Ornamental Snakes (*Denisonia maculata*) listed as vulnerable under NC Act and EPBC Act were located within the Land Zone 11 Woodlands and Brigalow fauna sites. This species may also occur in the *Eucalyptus cambageana* woodlands within the project area. The EIS states that the Ornamental Snake favours Brigalow and riparian woodlands and feeds almost exclusively on frogs. Due to the high rainfall event prior to the 2010 survey there were a high number of frogs near waterways and extending into hilly woodland areas. The EIS states that this could be a factor contributing to the Ornamental Snake being located within the Woodland and Brigalow Sites. However, habitat for the ornamental snake is typically freshwater waterholes/creeks and under litter/fallen timber and in wide soil cracks on deep cracking clay and sandy loam soils in riparian woodland/open forest and shrub/woodland including Brigalow, consistent with survey findings.

The proposed haul road will encroach on some ornamental snake habitat: 4.2 ha of Brigalow and 5.02 ha of Land Zone 11 Woodland. The haul road follows an existing fire break and encroaches no more than 40m into the REs and 50 m into Land Zone 11 Woodland. The EIS states that frequent culverts under the haul road will provide corridors for the Ornamental Snake to access habitats both sides of the haul road.

An assessment of significance was prepared for this species within the EIS and the assessment found that project is not expected to cause a significant impact. Furthermore, the proponent states that the proposed offset will provide additional habitat for this species.

Squatter Pigeon (*Geophaps scripta scripta*)

The Squatter Pigeon was recorded at two sites, both in and near remnant *E. crebra* woodlands during the April 2010 Survey. Their preferred habitat is grassy woodlands with regular access to water. Squatter Pigeons are known to prefer short sparser grasses to dense longer grasses allowing ease of movement when feeding and provision of nesting habitat. The EIS states that the retention of grassy woodlands in the western and southern portions of the project area will ensure that suitable habitat remains available. The majority of the proposed mining activities are to be located in non-remnant areas which exhibit signs of degradation. The retention of this habitat will ensure the area of occupancy will not be reduced and habitat important to this population will not be adversely affected.

The assessment of significance for the Squatter Pigeon indicates that due to the majority of the proposed mining activities being restricted to non-remnant, degraded vegetated areas, and the limited disturbance to suitable habitat from development of infrastructure, the impacts of the proposed project will not be significant. Furthermore, the proponent states that the proposed offset will provide additional habitat for this species.

Migratory listed bird species - Rainbow Bee-eater (*Merops ornatus*) and Eastern Great Egret (*Ardea modesta*)

The Rainbow Bee-eater was recorded incidentally within the project area and utilises areas of open woodland with sandy and loam soils. The EIS states that this species is more likely to breed in sandy habitats along river and creek systems outside the mine footprint.

The Eastern Great Egret was recorded at a farm dam at the project site. This species has a widespread distribution and utilises shallow rivers, wetlands and large dams.

The EIS states that the loss of habitat for terrestrial migratory bird species listed under the EPBC Act would not be significant due to the very small loss of woodland habitat within the project area. The remnant woodland is only a small proportion of the site, but it is listed as an important corridor and will not be cleared where practically possible. Migratory and nomadic species that use wetlands and dams will not have any habitat loss due to the proposed mining operations. However, the EIS notes that there may be an increase in stopover points for waterbirds through more dams being constructed on the mine site.

Reptiles

The following reptiles were not recorded at the project site but have been recorded in the region:

- Brigalow Scaly-foot (*Paradelma orientalis*), listed as 'vulnerable' under the EPBC Act, is found in the litter or under logs of sandy dry sclerophyll woodlands with relatively high shade. However, little of this habitat occurs at the project site. Impacts on its habitat will be minor as much sandy woodland habitat in the region is still in remnant condition, and the areas impacted by mining activity, if any, will be small in the wider area context.
- Short-necked Worm-skink (*Anomalopus brevicollis*), listed as 'not significant' under the EPBC Act, is found in the litter or logs of dry sclerophyll woodlands with relatively high shade and sandy soils. Can be quite common in suitable habitat which may occur at Codrilla. Impacts on its habitat will be minor as the areas impacted by mining activity will be small in the wider area context
- Yakka Skink (*Egernia rugosa*), listed as 'vulnerable' under the EPBC Act, is found in the litter or under logs of dry sclerophyll woodlands with relatively high shade, often with sandy soils. However, little suitable habitat occurs within the Codrilla study area. It is a furtive species which is hard to detect, but impacts on its potential habitat will be minor as the areas impacted by mining activity will be small in the wider area context
- Dunmall's snake (*Furina dunmali*), listed as 'vulnerable' under the EPBC Act, is found in the litter or under logs of dry sclerophyll woodlands with relatively high shade, often with sandy soils, so little suitable habitat occurs within the Codrilla study area.

4.12.3 Mitigation measures

The proponent has provided commitments in the EM plan to avoid, mitigate and offset impacts of the mining project on matters of national environmental significance, including:

- significant weed infestations will be controlled in all areas of the project. Species targeted for control or eradication will include those declared under legislation in accordance with the *Land Protection (Pest and Stock Route Management) Act 2001*
- vegetation will only be removed where required. Vegetation outside mining and infrastructure areas will remain undisturbed
- existing tracks and cleared areas will be utilised
- cleared areas will be progressively rehabilitated
- implementation of a fauna and flora habitat monitoring program to measure rehabilitation success
- a biodiversity offset management plan will be developed and implemented to manage the offsetting of cleared significant vegetation communities in keeping with the principles of relevant policies and guidelines such as:
 - Draft policy statement Use of environmental offsets under the EPBC Act 1999 (DEWHA 2007)
 - Queensland Policy for Vegetation Management Offsets (DNRW, 2007)
 - Queensland Government Environmental Offset Policy
 - Queensland Biodiversity Offset Policy (3 October 2011)
- a Species Management Program (under provisions of the NC Act) will be developed prior to construction activities being undertaken.

DERM is satisfied that the information presented in the EIS provides a suitable assessment of the significance of the potential impacts of the project on nature conservation and matters of national environmental significance, and specifically the listed threatened species and communities under the EPBC Act.

4.13 Cultural heritage

The EIS has adequately addressed the TOR with respect to both Indigenous cultural heritage and non-Indigenous cultural heritage issues.

4.13.1 Indigenous cultural heritage

The EIS stated that a cultural heritage management plan (CHMP) has been developed between the proponent and the Barada Barna People in accordance with Part 7 of the *Aboriginal Cultural Heritage Act 2003* (ACH Act), and has been submitted for approval to the Cultural Heritage Coordination Unit of the DERM on 8 July 2010. Unless the CHMP is approved under the ACH Act before the environmental authority is issued, the environmental authority must include conditions requiring the approval of the CHMP prior to any disturbance due to mining activities for the project.

Coal mining exploration works have been undertaken on the project site including the drilling of bore holes and clearing of tracks to allow for seismic testing. In accordance with the Duty of Care requirements under section 23 of the ACH Act, these activities were carried out in full consultation with, and involvement of, the Barada Barna People, as the aboriginal party for the area under their native title claim.

The EIS states that cultural heritage inspections were undertaken by the Barada Barna People for drilling activities in August 2008. Based on these inspections, the Barada Barna People granted a "blanket" clearance over the blade plough areas of the project, allowing for drilling to occur without individual site inspections. The clearance was granted with the exception of areas surrounding creeks and areas with vegetation cover. In September 2009, a number of other sites were also inspected. No items of cultural heritage significance were identified in the inspected areas.

The proponent conducted a search of the Cultural Heritage Register maintained by DERM. No cultural heritage has been recorded on the register.

The EIS states that an archaeological study has not been conducted for the entire project area due to time constraints and the availability of the Barada Barna People and their archaeological advisers. However, the CHMP allows for full archaeological investigations to be carried out prior to the occurrence of any disturbance activities associated with the project.

4.13.2 Non-Indigenous cultural heritage

The EIS mentions that Leichhardt's diaries provide the first account of European exploration into the project region in 1845. Leichhardt's expedition party followed the course of the Isaac River to the west of the project site, and in the following two decades the area was taken up as pastoral leases and stocked with sheep and cattle. The closest township of Nebo was surveyed in 1865 under the original name of Fort Cooper. Whilst the area has largely been devoted to pastoral use since European settlement, copper and gold mining constituted other historical industries in the region, with the Mount Orange copper mine once operating to the north of the project. Some of the original copper smelters remain intact and one has been restored on Bundarra Station, approximately 20km from the project site.

A physical historical archaeological study of the Codrilla Project site has not yet been undertaken. The EIS states that information currently available indicates a fairly low potential for significant historical cultural heritage to be present within the project site. Under the EM plan, it is intended that historical cultural heritage will be investigated in conjunction with the Aboriginal archaeological surveys prior to the commencement of works. The study will be undertaken by an appropriately qualified archaeologist and will include a study of the project area, an assessment of the significance of any cultural heritage found, and recommendations on the management of cultural heritage as the project progresses.

The proponent has provided adequate commitments in the EM plan to address impacts on cultural heritage, including:

- Indigenous cultural heritage matters will be managed in accordance with the CHMP
- procedures will be developed detailing the actions required in the event that any discovery, damage or destruction of culturally significant places or artefacts occurs
- a complete archaeological study will be conducted in accordance with the CHMP prior to any site disturbance
- an Historic Heritage Management Plan (HHMP) will be developed prior to construction as per proposed EA condition K1.

Also the proponent provided adequate steps in the EM plan that should be undertaken to manage the cultural heritage values on site including:

- cultural heritage inductions and training programs to include cultural awareness and identification of significant aboriginal objects, significant aboriginal areas, personnel responsibilities under the CHMP and the relevant legislation, and appropriate protocols for the management of Cultural Heritage finds
- throughout the life of the operation, the Barada Barna People will be engaged to present Aboriginal Cultural Heritage training programs to key site personnel
- a Cultural Heritage Committee meeting will be held annually or as agreed between the parties and will include discussions on:
 - project progress
 - cultural heritage training programs
 - any disputes
 - any assessments being carried out
 - any shortfalls in respect to the CHMP
- Cultural Heritage Field survey or inspection to be carried out prior to any proposed construction, mining and/or exploration activities in accordance with the CHMP
- identified cultural areas of significance are to be demarcated in such a way as not to be ambiguous to mine site personnel
- a register of cultural areas of significance will be maintained and will contain information relating to artefact, the date discovered and its location
- a plan of cultural areas of significance will be maintained and kept on file
- in the event that unrecorded cultural heritage sites or materials are discovered during future operations, works at that particular location will cease and be cordoned off as a 'no-go' zone until traditional owner representatives are contacted to provide advice on significance of the finds and management options
- if fossils are located during the development and operation of the project, the proponent will advise the Queensland Museum.

The cultural heritage conditions recommended to be included in the draft environmental authority are contained in Appendix 1.

4.14 Social issues

The Codrilla Project is located within the Mackay Statistical Division (SD), which comprises the three local government areas of Mackay, Whitsunday and Isaac Regional Councils, and includes approximately 34 urban centres and localities. There were 167,666 residents in the Mackay SD at the time of estimation of resident population on 30 June 2008. The region's principal economic base derives from mining and minerals followed by agricultural production.

The closest towns to the project are Nebo and Moranbah within the Isaac Regional Council (IRC). Nebo is approximately 45 km away from the project and is a small town with a resident population of 343. Moranbah, situated about 57 km from the project, is a town predominantly supporting the local mining industry with a resident population of 8,087 persons. A range of government and community facilities are provided for in Moranbah as well as a number of accommodation types.

The IRC was home to 21,993 people in 2009, about 13.1% of the regional population and a 1.8% increase in the population the previous year. Unemployment in the IRC is very low at 1.3% in 2009, compared to the State average at 6.0%

The closest major regional centre to the project is Mackay being 120 km from the project. Mackay has a population of approximately 74,236 and is one of the fastest growing regions in Queensland. The city acts as the main regional service centre in the northern part of Central Queensland and includes health facilities such as hospitals, sporting and recreation facilities, and specialist health and finance services.

The area on and around the proposed project site is currently used for beef cattle production and grazing and residential purposes. The project is situated on the Codrilla cattle station, which is one of the largest cattle stations in the Central Queensland Region.

The closest coal mine to the project is the Moorvale Coal Mine, which is located approximately 20 km north west. Other mine sites also located in the vicinity of Nebo and Moranbah include Coppabella, South Walker Creek, Carborough Downs, Isaac Plains, Millennium and Poitrel.

The nearest existing public buildings are the Valkyrie State Primary School and school residence about 2.9 km from the mining pit at the project. A number of submissions were received about environmental impacts to the school and school residence. The proponent commits to relocating the Valkyrie School and school residence and have included in the Draft Social Impact Management Plan (SIMP) a commitment to developing a process for addressing the relocation of the school and the principal's residence. The proponent advised that a potential preferred site for the relocated Valkyrie School has been identified by the Valkyrie School Community Working Group (VSCWG), consisting of representatives of the Proponent, the School Community and the regional Department of Education and Training (DET). However, the ultimate relocation decisions are a matter for DET.

The project is expected to require 170 construction personnel and 240 permanent operational personnel. The project would commence construction in 2012 and continue for about 13 and a half years. Staff are planned to be housed at the Moorvale (Terowie) camp that may expand to 500 accommodation units in 2011. Staff will be transported to the project site via bus along the Codrilla - Moorvale Haul Road. The EIS states that, should the Moorvale Camp fill to capacity, staff would be accommodated at either the Coppabella or Nebo camps.

The Department of Communities (DoC) raised an issue in their submission that the EIS should acknowledge the small proportion of workers who may opt to reside in local towns such as Nebo and Moranbah. The proponent addressed the DoC issue by making a commitment in the sEIS of identifying strategies to assist employees and their families with accommodation who show an interest in relocating to local towns.

The EIS states that the local community potentially impacted by the project includes the landholders and families centred around the Valkyrie State School with associated community and recreation facilities. Concerns held by that community can be summarised by following:

- social impacts of demographic changes through some landholders having to relocate from the area, as well as mining bringing in a large transient workforce with a different culture to rural people
- environmental impacts, with concerns about increased dust and noise impacting on local residents and the Valkyrie State School, and other potential impacts on water resources and the natural environment
- concerns about increased traffic on both the public highways and internal haul roads
- impacts on the location and future viability of the Valkyrie State School.

The above issues were also raised through submissions received by DERM on the EIS from landholder and advisory body members including the Isaac Regional Council, Department of Communities, Queensland Police and the Department of Employment, Economic Development and Innovation. Issues raised by landholders and the advisory body were adequately addressed through the EIS.

The EIS discusses the regional communities potentially impacted by the project including the local towns of Nebo and Moranbah. The EIS mentions that some of the impacts on these towns will occur through limited population increases, with subsequent impacts on housing markets and service requirements. The EIS states that there may also be some impacts on local employment markets, with increased demands for labour making it harder for local businesses to attract and retain labour force. Increased traffic, particularly with a large non-resident workforce commuting to the area, and associated issues of road safety and accidents are another key area of impact for regional communities. The developing pattern of a large non-resident workforce in the area brings additional challenges of supplying infrastructure and core services (e.g. accommodation, emergency and health services) with only a limited population base. These issues for the regional communities are compounded by cumulative effects from multiple projects in the region.

The proponent noted in the EIS that the mining industry does place increased demand for infrastructure and services within the region. The resource industry, in partnership with Local Government and the Queensland Government are seeking to address these impacts through the 'Building Better Communities' initiative. The proponent is fully supportive of this initiative.

Potential impacts at the regional level will largely accrue in the Mackay City region as a consequence of rapid employment, population and business services growth. The population and business growth will bring additional requirements for infrastructure and services, particularly increased housing and community services. Some pressure on housing markets can be expected as a consequence of rapid growth in demand, while some pressure on employment markets will be generated by the direct and indirect employment generated by the project. The size and diversity of Mackay City and surrounding areas, together with the level of available infrastructure and services, means that there is substantial potential to cater for these growth pressures. However, the cumulative impact of a number of other mining and industrial projects may increase growth pressures, particularly in the short term.

The proponent has provided adequate commitments in the EM plan to address the potential negative impacts at the local community, sub-regional and regional levels, including:

- develop and implement policies relating to service provision and purchasing hierarchies, e.g. local personnel and business first if qualified and commercially competitive
- Community Investment Programs – including mix of apprenticeships, scholarships and vocational training opportunities
- continue the ongoing development and implementation of the Community Consultation Program. The program will be implemented specifically to reflect the stages of project development, namely project application stage, pre-development and construction, ongoing operation and mine closure/post-mine land use
- provide bus transport arrangements from worker accommodation to the project site to minimise traffic flows on the surrounding road network
- investigate bus transport options for employees between work accommodation and Mackay and/or Rockhampton during roster change-over
- ensure that project lighting is oriented to minimise light spill beyond what is required for project operations
- develop and maintain a complaints management system during construction and operation of the Codrilla Project:
 - maintenance of a register of complaints to be held on site
 - procedures for receiving, handling and investigating complaints
 - expeditious investigation of complaints and a response as soon as practicable
 - a non-compliance notification will be given to any party whose actions have caused a complaint as a result of non-compliance with site environmental requirements
- consultation to be maintained with the Isaac Regional Council, which serves as a forum for progressing community based initiatives and infrastructure programs
- develop and maintain the Social Impact Management Plan (SIMP) for the life of the project.

The proponent has drafted a SIMP for the project. The SIMP provides an ongoing mechanism for identifying social and economic impacts and progressing mitigation measures, and will help to plan and coordinate response strategies into the future. The recommended strategies and mitigation measures that have been identified in the EIS are summarised in the draft SIMP.

The Social Impact Assessment Unit (SIAU) in the Office of the Coordinator General in DEEDI is the lead agency on social issues and will assess the SIMP. The SIAU provided comments on the project including the SIMP. The SIAU recommended that the proponent's housing and accommodation strategy take into account the recently approved Major Resource Project Housing Policy. The policy outlines that the Queensland Government believes that resource workers should have a choice of where and how they live, and the need for proponents to work with local communities, Councils, unions and the State Government to make sure the liveability and sustainability of towns is protected, and that workers have a choice about where they live. Furthermore, the policy states that the proponent must, where practicable and sustainable, locate a proportion of their operational workforce in resource towns to support the growth and liveability of these towns and should provide evidence that they have considered this option in consultation with the relevant State and Local Government and community.

In the response to comments dated 28 September 2011, the proponent disagrees that the current proposal for housing operational workforce in workers camps needs reviewing as the proponent claims that this is the expected preference of the workforce. Furthermore, the proponent adds that even though it is expected that the majority of the workforce will be housed in camps, they will be offered other options as per the Housing and Accommodation Strategy (HAS). It is recommended that the proponent and the SIAU continue to liaise in order to resolve outstanding issues with having employees housed in workers camps.

The proponent, in the response to comments dated 28 September 2011, commits to submitting a final SIMP to the SIAU, Office of the Coordinator General that includes:

- developing a Housing and Accommodation Strategy (HAS)
- reviewing the Major Resource Housing Policy when developing the HAS.

4.15 Health and safety

The Health and Safety section of the EIS adequately addressed the TOR with respect to the potential impacts of the Codrilla Project on the health and safety of the community. The potential impacts on the workforce are covered by other legislation and are not subject to approvals under the EP Act.

The project is located in close proximity to a number of homesteads including the Codrilla homestead, and the project is close to the Valkyrie State Primary School and the school residence. The EIS identified potential impacts to the local community relating to air, noise, traffic, water quality and social values. Mitigation measures are proposed in the relevant sections of the EIS and incorporated as commitments in the EM plan.

Also, the EIS identified the potential impacts of the project on the health and safety of the community in relation to surface water, including potential for:

- flood events to cause damage to improperly constructed or located coal haul roads and mining infrastructure, posing a danger to life and property
- contamination of usable alluvial aquifers downstream from mining operations from poor quality mine water.

The monitoring, auditing and management of water quality impacts are incorporated in the EM plan and conditioned in the Environmental Authority.

Due to the remote location of the project, the proponent anticipates that the residences of Nebo, Moranbah and Mackay will not be affected by dust, air emissions or odours; noise and vibration; or changes to water quality.

Queensland Police raised issues regarding traffic safety such as fatigue management, increased traffic and wide load movements, speeding and drink driving. These matters should be appropriately addressed by the proponent through the traffic management plan in the EIS.

The proponent commits to implementing a Health and Safety Management Plan during all stages of the project. The Health and Safety Management Plan will document the systems, standards, methods and procedures necessary to ensure mitigation of risks relevant to the stages of the Codrilla Project to ensure legislative compliance. The aim

of the management plan will be to maintain the health, safety and quality of life of the project workforce, contractors and visitors.

4.15.1 Economy

The project is situated in the Isaac Regional Council (IRC) area. While the IRC area contributes to the Mackay regional economy in a number of sectors, including agriculture and service industries, the largest contribution is from the mining sector. The region contributes 52.1% of the Gross Regional Product (GRP), and represents 3.7% of the Queensland economy. The economy has very limited diversity and is dominated by the mining sector, which represents 77% of the output in the Isaac subregion. The Isaac subregion also accounts for 80% of the mining income into the Mackay regional economy.

As part of the EIS, a benefit-cost analysis was undertaken to identify the economic costs and benefits of the Codrilla Project.

The EIS discussed the loss of approximately 4,540 hectares of agricultural (beef cattle) production land due to the total footprint of mining activities over the life of the mine. The EIS stated that some beef cattle production may continue on mining land over the period, and production should be restored in the future after rehabilitation of mining lands is completed, except for the final voids and reduced productivity of the mine dumps.

DERM received a submission from a landholder regarding the EIS failing to undertake a proper and balanced cost-benefit analysis. The proponent provided an adequate response to landholder issues and provided amendments to the revised social and economic assessment.

The EIS identified the following opportunity costs should the Codrilla Project proceed:

- increased export income to Australia, of approximately \$410 M per annum from average sales of up to 3.8Mtpa
- net profits to the project proponent from annual operating revenue less all costs and return on capital, estimated at \$41 M per annum. This income will flow to operators and owners, and ultimately to shareholders
- royalty payments to the Queensland Government of approximately \$35M per annum over 12 and a half years
- increased income and company tax receipts to the Australian Government
- increased direct employment in the regional area of 170 full time employee (FTE) workers in the construction phase and 240 FTE workers in the operating stage
- increased indirect employment in the regional, state and national economies, with a total of 2,048 extra jobs created nationally
- further development of the mining services supply chain in the Mackay region and other parts of Queensland.

DEEDI raised an issue in their submission to DERM that the EIS does not include reference to Queensland Government's Local Industry Policy. The purpose of the Policy is to ensure capable competitive local industry is provided with full, fair and reasonable opportunity to tender for infrastructure and resource based projects. However, since the Codrilla Project is not a significant project under the *State Development and Public Works Organisation Act 1971*, this policy does not apply to the Codrilla Project. The proponent addressed DEEDI's issue by committing in their SIMP to implementing an appropriate strategy or policy in regard to ensuring local goods and service providers are given opportunity to provide to the project.

The proponent provided adequate economic commitments in their EM plan, including:

- develop and implement policies relating to service provision and purchasing hierarchies, e.g. local personnel and business first if qualified and commercially competitive
- community Investment Programs – including mix of apprenticeships, scholarships and vocational training opportunities
- develop and maintain the SIMP for the life of the Codrilla Project.

The EIS has adequately addressed the TOR with respect to economic issues.

4.16 Hazard and risk

The EIS conducted a preliminary hazard and risk assessment (PHA) of the potential hazard and risks to people and property associated with the Codrilla Project. The EIS presented an acceptable Risk Management Framework and Risk Assessment Methodology and Criteria for the project.

The PHA considered natural disasters, dangerous goods, waste materials (process and non process), air and noise, surface and groundwater, cultural heritage, wildlife, landform failure, disease and other construction and operational activities that may impact the health and safety of humans and the environment.

The breakdown of the hazards by risk ranking was as follows:

- 11 high risk
- 28 medium risk
- 3 low risk.

The EIS then considered the risks after application of mitigation strategies, and the residual risk ranks were grouped as follows:

- 0 high
- 8 medium
- 34 low.

The medium residual risks that were identified in the EIS with their proposed mitigation strategies are shown below in Table 4.8.

Table 4.8 - Risk Assessment Table

Aspect/Activity	Impact	Proposed Mitigation Strategies
Off-site transport – increase in movements of heavy vehicles and traffic during construction and operation.	Increased risk of accidents and injury/death	Traffic management plan Police escorts Public notices regarding timing and anticipated route. Development of right hand turn lane into mine at Fitzroy Developmental Road access Driver fatigue management incorporated into Health & Safety Management Plan
Onsite transport – heavy vehicle and light vehicle movement during construction and operation.	Risk of accident and injury/death	Traffic management plan Health & Safety inductions Competency based driving assessment for relevant workforce Workforce to be transported by bus between accommodation camp at Moorvale Mine and project
Construction Activities	Risk of injury/death	Health and Safety Management Plan Formal safety practice design Experienced supervisors Contractor and supplier selection Equipment selection Equipment inspection Fall from heights controls Welding safety practices Personal Protective Equipment (PPE)
Blasting during operation	Potential risk of injury/death to person	Relevant staff to complete fire safety training during initial induction and on an annual basis Regular fire safety testing of mine operation facilities and equipment Liaison with landowners and local authorities regarding fire breaks and ongoing maintenance programs to minimise bush fire risk Documented Emergency Response Plan
Electricity, during	Contact with high	Restricted access to high voltage areas

operation.	voltage electricity	<p>Use of qualified electricians</p> <p>Isolation procedures for control of energy</p> <p>SOPs and MOPs for general electricity including cable management</p> <p>Application of relevant standards relating to Electricity Act</p> <p>Compliance check on contractors</p> <p>Contractor management system</p> <p>Overhead lines marked</p> <p>Clearance for overhead lines</p>
Final Void during decommissioning	Falling Hazard	<p>Maximum slope of final landform no more than 8°</p> <p>Assess possible tools to restrict access, for example fencing</p> <p>In pit dumping</p> <p>Clear signage</p> <p>DERM guidelines to be adhered to when managing final voids</p>

Source Table from Tables 4.12.7, 4.15.8 and 4.15.9 [of the EIS?]

The EIS states that if the proposed mitigation measures are adhered to, no residual risk will remain that exceeds generally accepted community standards.

The EIS satisfactory addressed the requirements of the TOR matters in relation to hazard and risk .

4.17 Rehabilitation

The EIS included a progressive rehabilitation strategy that generally consists of the development of a stable, self sustaining final landform, with appropriate post-mining land uses applied.

DERM advised the proponent of issues regarding rehabilitation, including:

- the proponent to revise the rehabilitation objectives in accordance with specified objectives and completion criteria provided by DERM
- an alternative method to be adopted for overburden placement, encapsulation and rehabilitation that is suitable for the highly sodic waste material that would be excavated, having an exchangeable sodium percentage of between 17.8% to 60.6%
- need to amend the statement made about the success of rehabilitation at the Coppabella Coal Mine given that DERM is aware of significant issues with gully and rill erosion and difficulties in meeting rehabilitation acceptance criteria in the overburden stockpiles at Coppabella Coal Mine.

The proponent provided an adequate response to DERM issues that included providing additional information on the rehabilitation of overburden dumps and amendments to the EIS.

DERM is satisfied that the EIS has adequately addressed the TOR with regard to the proposed rehabilitation of the Codrilla Project site.

The EM plan dated 12 October 2011, states that the rehabilitation strategy for the mine will consider the following integrated measures:

- detailed planning prior to disturbance, such as topsoil stockpile locations, etc
- implementation of practical landform designs, to prevent erosion and establish final landform stability
- identification of an appropriate post-mine land use consistent with local environmental constraints and values
- revegetation trials for the selection of appropriate species and methodology
- progressive rehabilitation of disturbed areas, using appropriate rehabilitation procedures for the area having been disturbed
- implementation of best practice erosion control measures
- a rehabilitation monitoring program to assess success, or potential for improvement, of rehabilitation practices
- a corrective action program to address failed areas of rehabilitation

- prepare a Final Rehabilitation Report within 2 years prior to the surrender of the MLs.

The EM plan dated 12 October 2011 contained a commitment that rehabilitation areas will be designed to meet the final rehabilitation design criteria outlined below:

- out of pit overburden dumps
 - elevated landform – maximum 50 m vertical height
 - outer batter slope – maximum 5.7°
 - crest slope – maximum 2.3°
- codisposal and ROM Pad
 - elevated landform – 15 - 18m vertical height
 - outer batter slope – 8° or less
 - crest slop – maximum 2.3°
- coal stockpile areas
 - flat to undulating - <4.6° slope
- in pit overburden backfill
 - flat to undulating - <4.6° slope
- infrastructure areas
 - flat to undulating - <4.6° slope
- final void
 - depth – 150m
 - highwall as mined weathered average slope angle - 1V and 0.7H (55°)
 - lowwall as backfilled at angle of repose - 1V to 1.35H (36°)
- design and install perimeter stormwater diversion
- fence the perimeter of the residual void to restrict access
- surface runoff from all rehabilitated areas will be directed to sediment control structures to reduce the amount of final sediment loads reporting to watercourses.

The EM plan states that the basic process that will be adopted to achieve the desired outcomes of the rehabilitation strategies, are:

- clearing and piling up of vegetation ahead of mining
- topsoil recovery as per the Topsoil Management Plan to be developed for the operation
- management of poor quality overburden materials within dumps
- contouring of overburden dumps
- construction of drainage structures if required
- spreading of topsoil on contoured surface as detailed in the Topsoil Management Plan
- ripping along the contour
- application of relevant seed mix and fertiliser
- monitoring and success assessment of rehabilitation areas
- maintenance of rehabilitation as required.

The EM plan dated 12 October 2011 contained a commitment to developing a residual void plan that will be developed to manage the residual void and will be based on operational experience and geotechnical assessment.

The residual void plan will include consideration of:

- minimisation of the size of the residual void
- development of a detailed plan for post mining management of the void
- groundwater draw down
- long term water quality
- ensuring the void is geotechnical stable
- ensuring exposed coal seams do not present a potential fire risk
- provision of reasonable permanent safety measures to prevent accidental entry to the void by persons, vehicles, stock or wildlife
- provision of water diversion structures to avoid flooding.

The rehabilitation conditions recommended to be included in the draft environmental authority are contained in Appendix 1.

5 Adequacy of the environmental management plan

An EM plan was included with the EIS that was released for public notification. A number of submissions on the EIS raised issues that required amendments to the EM plan and many of these amendments were included by the proponent in the amended EM plans dated 30 June and 24 August 2011. DERM reviewed the latest amended EM plan dated 24 August 2011, but considered that the following recommendations needed to be included:

- the proposed management strategies for miscellaneous coarse rejects
- commitments to further address dust emissions from the haul road in the event
- a commitment to correlation of information from noise monitoring equipment and the weather station to enable mitigation strategies to be further developed based on actual site specific conditions
- change the Government Biodiversity Offset Policy (Draft) to the Queensland Biodiversity Offset Policy (version 1) 3 October 2011.

The proponent has included the above recommendations in the final EM plan (12th October 2011) and therefore DERM has decided that the EM plan complies with the content requirements of s203 of the EP Act.

6 Suitability of the project

DERM has considered the TOR, the submitted EIS, all submissions on the submitted EIS, and the standard criteria. The submitted EIS has not identified impacts of sufficient magnitude to prevent the project from proceeding.

7 Recommended conditions

The proponent has provided a list of draft conditions for an environmental authority and DERM has provided recommended amendments to these conditions. It is recommended that the conditions provided in Appendix 1 of this report should be included in the environmental authority for the project.

8 Completion of this EIS process

Once this EIS assessment report has been approved by the delegate for the chief executive, the giving of this EIS assessment report to the proponent completes the EIS process.

Approved by

Signature: SIGNED

Date: 24 October 2011

Lindsay Delzoppo

Director, Environmental Impact Assessments

Department of Environment and Resource Management

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