



Millennium Expansion Project Environmental Impact Statement

December 2010

APPENDICES - VOLUME 3

Peabody

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Millennium Expansion Project Environmental Impact Statement

APPENDIX A:

FINAL TERMS OF REFERENCE

Terms of reference for an environmental impact statement

Final terms of reference for the Millennium Expansion Project EIS

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Background

The Millennium Coal Mine is an existing open-cut coal mine, operated by Millennium Coal Pty Ltd (MCPL), a wholly owned subsidiary of Peabody Pacific Pty Ltd. MCPL proposes to extend the open-cut mining operation within areas covered by mining lease (ML) 70313, ML Application 70401 and Mineral Development Licence 136. The proposed open-cut extension is called the Millennium Expansion Project (MEP).

The Millennium Coal Mine is located in the Bowen Basin approximately 22km east of Moranbah and 16km southwest of Coppabella, within the Isaac Regional Council area. The mine is located adjacent to the Poitrel Coal Mine which is owned and operated by BHP Mitsui Coal Pty Limited.

The mine has been operating since 2005 with approval to produce at a rate of 1.9 million tonnes a year (Mt/y). The MEP proposes to increase the extraction rate to approximately 10 Mt/y run-of-mine (ROM) coal. The estimated mine life is a further 15 years from when the environmental approvals would be granted. The MEP proposes to continue the existing open-cut truck and excavator terrace mining methods, though the use of an electric shovel and/or a dragline may be considered at a later stage in the life of the mine. The size of current ROM and product stockpile areas would be increased to meet the additional throughput. The MEP would process the ROM coal onsite at the existing Coal Handling and Preparation Plant (CHPP) and the product coal would be transported via the existing rail network to the established Dalrymple Bay Coal Terminal for export.

Water would be sourced from the West Creek Environmental Control Dam, the CH4 Coal Seam Gas operation and the Burdekin Pipeline. The MEP may require an upgrade to the current power supply if alternative mining methods (e.g. electric shovel and/or dragline) are undertaken in the future.

Accommodation facilities would be provided for construction and operational contractors and personnel at the MAC Accommodation Village at Coppabella. Additional staff may be accommodated at the MAC Accommodation Village at Moranbah.

MCPL applied for, and has been granted, approval to prepare a voluntary environmental impact statement (EIS) for the project. The MEP is a controlled action that requires approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions under Division 1, Part 3 of the EPBC Act are section 18 and 18A (listed threatened species and communities). The State's EIS process has been 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 (2004).

CONTENT OF THE EIS

Executive summary

The Executive Summary will be written as a stand alone document, able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole.

The function of the executive summary is to convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms.

The structure of the Executive Summary should follow that of the EIS, and focus strongly on key issues and conclusions to enable the reader to obtain a clear understanding of the MEP and its potential adverse and beneficial environmental, social and economic impacts, as well as the management measures to be implemented by the Proponent to mitigate all adverse impacts.

Glossary of terms

A glossary of technical terms, acronyms and abbreviations will be provided before the main text of the EIS.

1 Introduction

The function of the introduction is to explain why the EIS has been prepared and what it sets out to achieve. It will also define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document will be referenced.

1.1 Project proponent

Provide details of the project proponents, including details of any joint venture partners.

1.2 Project description

A brief description of the key elements of the MEP will be provided and illustrated. Any major infrastructure requirements will also be summarised. Detailed descriptions of the MEP will follow in section 3.

A brief description will be provided of studies or surveys that have been undertaken for the purposes of developing the MEP and preparing the EIS. This will include reference to relevant baseline studies or investigations undertaken previously.

1.3 Project objectives and scope

A statement of the objectives which have led to the development of the MEP and a brief outline of the events leading up to the MEP's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and actions already undertaken within the MEP area.

Describe the current status of the MEP and outline the relationship of the MEP to other developments or actions that may relate whether or not they have been approved. The consequences of not proceeding with the MEP will also be discussed.

1.4 The environmental impact statement (EIS) process

The important aspect of this section is to make clear the methodology and objectives of the environmental impact statement under the relevant legislation.

1.4.1 Methodology of the EIS

This section will provide a description of the EIS process steps, timing and decisions to be made for relevant stages of the MEP. A brief description will be provided of studies or surveys that have been undertaken for purposes of developing the project and preparing the EIS. This will include reference to relevant baseline studies or investigations undertaken previously. This section will also indicate how the consultation process would integrate with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation. The information in this section is required to ensure:

- relevant legislation is addressed;
- readers are informed of the process to be followed; and
- stakeholders are aware of any opportunities for input and participation.

1.4.2 Objectives of the EIS

Having described the methodology of the EIS, a succinct statement will be made of the EIS objectives. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives. The reader should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the MEP.

While the TOR provides guidance on the scope of the EIS studies, they should not be seen as exhaustive or limiting. It is important for proponents and their consultants to recognise that there cannot be perfect knowledge in advance of undertaking an EIS of what the EIS studies may find.

If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the MEP, those matters will be included in the EIS.

In addition, it is essential that the main text of the EIS addresses all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft environmental management plan (EM plan).

The depth and scope of the assessment in the EIS will need to be commensurate with the values to be impacted and the scale of the impacts. When considering whether an impact is or is not significant, the Proponent will take account of both the intensity of the impact and the context in which it would occur.

The EIS is a public document. Its purpose is not only to provide information to regulatory agencies, but also to inform the public of the scope, impacts and mitigation measures of the MEP. As such, the main text will be written in plain English avoiding jargon as much as possible. Additional technical detail may be provided in appendices. The main text will not assume that a reader would have a prior knowledge of the MEP site. It should not be necessary for the reader to have visited the site to understand the issues involved in the MEP.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the MEP, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in providing the MEP's draft EM plan will also be discussed, with particular reference to the EM plan's role in providing management measures that can be carried over into conditions that would attach to any approval(s), environmental authorities and permits for the MEP.

1.4.3 Submissions

Readers will be informed as to:

- how to make submissions;
- what form the submissions will take and required contact details;
- when submissions must be made to gain standing for any legal appeal process; and
- how submissions on the draft EIS will be addressed and taken into account in the decision-making process.

1.5 Public consultation process

An appropriate public consultation program is essential to the impact assessment. This section will outline the methodology that will be adopted to identify and mitigate socio-economic impacts of the MEP. Information about the consultation that has already taken place and the results of such consultation will be provided.

The submission of a list of affected persons and interested persons as well as a statement of how the Proponent proposes to consult with those persons is a statutory requirement of the EIS process in the *Environmental Protection Act 1994*.

The public consultation program will provide opportunities for community involvement and education. It may include interviews with individuals, public meetings, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation process will identify broad issues of concern to local community and interest groups and will continue from project planning through commissioning, project operations and final decommissioning. Refer to the DERM guideline '*Issue Identification and Community Consultation*'.

1.6 Project approvals

1.6.1 Relevant legislation and policy requirements

This section will explain the legislation and policies controlling the approvals process. The requirements for any approval under relevant State legislation will be discussed. Any exemption that may apply will also be discussed. Reference will be made to the Queensland *Environmental Protection Act 1994*, *Water Act 2000*, *Water Resource (Fitzroy Basin) Plan 1999*, *Fitzroy Basin Resource Operations Plan* and any other relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* will also be included. Local Government planning controls, local laws and policies applying to the development will be described where relevant.

This information is required to assess how the legislation applies to the MEP, which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate.

1.6.2 Project approvals

A list of the approvals (including Local Government planning controls, local laws and policies) required for the MEP will be provided, including the expected timetable for approval of the various applications. This information is required to make clear how the MEP conforms to State, regional and local plans for the area.

1.6.3 Planning processes and standards

This section will discuss the consistency of the MEP with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans), and the legislation, standards, codes or guidelines available to monitor and control operations on site. This section will refer to all relevant State and regional planning policies. In particular, this section will highlight requirements of the *Environmental Protection Act 1994*, such as the Ecologically Sustainable Development (ESD) principles, 'best practice environmental management', 'general environmental duty', relevant Environmental Protection Policies (EPPs) i.e. Air, Noise, Water and Waste Management, and the *Environmental Protection Regulation 2008*.

1.7 Accredited process for controlled actions under Commonwealth legislation

The MEP is a controlled action under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) requiring approval from the Federal Minister for the Environment, Heritage and the Arts. The controlling provisions under Division 1, Part 3 of the EPBC Act are: Section 18 and 18A (listed threatened species and communities). The State's EIS process has been 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 (2004).

It will be necessary for the EIS to address potential impacts on the matters of national environmental significance (NES) that are identified in the controlling provisions. Schedule 4 of the Commonwealth's *Environment Protection and Biodiversity Conservation Regulations 2000* sets out the matters to be addressed in the EIS. The EIS will provide separate discussions under subheadings in the relevant sections of the EIS that address the prescribed matters. Alternatively, a stand-alone report could be provided and presented as a separate chapter of the EIS that exclusively and fully addresses the matters relevant to the controlling provisions. Whichever method is used, those parts of the EIS addressing matters of NES will be readily identifiable from the table of contents.

2 Project need and alternatives

2.1 Project justification

The justification for the MEP will be described, with particular reference made to the economic and social benefits, including employment and spin-off business development, which the MEP may provide. The status of the MEP will be discussed in a regional, State and national context.

2.2 Alternatives to the MEP

This section will describe feasible alternatives, including conceptual, technological and locality alternatives to the MEP, and discussion of the consequences of not proceeding with the MEP. Alternatives will be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Comparative environmental impacts of each alternative will be summarised.

The interdependencies of the MEP components will be explained, particularly in regard to how each of any industrial developments, or various combinations of industrial developments, and any infrastructure requirements relate to the viability of the MEP. Should water supply, power, transport and/or storage infrastructure be included as an element of the MEP, this section should include a description of and rationale for such infrastructure.

Reasons for selecting the preferred options will include technical, commercial, social and natural environment aspects. In particular, principles of ESD and sustainable development will be included. The relationship of options chosen for waste management and any emissions produced will be detailed.

This information is required to assess why the scope of the MEP is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the MEP.

3 Description of the MEP

This section will describe the MEP through its lifetime with emphasis on those aspects that will change as a consequence of the increased coal production rate and or additional areas to be mined. Where appropriate, each section will also address the various stages of the MEP i.e. planning, construction, operation and decommissioning. It also allows further assessment of which approvals may be required. Maps or figures showing the position of features or boundaries will use the latitudes and longitudes on the GDA94 datum. Latitudes and longitudes on the GDA94 datum will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

3.1 Location

3.1.1 Regional context

The regional context of the MEP will be described and illustrated on maps at suitable scales.

3.1.2 Local context

The local context of the MEP will be described and include real property descriptions of the MEP site and adjacent properties. Maps at suitable scales will be provided showing the precise location of the MEP area, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the MEP area is or will be subject;
- the location and boundaries of the MEP footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, plant locations, water storages, buildings, bridges, culverts, hardstands, car parks, etc; and
- the location of any proposed buffers surrounding the working areas.

This section will include a rectified air photo enlargement (preferably A3 size) to illustrate components of the MEP in relation to the land and mining tenures and natural and built features of the area.

3.2 Construction

The extent and nature of the MEP's construction phase will be described. The description will include the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site. Sources of construction materials and their associated haulage routes will also be identified for assessment purposes.

Any staging of the MEP will be described and illustrated showing site boundaries, development sequencing and timeframes.

The estimated numbers of people to be employed in the MEP construction phase will also be provided with a brief description of where those people may be accommodated and/or how they will be transported to the site.

3.3 Operations

The location and nature of the processes to be used will be described in the text and illustrated with maps, diagrams and artist's impressions as required. Operational issues to be addressed will include, but may not be limited to:

- a description of plant and equipment to be employed;
- the capacity of plant and equipment, and
- chemicals to be used.

Concept and layout plans will be provided highlighting proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials, will be described.

Indicative process flow-sheets will be provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

3.3.1 Tenements and tenures

Describe and illustrate any existing mining tenements, geothermal and petroleum tenures overlying and adjacent to the MEP site, and any proposed tenure applications for the MEP.

3.3.2 Resource base and mine life

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal (further detail should be provided in section 4.2.1.2, Geology). The location, volume, tonnage and quality of natural resources required will be described (e.g. land, water, timber, energy, etc.). Specific details will be provided on the following:

- the proposed mine life and an outline of the coal/mineral resource base including the total thickness of seams or extent of the ore body;
- the planned recovery of resources;
- locations of any resources that would be sterilised by the planned activities; and
- the quantity of coal/mineral to be mined annually including any proposed ramping of production or staging of development.

3.3.3 Mining methods and equipment

Specific details will be provided of the following:

- the mining type and methods to be used, including the major equipment to be used in the various components of the operation;
- the use of different techniques in areas of different topographic or geo-technical character; and
- chemicals to be used, including hydraulic fluids used and released in underground operations.

The description will refer to, and be complemented by, the figures previously presented in section 3.3.1 showing the locations of key aspects of the MEP. Additional figures will be provided if required.

3.3.4 Mine sequencing

Specific details will be provided of the following:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease;
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled during the MEP's operation or left after mining ceases—the description will include the rate of throughput of stockpiles of product, reject and overburden;
- the proposed progressive backfilling of excavations; and
- the area disturbed at each major stage of the MEP.

Information will also be provided on the workforce numbers to be employed in the facility's operations during its various phases (construction, commissioning, operation and decommissioning) and stages with a brief description of where those people may be accommodated and/or how they will be transported to the site. Comment will be made on the anticipated basis of employment (permanent, contract, etc).

3.3.5 Workforce

Information will be provided on the workforce numbers to be employed in the facility's operations during its various phases (construction, commissioning, operation and decommissioning) and stages. The EIS will also provide a description of where those people may be accommodated and/or how they will be transported to the site. Comment will be made on the anticipated basis of employment (permanent, contract, etc).

3.3.6 Processing and products

This section will describe the quantities and characteristics of the products produced on an annual basis. Indicative process flow-sheets will be provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

3.3.7 Ongoing evaluation and exploration activities

This section will describe the extent and nature of any proposed ongoing exploration or geological/geo-technical evaluation within the MEP area that may be required over the life of the MEP.

3.4 Product handling

This section will describe and show on plans (at an appropriate scale), the existing and proposed methods and facilities to be used for product storage and for transferring product from the processing plant to the storage facilities and from the storage facilities to the transport facilities. Include a discussion of any environmental design features of these facilities, including bunding of storage facilities.

3.5 Infrastructure requirements

This section will provide descriptions, with concept and layout plans, of requirements for constructing, upgrading or relocating all infrastructures associated with the MEP. The locations of any necessary infrastructure easements will be shown on the plan. The matters to be considered include such infrastructure as roads, rail, bridges, jetties, ferries, tracks and pathways, conveyors, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), and pipelines for any services (whether underground or above).

3.5.1 Transport—road/rail/conveyor/air/ship

Provide an overview of the arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction phase and operational phases of the MEP will be described. The description will cover the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

3.5.2 Energy

The EIS will describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the MEP. The locations of any easements will be shown on the infrastructure plan. The EIS will describe measures to protect energy easement interests, including access for maintenance and operational works. Energy conservation will be briefly described in the context of any Commonwealth, State and local government policies.

3.5.3 Water supply, demand and storage

The EIS will provide information on water usage by the MEP, including the quality and quantity of all water supplied to the site. In particular, the proposed and optional sources of water supply will be described (e.g. bores, any surface storages such as dams and weirs, municipal water supply pipelines). This section will detail the proposed construction of any water supply or storage works required. Any storages to take overland flow water will be detailed along with their storage capacities.

The EIS will discuss dewatering if it is proposed to be used as a water source. It will detail any treatment required of this water source.

This section will detail any investigative work required in determining the availability of the supply.

Reference will be made to the regulatory requirements under the *Water Act 2000* that may be associated with access to water supply, including a water licence to take water for dewatering under the *Water Act 2000*.

Estimated rates of supply from each source (average and maximum rates) will be given. Any proposed water conservation and management measures will be described.

Determination of potable water demand will be made for the MEP, including the temporary demands during the construction period. Details will be provided of any existing town water supply to meet such requirements. If water storage and treatment is proposed on site, for use by the site workforce, then this will be described.

3.5.4 Stormwater drainage

An illustrated description will be provided of the proposed stormwater drainage system (i.e. mine water management system) and the proposed disposal arrangements, including any off-site services. Contour plans at a suitable scale (1m contours in areas of low relief) will be provided with site facility locations superimposed to show contributing catchments for disturbed areas under the MEP.

3.5.5 Sewerage

This section will describe, in general terms, the sewerage infrastructure required by the MEP. If it is intended that industrial effluent or relatively large amounts of domestic effluent are to be discharged into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent will be provided in Section 4.3 Waste. For industrial effluent, this will include detail of the physical and chemical characteristics of the effluent(s).

3.5.6 Telecommunications

The EIS will describe any impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure.

3.5.7 Accommodation and other infrastructure

A description will be provided of any other developments directly related to the MEP not described in other sections, such as:

- camps, townships or residential developments;
- fuel storage areas;
- equipment hardstand and maintenance areas; and
- technical workshops and laboratories.

3.6 Waste management

An inventory of all wastes to be generated by the MEP during the construction, operational and decommissioning phases of the MEP will be provided. In addition to the expected total volumes of each waste produced, include an inventory of the following per unit volume of product produced:

- the tonnage of raw materials processed;
- the amount of resulting process wastes; and
- the volume and tonnage of any re-usable by-products.

Schematic diagrams, which for the operational phase may be simplified versions of those provided in section 3, will be provided for each distinct stage of the MEP (e.g. construction/site preparation, commissioning, operation and decommissioning) indicating the processes to be used and highlighting their associated waste streams (i.e. all waste outputs: solid, liquid and gaseous), including recycling efforts, such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. The physical and chemical characteristics of waste material from the process plant will be provided.

Having regard for best practice waste management strategies and the Environmental Protection (Waste) Policy, the proposals for waste avoidance, reuse, recycling, treatment and disposal will be described in the appropriate sub-section below. Information will also be provided on the variability, composition and generation rates of all waste produced at the site and processing plant.

Cleaner production waste management planning will be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the MEP. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, co-generation of power and by-product reuse as shown in a material/energy flow analysis will be presented.

This information is required to enable the resource management agencies and other stakeholders to assess the efficiency of resource use, and allocation issues.

3.6.1 Air emissions

Describe in detail the quantity and quality of all air emissions (including particulates, fumes and odours) from the project during construction and operation. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks, either by entrainment from the load or by passage on unsealed roads).

The methods to be employed in the mitigation of impacts from air emissions should be described in section 4.6 Air.

3.6.2 Excavated waste

This section will describe and show the location, design and methods for constructing dumps for waste rock and subsoil. The location of the dumps will be shown on a map relative to topography and other natural features of the area. The following will be detailed and discussed:

- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually.
- Results of waste rock and subsoil characterisation that includes the net acid producing potential of the mined waste rock (metals analysis, sulfides, pH, conductivity, sodic, saline, Net Acid Producing Potential (NAPP), Net Acid Generation (NAG) and Acid Neutralising Capacity (ANC)).
- Characterisation will also address the properties of waste rock and subsoil that affect their erosion potential. Sampling will be representative with profiles of all geological units included and based on accepted statistical procedures and be in accordance with recognised guidelines.
- Details of any likely leachate quality expected under field conditions, including contaminants such as sulfate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.
- Measures to ensure stability of the waste dumps, particularly the management of drainage.
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance.
- Alternatives for excavated waste disposal, including in-filling of voids, off-site options and treatment of any contaminated soil.

3.6.3 Tailings or fine rejects

This section will describe the tailings waste produced by preparation and/or processing plants and the proposed methods for its disposal. Alternative options for tailings disposal including the proposed location, site suitability and volume of any tailings storage and/or disposal site(s), including the method of construction will be described.

The approximate quantity of tailings to be produced by the MEP and its processing plant annually for the life of the mine will be described. Tailings characterisation information will also be presented in this section, including:

- physical properties of the tailings solids;
- geochemical properties of the tailings solids using static testing (Net Acid Production Potential (NAPP), NAG etc); and
- chemical properties of tailings pore-water including pH, conductivity, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.

The construction of the tailings storage facility will be described with regards to construction material and design sufficient to determine storage volume relationships and the basic stability of the design. The EIS will address how the tailings storage facility complies with relevant codes for the construction of such containment systems.

Describe the strategies to monitor and manage seepage into ground and surface waters. The location of the storage and/or disposal site with regard to adjacent creeks and rivers will be described.

3.6.4 Solid waste disposal

The quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal will be described. The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, will be shown.

3.6.5 Liquid waste

A description will be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the MEP other than that addressed in previous sections. Particular attention will be given to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the MEP and processing plant is required to account for the estimated usage of water.

The EIS must consider the following effects:

- groundwater from excavations;
- rainfall directly onto disturbed surface areas;
- run-off from roads, plant and industrial areas, chemical storage areas;
- drainage (i.e. run-off plus any seepage or leakage);
- seepage from other waste storages;
- water usage for:
 - process use;
 - dust suppression;
 - domestic purposes;
- evaporation;
- domestic sewage treatment – disposal of liquid effluent and sludge; and
- water supply treatment plant – disposal of wastes.

3.7 Rehabilitation and decommissioning

This section will present and describe the options, strategies and methods for both progressive and final rehabilitation of the environment disturbed by the MEP. The strategic approach to progressive and final rehabilitation will be described. A preferred rehabilitation strategy will be developed with a view to minimising the amount of land disturbed at any one time. The final topography of any excavations, waste areas and dam sites will be shown on maps at a suitable scale.

The strategies and methods presented for progressive and final rehabilitation of disturbed areas will demonstrate compliance with the objectives of the Guideline 18: *Rehabilitation requirements for mining projects* and the *Technical guidelines for the environmental management of exploration and mining in Queensland (1995)* except where superseded by Guideline 18. In particular, the strategies and methods will have the following objectives:

- mining and rehabilitation will aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed;
- mine wastes and disturbed land will be rehabilitated to a condition that is self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use; and
- surface and ground waters that leave the lease will not be degraded to a significant extent. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site.

The means of decommissioning the MEP, in terms of the removal of plant, equipment, structures and buildings will be described, and the methods proposed for the stabilisation of the affected areas will be given. Information will be provided regarding decommissioning and rehabilitation of the plant site, removal of processing plant, rehabilitation of concrete footings and foundations, hardstand areas and storage tanks (including any potential for reuse of these facilities). Options and methods for the disposal of wastes from the demolition of plant and buildings will be discussed in sufficient detail for their feasibility and suitability to be established.

Describe any proposals to divert creeks during operations, and, if applicable, the reinstatement of the creeks after operations have ceased. The EIS will consider and recommend the levee protection required for any pits, voids, uncompacted overburden and workings arising in the MEP that might be subject to inundation during operation and decommissioning. Where dams are to be constructed, proposals for the management of these structures after the completion of the MEP will be given. Also, the final drainage and seepage control systems and long-term monitoring plans will be described. The EIS should also demonstrate where final voids and uncompacted overburden and workings at the end of mining would lie in relation to flood levels up to and including the “probable maximum flood level” based on the Bureau of Meteorology’s “probable maximum precipitation” forecast for the locality.

A description of topsoil management will consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) will also be addressed.

Detail of the impacts of the preferred rehabilitation strategy will be discussed in the appropriate subsections of Section 4 (Environmental values and management of impacts) particularly with regard to such issues as final landform stability, rehabilitation of flora and the long-term quality of water in any final voids. Implications for the long-term use and fate of the site will also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

4 Environmental values and management of impacts

The functions of this section are to:

- Describe the existing environmental values of the area which may be affected by the MEP. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values will be described by reference to background information and studies, which will be included as appendices to the EIS.
- Describe the potential adverse and beneficial impacts of the MEP on the identified environmental values. Any likely environmental harm on the environmental values will be described.
- Describe any cumulative impacts on environmental values caused by the MEP, either in isolation or by combination with other known existing or planned development or sources of contamination.
- Propose environmental protection objectives and commitments. All environmental protection commitments must be measurable and auditable.
- Examine viable alternative strategies for managing impacts. These alternatives will be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives will be discussed. This section will detail the environmental protection measures to be used in the planning, construction, operations, decommissioning, rehabilitation and decommissioning stages of the project and any associated works for the MEP. Measures will prevent, or where prevention is not possible, minimise environmental harm and maximise socio-economic and environmental benefits of the MEP. Preferred measures will be identified and described in more detail than other alternatives.
- Describe any computational model used to make predictions of impacts and/or outcomes of mitigation measures. The description will address the inputs, assumptions, limitations, sensitivities, accuracy and precision of the model.

Any maps or figures showing the position of features or boundaries will use latitudes and longitudes on the GDA94 datum. Latitudes and longitudes on the GDA94 datum will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the MEP including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the *Environmental Protection Act 1994*, and any catchment management plans prepared by local water boards or land care groups. Special attention will be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.

This section will address all elements of the environment, (such as land, water, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk) in a way that is comprehensive and clear. To achieve this, the following issues will be considered for each environmental value relevant to the MEP:

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in appendices - note such studies may be required over several seasons). It will be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).
- Impact on environmental values: describe quantitatively the likely impact of the MEP on the identified environmental values of the area. The cumulative impacts of the MEP must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of the Great Barrier Reef Marine Park Authority, relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans will be addressed.
- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems must be discussed in the relevant

sections. This assessment will include air and water sheds affected by the MEP and other proposals competing for use of the local air and water sheds.

- Where impacts from the MEP will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the MEP's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements will be described in the EIS.
- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land will be included.
- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.
- Environmental offsets: Information is required to show that measures have been taken to avoid and minimise potential adverse impacts of the proposal. Environmental offsets will be proposed to counterbalance any remaining loss of environmental values, consistent with the specific-issue offset policies under the framework of the Queensland Government *Environmental Offset Policy 2008*.
- Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.
- Auditing programs: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented, such as by a continuous improvement framework, including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element will also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

It is recommended that where possible the final TOR and the EIS follow the heading structure below. The mitigation measures, monitoring programs, etc., identified in this section of the EIS will be used to develop the environmental monitoring program for the MEP (refer to Section 5, EM Plan).

4.1 Climate

This section will describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the MEP including air quality within the region of the MEP. Extremes of climate (e.g. droughts, floods, cyclones, etc.) will also be discussed with particular reference to water management at the MEP site. The vulnerability of the area to natural or induced hazards, such as landslides, floods and bushfires, will also be addressed. The relative frequency and magnitude of these events will be considered together with the risk they pose to management of the MEP.

The potential impacts due to climatic factors will be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion will be addressed in Section 4.2.2.6. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) will be addressed in Section 4.4 with regard to contamination of waterways and in Section 4.3 with regard to the design of the waste containment systems. The impacts of winds, rain, humidity, and temperature inversions on air quality will be addressed in Section 4.5.

4.2 Land

4.2.1 Description of environmental values

This section describes the existing environmental values of the land area that may be affected by the proposal. It will also define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.2.1.1 Topography/geomorphology

The topography of the MEP site and any other potentially impacted area will be detailed with contours at suitable increments, shown with respect to Australian Height Datum (AHD) and drafted to the GDA 94 datum. Significant features of the locality will be included on the maps. Such features will include any locations subsequently referred to in the EIS (e.g. the nearest noise sensitive locations) that are not included on other maps in Section 4.2. Commentary on the maps will be provided highlighting the significant topographical features.

4.2.1.2 Geology

The EIS will provide a description, map and a series of cross-sections of the geology of the MEP area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the MEP will be described. In locations where the age and type of geology is such that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations, the EIS will address the potential for significant finds.

4.2.1.3 Mineral resources and ore reserves

The EIS will provide a summary of the results of studies and surveys undertaken to identify and delineate the mineral resources and ore reserves within the MEP mining leases (including any areas underlying related infrastructure).

The location, tonnage and quality of the mineral resources and ore reserves within the proposed mining leases will be described in detail as indicated below and, where possible, it will be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources and ore reserves will be estimated and reported in accordance with the *Australasian code for reporting of mineral resources and ore reserves* (the JORC Code - available at www.jorc.org/main.php) and the principles outlined in the *Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves* (available at www.jorc.org/pdf/coalguidelines.pdf) as appropriate.

In addition, maps (at appropriate scales) will be provided showing the general location of the project area, and in particular:

- the location and areal extent of the mineral resources to be developed or mined;
- the location and boundaries of mining tenures, granted or proposed, to which the project area is, or will be subject;
- the location of the proposed mine excavation(s);
- the location and boundaries of any project sites;
- the location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure;
- the location of any proposed buffers, surrounding the working areas; and
- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure.

4.2.1.4 Soils

A soil survey of the sites affected by the MEP will be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land. Soil surveys will be undertaken in accordance with

the *Guideline for Surveying Soils and Land Resources* (McKenzie et al, 2008). Information will also be provided on soil stability and suitability for construction of proposal facilities.

Soils will be described and mapped at a suitable scale of 1:10 000 or better. The soils will be described according to the *Australian soil and land survey field handbook* (National Committee on Soil and Terrain, 3rd Edition, 2009) and *Australian soil classification* (Isbell, Revised Edition, 2002). An appraisal of the depth and quality of useable soil will be undertaken. An assessment will be made of each soils agricultural land suitability in accordance with Guidelines for agricultural land evaluation in Queensland (Land Resources, 1990) *Planning guidelines: the identification of Good Quality Agricultural Land* (DPI, DHLGP, 1993), and the *State Planning Policy 1/92: Development and the conservation of agricultural land*.

4.2.1.5 Land use

The EIS will provide a description of current land tenures and land uses, including native title issues, in the MEP area, with particular mention of land with special purposes. The location and owner/custodians of Native Title in the area and details of Native Title claims will be shown.

Maps at suitable scales showing existing land uses and tenures, and the MEP location, will be provided for the entire proposal area and surrounding land that could be affected by the development. The maps will identify environmental values and areas of conservation value in any locality that may be impacted by the MEP. The location of existing dwellings and the zoning of all affected lands according to any existing town or strategic plan will be included.

Describe the land use suitabilities of the affected area in terms of the physical and economic attributes. The assessment will set out soil and landform subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classification system to use is that in Attachment 2 of *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (1995).

Provide a land suitability map of the proposed and adjacent area, and setting out land suitability and current land uses, e.g. for grazing of native and improved pastures and horticulture. Land classified as Good Quality Agricultural Land in the Department of Natural Resources and Water's land classification system is to be shown in accordance with the planning guideline, *The Identification of Good Quality Agricultural Land*, which supports State Planning Policy 1/92.

4.2.1.6 Infrastructure

The location and owner/custodians of all tenures, reserves, roads and road reserves, railways and rail reserves, stock routes and the like, covering the affected land will be shown on maps of a suitable scale. Indicate locations of gas and water pipelines, power lines and any other easements. Describe the environmental values affected by this infrastructure.

4.2.1.7 Sensitive environmental areas

The proximity of the proposal to any environmentally sensitive areas will be shown on a map of suitable scale and with outlines of the MEP infrastructure superimposed. This section of the EIS will then identify whether any of those environmentally sensitive areas could be affected, directly and indirectly, by the proposal.

In particular, the EIS will indicate if the land affected by the proposal is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration will be given to national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA, ROKAMBA), areas of cultural significance and scientific reserves (see section 4.7 for further guidance on sensitive areas).

In addition, this section will also address the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and whether there are national environmentally significant matters in the proposal area.

4.2.1.8 Landscape character

This section will describe in general terms the existing character of the landscape that will be affected by the MEP. It will comment on any changes that have already been made to the natural landscape since European settlement. It will 'set the scene' for the description of particular scenic values in the following section on visual amenity. The difference being that this section describes the general impression of the landscape that would be obtained while travelling through and around it, while the visual amenity section addresses particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.

4.2.1.9 Visual amenity

This section will describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, State-wide, national or international significance. Information in the form of maps, sections, elevations and photographs is to be used, particularly where addressing the following issues:

- identification of elements within the MEP and surrounding area that contribute to their image of the town/city as discussed in the any local government strategic plan - city image and townscape objectives and associated maps;
- major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area, including assessment from private residences in the affected area along the route;
- focal points, landmarks (built form or topography), gateways associated with project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the MEP site;
- character of the local and surrounding areas including character of built form (scale, form, materials and colours), vegetation (natural and cultural vegetation), directional signage and land use;
- identification of the areas of the MEP that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
- the value of existing vegetation as a visual screen.

4.2.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing the land-based environmental values identified through the studies outlined in the previous section. It will describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.2.2.1 Resource Utilisation

With regard to the resource stewardship, the EIS will analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the mineral resources within the MEP area and consider its impacts on other resources. It will demonstrate that the mining proposal will 'best develop' the mineral resources within the MEP area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the State's coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon or sterilised by the mining activities or related infrastructure.

The EIS will provide detail on how the company plans to manage low grade and/or current uneconomic material to ensure that non-sterilisation of this significant potential future resource is considered. The EIS will detail the basis for any non-stockpiling or sterilisation of current un-economic material. This section will also provide details and maps of expected residual or remnant resources within the project area including: any low grade stockpiles; tailings; and current un-economic material.

4.2.2.2 Land use suitability

The potential for the construction and operation of the MEP to change existing and potential land uses of the MEP site and adjacent areas will be detailed. Post operations land use options will be detailed including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options will be given in the context of land use suitability prior to the MEP and minimising potential liabilities for long-term management.

The potential environmental harm caused by the MEP on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business and the implications of the MEP for future developments in the impact area including constraints on surrounding land uses will be described. If the development adjoins or potentially impacts on good quality agricultural land, then an assessment of the potential for land use conflict is required. Investigations will follow the procedures set out in the planning guideline, *The Identification of Good Quality Agricultural Land, which supports State Planning Policy 1/92*.

Outline incompatible land uses, whether existing or potential, adjacent to all aspects of the MEP, including essential and proposed ancillary developments or activities. Areas directly or indirectly affected by the construction and operation of these activities will be identified and measures to avoid unacceptable impacts defined.

4.2.2.3 Subsidence

This section will provide comprehensive surface subsidence predictions taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and including an assessment of the reliability of the predictions. The results of the predictions will be shown on maps with 1m contour increments and a scale appropriate for assessment of surface subsidence impacts. Mitigation measures will be proposed to deal with any significant impacts to the identified environmental values that would result from subsidence.

4.2.2.4 Land disturbance

A strategy will be developed that will minimise the amount of land disturbed at any one time. The strategic approach to progressive rehabilitation of landforms and final decommissioning will be described with particular regard to the impacts in the short, medium and long timeframes. The methods to be used for the MEP, including backfilling, covering, re-contouring, topsoil handling and revegetation, will be described. However, a description of erosion and sediment control could be deferred to section 4.2.2.6. Any proposals to disturb land that would impede or divert overland flow or waterways, and any subsequent reinstatement, during construction or operations will be first described in this section. However, the potential impacts of interfering with flow on the quantity and quality of water resources will be assessed in section 4.4. Also, the final drainage and seepage control systems and any long-term monitoring plans will be described.

In addition to assessing the operational phase of land disturbance, the EIS will address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 3.7. The EIS will detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences. Those changes will be illustrated on maps at a suitable scale and with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters (though the assessment of the impacts on drainage and water quality will be provided in the water resources section of the EIS). The mitigation measures for land disturbance to be used on decommissioning the site will be assessed in sufficient detail to decide their feasibility. In particular, the EIS will address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Rehabilitation success criteria for land disturbance will be proposed in this section while rehabilitation success criteria for revegetation will be proposed in the section on nature conservation.

If geological conditions are conducive, the proponent will consider the possibility that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

4.2.2.5 Land contamination

The EIS will describe the possible contamination of land from aspects of the MEPs including waste, reject product, acid generation from exposed sulfidic material and spills at chemical and fuel storage areas.

The means of preventing land contamination will be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land will be outlined. Intentions will be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after proposal completion.

A preliminary site investigation (PSI) of the site consistent with the DERM's *Draft guidelines for the assessment and management of contaminated land in Queensland* will be undertaken to determine background contamination levels. The results of the PSI will be summarised in the EIS and provided in detail in an appendix.

If the results of the preliminary site investigation indicate potential or actual contamination, a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the *'Draft guidelines for the assessment and management of contaminated land in Queensland'* will be undertaken.

In short, the following information may be required in the EIS:

- mapping of any areas listed on the Environmental Management Register or Contaminated Land Register under the *Environmental Protection Act 1994*;
- identification of any potentially contaminated sites not on the registers which may need remediation; and
- a description of the nature and extent of contamination at each site and a remediation plan and validation sampling.

The EIS will address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities. The *'Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland'* can be downloaded from the DERM website at: www.derm.qld.gov.au/ecoaccess/contaminated_land/guidelines_and_information_sheets/. The Proponent will refer study proposals to DERM for review prior to commencement.

4.2.2.6 Erosion and stability

For all permanent and temporary landforms, possible erosion rates and management techniques will be described. For each waste rock and soil type identified, erosion potential (wind and water) and erosion management techniques will be outlined. An erosion-monitoring program, including rehabilitation measures for erosion problems identified during monitoring, will also be outlined. Mitigation strategies will be developed to achieve acceptable soil loss rates, levels of sediment in rainfall runoff and wind-generated dust concentrations.

The report will include an assessment of likely erosion and stability effects for all disturbed areas such as:

- areas cleared of vegetation;
- waste dumps;
- stockpiles;
- dams, banks and creek crossings;
- the plant site, including buildings; and
- access roads or other transport corridors.

Methods proposed to prevent or control erosion will be specified and will be developed with regard to (a) the long-term stability of waste dumps and voids; (b) preventing soil loss in order to maintain land capability/suitability, and (c) preventing significant degradation of local waterways by suspended solids. The mitigation measures will address the selective handling of waste rock and capping material to maximise long-term stability of final landforms in regard to slumping and erosion both on and below the surface. Erosion control measures will be developed into an erosion and sediment control plan for inclusion in the EM plan.

4.2.2.7 Landscape character

Describe the potential impacts of the MEP landscape character of the site and the surrounding area. Particular mention will be made of any changes to the broad-scale topography and vegetation character of the area, such as due to spoil dumps, excavated voids and broad-scale clearing.

Details will be provided of measures to be undertaken to mitigate or avoid the identified impacts.

4.2.2.8 Visual amenity

This section will analyse and discuss the visual impact of the MEP on particular panoramas and outlooks. It will be written in terms of the extent and significance of the changed skyline as viewed from places of residence, work, and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, during all stages of the MEP as it relates to the surrounding landscape. The assessment is to address the visual impacts of the MEP structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations. Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the MEP.

Detail will be provided of all management options to be implemented and how these will mitigate or avoid the identified impacts.

4.2.2.9 Lighting

Management of the lighting of the MEP, during all stages, is to be provided, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid:

- the visual impact at night;
- night operations/maintenance and effects of lighting on fauna and residents;
- the potential impact of increased vehicular traffic; and

- changed habitat conditions for nocturnal fauna and associated impacts.

4.3 Transport

The transport section of the EIS will have separate subsections describing infrastructure associated with the various modes of transport, such as road, rail, air and sea.

4.3.1 Description of existing infrastructure and values

Provide details of the proposed use of existing infrastructure for the transport of materials, products or wastes to and from the MEP site. Also provide details, either in the transport section of the EIS or by cross reference to other sections, of the environmental values that would be affected by the altered use of existing transport infrastructure or the construction of new or altered infrastructure. The EIS will provide details of any MEP related plant or utilities within, or impacting on, the jurisdiction of any transport authority. Also provide details of the likely traffic to be generated by workforce personnel and service providers.

For road and rail transport, describe separately and in detail the existing or new road and rail networks that would be used by the MEP. Provide illustrations of the networks at suitable scales. For each mode of transport and each phase of the MEP, the EIS will describe: the expected volumes and weights of materials, products, hazardous goods or wastes; the likely number and timing of trips; the types of vehicles to be used; and the routes. The description will include, but not necessarily be limited to, details of access and haul roads, realignments, rail loops and load-out facilities, and level crossings used by any transport associated with the MEP. Provide details of any heavy or oversized loads, including the number and type of vehicles, with a description of the likely timing and routes of those loads highlighting any vulnerable bridges or other structures along the proposed routes.

In relation to air transport, describe the existing, new, and/or altered air fields and associated infrastructure that would be used by the MEP. Describe the likely additional number of flights, frequency, timing (particularly any increase in night arrivals or take-offs), and size of aircraft. Describe any features of the MEP that could impact on air transport (e.g. the placement of waste dumps, stacks or flares beneath flight paths).

In relation to the importation or export of materials and products, the EIS will identify any aspects of the MEP that will increase the shipment of materials through any port. Details will be provided of the ports that will be used, the berths at those ports, likely size and number of vessels, and the associated infrastructure that moves and stores materials between the ships and the rail and/or road networks.

4.3.2 Potential impacts and mitigation measures

The EIS will provide sufficient information to make an independent assessment of how transport infrastructure will be affected by each phase of the MEP at a local and regional level. Similarly, sufficient information will be provided to make an independent assessment of how transport used by the MEP will impact on environmental values. In both cases, the impacts along the whole length of each affected route will be discussed and measures proposed to avoid or mitigate the impacts.

Details will be provided of the:

- results of any modeling of transport impacts;
- assessment methodology used, including a summary of consultation undertaken with transport authorities regarding the scope of the impact assessment and methodology to be used;
- base data assumptions, including an assessment of the current condition of the affected network and its performance;
- possible interruptions to transport operations; and
- likelihood and nature of spills of products or hazardous materials during transport, and the requirements for dealing with any spills.

This section of the EIS will outline, and cross-reference to more detailed descriptions with the EIS, the impacts of transport associated with the MEP on amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental effects.

The assessment of road impacts will be in accordance with the latest version of the Department of Main Road's *Guidelines for Assessment of Road Impacts of Development*, available from the website: <http://www.mainroads.qld.gov.au>.

In relation to road impacts, the EIS will include an assessment of impacts on:

- the safety, efficiency and condition of road operations and assets;
- any existing or proposed pedestrian cycle networks;
- any existing public transport networks (assets and services); and
- watercourses and overland flows, and their interaction with the current and future road network (note: impacts on water values due to transport infrastructure will be outlined in the transport section of the EIS and cross-referenced to a detailed assessment in the water resources section).

The assessment of impacts on the rail network itself, or on environmental values affected by changes in rail traffic (e.g. due to dust, noise and vibration) will also consider the following matters:

- impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings (i.e. those crossings which form part of private access pathways to and from residential or business sites); and
- impacts on passenger transport and services.

The EIS will assess any impacts on any port due to the import or export of materials or products. Matters to be assessed will include the need for:

- new coastal works, such as berth construction or alteration, land reclamation, etc.;
- any dredging for shipping channels and swing basins;
- new or altered stockpile areas; and
- new or altered infrastructure to handle materials between ships and road or rail transport.

The EIS will also assess any impacts on nearby areas due to the handling or storage of materials at ports (e.g. because of dust, noise or lighting).

Any potential impacts of the MEP on water traffic in rivers and dams will be assessed.

The EIS will assess: any impacts of the MEP on existing air fields and flight paths; any impacts on environmental values due to the need to redevelop or construct new airfields; and any impacts on amenity due to increased air traffic. The proposal and assessment will have regard to State Planning Policy 1/02: *Development in the Vicinity of Certain Airports and Aviation Facilities*. With regard to air safety matters to be assessed include the raising of landforms or the construction of stacks, flares or lighting within flight paths.

If the works that could result in impacts, or the associated mitigation works for identified impacts, are the responsibility of the proponent then the EIS will fully assess those impacts, detail the mitigation works and carry the environmental protection commitments forward into the MEP's EM plan.

If the proponent will not be responsible for the works associated with the impacts (e.g. for dredging at a port) the EIS will clearly identify the entity that will be responsible and what approvals would be needed. Nevertheless, in this case, the EIS will provide enough assessment of the likely impacts of all associated activities for the regulatory authorities to have confidence that approval of the MEP subject to this EIS process would not have unacceptable flow-on impacts due to necessary works farther down the transport chain.

The proponent will detail measures to avoid or mitigate impacts on each transport mode. The mitigation measures will ensure the safety, efficiency and condition of each mode is maintained. These mitigation measures are to be prepared by the proponent in close consultation with the relevant transport authorities. Any residual impacts that cannot be avoided will be identified and quantified.

Mitigation strategies must include:

- consideration of any transport authority's works program and forward planning;
- proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority standards and practices;

- the responsible parties for any works;
- estimates of costs;
- details on the timing of the works; and
- a summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the MEP.

The EIS will consider public transport requirements and links to, or development of pedestrian and cycle networks.

4.4 Waste

This section will complement other sections of the EIS by providing technical details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria, while other sections describe how those emissions, discharges and disposals would impact on the relevant environmental values. The purpose of this format is to concentrate the technical information on waste management into one section in order to facilitate its transfer into the EM plan.

4.4.1 Description of environmental values

This section will introduce and briefly describe the existing environment values that may be affected by the MEP's wastes. Refer to each of the waste streams described in section 3.6 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS.

4.4.2 Potential impacts and mitigation measures

The purpose of this section is to bring together a description of the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste will be provided in the relevant sections of part 4 of the EIS.

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

As part of the description, and unless issues related to excavated waste have been addressed in section 4 (in which case reference will be made to the appropriate subsection), this section will provide details of each waste in terms of:

- operational handling and fate of all wastes including storage;
- on-site treatment methods proposed for the wastes;
- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes;
- hazards associated with the handling and storage of wastes;
- the potential level of impact on environmental values;
- proposed discharge/disposal criteria for liquid and solid wastes;
- measures to ensure stability of the dumps and impoundments will be described;
- methods to prevent, seepage and contamination of groundwater from stockpiles and/or dumps will be given;
- design criteria to be used to ensure that waste containment and/or storage facilities perform satisfactory;
- market demand for recyclable waste (where appropriate) will be addressed;
- waste minimisation techniques processes proposed; and
- decommissioning of the site.

Having regard to the *Environmental Protection (Waste Management) Policy 2000*, the EIS will indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology options during all

phases of the MEP. The DERM has also released draft guidelines covering aspects of waste management under the *Environmental Protection (Waste Management) Policy 2000*, which will be addressed.

Waste minimisation and treatment, and the application of cleaner production techniques, will also be applied to gaseous wastes, particularly methane, nitrogen oxides, sulfur oxides, particulates and carbon dioxide. Particular attention will be paid to measures, which will maximise energy efficiency and minimise internal energy consumption in the MEP.

Cleaner production waste management planning will be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the MEP. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, and any co-generation of power and by-product reuse as shown in a material/energy flow analysis are required.

4.5 Water resources

4.5.1 Description of environmental values

This section describes the existing environment for water resources that may be affected by the MEP in the context of environmental values as defined or considered in such documents as the *Environmental Protection Act 1994*, *Environmental Protection (Water) Policy 1997 (EPP (Water))*, ANZECC 2000, the National Water Quality Management Strategy (NWQMS), the DERM Guideline: *Establishing draft environmental values and water quality objectives* and the *Queensland Water Quality Guidelines 2006*, the *Water Act 2000*, the *Water Resources (Fitzroy Basin) Plan 1999* and associated *Resource Operations Plan*, and the *Water Resources (Great Artesian Basin) Plan 2006* and associated *Resource Operations Plan*. The definition of waters in the *Environmental Protection (Water) Policy 1997* includes the bed and banks of waters, so this section will address benthic sediments as well as the water column.

4.5.1.1 Surface waterways

A description will be given of the surface watercourses and their quality and quantity in the area affected by the MEP with an outline of the significance of these waters to the river catchment system in which they occur. Details provided will include a description of existing surface drainage patterns, and flows in major streams and wetlands. Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the MEP. Flood studies will include a range of annual exceedance probabilities for affected waterways, based on observed data if available or use appropriate modelling techniques and conservative assumptions if there are no suitable observations. The flood modelling assessment will include local flooding due to short duration events from contributing catchments on site, as well as larger scale regional flooding including waterways downstream.

The EIS will provide a description, with photographic evidence, of the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description will form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the MEP.

An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the MEP. The basis for this assessment will be a monitoring program, with sampling stations located upstream and downstream of the MEP including reference locations (i.e. non-impacted sites). Downstream monitoring will include sites located near to any proposed discharge points in addition to further downstream locations. Sites will include permanent and semi-permanent ponded water holes or known aquatic habitat. Complementary stream-flow data will also be obtained from historical records (where available) to aid in interpretation. The condition of the water environment should be assessed by making comparison against water quality objectives and water quality guidelines (based on ANZECC & ARMICANZ 2000 and Queensland Water Quality Guidelines 2006).

The water quality will be described, including seasonal variations or variations with flow where applicable. Monitoring of ephemeral streams will primarily focus on times of natural flow. A relevant range of physical, chemical and biological parameters will be measured to gauge the environmental harm on any affected creek or wetland system. This will include, but not be limited to, water quality indicators likely to be affected by the MEP such as electrical conductivity, specific identified metals (dissolved), turbidity, suspended sediments and pH. Biological indicators should include macro-invertebrate assessment according to published methods.

Describe the environmental values of the surface waterways of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy 1997;

- sustainability, including both quality and quantity;
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form; and
- any water resource plans, water quality improvement plans, land and water management plans relevant to the affected catchment.

4.5.1.2 Groundwater

The EIS will review the quality, quantity and significance of groundwater in the MEP area, together with groundwater use in neighbouring areas.

This section of the EIS will address any requirement for a licence to take groundwater for dewatering purposes if that is indicated by preliminary groundwater investigations. A groundwater model will be required if a groundwater resource is encountered at the MEP that will be impacted by mining activities.

The review will include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any environmental harm. The information to be gathered for analysis is to include:

- location;
- pumping parameters;
- draw down and recharge at normal pumping rates; and
- seasonal variations (if records exist) of groundwater levels.

A network of observation points which would satisfactorily monitor groundwater resources both before and after commencement of operations will be developed and described in the EIS.

This section of the EIS will address the nature and hydrology of the aquifers and provide a description of the:

- geology/stratigraphy - such as alluvium, volcanic, metamorphic;
- aquifer type - such as confined, unconfined;
- depth to and thickness of the aquifers;
- the significance of the resource at a local and regional scale;
- depth to water level and seasonal changes in levels;
- groundwater flow directions (defined from water level contours);
- interaction with surface water;
- interaction with sea/salt water;
- possible sources of recharge; and
- vulnerability to contamination.

The data obtained from the groundwater survey will be sufficient to enable specification of the major ionic species, pH, electrical conductivity, total dissolved solids and any potentially toxic or harmful substances.

Describe the environmental values of the underground waters of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy 1997;
- sustainability, including both quality and quantity; and
- physical integrity, fluvial processes and morphology of groundwater resources.

4.5.2 Potential impacts and mitigation measures

This section is to assess potential impacts on water resource environmental values identified in the previous section. It will also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The EIS will describe the possible environmental harm caused by the proposed proposal to environmental values for water as expressed in the Environmental Protection (Water) Policy. The DERM Operational Policy *Waste water discharge to Queensland waters* may be consulted for guidance on how discharge proposals will be assessed.

Where a licence or permit will be required under the *Water Act 2000* to take or interfere with the flow of water, this section of the EIS will provide sufficient information for a decision to be made on the application. Similarly, waterway barrier works may need approval under the *Fisheries Act 1994*, and if so will be addressed in the EIS.

The EIS will assess potential impacts of the MEP on flows in the watercourse(s) and overland flow at points immediately downstream of the MEP.

Water management controls will be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby marine, surface and groundwater will be discussed, along with the MEP for the diversion of affected creeks during mining, and the stabilisation of those works. Monitoring programs will be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the MEP.

Key water management strategy objectives include:

- protection of the integrity of the marine environment, and ultimately the Great Barrier Reef Marine Park and World Heritage property;
- protection of important local aquifers and protection of their waters;
- maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters including maintenance of dependent biota; and
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the MEP.

Conduct a risk assessment for uncontrolled emissions to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts.

4.5.2.1 Surface water and water courses

The potential environmental harm to the flow and the quality of surface waters from all phases of the MEP will be discussed, with particular reference to their suitability for the current and potential downstream uses, including the requirements of any affected riparian area, wetland, estuary, littoral zone, and any marine and in-stream biological uses. The impacts of surface water flow on existing infrastructure will be considered with reference to the *Environmental Protection (Water) Policy 1997* and *Water Act 2000*.

The hydrological impacts of the MEP will be assessed, particularly with regard to: stream diversions (whether temporary or permanent); scouring and erosion; the consequent impacts of subsidence; and changes to flooding levels and frequencies both upstream and downstream of the MEP. When flooding levels will be affected, modelling of afflux will be provided and illustrated with maps.

Quality characteristics discussed will be those appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters will be discussed along with toxicity of effluent constituents to flora and fauna. Consideration will be given to impacts on all local and downstream connected waterways due to discharge from the site. Stream flow data will be used in combination with proposed discharge rates to estimate in-stream dilution and water quality. Consideration will be given to the available assimilative capacity of the receiving waters given existing background levels and other known and significant potential point source discharges in the catchment.

Reference will be made to the properties of the land disturbed and processing plant wastes, the technology for settling suspended clays from contaminated water, and the techniques to be employed to ensure that contaminated water is contained and successfully treated on the site.

In relation to water supply and usage, and wastewater disposal, the EIS will discuss anticipated flows of water to and from the MEP area. Where dams, weirs or ponds are proposed, the EIS will investigate the effects of predictable climatic extremes (storm events, floods and droughts) on: the capacity of the dams to retain contaminants; the structural integrity of the containing walls; and the quality of water contained, and flows and

quality of water discharged. The design of all water storage facilities will follow the current technical guidelines on site water management.

The need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000* will be discussed. Water allocation and water sources will be established in consultation with DERM.

Assess the impacts on water resources of any dams and roads and other infrastructure related to the MEP and propose management measures for identified impacts.

Having regard for the requirements of the *Environmental Protection (Water) Policy*, the EIS will present the methods to avoid stormwater contamination by raw materials, wastes or products and present the means of containing, recycling, reusing, treating and disposing of stormwater. Where no-release water systems are to be used, the fate of salts and particulates derived from intake water will be discussed.

The Australian and New Zealand Environment and Conservation Council (ANZECC & ARMCANZ 2000) *National Water Quality Management Strategy*, *Australian Water Quality Guidelines for Fresh and Marine Waters*, *Queensland Water Quality Guidelines 2006* and the Environmental Protection (Water) Policy 1997 will be used as a reference for evaluating the effects of various levels of contamination.

Options for mitigation and the effectiveness of mitigation measures will be discussed with particular reference to sediment, acidity, salinity, metals and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Where it is proposed that creeks will be diverted, the EIS will detail how rehabilitation will affect both the physical and ecological condition of the creek's bed and banks and the quality of water in it. Furthermore, the EIS will describe the monitoring that will be undertaken after decommissioning, and who will have responsibility for management measures and corrective action, to ensure that rehabilitated creeks do not degrade.

4.5.2.2 Groundwater

The EIS will include an assessment of the potential environmental harm caused by the MEP to local groundwater resources.

The impact assessment will define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the MEP to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the MEP will be described.

An assessment will be undertaken of the impact of the MEP on the local ground water regime caused by the altered porosity and permeability of any land disturbance.

An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination will be discussed.

4.6 Air

4.6.1 Description of environmental values

This section will describe the existing air shed environment which may be affected by the MEP in the context of environmental values as defined by the *Environmental Protection Act 1994*, EPPs and Regulations.

A description of the existing air shed environment will be provided having regard for particulates and relevant gaseous compounds. The EIS will discuss the background levels and sources of suspended particulates and any other relevant constituent of the air environment that may be affected by the MEP.

Sufficient data on local meteorology and ambient levels of contaminants will be gathered to provide a baseline for later studies or for the modelling of air quality environmental harms within the air shed. Parameters will include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

4.6.1.1 Greenhouse gas emissions

This section of the EIS will:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO2 equivalent' terms;

- estimate emissions from indirect activities associated with the MEP, including fossil fuel based electricity consumed; and
- briefly describe method(s) by which estimates were made.

The Australian Department of Climate Change's *National Greenhouse Accounts (NGA) Factors* (available via the internet) can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. The MEP EIS will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the MEP.

4.6.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The objectives for air emissions will be stated in respect of relevant legislation, emission guidelines and standards (ambient and ground level concentrations) and the particulate emissions modelled using a recognised atmospheric dispersion model. The potential for interaction between the emissions from the processing plant, and emissions in the air shed, and the likely environmental harm from any such interaction, will also be detailed. If relevant, shut-down thresholds will be identified if meteorological conditions are such that unacceptable impacts on any sensitive areas are unavoidable.

The proposed levels of particulate emissions will be provided in terms of the *Environmental Protection (Air) Policy 2008* and the *National Environment Protection (Ambient Air Quality) Measure* (July, 2003).

The predicted average ground level concentrations at nearby sensitive areas (e.g. residences) will be modelled and described. These predictions will be made for both normal and expected maximum emission conditions and the worst case meteorological conditions will be identified and modelled where necessary. Ground level predictions will be made at any residential, industrial and agricultural developments believed to be sensitive to the effects of predicted emissions. The techniques used to obtain the predictions will be referenced and key assumptions and data sets will be explained.

The assessment of the MEP's impact on air quality will consider and describe:

- The air quality modelling results in light of the limitations and accuracy of the applied atmospheric dispersion models.
- The air quality results with relevance to the goals in the *Environmental Protection (Air) Policy 2008* and the *National Environment Protection (Ambient Air Quality) Measure*.
- The contamination control equipment and techniques to be employed on the MEP to suppress or minimise dust emissions.
- The back up measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of adverse air impacts.
- Provide an air emission inventory of the proposed site for all potential emission sources including fugitive emissions from such activities as mining, and rail and road transport of product or wastes. Provide a complete list of emissions to the atmosphere, including particulates and PM₁₀.
- For other than insignificant emissions, undertake an impact assessment with relevant inputs of emissions and local meteorology using an air dispersion model to provide estimates of the likely impacts on the surrounding environment. The model inputs should be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Estimate ground level concentration (GLC) at the nearest sensitive receptor(s) based on 1-hour average for maximum concentration (99.9 percentile). Simulate monthly average dust deposition at the nearest sensitive receptor(s). Results of the dispersion modelling must be presented as maximum hourly and annual average concentration contour plots and maximum monthly average dust deposition contour plots. The predicted ground level concentrations should be made for both normal and expected maximum emission conditions and the 'worst case' meteorological conditions should be identified and modelled where necessary.. The techniques used to obtain the predictions should be referenced, and key assumptions and data sets explained.

- The air quality modelling results will be discussed in light of the limitations and accuracy of the applied models.
- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. strong convection, terrain features, temperature inversions and contaminant re-circulation), a combination of acceptable models will need to be applied.
- The averaging period for ground level concentrations of contaminants that are modelled should be consistent with the relevant averaging periods for air quality indicators and goals in the Environmental Protection (Air) Policy 2008 and National Environmental Protection (Ambient Air Quality) Measure (NEPM) Air.
- Evaluate whether any planned buffer distance(s) between the facility and neighbouring sensitive receptors will be adequate during 'worst case' emissions that may occur during operations.
- Modelled air quality concentrations at the most exposed existing or likely future off-site sensitive receptors must be compared with the appropriate national and international ambient air quality standards including the Environmental Protection (Air) Policy 2008 and the National Environmental Protection Council (Ambient Air Quality) Measure.
- Evaluate cumulative impacts of the proposed emissions on the receiving environment by considering the MEP in conjunction with other known and available emission sources within the region. Describe air shed management and the contribution of the MEP to the air shed capacity in view of existing and future users of the airshed for assimilation and dispersion of emissions.
- The human health risk associated with emissions from the operation of all hazardous or toxic contaminants should be assessed whether they are or are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 2008.
- For any proposal that does not meet the Environmental Protection (Air) Policy 2008 air quality objectives, the proponent will undertake a risk assessment to determine the level of risk of adverse impact off site. Risk management strategies also need to be developed that identify options that will reduce exposure of local communities to levels of indicators that may be of concern and how to meet the objectives of Environmental Protection (Air) Policy 2008 progressively over the long-term.

The EIS will define and describe measures to suppress or minimise emissions, including dust from all potential emission sources. The environmental impact/nuisance of coal dust caused by the transportation of coal by road/rail will also be addressed as part of the EIS process. In relation to the rail transport of coal, the EIS will describe the proposed measures designed to minimise coal dust emissions from trains during the haulage of coal from the MEP to the proposed export port.

4.6.2.1 Greenhouse gas abatement

This section of the EIS will propose and assess greenhouse gas abatement measures. Where relevant it will include:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the MEP, including such activities as transportation of products and consumables, and energy use by the MEP;
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency,
- a comparison of the preferred measures for emission controls and energy consumption with best practice environmental management in the relevant sector of industry; and
- a description of any opportunities for further offsetting greenhouse gas emissions through both direct and indirect means.

Direct means of reducing greenhouse gas emissions could include such measures as:

- minimising clearing at the site;
- integrating transport for the MEP with other local industries such that greenhouse gas emissions from the construction and running of transport infrastructure are minimised;
- maximising the use of renewable energy sources; and

- co-locating coal seam methane use for energy production with coal extraction.

Indirect means of reducing greenhouse gas emissions could include such measures as:

- carbon sequestration at nearby or remote locations by:
 - progressive rehabilitation of disturbed areas; and
 - planting trees or other vegetation external to the MEP to achieve greater biomass than that cleared for the MEP.
- carbon trading through recognised markets.

The Environmental Management Plan will include a specific module to address greenhouse abatement. That module will include:

- commitments to the abatement of greenhouse gas emissions from the MEP with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions;
- commitments to energy management, including undertaking periodic energy audits with a view to progressively improving energy efficiency;
- a process for regular review of new technologies to identify opportunities to reduce emissions and use energy efficiently, consistent with best practice environmental management;
- any voluntary initiatives such as projects undertaken as a component of the national Greenhouse Challenge Plus program, or research into reducing the lifecycle and embodied energy carbon intensity of the project's processes or products;
- opportunities for offsetting greenhouse emissions, including, if appropriate, carbon sequestration and renewable energy uses; and
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

4.6.2.2 Climate change adaptation

Climate change, through alterations to weather patterns and rising sea level, has the potential to impact in the future on developments designed now. Most developments involve the transfer to, or use by, a proponent of a community resource in one form or another, such as the granting of a non-renewable resource or the approval to discharge contaminants to air, water or land. It is recognised that the MEP design should be adaptive to climate change so that community resources are not depreciated or abandoned or require costly modification before their potential to provide a full return to the community is realised. Consequently, the EIS will provide an assessment of the MEP's vulnerabilities to climate change and describe possible adaptation strategies for the activity including:

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the MEP.
- the preferred and alternative adaptation strategies to be implemented; and
- commitments to undertaking, where practicable, a cooperative approach with government, other industry and other sectors to address adaptation to climate change.

DERM recognises that predictions of climate change and its effects have inherent uncertainties, and that a balance must be found between the costs of preparing for climate change and the uncertainty of outcomes. Nevertheless, the Proponent will use their best efforts to incorporate adaptation to climate change in their EIS and project design.

4.7 Noise and vibration

4.7.1 Description of environmental values

This section describes the existing environment values that may be affected by noise and vibration from the MEP.

If the proposed activity could adversely impact on the noise environment, baseline monitoring will be undertaken at a selection of sensitive sites that are potentially affected by the MEP. Noise sensitive places are defined in the *Environmental Protection (Noise) Policy 2008*. Measured background noise levels that take into account seasonal variations are required. The locations of sensitive sites will be identified on a map at a suitable scale. The results of any baseline monitoring of noise and vibration in the proposed vicinity of the MEP will be described.

Sufficient data will be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites will be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods will adhere to accepted best practice methodologies, relevant DERM guidelines and Australian Standards, and any relevant requirements of the *Environmental Protection Regulation 2008* and *Environmental Protection (Noise) Policy 2008*.

Comment will be provided on any current activities near the MEP area that may cause a background level of ground vibration (for example: major roads, excavation activities, etc.).

4.7.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed. The assessment of noise impacts will include matters raised in the document *The health effects of environmental noise – other than hearing loss* published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9.

Information, including mapped noise contours from a suitable acoustic model, will be submitted based on the proposed generation of noise. The potential environmental harm of noise and vibration at all potentially sensitive places, in particular, any place of work or residence will be quantified in terms of objectives, standards and indicators to be achieved. Particular consideration should be given to emissions of low-frequency noise; that is, noise with components below 200Hz. The assessment should also include the environmental impacts on terrestrial animals and avifauna, particularly migratory species.

Proposed measures for the minimisation or elimination of potential impacts will be provided, including details and illustrations of any screening, lining, enclosing or bunding. A discussion will be provided of timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise.

Information will be supplied on blasting which might cause ground vibration or fly rock on, or adjacent to, the site with particular attention given to places of work, residence, recreation, worship and general amenity. The magnitude, duration and frequency of any vibration will be discussed. A discussion will be provided of measures to prevent or minimise environmental nuisance and harm associated with blasting and vibration emissions. Reference will also be made to the DERM Guideline: *Noise and vibration from blasting*.

The assessment will also address off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the MEP.

4.8 Nature conservation

4.8.1 Description of environmental values

This section will describe the existing environment values for nature conservation that may be affected by the MEP.

The environmental values of nature conservation for the affected area will be described in terms of:

- integrity of ecological processes, including habitats for rare and threatened species;
- conservation of resources;
- biological diversity, including habitats of rare and threatened species;
- integrity of landscapes and places including wilderness and similar natural places; and
- aquatic and terrestrial ecosystems.

A discussion will be presented on the nature conservation values of the areas likely to be affected by the MEP. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including

waterways, riparian zone, and littoral zone, rainforest remnants, old growth indigenous forests, wilderness and ecological corridors will be described. The description will include a plant and vertebrate species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation from a local, regional and state perspective. The description will indicate any areas of state or regional significance identified in an approved biodiversity planning assessment (BPA) or approved aquatic conservation assessment (ACA), if available produced by the DERM (e.g. see the draft Regional Nature Conservation Strategy for SE Qld 2001-2006).

Survey effort will be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet season. The survey will account for the ephemeral nature of watercourses traversing the MEP area, and seasonal variation in fauna populations.

The EIS will identify sensitive areas, or areas that may have low resilience to environmental change, in proximity to the MEP or its associated activities. Areas of special sensitivity include corridors, wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities.

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features (and which will be identified, mapped, avoided or effects minimised):

- protected areas, including nature refuges, which have been proclaimed under the *Nature Conservation Act 1992* or are under consideration for proclamation;
- critical habitat identified under the *Nature Conservation Act 1992*;
- important habitats of species listed under the *Nature Conservation Act 1992* and/or *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* as presumed extinct, endangered, critically endangered, vulnerable or rare;
- vegetation mapped as essential habitat;
- high value regrowth vegetation;
- regional ecosystems listed as 'endangered' or 'of concern' under State legislation, and/or ecosystems listed as presumed extinct, endangered, critically endangered or vulnerable under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*;
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at DERM's website;
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas;
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species;
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA), between Australia and China (CAMBA) and/or between Australia and the Republic of Korea (ROKAMBA);
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance;
- sites of known palaeontologic significance such as fossil sites;
- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
 - natural vegetation in good condition or other habitat in good condition (e.g. wetlands); and/or
 - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area;
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism; and

- ecosystems which provide important ecological functions such as: wetlands of national, state and regional significance; coral reefs; riparian vegetation; important buffer to a protected area or important habitat corridor between areas.

Reference will be made to both State and Commonwealth endangered species legislation and the proximity of the area to any World Heritage property.

The Queensland *Vegetation Management Act 1999* and the findings of any regional vegetation management plan will also be referenced.

The occurrence of pest plants and animals in the MEP area will be described.

4.8.1.1 Terrestrial flora

Provide a map of terrestrial vegetation at a suitable scale with descriptions of the units mapped. Within each defined vegetation community, surveys will be undertaken at intensity commensurate with the type and extent of vegetation present using recognised Queensland herbarium mapping protocols (Neldner et. al. 2005).

Sensitive or important vegetation types will be highlighted, including any riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species will be specifically addressed. The surveys will include species structure, assemblage, diversity and abundance. The description will contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

The existence of important local and regional weed species will also be discussed, including their impact on existing biodiversity values.

Vegetation mapping will include adjacent areas to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas.

The terrestrial vegetation communities within the affected areas will be described at an appropriate scale (maximum 1:10 000) with mapping produced from aerial photographs and ground-truthing, showing the following:

- location and extent of ecosystems listed as 'endangered', 'of concern' and 'not of concern' under State legislation, non-remnant vegetation on State lands, and high-value regrowth vegetation;
- location and extent of ecosystems listed as presumed extinct, endangered, critically endangered or vulnerable under the EPBC Act;
- location and extent of vegetation types using the DERM's regional ecosystem type descriptions in accordance with the REDD;
- location of vegetation types of conservation significance based on DERM's regional ecosystem types and occurrence of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006* and subsequent amendments, as well as areas subject to the *Vegetation Management Act 1999*;
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges);
- any plant communities of cultural, commercial or recreational significance should be identified,; and
- the location and abundance of any exotic or weed species.

Within each defined (standard system) vegetation community, a minimum of three sites (numbers should be discussed with DERM) will be surveyed for plant species, preferably in both summer and winter, as follows:

- site data shall be recorded using the Queensland Herbarium methodology and proformas in the latest version of the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (DERM, 2005);
- the minimum site size should be 10 by 50 metres;
- a complete list of species present at each site should be recorded;

- the relative abundance of plant species present should be recorded;
- any plant species of conservation, cultural, commercial or recreational significance should be identified; and
- specimens of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006*, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

Existing information on plant species may be used instead of new survey work provided that the data is derived from previous surveys at the site consistent with the above methodology. Methodology used for flora surveys will be specified in the appendices to the report.

4.8.1.2 Terrestrial fauna

The terrestrial and riparian fauna occurring in the areas affected by the MEP will be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the fauna present or likely to be present in the MEP will include:

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles and mammals;
- any species that are poorly known but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes; including movement corridors, edge-related effects, barriers to movement and waterways;
- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (e.g. any requirements of protected area management plans); and
- use of the area by migratory birds, nomadic birds, bats, and arboreal and ground-dwelling fauna.

A comprehensive vertebrate fauna survey will be undertaken at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). Apart from the species recorded in the survey, an indicative list of all known and potential species and threatened species in the project area will be provided, by reference to the regional ecosystems within the project area and a 100km buffer, and knowledge of species present in the local bioregion. The occurrence of fauna of conservation significance should be geocoded to mapped vegetation units or habitats, which can then be used in section 4.8.2 to propose areas to be protected.

The EIS will indicate how well any affected communities are represented and protected elsewhere in the province where the site of the proposal occurs.

Methodologies used during the fauna survey, including the prevailing climatic conditions during the survey, will be specified.

4.8.1.3 Aquatic biology

The aquatic flora and fauna occurring in the areas affected by the MEP will be described, noting the patterns and distribution in the waterways and any associated wetland environments. The description of the fauna and flora present or likely to be present in the MEP area will include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area;
- aquatic plants and fish habitats;
- aquatic and benthic substrate; and
- habitat upstream and downstream of the project or potentially impacted due to currents in associated lacustrine environments.

The EIS should provide a description to Order or Family taxonomic rank of the presence and nature of stygofauna occurring in groundwater likely to be affected by the MEP. Sampling and survey methods should follow the best practice guideline which is currently that published by the Western Australian Environmental Protection Authority – *Guidance for the assessment of Environmental Factors No.54 (December 2003) and No.54a (August 2007)*.

4.8.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing nature conservation values, describes how nominated quantitative standards and indicators may be achieved for nature conservation management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS will address any actions of the MEP or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*. The EIS will detail any areas proposed to be cleared that will not be exempt from the provisions of the *Integrated Planning Act 1997* and the *Vegetation Management Act 1999*.

The discussion will cover all likely direct and indirect environmental harm due to the MEP on flora and fauna, particularly sensitive areas. Terrestrial and freshwater aquatic environments will also be described as well as the potential human impacts and the control of any domestic animals introduced to the MEP area. Access any significant impact on aquatic values resulting from any proposed water management structures, including dams, weirs or diversions.

Strategies for protecting any rare or threatened species will be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA and ROKAMBA) will be discussed.

In any groundwater aquifers found to contain stygofauna, describe the potential impacts on stygofauna of any changes in the quality and quantity of the groundwater, and describe mitigation measures that would be applied to demonstrate lack of threat in accordance with best practice, which at present is guided by the Western Australian Environmental Protection Authority – *Guidance for the Assessment of Environmental Factors No.54 (December 2003) and No.54a (August 2007)*.

Strategies for collecting and preserving any significant fossils should be described.

The potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the MEP including clearing, salvaging or removal of vegetation will be described, and the indirect effects on remaining vegetation will also be discussed. Short-term and long-term effects will be considered with comment on whether the impacts are reversible or irreversible. The capacity of the environment to assimilate discharges and emissions should be assessed.

Mitigation measures and/or offsets will be proposed for adverse impacts, where relevant. Any departure from no net loss of ecological values will be described.

Key flora and fauna indicators will be identified for future ongoing monitoring. Reference sites for monitoring rehabilitation will be established.

The EIS will propose and describe in detail, measures to be taken to avoid and minimise potential adverse impacts of the proposal nature conservation and biodiversity values. Any potential net loss of environmental values will be identified and quantified. Environmental offsets will be described that would counterbalance the remaining loss of environmental values. Proposed environmental offsets will be consistent with the requirements set out in the specific-issue offset policies under the framework of the *Queensland Government Environmental Offset Policy (QGEO) 2008*.

The potential environmental harm on flora and fauna due to any alterations to the local surface and ground water environment will be discussed with specific reference to environmental impacts on riparian vegetation or other sensitive vegetation communities. Measures to mitigate the environmental harm to habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains will be described.

The provision of buffer zones and movement corridors, and strategies to minimise environmental harm on migratory, nomadic and aquatic animals will be discussed.

Weed and pest management strategies are required for containing existing exotic species (e.g. Parthenium, declared pests, and environmental weeds) and ensuring no new declared plants are introduced to the area. Feral animal management strategies and practices will also be addressed. The study will develop strategies to ensure that the MEP does not contribute to increased encroachment of a feral animal species. Reference will be made to the local government authority's pest management plan when determining control strategies. The strategies for both flora and fauna will be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM Plan for the project.

Rehabilitation of disturbed areas will incorporate, where appropriate, provision of nest hollows and ground litter. Where the rehabilitation outcome of the EIS includes native vegetation, local indigenous species should be sourced from a local seed bank.

4.9 Cultural heritage

4.9.1 Description of environmental values

This section of the EIS will describe the existing cultural heritage values that may be affected by the MEP and include a description of the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, an indigenous cultural heritage study must be undertaken in accordance with the requirements of Part 7 of that Act.

A non-indigenous cultural heritage study will also be undertaken of the known and potential historical cultural heritage values of the affected area. The study will, as a minimum, include a desktop analysis and an archaeological investigation (i.e. a physical investigation) of the area potentially affected by the MEP.

This initial desktop component of the study will, as a minimum, review the following sources for information on historical cultural heritage values within the region of the MEP site:

- the Queensland Heritage Register, for places already protected under the *Queensland Heritage Act 1992*;
- local government heritage registers, lists or inventories; and
- the results of previous cultural heritage studies conducted within the region of the MEP.

The scope of the archaeological investigation will be based upon the results of the desktop analysis and previous archaeological surveys and management efforts. Any additional archaeological investigations will be conducted by an appropriately qualified person, as required by the *Queensland Heritage Act 1992*, and will address all types of historical cultural heritage places located within the MEP area (i.e. built, archaeological and cultural landscape values).

The discovery and protection of any previously unidentified significant archaeological artefacts or archaeological places during the course of the historical cultural heritage study must comply with Part 9 of the *Queensland Heritage Act 1992*.

4.9.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for managing, protecting or enhancing cultural heritage values that may be affected by the MEP. It describes how practices may be implemented for the appropriate management of those values, and how the achievement of the objectives will be monitored, audited and managed.

4.9.2.1 Indigenous cultural heritage

Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, the potential impacts on indigenous cultural heritage values in the vicinity of the project must be managed under a cultural heritage management plan (CHMP) developed and approved under Part 7 of that Act. Development of the CHMP should follow the guidelines gazetted under section 85 of the *Aboriginal Cultural Heritage Act 2003*. DERM's EIS Coordinator must be made aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report.

4.9.2.2 Non-indigenous cultural heritage

The potential impacts on non-indigenous cultural heritage values and their avoidance or mitigation will also be addressed in a management plan. The historical heritage management plan will specifically address identified values and provide a process for managing values should they become apparent during development of the MEP.

The development of a historical heritage management plan will be negotiated with the lead agency (the Cultural Heritage Branch, DERM) and any other relevant stakeholders.

The historical heritage management plan will as a minimum address the following issues:

- Processes for the mitigation, management and protection of identified non-indigenous cultural heritage values during excavations of the construction, operational, rehabilitation and decommissioning phases of the MEP.
- Processes for reporting, as required by section 89 of the *Queensland Heritage Act 1992*, the discovery of any archaeological artefact not previously identified in the historical cultural heritage study.
- Procedures for the collection of any artefact material, including appropriate storage and conservation.
- Historical cultural heritage awareness training or programs for project staff.

The historical heritage management plan will be incorporated into the MEP's draft EM plan.

4.10 Social

The description of the social and cultural values potentially impacted by the project, and the assessment of the impacts on those values, should be conducted in consultation with the Social Impact Unit of the Department of Infrastructure and Planning, and all affected local, State and Federal government bodies.

4.10.1 Description of social and cultural values

This section of the EIS should define and describe the social and cultural area of influence of the project and any associated activities. It should identify key social and cultural organisations, including relevant government, quasi-non-government and non-government organisations, and other community groups. This section of the EIS should also describe the community engagement process and present its findings to date.

The EIS should describe the current population and demographics of the potentially affected communities within the project's social and cultural area of influence. Such communities include all communities likely to be impacted directly and indirectly by the project, such as the potential host communities and the source communities for the project workforce and their families. Separate population figures and demographics should be provided for affected indigenous and non-indigenous populations and communities. Characteristics to be described include:

- the community size, history, age structure, ethnic characteristics, and gender composition;
- average income profiles, including the number and proportion of low income households;
- education and skill level by age and gender;
- prevalence of disability;
- health and wellbeing indicators;
- major trends and changes in the population make-up that may be occurring irrespective of the project; and
- any additional information identified as relevant through engagement with the communities.

Describe and analyse the current employment patterns, rates and trends within the social and cultural area of influence, for the indigenous and non-indigenous populations, including:

- the locations and types of other significant places of employment;
- numbers employed in relevant industry sectors and demographic cohorts (including disadvantaged groups);
- shift patterns and hours of work;
- type and level of qualifications and skills;
- unemployment rates or shortage levels within relevant skill levels and sectors; and
- any other relevant historical or anticipated changes or shifts in these employment patterns, rates and trends.

The EIS should describe the settlement patterns and residential profile of communities within the social and cultural area of influence, including:

- household size;
- type of occupancy (e.g. families versus singles house sharing);

- length of occupancy, including generational continuity (e.g. of farming properties);
- current property values and trends;
- home ownership rates;
- the size of the private rental market;
- typical rents for the area, including trends;
- the vacancy rate of rental accommodation with an assessment of seasonal fluctuations;
- rates of housing stress, e.g. availability, affordability, and adequacy;
- comparative affordability for ownership and renting relative to other towns and centres; and
- constraints and opportunities for new housing construction in the local communities, including the capacity of the local land development and housing construction industries to provide new housing and accommodation.

The EIS should provide a profile of the current social and cultural values and the characteristics of communities, groups and individuals likely to be impacted by the proposal. The social and cultural values for the affected communities and populations should be described in terms of:

- the use of the area on and around the project site for business (including industry, agriculture, forestry, fishing, aquaculture, and education), cultural purposes (including the gathering of natural products for food, medicine or ceremonial purposes), or residential purposes;
- the historical, aesthetic, social and cultural significance of places to people who use, or have used, potentially affected places in the area;
- the sense of community;
- the integrity of social conditions, including perceptions of community cohesion and personal safety; and
- amenity, liveability, harmony and well being.

Describe the current availability of community access to recreational facilities and sites, and to social and community services and infrastructure.

Outline the current rates of crime against persons and property, and the likely rate of substance abuse as far as it is known.

Social, economic and cultural values are not as easily separated as physical and ecological values. Therefore it may be necessary for some material in this section to be cross-referenced with section 4.9, Cultural Heritage, and section 4.12, Economy.

4.10.2 Potential impacts and mitigation measures

The assessment of impacts (both beneficial and adverse) must be supported by evidence-based discussions, and be developed in consultation with all relevant government agencies and community groups. It should include information obtained so far through the project's community engagement process, and provide a description of how consultation feedback has identified and informed the assessment of impacts and the development of mitigation measures. The assessment should not consider the impacts of the project in isolation, rather it should discuss the likely direct, indirect and cumulative impacts of the project in conjunction with all known existing and planned projects within the area of influence. The assessment should address not only impacts on people and families directly affected by those matters, but also impacts on associated people and communities, such as those whose livelihoods would be affected by loss or gain of direct or indirect (e.g. service provision) employment.

With regard to its timeframe, the assessment of social impacts should cover:

- the state of affairs immediately before the project was proposed;
- the period from when people first became aware of the project until it is commissioned, should approval be given;
- the proposed active phases of the project (e.g. construction, operation and decommissioning); and

- the phase after the project ceases to the extent that there may be residual impacts.

Describe the likely impacts on population numbers in the social and cultural area of influence and the associated demographic shifts.

Describe the social impacts of changes in land use, the alienation of property and loss of connection with the land. It should also address the impacts and stresses associated with relocations.

Describe likely recruitment schedules and locations, and how recruitment during the various phases of the project will impact on employment patterns, rates, and trends within the social and cultural area of influence. The assessment should at least address the following matters:

- estimated employment rates including the number of staff to be employed, with an estimate of the numbers in the various trades and sectors (e.g. clerical staff, unskilled labour, etc.);
- estimated impacts on unemployment levels, including creation of labour shortages within skilled, semi-skilled and unskilled trades and sectors;
- employment trends such as attraction (cross-over) of workforce between trades and sectors or changes to sector numbers due to the influx of new workers or the redeployment of existing workers within the area;
- Indigenous education, training and employment initiatives
- recruitment of people from disadvantaged groups; and
- to the extent that information is available, include cumulative effects of other major employers in the area and their likely recruitment schedules.

Describe likely lay-off schedules and how reductions in the workforce at various stages will impact on employment patterns in the social and cultural area of influence. To the extent that information is available, include the cumulative effects of other major employers in the area and their likely lay-off schedules.

Describe the training opportunities to be provided during the various phases of the project, particularly for indigenous people, or people from disadvantaged groups, and describe the provisions to be made for apprenticeship and worker training schemes.

Describe where staff and their immediate families are likely to reside during the construction and operational phases, and assess the likely impacts on housing availability and affordability, including:

- the likely changes to residential patterns in the social and cultural area of influence during all stages of the project;
- the effects of the commuting model, e.g. FIFO and/or DIDO versus local residency;
- locations, size and type of any workers camps;
- purchase of existing housing for mine staff;
- changes to residential occupation patterns, e.g. families versus house sharing by groups of singles;
- construction of new family housing;
- availability of existing housing for purchase and rent, and the capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project;
- effects on property values and rents;
- effects on property marketability;
- the potential displacement of existing residents who may no longer be able to afford accommodation; and
- impacts of the project on the availability of low cost housing within the social and cultural area of influence (e.g. assess whether pressure on rents would create a need for a local authority to build low cost housing for those in the community who would not benefit economically from the project).

The assessment should address not only the impacts on residential issues due to the accommodation of workers directly employed by the project, but also those due to the numbers of contractors and service providers that may be attracted by the opportunities offered by the project. The EIS should assess the impacts arising from alternative options for accommodation and develop a preferred accommodation strategy. Identify

any approvals needed for the preferred option for new worker camps or housing, and cross-reference to those sections of the EIS that assess the potential impacts of new camps or housing.

The EIS should assess, for the various stages of the project, the demand for community services and the likely impacts on social infrastructure provided by local, State and Federal governments. The assessment should provide sufficient information for affected government authorities to make informed decisions about how the proposal may affect their business and enable them to plan for the continuing provision of social infrastructure including health, education, community services, recreational activities and other services in the region.

Assess the likely cultural pressures and shifts both for indigenous and non-indigenous cultural groups. Particular attention should be paid to the effects on:

- likely changes to cultural identities in the social and cultural area of influence;
- the ability of both indigenous and non-indigenous people, to live in accordance with their own values and priorities; and
- the use of, and access to, culturally important areas and landscapes.

The EIS should assess the likely impacts on lifestyle and amenity in the social and cultural area of influence, including:

- effects on families (and the demand for family support services) of parents being absent while on-roster;
- changes to perceptions of safety and community in the established population;
- changes to health and social wellbeing of families and communities including household consumption patterns; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx.
- impacts on amenity of any changes in household composition patterns, such as sharing singles replacing families in residential areas, increased noise from social activities, and contractors parking commercial vehicles and machinery in residential areas.

Describe likely effects on the prevalence of crimes against the person and against property in the social and cultural area of influence based on evidence of equivalent social changes elsewhere.

Assess the likely adverse and beneficial social impacts of the project on local and regional service industries and the families that depend in whole or part on the income that comes from those service industries (the financial effects should be discussed in the Economy section of the EIS).

Describe the implications of the proposal for future developments in the social and cultural area of influence including constraints on surrounding land uses.

The EIS should summarise the net adverse or beneficial social impacts of the proposed project with an estimation of the overall significance of those impacts.

For identified social impacts, social impact mitigation strategies and measures should be presented to address:

- the demographic changes in the profile of the social and cultural area of influence;
- the recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community;
- housing and accommodation issues, in consultation with relevant local authorities and state government agencies, with proposals for accommodating the project workforce and their families that avoid, mitigate or offset any short and medium term adverse effects on housing affordability and availability, including the rental market, in the social and cultural area;
- capacity of current social infrastructure, particularly health and welfare, education, policing and emergency services; and
- the adequate provision of education, training and employment for all groups, including women, people with a disability, and Indigenous people.

The proponent should describe any consultation with government agencies and the communities regarding the acceptability of proposed mitigation strategies and the implementation of practical management and monitoring

regimes. The EIS should clearly indicate whether any nominated party other than the proponent accepts responsibility for implementing the measure(s).

A draft social impact management plan should be presented that promotes an active and ongoing role for impacted communities, local authorities and government agencies through the project life cycle from planning, construction, operations and decommissioning. The draft plan should cover:

- action plans for the implementation of mitigation strategies and measures;
- assignment of accountability and resources;
- reporting mechanism for activities and commitments;
- mechanisms to respond to public enquiries and complaints;
- mechanisms to resolve disputes with stakeholders;
- periodic evaluation of the effectiveness of community engagement processes; and
- practical mechanisms to monitor and adjust mitigation strategies and action plans to achieve best outcomes.

4.11 Health and safety

4.11.1 Description of environmental values

This section will describe the existing community values for public health and safety that may be affected by the MEP. For projects proposing air emissions, and/or those with the potential to emit odours, nearby and other potentially affected populations will be identified and described. Particular attention will be paid to those sections of the population, such as children and the elderly that are especially sensitive to environmental health factors.

4.11.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing health and safety community values, describes how nominated quantitative standards and indicators may be achieved for health impacts management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS will assess the effects on the MEP workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from project operations and emissions. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders will be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

Map(s) will be provided showing the locations of sensitive receptors, such as, but not necessarily limited to, kindergartens, schools, hospitals, aged care facilities, residential areas, and centres of work (e.g. office buildings, factories and workshops). The EIS, illustrated by the maps, will discuss how planned discharges from the MEP could impact on public health in the short and long term, and will include an assessment of the cumulative impacts on public health values caused by the MEP, either in isolation or by combination with other known existing or planned sources of contamination.

The EIS will address the MEP's potential for providing disease vectors. Measures to control mosquito and biting midge breeding will be described. Any use of recycled water will be assessed for its potential to cause infection by the transmission of bacteria and/or viruses by contact, dispersion of aerosols, and ingestion (e.g. via use on food crops). Similarly, the use of recycled water will be assessed for its potential to cause harm to health via the food chain due to contaminants such as heavy metals and persistent organic chemicals. Practical monitoring regimes will also be recommended in this section.

4.12 Economy

4.12.1 Description of environmental values

This section will describe the existing economic environment that may be affected by the MEP. The character and basis of the local and regional economies will be described including:

- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and rural downturn etc); and

- historical descriptions of large-scale resource developments and their effects in the region.

The economic impact statement will include estimates of the opportunity cost of the MEP and the value of ecosystem services provided by natural or modified ecosystems to be disturbed or removed during development.

4.12.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives and practical measures for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

An economic analysis, including a cost-benefit analysis, will be presented from national, state, regional and local perspectives as appropriate to the scale of the MEP. The general economic benefits from the MEP will be described.

At a level of detail appropriate to the scale of the MEP, the analysis is to consider:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the MEP by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in section 4.12 Economy;
- the distributional effects of the MEP including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Consideration of the impacts of the MEP in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention will be directed to the long and short-term effects of the MEP on the land-use of the surrounding area and existing industries, regional income and employment and the state economy.

For identified impacts to economic values, appropriate mitigation and enhancement strategies will be proposed.

4.13 Hazard and risk

This section of the EIS will describe the potential hazards and risk to people and property that may be associated with the MEP as distinct from hazards and risk to the natural environment, which will be addressed in the other sections of the TOR.

4.13.1 Description of environmental values

Detail the values related to people and property that could be affected by any hazardous materials and actions incorporated in the proposal.

4.13.2 Potential impacts and mitigation measures

This section of the EIS will describe the potential hazard and risk that may be associated with the MEP, including consideration of both natural and man-made hazards. This section will also define and describe the objectives and practical measures for protecting people and places from hazards and risk, describes how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed.

An analysis is to be conducted into the potential impacts of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the MEP on sensitive areas and resources such as

forests, water reserves, State and local Government controlled roads, places of residence and work, and recreational areas. The degree and sensitivity of risk will be described.

The EIS will provide an inventory for each class of substances listed in the Australian Dangerous Goods Codes to be held on-site. This information will be presented by classes and will contain:

- chemical name;
- concentration in raw material chemicals;
- concentration in operation storage tank;
- U.N. number;
- packaging group;
- correct shipping name; and
- maximum inventory of each substance.

Details will be provided of:

- safeguards proposed on the transport, storage, use, handling and on-site movement of the materials to be stored on-site;
- the capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to adversely impact upon the environment in the event of an accident; and
- the procedures to prevent spillages, and the emergency plans to manage hazardous situations.

The proponent will develop an integrated risk management plan for the whole of the life of the MEP including construction, operation and decommissioning phases. The plan will include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis. The assessment will outline the implications for and the impact on the surrounding land uses, and will involve consultation with Department of Community Safety, including regional representatives from the Queensland Fire and Rescue Service, Emergency Management Queensland and the Queensland Ambulance Service. The preliminary hazard analysis will incorporate:

- all relevant major hazards both technological and natural;
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- life of any identified hazards;
- a list of all hazardous substances to be used, stored, processed, produced or transported;
- the rate of usage;
- description of processes, type of the machinery and equipment used;
- potential wildlife hazards such as crocodiles, snakes, and disease vectors; and
- public liability of the State for private infrastructure and visitors on public land.

The integrated risk management plan will include the following components:

- operational hazard analysis;
- regular hazard audits;
- fire safety, emergency;
- response plans;
- qualitative risk assessment; and
- construction safety.

4.14 Cross-reference with the terms of reference

This section provides a cross reference of the findings of the relevant sections of the EIS, where the potential impacts and mitigation measures associated with the project are described, with the corresponding sections of the TOR.

5 Environmental management plan

The environmental management plan (EM plan) will be developed from the mitigation measures detailed in part 4 of the EIS. Its purpose is to set out the proponents' environmental protection commitments in a way that allows them to be measured and audited.

The EM plan is an integral part of the EIS, but will be capable of being read as a stand-alone document without reference to other parts of the EIS. For a mining project the EM plan must meet the content requirements of section 203 of the *Environmental Protection Act 1994*. The general contents of the EM plan will comprise:

- the environmental values likely to be affected by the mining activities;
- the potential adverse and beneficial impacts of the mining activities on the environmental values;
- the proponents' commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, performance monitoring and reporting;
- impact prevention or mitigation actions to implement the commitments; and
- corrective actions to rectify any deviation from performance standards.

Through the EM plan, the EIS's commitments to environmental performance can be used to develop regulatory controls as conditions to apply to project approvals. Therefore, the EM plan is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them. The EM plan may suggest conditions that will form the basis for developing the draft environmental authority.

6 Commitments not included in the EM plan

This section of the EIS should summarise any commitments made by the proponent that are not included in the EM plan (such as a commitment to assist a local council mitigate social impacts). It should be clear how and when the commitments will be fulfilled.

7 References

All references consulted will be presented in the EIS in a recognised format.

8 Recommended appendices

A1. Final terms of reference for this EIS

A copy of the final TOR will be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least will be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, will be provided in section 4.14 of the EIS.

A2. Approvals

A list of the approvals required by the MEP will be presented.

A3. Study team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers will be provided.

A4. The standard criteria

A brief summary will be presented of the MEP's compatibility with the standard criteria as defined by the *Environmental Protection Act 1994*, which include the principles of ESD and other relevant policy instruments. With regard to the principles of ESD, as listed in The National Strategy for Ecologically Sustainable Development, published by the Commonwealth Government in December 1992 (available from the Australian Government Publishing Service), each principle will be discussed and conclusions drawn as to how the MEP conforms. A life-of-project perspective will be shown.

A5. Consultation report

The summary Consultation Report appendix for an EIS under the *Environmental Protection Act 1994* will commence by including the details of affected and interested persons, and the statement of planned consultation with those persons, originally provided with the draft terms of reference. It will describe how 'interested' and 'affected persons,' and any 'affected parties' as defined in the *EPBC Act*, were identified.

A further list will be provided that includes the Commonwealth, state and local government agencies consulted, and the individuals and groups of stakeholders consulted.

The Consultation Report appendix will summarise the results of the community consultation program, providing a summary of the groups and individuals consulted, the issues raised, and the means by which the issues were addressed. The discussion will include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used.

A6. Specialist studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices. These may include:

- geology;
- soil survey and land suitability studies;
- air and greenhouse gas;
- noise and vibration studies;
- surface hydrology and groundwater studies;
- ecology studies;
- social and economic studies, and cost benefit analysis; and
- hazard and risk studies.


A7. Research

Any proposals for researching alternative environmental management strategies or for obtaining any further necessary information will be outlined in an appendix.


Disclaimer

While this document has been prepared with care, it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to DERM should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

Approved By



Signature



Date

Director, Assessment Branch
Environmental Services Division, DERM
160 Ann Street, Brisbane, Q 4000

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APPENDIX B:

APPROVALS

1.0 APPROVALS

The following table outlines a broad range of permits, licences and approvals likely to be required for MEP, based on an analysis of the Project components known at the time of the EIS preparation. Final explicit identification of all permits, licences and approvals for the MEP cannot occur until such time as detailed design occurs and/or the siting of project infrastructure and the final alignment is confirmed.

1.1 LIST OF APPROVALS

Permit/Licence/Approval	Reason for Application	Applicable Legislation/Standards	Administering Authority	Permit Application Details/Approval Timing
Commonwealth Legislation				
Assessment of Matters of National Environmental Significance (MNES) and approval of controlled action.	The Project is required to be referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (SEWPAC) as it is likely to have a significant impact on MNES.	<i>Environmental Protection and Biodiversity Conservation Act, 1999</i> (EPBC Act).	SEWPAC.	The MEP has been referred to SEWPAC. The MEP has been determined to be a controlled action by SEWPAC as it is considered likely to have a significant impact on Commonwealth listed threatened species and communities. Predicted approval date: July 2011
State Legislation				
Preparation of an Environmental Impact Statement (EIS).	Under the <i>Environmental Protection Act, 1994 (EP Act)</i> , a proponent is either required to or can voluntarily apply to prepare an EIS.	<i>EP Act.</i>	Department of Environment and Resource Management (DERM).	The completed EIS is made publicly available for a minimum period of 30 business days. Chief Executive issues an EIS Assessment Report (typically 30 business days after the end of the submission period). Predicted approval date: June 2011

Permit/Licence/Approval	Reason for Application	Applicable Legislation/Standards	Administering Authority	Permit Application Details/Approval Timing
State Legislation (cont.)				
Amendment of the existing Environmental Authority under Chapter 5, Part 8 of the <i>EP Act</i> .	Required to authorise the proposed additional mining activities for the MEP.	<i>EP Act</i> .	DERM.	A revised Environmental Authority including requirements for the MEP will be issued by DERM following EIS approval. Predicted approval date: August 2011
Amendment of the EM Plan.	Amendment of the existing EM Plan may be required to incorporate commitments from the MEP EIS.	<i>EP Act</i> .	DERM.	A revised EM Plan including EIS commitments for the MEP and new Environmental Authority conditions will be drafted by Peabody following EIS approval and issuance of the revised Environmental Authority. Predicted approval date: August 2011
Preparation of an approved Cultural Heritage Management Plan (CHMP) that makes sufficient provision to avoid or minimise harm to Aboriginal cultural heritage.	Where an EIS is required for a project, a CHMP must be developed and approved under Part 7 of the Aboriginal Cultural Heritage Act 2003. A CHMP is currently being drafted with the relevant Aboriginal parties.	<i>Aboriginal Cultural Heritage Act, 2003</i> .	DERM Cultural Heritage Coordination Unit.	The Aboriginal Cultural Heritage Act 2003 establishes a four month period within which to develop a CHMP. This period can be extended by the Sponsor should this be considered appropriate in the circumstances. Predicted approval date: January 2011
Approval of Mining Lease Application 70401 and Mineral Development Licence 136.	The <i>Mineral Resources Act, 1989</i> facilitates the granting, conditioning and management of mining leases and other tenement types.	<i>Mineral Resources Act, 1989</i> .	Department of Employment, Economic Development and Innovation (DEEDI) – Resources and Energy.	The Mining Lease Application will be assessed by DEEDI following approval of the EIS. MLA 70401 – Awaiting Approval MDL 136 – MLA December 2010 Predicted approval date: August 2011

Permit/Licence/Approval	Reason for Application	Applicable Legislation/Standards	Administering Authority	Permit Application Details/Approval Timing
State Legislation (cont.)				
Vegetation clearing of listed species.	<i>Cerbera dumicola</i> has been identified on the MEP and is listed as rare under the <i>NC Act</i> . Any removal of this plant species (or any other <i>NC Act</i> listed species) would require approval from DERM.	<i>Nature Conservation Act 1992.</i>	DERM.	Application must be made to DERM for the taking of any listed species. DERM may determine a Conservation Plan is required. If required, preparation of a Conservation Plan, public notice process and DERM assessment may take up to 6 months. Predicted approval date: December 2011



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APPENDIX C:

STUDY TEAM

Study Team

The qualifications and experience of the study team and specialist sub-consultants are listed below.

Executive Summary or Chapter no. or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
All	All	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
			Dale du Mee – Peabody	PhD (Sc); B. Sc (Zoo.)(Hons); B.App.Sc (Env Mgt); Dip. (Business) – 11 years
Executive Summary	Executive Summary	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Executive Summary	Glossary of Terms	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Chapter 2	Regulatory Approvals	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Dale du Mee – Peabody	PhD (Sc); B. Sc (Zoo.)(Hons); B.App.Sc (Env Mgt); Dip. (Business) – 11 years
			Stanislas Leger – Peabody (seconded)	M EnvLaw (France & Australia); B. Law; Dip. EnvSc, 6 + years
Part B B1	Introduction	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Chapter 3	Needs and Alternatives	All	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Chapter 4	Project Description	All	Stuart Clarke - Peabody	Ass. Dip Surveying 18+ years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
Chapter 5	Rehabilitation and Decommissioning	All	Dr Trevor Meers – MET Serve	B. App. Sci. (Nat. Res. Mgt), PhD School of Forest and Ecosystem Science, 3.5 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
Chapter 6	Climate	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years

Executive Summary or Chapter no. or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
Chapter 7 – Appendix F1	Land	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
		Soils Technical Report	Graham Tuck - GTES Pty Ltd	B. Sci. (Env. Sci.), 35 years
		Visual Amenity Technical Report	Susanne Georgii - Urbis	Grad. Dip. Landscape Architecture, 9 years
			Andrew Johnston - Urbis	B. Env. Sci., Grad. Dip. GIS, M. Urban and Regional Planning, 16 years
			Ashley Poon - Urbis	B. Planning and Design (Architecture), 9 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
Daniel Jones – Peabody	B. Env Eng; GradCert Mineral Resources, 8 years			
Chapter 8 – Appendix F2	Transport	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
		Transport Technical Report	Mac Hulbert - Halcrow	B. Eng. Tech. (Civil), Ass. Dip. Civil Eng., 18 years
			Trish Robertson - Halcrow	B. Eng. (Civil), 5+ years
Chapter 9	Waste	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years

Chapter or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
Chapter 10, Appendix F3, Appendix F4	Water Resources	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 19 years
			Clem Hill – MET Serve	B.App.Sc (Applied Geology); M.App.Sc, 20 years
		Surface Water Technical Report	Dr Sharmil Markar - WRM	B. Sc. (Eng)(Hons), PhD, 23 years
			Greg Roads - WRM	B. Eng. (Civil) (Hons), 18 years
			Julian Orth - WRM	B. Eng. (Hons), graduate
			Carl Wallis - WRM	B. Eng. (Env) (Hons), 2 years
		Groundwater Technical Report	Neil Manewell - MET Serve	B. Sci. (Geological Sciences), M. Sci. (Engineering Geology) (Hons), 2 years
			Bonny O'Neil - Matrixplus	B.Env.Sc (Earth Science), 5 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons), 17 years
			Daniel Jones – Peabody	B. Env Eng; GradCert Mineral Resources, 8 years
Chapter 11, Appendix F5	Air	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
		Technical Report	Mark Simpson - Noise Mapping Australia	B. Eng. (Mech), 20+ years
Chapter 12, Appendix F6	Noise and Vibration	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
		Technical Report	Mark Simpson - Noise Mapping Australia	B. Eng. (Mech), 20+ years

Chapter or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
Chapter 13, Appendix F7, Appendix F8	Nature Conservation	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18+ years
			Chris Spain – MET Serve	B. Sci (Hons, Class 1 – Botany), B. Sci (Ecology & Wildlife Biology), B. Arts, 4+ years
		Terrestrial Ecology Technical Report	Chris Spain – MET Serve	B. Sci (Hons, Class 1 – Botany), B. Sci (Ecology & Wildlife Biology), B. Arts, 4+ years
			Stewart Macdonald	B. Sci. (Hons), 6+ years
			Dr Andrew Daniel	B. Sci. (Biological Sciences), PhD Env. Eng., 20 years
		Aquatic Ecology Technical Report	Dr Greg Vinall, Aquateco Consulting Pty Ltd	B. Sc. (Hons), PhD (Research) Aquatic Science, 18 years
			Mark Bantic, Aquateco Consulting Pty Ltd	B. Sc., B. Env. Sc., M. Env. St., 8 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
			Daniel Jones – Peabody	B. Env Eng; GradCert Mineral Resources, 8 years
		Chapter 14 – Appendix F9,– Appendix F10	Cultural Heritage	EIS Section
Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years			
Indigenous Cultural Heritage Technical Report	Technical reports completed prior to EIS.			N/A.
European Heritage Technical Report	Tim Robbins, Everick Heritage Consultants Pty Ltd			B. Arch., Grad. Dip. Leg. Prac., 7+ years

Chapter or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
Chapter 15, Appendix F11	Social	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Georgina Thrum – Matrixplus Consulting	Cert. II Conservation & Land M'gt (Land, Parks & Wildlife), B. Env. Mgt (partially completed), Cavaye Community Development – Community Practitioner Course, 5 years
			Jessie Keast – MET Serve	B. Env. Mgt (Hons, Class 1 – Sustainable Development), 5 years
			Paula Shields - Matrixplus	GradDip Comms (USC), PGrad Dip PR (CIPR, UK), 16 years
			Dale du Mee – Peabody	PhD (Sc); B. Sc (Zoo.)(Hons); B.App.Sc (Env Mgt); Dip. (Business) – 11 years
Chapter 16	Health and Safety	EIS Section	Nick Levebre – MET Serve	B. Sc. (Geology) (Hons), 30 years
Chapter 17 - Appendix F12	Economics	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Terry Whiteman, Aurecon	B. Econ., 28 years
			Craig Lawrence, Aurecon	B. Econ., M. Mgt. Econ., M. App. Fin., 20 years
			Graeme Wallace, Aurecon	B. Eng. (Env), B. Bus. (Mgt), 4 years
Chapter 18	Hazard and Risk	EIS Section	Nick Levebre – MET Serve	B. Sc. (Geology) (Hons), 30 years
Chapter 19	TOR Cross Reference	EIS Section	Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
Chapter 20	Environmental Management Plan	EIS Section	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
			Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
			Daniel Jones – Peabody	B. Env Eng; GradCert Mineral Resources, 8 years

Chapter or Appendix no.	Section Name	Study Component	Team Member Name and Company	Qualifications and Experience
Chapter 21	Commitments not in EMP	EIS Section	Anthony Bianco - MET Serve	B. Sci (Hons, Class 1 – Botany/Geography), 14 years
			Antoinette Ward – Peabody	B. App. Sc (Environmental Resource Mgt) (Hons).- 17 years
Chapter 22	References	EIS Section	Collated by MET Serve.	N/A
Appendix A	Final TOR	EIS Appendix	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Appendix B	Approvals	EIS Appendix	Jessie Keast – MET Serve	B. Env. Mgt (Hons, Class 1 – Sustainable Development), 5 years
Appendix C	Study Team	EIS Appendix	Jessie Keast – MET Serve	B. Env. Mgt (Hons, Class 1 – Sustainable Development), 5 years
Appendix D	Standard Criteria	EIS Appendix	Colleen Fish – MET Serve	B. App. Sc. (Biology), Dip. App. Sc. (Wilderness Reserves and Wildlife), 18 + years
Appendix E	Consultation Report	EIS Appendix	Georgina Thrum – Matrixplus Consulting	Cert. II Conservation & Land M'gt (Land, Parks & Wildlife), B. Env. Mgt (partially completed), Cavaye Community Development – Community Practitioner Course, 5 years
			Jessie Keast – MET Serve	B. Env. Mgt (Hons, Class 1 – Sustainable Development), 5 years



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APPENDIX D:

THE STANDARD CRITERIA

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1.0 STANDARD CRITERIA

1.1 INTRODUCTION

Division 5, Section 58 of the *Environmental Protection Act 1994 (EP Act)* requires the chief executive to consider the 'standard criteria' when preparing an EIS Assessment Report. Schedule 4 – Definitions of the *EP Act* lists the standard criteria as:

- a) the principles of ecological sustainable development as set out in the *National Strategy for Ecological Sustainable Development*;
- b) any applicable environmental protection policy;
- c) any applicable Commonwealth, State or Local government plans, standards, agreements or requirements;
- d) any applicable environmental impact study, assessment or report;
- e) the character, resilience and values of the receiving environment;
- f) all submissions made by the applicant and submitters;
- 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
 - vi. 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;
- h) the public interest;
- i) any applicable site management plan;
- j) any relevant integrated environmental management system or proposed integrated environmental management system; and
- k) any other matter prescribed under a regulation.

1.2 MEP COMPATIBILITY WITH THE STANDARD CRITERIA

The MEP's compatibility with the Standard Criteria (b) – (k) are summarised below:

- Standard Criteria (b), (c), (g), (i), (j) and (k) relate to compliance with applicable legislation, standards, licences/authorities, best practice environmental instruments, site management plans, environmental management systems or related documentation. All applicable legislation and documented instruments have been assessed and discussed for each of the various components within the EIS. **Chapter 2 – Regulatory Approvals** details the complete range of regulatory documents and their requirements that were incorporated into the EIS development, while specific legislation and guidelines are discussed at the beginning of each relevant Chapter.
- Standard Criteria (d) and (e) relate to the knowledge and understanding of the existing environmental values for the MEP. The EIS documents the baseline, or receiving environment, and assess the impact the MEP will have on that environment. This is discussed for each component within the EIS, with detailed technical reports specific to the MEP attached as appendices.
- Standard Criteria (f) and (h) relate to stakeholder and community issues and submissions, along with a wider consideration of the public interest. A consultation program was undertaken throughout the EIS process to inform the public about

the MEP and to obtain feedback from the public on their concerns and interests relevant to the MEP. A consultation report is included as **Appendix E**.

The MEP compatibility with Standard Criteria (a), relating to ESD, is detailed in the following sections.

1.3 ESD OBJECTIVES

The Core Objectives of the *National Strategy for Ecologically Sustainable Development* are as follows:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations; and
- to protect biological diversity and maintain essential ecological processes and life-support systems.

1.4 ESD PRINCIPLES

The Guiding Principles of the *National Strategy for Ecologically Sustainable Development* are as follows:

- decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations;
- where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- the global dimension of environmental impacts of actions and policies should be recognised and considered;
- the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised;
- the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised;
- cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms; and
- decisions and actions should provide for broad community involvement on issues which affect them.

These guiding principles and core objectives should be considered in conjunction. No objective or principle should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ESD.

1.5 MINING ESD CHALLENGES AND OBJECTIVES

The *National Strategy for Ecologically Sustainable Development* also outlines broad challenges and provides a framework to meet the challenges for each major economic sector. The challenge for the mining sector (Part 2, Chapter 5) is "To further develop the mining industry in a way that manages the renewable and non-renewable resources on which it depends in an efficient manner which is also consistent with the principles of ESD".

The *National Strategy for Ecologically Sustainable Development* outlines the following two objectives to meet the challenge:

- a) to ensure mine sites are rehabilitated to sound environmental and safety standards, and to a level at least consistent with the condition of surrounding land; and
- b) to improve community consultation and information, improve performance in occupational health and safety and achieve social equity objectives.

The MEP will meet these objectives through mitigation and management strategies as outlined in **Chapter 5 – Rehabilitation and Decommissioning**, **Chapter 15 – Social**, **Chapter 16 – Health and Safety** and **Appendix E – Consultation Report**.

1.6 MEP ACHIEVEMENT OF ESD PRINCIPLES

Peabody's vision for sustainable development is to balance the needs of individuals with the need for a strong economy, a clean environment and a secure future.

Peabody has adhered to the principles of ESD through all planning and approval stages of the MEP. These principles are built into the standard operating processes and procedures for all Peabody operations. The social and economic impacts of the MEP, both positive and negative, have been identified and quantified in **Chapter 15 – Social** and **Chapter 17 – Economics** respectively. Environmental impacts have been identified and appropriate management and mitigation measures have been committed to throughout the remaining Chapters of the EIS, including an offset package for impacts on threatened ecological communities.

1.6.1 Decision making processes

Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations.

The MEP EIS highlights the continual application of ESD principles that are built into Peabody's standard operating processes and procedures for decision making. Specific decisions for the MEP that demonstrate the application of ESD principles include:

- redesigning the mine plan and waste rock emplacements to ensure a 100 m buffer around New Chum Creek and to avoid a recognised significant Indigenous cultural heritage site;
- developing a comprehensive Indigenous Engagement Program focussing on employment and training opportunities for Indigenous youth, as well as an ongoing Recruitment Strategy to attract a more diverse workforce;
- committing to remediate the land following cessation of operations and developing a Mine Closure Plan;
- maintaining the links established during the EIS process by ongoing organisation and support of the Community Reference Group; and
- utilisation of local contractors and workforces as a priority in order to support the development of the local and regional economy.

1.6.2 Precautionary Principle

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (Precautionary Principle).

The MEP EIS seeks to prevent the need to apply the precautionary principle through exhaustive and systematic completion of environmental surveys and studies that have been undertaken to identify potential environmental impacts and allow the development of appropriate management and mitigation measures.

While potential impacts causing serious or irreversible environmental damage are not predicted to result from the MEP, Peabody has the technical and financial credentials to implement the requirements of the Environmental Management Plan (EM Plan) and protect the environment in both the short and long term. In addition, Peabody is developing an Offsets Program in conjunction with Ecofund and in consultation with relevant Government Departments, where environmental impacts to listed environmental communities are unavoidable.

1.6.3 The global dimension of environmental impacts considered

The global dimension of environmental impacts of actions and policies should be recognised and considered.

Greenhouse gas (GHG) emissions from the MEP are the only potential environmental impact that is considered to have a global dimension. Peabody has committed to minimising its GHG emissions, voluntarily joined the Greenhouse Challenge Plus when it commenced and has complied with all requirements of the recently introduced *NGER Act* by producing and submitting annual reports of GHG emissions.

Peabody's objectives are to reduce the GHG emissions of its operations, accelerate the uptake of energy efficiency options, integrate greenhouse issues into business decision-making and provide more consistent reporting of GHG emission levels. Peabody recognises the global implications associated with coal mining in general and the MEP in particular. With this consideration, Peabody has identified a number of measures to reduce MEP GHG emissions such as:

- minimising clearing at the site, thereby maximising carbon storage in vegetation;
- integrating transport for the MEP with other local industries in order to limit emissions generated by transport, thereby minimising fuel usage and the associated GHG emissions;
- maximising the use of renewable energy sources to minimise emissions from burning of fossil fuels for electricity; and
- improving accuracy in GHG measurement by advancing from default factors to direct measurement methodologies, thereby allowing more accurate management and control of GHG emissions.

Other matters that will be assessed for the MEP include the sizing and selection of mobile diesel powered equipment, with fuel consumption rates being an integral part of the Peabody decision matrix for the selection of equipment, for both economic and environmental reasons.

1.6.4 Enhance individual and community well-being and welfare

Peabody recognises that the communities in which it operates are integral to the success of its operations. It is committed to enhancing the well-being and welfare of these communities.

Peabody has committed to maintaining the Community Reference Group (CRG) that commenced as part of the EIS process, as a way to continue direct communications with the local community and as an initiative to manage social issues throughout the life of the mine.

A draft Social Impact Management Plan (SIMP) has also been developed that aims to build upon the mitigation and management measures proposed in this EIS. Finalisation of the SIMP following MEP approvals will provide a framework for ongoing management of social impacts during the operation and decommissioning stages of the MEP. The finalisation of the SIMP will involve consultation with relevant local, State and Federal government departments, local community and industry.

The MEP will also provide significant employment opportunities along with flow-through economic benefits for the local community, as detailed in **Chapter 17 – Economics**.

1.6.5 Provide for equity within and between generations

The MEP has developed an EM Plan to ensure that potential impacts to the environment will be prevented, mitigated, monitored and managed so that the MEP does not significantly reduce, or fail to maintain, the health, diversity and productivity of the surrounding environment or affect future generations.

A detailed rehabilitation and decommissioning plan for the MEP commits to progressive rehabilitation to a safe and sustainable final land use, including a return to cattle grazing where appropriate, and the expansion of native vegetation ecosystems to enhance conservation values where grazing is not recommended.

Potential off-site environmental impacts have been assessed in relevant chapters of the EIS and mitigation measures will be implemented to ensure no future generations are negatively impacted through the current generation's use of these resources.

1.6.6 Protection of biological diversity and essential ecological processes

The conservation of biological diversity has been considered throughout the MEP process. Detailed baseline terrestrial and aquatic flora and fauna surveys were undertaken for the MEP, in addition to information already compiled for the existing Millennium Mine. The biodiversity values contained within the MEP were assessed against all relevant legislation and in consultation with relevant Government Departments.

Although the majority of the site has been previously cleared for agricultural purposes, some small areas of Endangered Regional Ecosystems and/or Threatened Ecological Communities were identified. Where possible, the mine plan was modified to prevent clearing of these listed ecosystems, and where not possible, Peabody has committed to developing an Offsets Program in conjunction with Ecofund and in consultation with relevant Government Departments.

Surveys for the MEP also identified a number of flora and fauna pest species that will be managed in accordance with the EM Plan to aid in conserving the MEP biodiversity values.

1.6.7 Diversified economy to enhance environmental protection

The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised.

The MEP is economically significant at a local, regional and State level. Socio-economic benefits resulting from the MEP include:

- maintaining the existing 220 employees for an additional 12 years beyond currently expected mine life at the Millennium Mine;
- additional long-term employment opportunities for approximately 160 people directly and over 625 people indirectly during the mine operations phase;
- the expected employee wages and salaries of up to \$38 million per annum into the local and regional economies;
- the expected flow-on effect of additional wages to the regional economy of around \$180 million per year;
- export income of between \$525 - \$700 million per annum;

- significant state and federal government taxes and royalties;
- the economic opportunity of developing a coal resource that is viable and in demand; and
- local and regional community employment opportunities.

1.6.8 Enhance international competitiveness in an environmental sound manner

The need to maintain and enhance international competitiveness in an environmental sound manner should be recognized.

The global demand for coal is increasing every year. Australia has a large resource of high-quality coal, with the Bowen Basin in Central Queensland containing virtually all of the state's hard coking coal resource. These high quality, low sulphur coals are attractive to overseas buyers conscious of minimising the environmental impact of their coal usage. The MEP seeks to further develop a known high quality coal resource and is strategically placed to service the expanding demands of Asia and the wider international metallurgical coal sectors. As an expansion project, the MEP will extend the life of the mine and largely utilise existing mining, rail and port infrastructure and services - thereby minimising associated impacts - to provide an excellent opportunity for efficient resource recovery and export.

1.6.9 Cost effective and flexible policy instruments adopted

Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms.

Peabody supports the Commonwealth, Queensland and Local Governments in the adoption of cost effective and flexible policy instruments governing valuation, pricing and incentive mechanisms.

1.6.10 Broad community involvement on issues which affect them

Decisions and actions should provide for broad community involvement on issues which affect them.

Stakeholder consultation was an integral component of the planning and approvals process for the MEP. A Stakeholder Consultation Strategy (SCS) was implemented to enhance the likelihood of informed discussion leading to better definition and greater support of the MEP. The SCS provided ongoing opportunities for community involvement and education, designed to encourage and facilitate active community participation and to provide an opportunity for community issues and concerns to influence the nature of the MEP.

Stakeholder consultation will continue before, during and after the period that the EIS and EM Plan is being prepared. This will facilitate an understanding of community values and concerns so that they can be addressed and where necessary, incorporated into appropriate environmental protection commitments. Consultation will form an integral part of social impact assessment within the EIS process and will continue in the form of the CRG and SIMP during the life of the mine.



Millennium Expansion Project Environmental Impact Statement

APPENDIX E:

CONSULTATION REPORT

Millennium Expansion Project

Appendix E

Consultation Report

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1 EXECUTIVE SUMMARY

A comprehensive stakeholder and community engagement program has been an integral component of the planning and approval process for the MEP.

Engagement has been undertaken with property owners, key stakeholders, government agencies and the broader community, and has included the following engagement tools and activities:

- meetings with Commonwealth, State and Local government agencies;
- meetings with affected property owners;
- distribution of Project information materials (e.g. factsheets);
- Community Information Days;
- establishing a Community Reference Group;
- establishment and maintenance of Project contact points (freecall telephone line, email, website, direct mail);
- media releases at key Project stages (e.g. Public Notices and advertisements); and
- a Community Survey.

A total of 29 property owners were identified as being directly affected by the MEP. These landholders were contacted directly, as well as being a key focus for the engagement activities listed above.

The key issues raised by stakeholders during the engagement process were:

- in general, throughout the stakeholder and community engagement process, the MEP largely received positive support from stakeholders;
- the regional area is predominantly made up of mining towns therefore the general community did not appear to be particularly concerned about one mine expansion in the area;
- the MEP is considered to offer a number of benefits, including increased employment opportunities, opportunity for investment in housing, provision of training opportunities and stimulation of the local economy;
- issues raised by the community included traffic impacts, population growth, limited employment pool, air quality impacts, access to government services and ongoing water supply; and
- although the MEP did not cause any major concerns to the local community, there are concerns that the accumulation of larger mining and expansion projects in the area may produce a number of cumulative impacts, particularly relating to housing and access to local government services.

These concerns have been considered and/or addressed directly during the engagement process and in the EIS.

Peabody will continue to undertake engagement throughout the commissioning, operational and final decommissioning phases of the MEP.

2 ENGAGEMENT OBJECTIVES

A comprehensive program of stakeholder and community engagement has been an integral component of the planning and approvals process for the MEP.

A comprehensive MEP Stakeholder and Community Engagement Program (SCEP) was prepared to provide a framework for the engagement process. The primary objectives of the SCEP were to:

- facilitate an engagement process that balanced the stakeholders' need for information with opportunities to provide input into the Environmental Impact Statement (EIS) approval processes;
- identify stakeholders and anticipate issues;
- build and maintain long-term positive relationships with all stakeholders;
- promote stakeholder confidence by ensuring open and transparent discussions;
- keep stakeholders informed of project developments;
- seek opinions from all stakeholders on matters of importance to them;
- manage stakeholder expectations and ensure stakeholders understood the nature of the project;
- work with stakeholders to develop agreed outcomes and solutions to issues wherever possible;
- ensure stakeholder issues are addressed appropriately as part of the EIS process;
- ensure stakeholder feedback is included in the Social Impact Assessment; and
- achieve regulatory compliance.

3 METHODOLOGY

This section details the methodology used to identify relevant stakeholders and describes the engagement activities that have been undertaken to date and those that will be ongoing for the MEP.

3.1 STAKEHOLDER IDENTIFICATION

Stakeholders can be defined as individuals, communities, traditional owners, non-government organisations, private organisations, government agencies, and small businesses who are impacted by, or who have an interest in, the project and its outcome.

The definitions of 'affected' and 'interested' persons provided in Sections 38 and 39 of the Queensland *Environmental Protection Act 1994 (EP Act)* and the definition of an 'affected party' provided in Section 500 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* were used to generate a stakeholder list. Title searches were undertaken for parcels of land located within and adjacent to the Project tenements. A desktop review was undertaken to identify other relevant stakeholders including a review of cadastral information, searches to identify holders of mining tenements, local community directories and Native Title claim mapping.

The full list of identified stakeholders (**Attachment A**) includes Directly Affected Stakeholders as defined by the *EP Act*, including landowners, easement holders, tenement holders, the Isaac Regional Council (IRC), the nearby townships of Moranbah and Coppabella and indigenous parties.

Attachment A also includes a list of Interested Persons as defined in the *EP Act*, including government agencies and authorities, non-government agencies and authorities (e.g. conservation groups, industry groups, media, employees, support services and organisations and community clubs) and other interested parties.

The comprehensive list of stakeholders that were identified during the engagement process was split into three tiers, according to the stakeholder's level of influence and anticipated level of interest in the MEP:

- **Tier One** stakeholders include individuals or groups with a high or frequent level of impact, interest or influence on the Project's activities and decisions.
- **Tier Two** stakeholders include individuals or groups with a medium or semi-frequent level of impact, interest or influence on the Project's activities and decisions.
- **Tier Three** stakeholders include individuals or groups with a low or infrequent level of impact, interest or influence on the Project's activities and decisions.

3.2 ENGAGEMENT ACTIVITIES

3.2.1 Face-to-face Meetings

A number of face-to-face meetings were held to discuss the MEP with stakeholders. These meetings are described below. Peabody will continue to hold face-to-face meetings as required throughout the life of the MEP.

Government Departments

Meetings were held with representatives of various government departments during the EIS process. These meetings provided a two-way communications process for sharing information regarding the MEP. A summary of these meetings is provided below:

- Meeting with the Queensland Department of Environment and Resource Management (DERM) in Emerald on 12 September 2008 to discuss the Initial Advice Statement (IAS) lodgement for the MEP;
- Meeting with DERM in Brisbane on 1 October 2008 to discuss the MEP;

- Meeting with the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) in Canberra on 8 October 2008 to discuss the referral of the Project under the *EPBC Act*;
- MEP pre-design conference with DERM on 15 October 2008 at the DERM Office in Brisbane.
- Meetings with IRC providing information on the proposed MEP and gathering information from the IRC about any issues or concerns regarding the MEP. Peabody met with members of the IRC on Tuesday 16 December 2008, Tuesday 23 June, 2009 and Tuesday 27 April 2010;
- Meeting with Freya Walton, Director of the Social Impact Assessment Unit, Queensland Department of Infrastructure and Planning (DIP) in Brisbane on Thursday, 25 June 2009; and
- Pre-lodgment meeting with DERM on 15 September 2010 at the DERM Office in Brisbane.

Property Owners

Peabody representatives met with property owners to discuss the MEP, provide relevant information and address any issues or concerns. The issues discussed at these meetings are summarised in **Section 4.1**.

3.2.2 Factsheets

Three Project factsheets were prepared to introduce the MEP, provide ongoing Project information and updates and to notify that the EIS was available for comment.

The factsheets were distributed to the Moranbah and Coppabella communities by direct letterbox drop (2,884 copies in Moranbah and 123 copies in Coppabella), to Peabody employees and contractors (550 copies) and also by direct mail to persons identified on the stakeholder list. A copy of each factsheet was made publicly available on Peabody's website.

A summary of the information provided in the Project factsheets is provided below and copies are included in **Attachment B**.

Factsheet 1 – November 2008

The initial factsheet provided:

- details of existing operations;
- an overview of the MEP;
- explanation of the EIA process;
- an EIS process flowchart;
- details of the stakeholder and community engagement process;
- description of the draft Terms of Reference (TOR);
- how to register as an 'interested' person for the Project;
- a Project area map; and
- contact details for the Project team.

Factsheet 2 – May 2009

The second factsheet included:

- an overview of Peabody;
- details of how to view the draft and final TOR;
- an EIS process flowchart advising where the Project is in the process;

- how to register interest for employment on the Project;
- information on the EPBC referral;
- study updates;
- details of the inaugural meeting of the Community Reference Group (CRG);
- details of the Community Information Days;
- a Project area map; and
- Project freecall contact details.

Factsheet 3 – November 2010

The third factsheet will include:

- an overview of Peabody;
- an overview of the Project;
- an EIS process flowchart advising where the Project is in the process;
- a summary of major sections / potential impacts / mitigation commitments in the EIS;
- details of how to view and comment on the draft EIS;
- a Project area map; and
- Project freecall contact details.

3.2.3 Community Information Days

Community Information Days were held in Clermont and Moranbah to provide information on the MEP, generate two-way communication with the community and to gain feedback about the Project from the community.

The Community Information Days were held on 26 and 27 May 2009 at the Clermont Show and on 28 June 2009 at the Moranbah Lions Market.

The community information display included the following details:

- project statistics;
- environmental information;
- community involvement;
- MEP location map;
- aerial view of proposed mine development; and
- contact details for the Project team.

Peabody and MET Serve staff discussed the MEP with the general public. Visitors were encouraged to complete a community survey (**Section 3.2.8**).

Approximately 95 people attended the Community Information Days held at the Clermont Show in May 2009, and approximately 104 people attended the Community Information Day at Moranbah Lions Market in June 2009.

Photos 3-1 and **3-2** show the displays at the Moranbah Lions Market and Clermont Show Community Information Days, respectively.



Photo 3-1 Information Display at the Moranbah Lions Market



Photo 3-2 Information Display at the Clermont Show

The findings of the Community Information Day are discussed in **Section 4.2**.

3.2.4 Community Reference Group

Peabody established a CRG for the MEP in 2009. The CRG is comprised of 10 representatives of the local community and community organisations. The CRG serves to:

- provide factual, accurate information about the project and any environmental, social and economic impacts;
- identify and understand existing community values and interests;
- identify and discuss any issues of concern;
- rapidly develop strategies to mitigate any potential negative impacts;
- demonstrate that the opinions and views of the local community are considered during the planning and operation of the MEP; and
- foster long term collaborative relationships between the local community and Peabody.

Due to the close proximity of another Peabody project, the Eaglefield Expansion Project (EEP), and for logistical reasons (i.e. relevance of stakeholders to both the EEP and the MEP), a joint CRG for the two Projects was developed.

The CRG includes representatives from the following groups/organisations:

- Moranbah Community Workers Club;
- 4RFM Moranbah Community Radio;
- IRC;
- DERM;
- DEEDI;
- BHP Billiton Mitsubishi Alliance (BMA) Goonyella Riverside Mine;
- Traditional Owners and
- neighbours.

The first CRG meeting for the MEP was held at the Eaglefield Mine on Thursday 2 April 2009. The CRG members discussed the CRG Charter (Peabody, 2009) (**Attachment C**). The CRG Charter provides details on the goals and objectives of the CRG, the roles and responsibilities of individuals, the process of the meetings and conduct of members. The proposed expansion to the Eaglefield operations was also discussed.

Three joint CRG meetings have been held to date.

Minutes and actions from each meeting were administered by Peabody and circulated to all CRG members, including those members who did not attend. Issues raised and feedback provided at CRG meetings to date is discussed in **Section 4.3**.

3.2.5 Project Contact Points

3.2.5.1 Freecall Number

A freecall telephone information line (1300 119 022) has been established and is operated during business hours.

3.2.5.2 Website

Peabody established a MEP page on their website to provide information to the wider community regarding details of the Project, Project updates, publications and contact details. A copy of the webpage content is included in **Attachment D**.

(<http://www.peabodyenergy.com.au/qld/millennium.html>),

3.2.5.3 *Project Mailing Address*

A mailing address for the MEP engagement team was provided in initial Project engagement materials.

3.2.6 **Media**

Public Notices regarding the draft and final TOR were placed in the following newspapers in order to inform the local and wider community of the scope of the EIS for the MEP:

- Courier Mail, Wednesday 8 April 2009;
- Mackay Daily Mercury, Wednesday 8 April 2009;
- Central Queensland News, Wednesday 8 April 2009;
- Central Queensland News, Friday 7 August 2009;
- Courier Mail, Saturday 8 August 2009; and
- Mackay Daily Mercury, Saturday 8 August 2009.

Public Notices will also be published in selected newspapers upon notification from DERM on the draft EIS.

A newspaper article regarding the Project was published in the Mackay Daily Mercury on Tuesday, 2 June 2009. A copy of the article is included as **Attachment E**.

3.2.7 **Direct Mail**

A summary of the letters sent directly to particular stakeholders is provided below.

Letter 1

Peabody provided a copy of the Project factsheets (**Section 3.2.2**) by direct mail to the following stakeholders on 26 November 2008:

- Department of Mines and Energy, Emerald (now Department of Employment, Economic Development and Innovation DEEDI);
- EPA, Emerald (now DERM);
- Mayor Cr Cedric Marshall, IRC;
- DEWHA, Mining Section, Canberra (now Department of Sustainability, Environment, Water, Population and Communities); and
- EPA, Brisbane (now DERM).

Letter 2

A letter was sent to the following stakeholders on 20 March 2009 inviting them to nominate their interest in becoming a member of the CRG:

- Mr Tony Mataika (Central Queensland Land Council);
- Barada Barna and Yetimarla People 3;
- Wiri People;
- Neville and Patricia Farley;
- John and Josephine Lloyd;
- Mr Allan Williams;
- David and Joy Deguara;
- Margaret Flohr;
- Ken Braithwaite;
- Ms Beryl Neilsen;

- Tenement Officer (AMCI [CQ] Pty Ltd);
- Tenement Officer (BHP Mitsui Coal Pty Limited);
- Tenement Officer (Moorvale West Coal Pty Ltd);
- Tenement Officer (Arrow Energy);
- Diane Clark (4RFM Moranbah Community Radio);
- Mr Kim Lowe (Moranbah District & Support Services);
- Mr Ashley Dowd (Moranbah Community Workers Club);
- Deborah Rae (Mackay Regional Council for Social Development Ltd);
- The Principal, Moranbah State School;
- Mr Gary Luck (Department of Natural Resources and Water);
- Mr Ed Donohue (Fitzroy WRP Community Reference Panel);
- Mr Ted Scott (Fitzroy Basin Association);
- Mr Royce Bishop (Mackay Whitsunday NRM Group);
- Ms Alison Jones (Capricorn Conservation Council);
- Dr Michael Williams (Mackay Conservation Group);
- Mr Scott Riley, IRC;
- Jan Anfruns, IRC; and
- Mayor Cr Cedric Marshall, IRC.

Letter 3

Letters were distributed by Peabody to potentially affected and interested stakeholders (see **Attachment F**) on 6 and 7 April 2009. The letter provided details of the Project, information on the release of the draft TOR and a copy of the Public Notice.

Letter 4

A letter was sent from Peabody to Moranbah Library on 6 April 2009, enclosing copies of the IAS and draft TOR and requesting that the library publicly display these documents.

Letter 5

A letter was distributed by Peabody on behalf of DERM to the DERM Advisory Body (see **Attachment F** for list) on 6 April 2009. The letter provided details of the Project, information on the release of the draft TOR and a copy of the Public Notice.

Letter 6

Following receipt of written submissions on the draft TOR (provided in **Attachment G**), a letter from Peabody was sent on 6 August 2009, thanking those who had provided submissions for their comments and advising them how to view a copy of the final TOR.

A total of 17 submissions were received commenting on the draft TOR from¹:

- Department of Communities;
- Department of Community Safety;
- DERM;

¹ The below list provides the names of government departments as they were when these letters were sent, prior to the government changes in March 2009.

- DIP;
- Department of Main Roads;
- Department of Mines and Energy;
- Department of Primary Industries and Fisheries;
- Department of Tourism, Regional Development & Industry;
- DEWHA, Mining Section, Canberra;
- Ergon Energy;
- IRC;
- Mackay Regional Council;
- Powerlink Queensland;
- Queensland Police Service;
- Queensland Transport;
- Queensland Treasury; and
- SunWater.

An example copy of one of these letters is attached as **Attachment F**.

3.2.8 Community Survey

Copies of the Community Survey were distributed at the Community Information Days. The survey aimed to collect local demographic information, views on existing services and facilities available, and opinions and general views on the MEP. The Community Survey also provided an opportunity for community members to express any issues or concerns they had on the MEP and potential impacts.

A copy of the Community Survey is attached as **Attachment H**. A total of 149 community members completed the Community Survey and the findings are discussed in **Section 5**.

3.2.9 Key Project Documentation

Key Project documentation (e.g. IAS, draft TOR, final TOR, EPBC Referral and EIS) was made publicly available in accordance with statutory requirements. Public notices notifying the general public of the release of such documentation are described in **Section 3.2.6**.

3.3 CONSULTATION MANAGER

The Consultation Manager stakeholder data management software was used to capture and record all stakeholder and community engagement activities undertaken for the MEP.

All engagement with stakeholders was recorded using the following process:

- all stakeholders, including their contact details were entered into the system;
- stakeholders were assigned to a tier as identified in **Section 3.1**;
- issues and event categories were established in conjunction with the EIS process;
- all contact with stakeholders including telephone conversations, email, face to face meetings, correspondence etc was recorded and any follow up actions assigned to the appropriate project personnel;
- all correspondence and documentation relating to engagement activities was attached to each stakeholder as appropriate; and
- action requests and timelines were sent to appropriate personnel for completion.

A summary of the Project activities from Consultation Manager is included as **Attachment I**.

4 COMMUNITY ENGAGEMENT FINDINGS

This section provides a summary of the findings of community engagement activities undertaken by Peabody to date, based primarily on comments from, and discussions with, stakeholders.

All issues raised were addressed appropriately, through direct discussion, provision of information, follow-up action, ongoing engagement, or incorporation of issues in technical studies for the EIS. The issues raised have been broadly categorised into groups. A description of the groups of issues and where more detail on each issue can be found within the EIS is provided in **Table 4-1**.

Table 4-1 Issues raised through the engagement program

Issue	EIS Section	EIS Appendix
Traffic and transport	Chapter 8	Appendix F2
Waste	Chapter 9	No technical report was required.
Water resources	Chapter 10	Appendices F3 (surface water) and F4 (groundwater).
Air quality	Chapter 11	Appendix F5.
Noise and vibration	Chapter 12	Appendix F6.
Nature conservation	Chapter 13	Appendices F7 (terrestrial ecology) and F8 (aquatic ecology).
Cultural heritage	Chapter 14	Appendices F9 (Indigenous cultural heritage) and F10 (European cultural heritage).
Social impacts	Chapter 15	Appendix F11.
Health and safety	Chapter 16	No technical report was required.
Economic impacts	Chapter 17	Appendix F12.
Hazard and risk	Chapter 18	No technical report was required.
Rehabilitation and Decommissioning	Chapter 5	Appendix F1 (soils) has relevance.

A full list of stakeholders consulted with during the MEP engagement process is included in **Attachment J**.

4.1 FACE-TO-FACE MEETINGS

Government Agency Meetings

- DERM – 12 September 2008
- DERM – 1 October 2008
- DEWHA – 8 October 2008
- DERM – 15 October 2008
- IRC – 16 December 2008
- IRC – 23 June 2009
- IRC – 27 April 2010
- DIP (Freya Walton) – 25 June 2009
- DERM – 15 September 2010

Property Owner Meetings

Peabody held meetings with the adjacent property owners over the course of the EIS process. No significant issues were raised during these meetings, as Peabody has ongoing communications with adjacent property owners as part of the existing Millennium Mine operations.

4.2 COMMUNITY INFORMATION DAYS

Very few comments, issues or concerns were raised at the Community Information Days, with the majority of people choosing to complete the Community Survey.

4.3 CRG MEETINGS

2 April 2009

The first CRG meeting, held on 2 April 2009, commenced with a general briefing about the Project.

Key issues discussed at the first CRG meeting included:

- cumulative socio-economic impacts of mining on local communities;
- the cost of housing and rent;
- small businesses competing with mining wages; and
- dust levels.

6 August 2009

A joint CRG meeting for both the MEP and EEP was held at the Millennium Coal Mine on 6 August 2009. Information provided by Peabody during the meeting included:

- an outline of the MEP;
- a progress report for the EEP;
- a description of the scope and methods for assessing economic impacts;
- a discussion about the Local Leadership Group, an initiative of the Sustainable Resource Communities Policy and a partnership between the State Government, Queensland Resources Council and the Local Government Association of Queensland;
- Peabody offered to arrange a member of the Local Leadership Group for the Bowen Basin to attend the next CRG meeting; and
- A discussion of the results of the Community Survey.

The key issues/topics raised included the following:

- methods for assessing impacts on local property values;
- high level of concern about housing affordability;
- consideration of the results of socio-economic assessments by the Queensland Government;
- high level of concern about availability of government services;
- potential need for increased service delivery;
- issues with planning for water supply for large numbers of non-resident people;
- the EEP and MEP were considered to have a minimal socio-economic impact on the local area;
- desirable to have housing and family where jobs are;
- perceived need for the provision of support for training and employment for young Aboriginal people; and
- potential for Peabody to provide support for a Regional Community Services Hub.

21 June 2010

A CRG meeting was held at the Moranbah Workers Club on 21 June 2010. Information provided by Peabody during the meeting included:

- latest mine plans for the MEP and EEP;
- a discussion of timelines; and

- a discussion of Peabody initiatives for road safety, indigenous employment and landcare awards.

Anne Smith (DEEDI) provided an overview of the Local Leadership Group and the Sustainable Resource Communities Policy.

The key issues/topics raised included the following:

- Concern was expressed requirements regarding no water to be released from the mine sites. It was believed this would have negative impacts on downstream users and on natural flow regimes.
- CRG to be notified prior to the public display of the EIS

4.4 ISSUES RAISED VIA PROJECT CONTACT POINTS

A summary of issues raised by community members who contacted the Project Community Engagement Team via the Project contact points is provided below:

- the location of the MEP in relation to individual properties;
- the status of the EIS process;
- registration of stakeholders as 'interested parties' for the MEP;
- nomination of interest for the CRG;
- employment opportunities;
- logistics for CRG meetings; and
- Native Title claim updates.

5 COMMUNITY SURVEY

A total of 149 members of the community completed the Community Survey. The results of the survey are discussed below.

Question 1: Which age group are you?

The first question in the survey asked respondents which age group they fit within. The largest single age group category for respondents was the 30-39 year old age group which accounted for 27% (40 out of 149) of all respondents. The combined age groups of 18-49 represented 60% of all respondents, which corresponds with ABS Census figures from 2006 which indicated that most people in mining towns are aged between 15 and 44 years.

Figure 5-1 presents the percentage of survey respondents within each age group category.

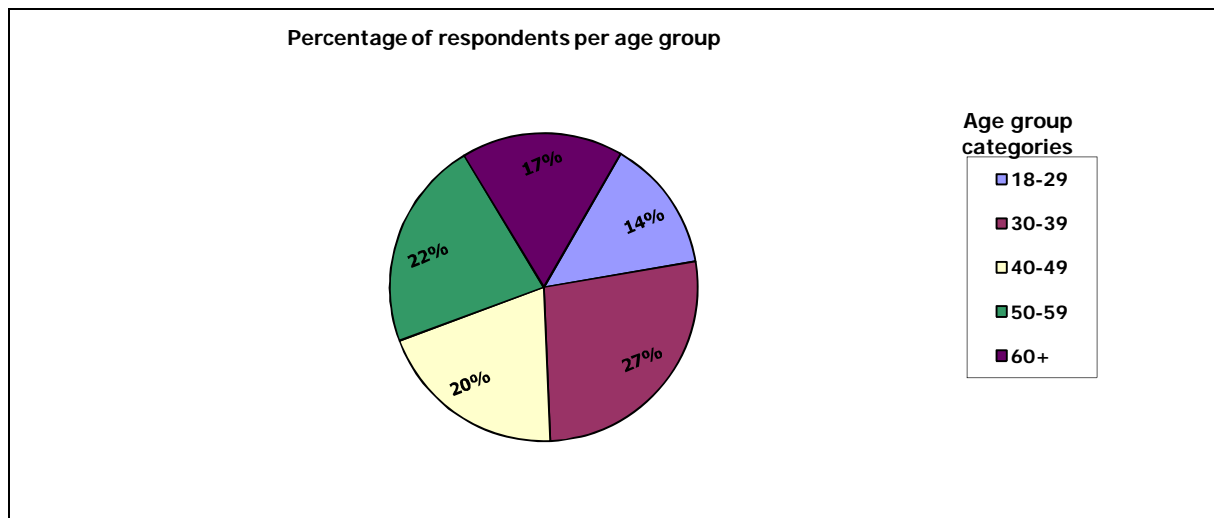


Figure 5-1 Percentage of respondents per age group

Question 2: What is your gender?

The second survey question asked for the gender of the respondents. There was an approximately even gender spread of respondents, with 50% male (74) and 50% female (75).

The almost equal number of male and female respondents suggests that females in the area have an equal interest in the mining industry, despite the general trend of mining workforces having historically been predominantly male.

The location of the Community Information Days may also account for a more even gender distribution, as both the Clermont Show and Moranbah Lions Markets are more likely to appeal to a family demographic rather than having specific appeal to either gender.

Question 3: Which local area do you live in?

The community survey also asked respondents to identify which local area they lived in. The majority of respondents (68% or 101 people) lived in Moranbah. Sixteen percent of respondents lived in Clermont and 11% chose 'other' as their local area. These were mainly short-term visitors to the area visiting family or persons on holiday. These figures are representative of the towns in which the Community Information Days were held (i.e. Moranbah and Clermont).

Figure 5-2 indicates the survey respondents' residential location.

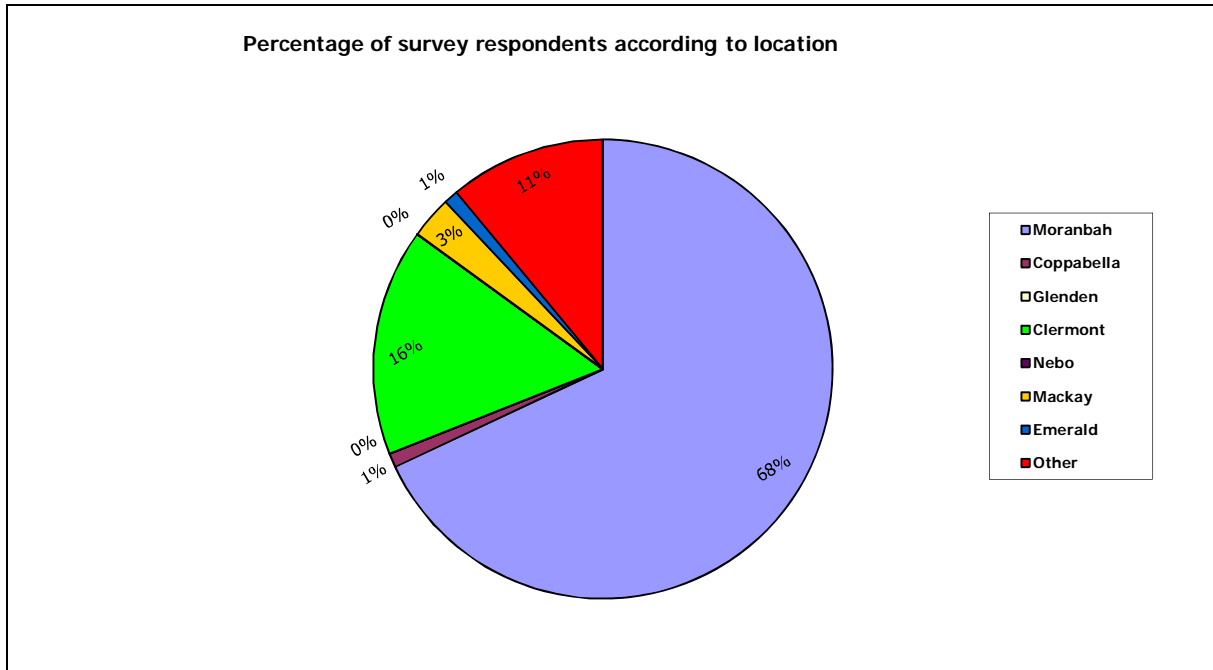


Figure 5-2 Percentage of survey respondents according to location

Question 4: How long have you been living in the area?

A large proportion of respondents (i.e. 34% or 50 people) indicated that they had been living in the area for between one and five years. Twenty-nine percent of respondents indicated that they had lived in the area for more than 20 years. **Figure 5-3** indicates the period of time survey respondents have been living in the area.

The majority of the respondents who had lived in the area for more than 20 years were born and raised locally and have chosen to remain in the area. These respondents were considered more likely to be involved in the agricultural industries of the region, with strong, often multi-generational ties to the land.

Those respondents who reported having lived in the area for between one and five years are more likely to be involved with the mining industry and associated support services. These people are generally attracted to the region for employment reasons and generally live in the area for the period of their employment.

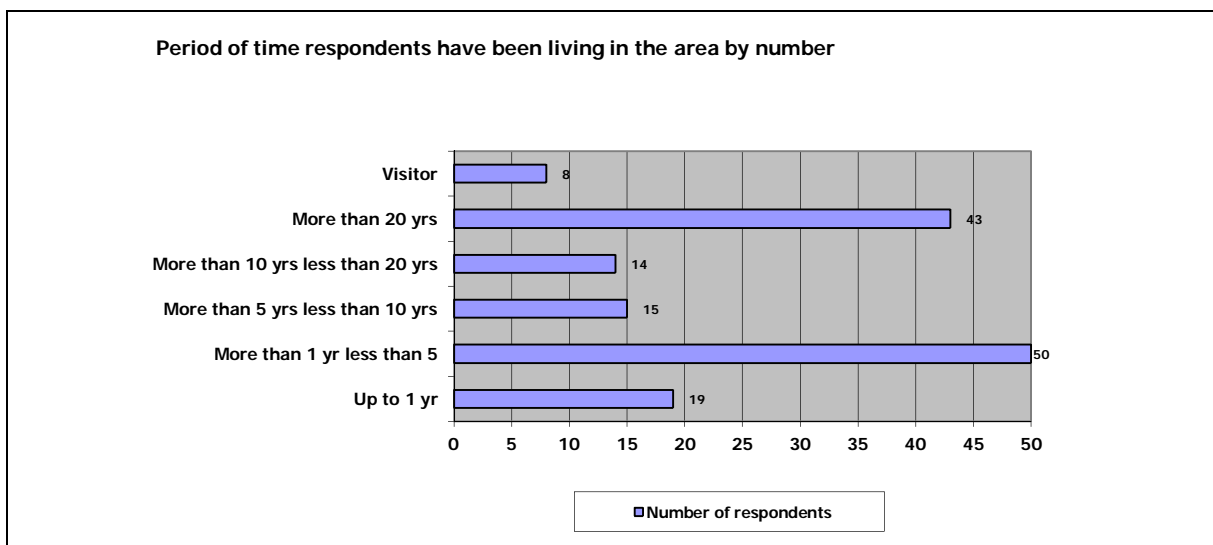


Figure 5-3 Period of time respondents have been living in the area

Question 5: How long do you intend on living in the area?

When asked how long they intended living in the area, a large proportion of the survey respondents (i.e. 19% or 29 people) indicated that they were unsure due to uncertainty of employment. These respondents indicated that they would remain in the area for as long as they were able to retain employment. The largest group of respondents, 24% (35 people), advised that they would remain in the area for between five and 10 years, stating that the main reason for this would be the length of time of their employment locally. **Figure 5-4** indicates the period of time survey respondents intend on staying in the area.

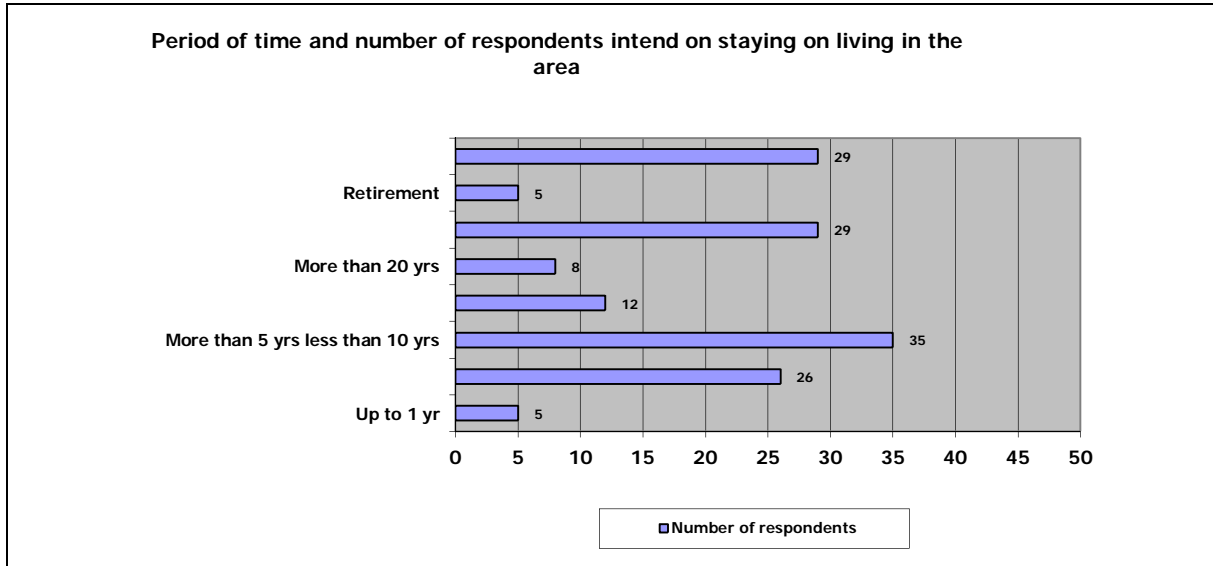


Figure 5-4 Period respondents intend on living in the area

Question 6: Overall, how would you rate your quality of life in the community?

This question asked respondents how they rated their quality of life. Of the 149 respondents, 91% (135 people) rated their quality of life as either 'very good' or 'good'. No respondents indicated that their quality of life was poor and only 3% (4) of respondents felt that their quality of life was below average. The survey respondents' ratings for their quality of life are presented in **Figure 5-5**.

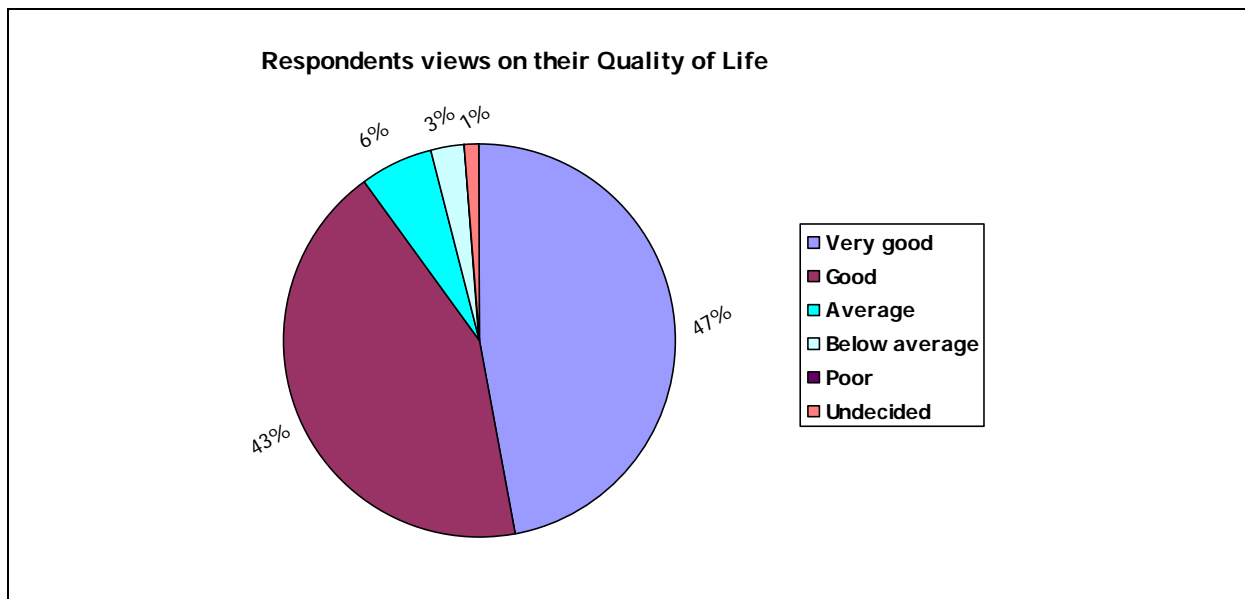


Figure 5-5 Respondents' views on their quality of life

Question 7: What do/don't you like about living in the area?

This question asked respondents what they liked and did not like about living in the area.

When respondents were asked what they liked about living in the area, the most frequent responses were that the area had a sense of community, was an ideal place to raise children, was good for families and was quiet and relaxed.

The most frequent answers when respondents were asked what they did not like about living in the area related to the remoteness of the area, the lack of facilities (in particular shopping facilities), the recent closure of the local cinema and the limited services available.

Question 8: Are there any major issues affecting your community and lifestyle?

The major issues highlighted by the respondents who answered this question included:

- a lack of employment in the area;
- the cost of housing (both purchasing and renting); and
- the high cost of living.

Question 9: Are you satisfied with the quality of and accessibility of services providing in your area?

More than half of respondents (i.e. 58% or 97 people) indicated that they were satisfied with the quality and accessibility of services in their area. The remaining 42% indicated that they were dissatisfied with the services in the area.

Those respondents who indicated that they were dissatisfied with the quality and accessibility of services were asked to explain their reasons. The main reasons provided were:

- the lack of shopping and facilities (e.g. choice of only one supermarket);
- limited trading hours for shopping (e.g. no Sunday trading);
- lack of entertainment facilities; and
- inadequate medical services, particularly for emergency medical support.

Question 10: What community organisations or clubs are you involved with and how are you involved?

Sixty-seven percent of survey respondents were involved with a local community organisation or club. The vast majority of respondents were involved as active participants in one or more local sporting organisations, including rugby, AFL, soccer, squash, netball and cricket. Some respondents had volunteer roles for organisations such as the Lions Club, Aged Care, Playgroup or local Church.

Question 11: Are you aware of the Peabody project at the Millennium site?

Fifty-eight percent of respondents were aware of the MEP. The remaining 42% of respondents were unaware of the MEP.

Those respondents who were aware of the MEP were asked if they thought the Project may have an impact on a number of environmental and social issues. The majority of respondents indicated that they thought the Project would have a positive effect on training, employment and the local economy. A large number of respondents felt that the MEP would have a negative affect on traffic and transport due to the perceived increased number of vehicles on local roads. Although the lack of available and affordable housing has been cited as a major problem for the area, almost half of the respondents (i.e. 45% or 40 people), stated that the Project would have a positive impact on housing in the area.

Figure 5-6 shows the types of potential impacts survey respondents perceived as being associated with the MEP.

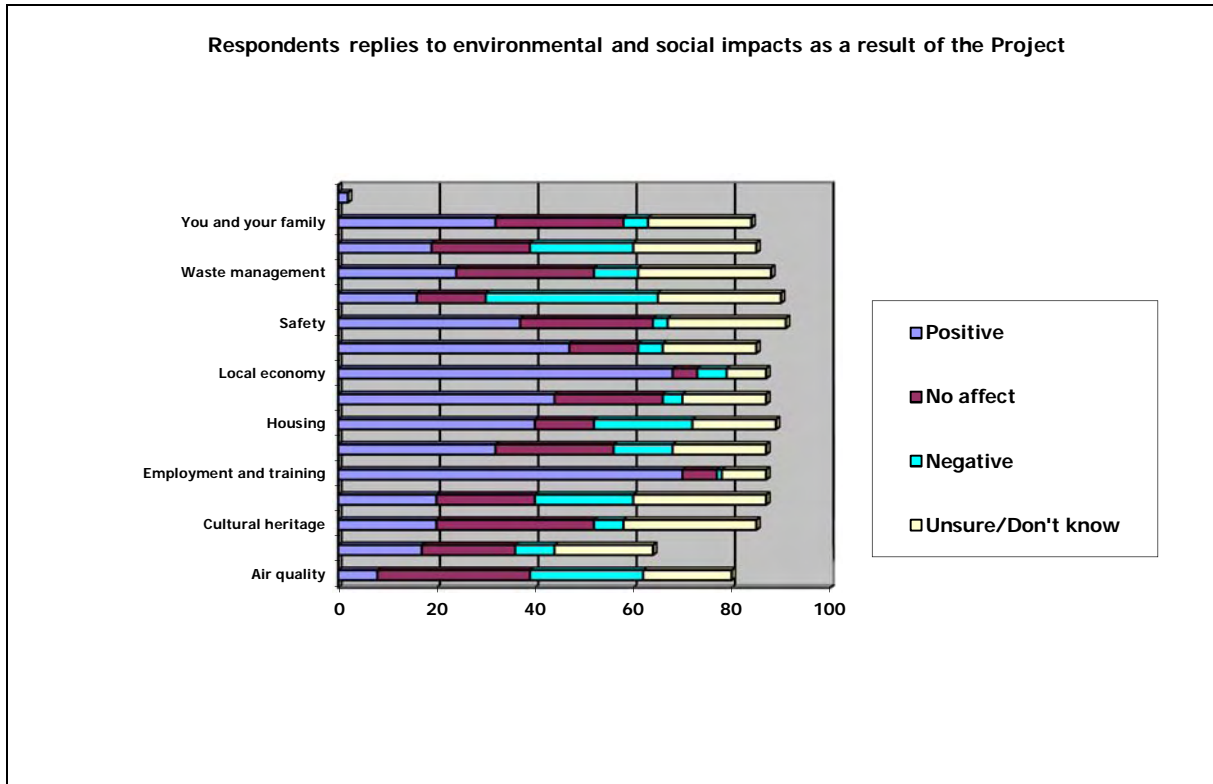


Figure 5-6 Perceived potential environmental and social impacts as a result of the MEP

Question 12: How would the Projects affect you?

This question asked respondents how the MEP may affect them. Fifteen percent of survey respondents did not provide an answer this question. Twenty-six percent of those who did reply to this question (38 people) stated that the MEP would have no effect on them, while 9% (14) were unsure. **Figure 5-7** shows how the MEP may affect respondents.

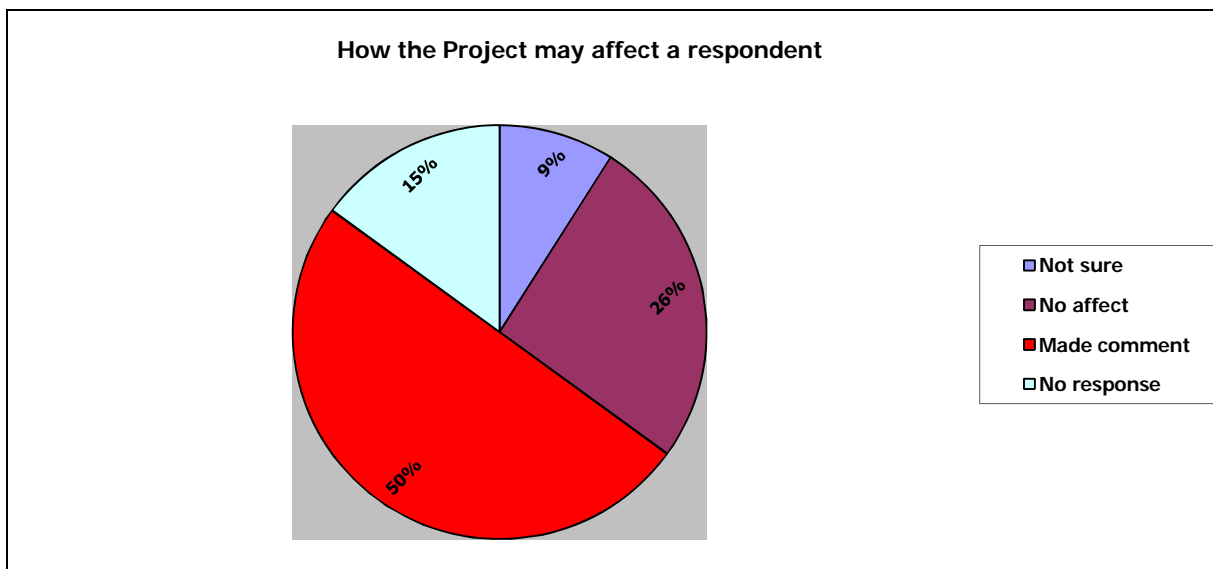


Figure 5-7 Perceptions of how the MEP may affect respondents

Almost 50% of respondents made comment(s) on how the Project may affect them. Comments made by a large majority stated:

- the Project may provide increased employment opportunities;
- the Project may increase the population of the area;
- the Project may provide opportunities for investment in housing; and
- the Project may affect traffic numbers with increased levels of traffic on local roads.

As a result of the Community Survey, an additional 118 members of the community requested that their contact details be added to the Consultation Manager database. These persons were provided with direct communications and regular updates regarding the Project.

6 CONCLUSION

The engagement process for the MEP was developed with the aim of ensuring a consistent approach to implementing, building and supporting positive, honest and credible relationships with local and broader stakeholders. This process enabled the identification of potential issues and allowed stakeholders and the wider community to provide feedback that would be considered in the EIS.

Throughout the engagement process, stakeholders and the community were encouraged to provide feedback relating to any potential impacts of the MEP on their personal circumstances, the community and the region. The key issues/comments raised included:

- In general, throughout the stakeholder and community engagement process, the MEP largely received positive support from stakeholders.
- The regional area is predominantly made up of mining towns therefore the general community did not appear to be particularly concerned about one mine expansion in the area.
- The MEP is considered to offer a number of benefits, including increased employment opportunities, opportunity for investment in housing, provision of training opportunities and stimulation of the local economy.
- Potential adverse impacts of the MEP raised during engagement include traffic impacts, population growth, socio-economic impacts, air quality impacts, access to government services, water supply.
- Although the MEP on its own did not cause a major concern to the local community, there are concerns that the accumulation of mining expansion projects in the area would produce a number of cumulative impacts, particularly relating to housing and access to local services.

7 REFERENCES

Peabody Energy Australia Pty Limited (2009) Eaglefield and Millennium Expansion Projects Community Reference Group Charter 2009.

ATTACHMENT A

LIST OF IDENTIFIED STAKEHOLDERS FOR THE MEP



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER				
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES
	Landholders (within the operational land)	Millennium Coal Pty Limited	Lot 3 SP190266	N/A
		Beryl Anne Nielsen [REGISTERED LESSEE]	Lot 2 GV165	Invite to join CRG, direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey
		Millennium Coal Pty Limited	Lot 4 SP190266	N/A
		David Joseph Deguara & Joy Elizabeth Deguara	Lot 2 SP187962	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey
		Vale Australia (CQ) Pty Limited	Lot 1 SP187962	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Nebo Central Coal Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		NS Carborough Downs Pty Limited		Direct mail, Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		POS-CD Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		JFE Steel Australia (CD) Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		JS Carborough Downs Pty Limited		Direct mail, Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Kalimati Coal Company Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		John David Lloyd & Josephine Louise Lloyd		Lot 3 RP866478
		Vale Australia (CQ) Pty Limited	Lot 24 SP162593	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Nebo Central Coal Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		NS Carborough Downs Pty Limited		Direct mail, Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		POS-CD Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER					
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES	
TIER 1: Directly Affected Stakeholders	Landholders (adjoining the operational land)	JFE Steel Australia (CD) Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		JS Carborough Downs Pty Limited		Direct mail, Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Kalimati Coal Company Pty Limited		Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Margaret Mary Flohr	Lot 5 GV132	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey	
		Beryl Anne Nielsen	Lot 6 SP174999	Invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey	
		Alan Gordon Homer Williams	Lot 3 GV90	Direct mail, invite to join CRG, factsheets	
		BHP Coal Pty Limited [REGISTERED LESSEE]	Lot 6 GV318	QCT Mining Pty Limited [REGISTERED LESSEE]	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Mitsubishi Development Pty Limited [REGISTERED LESSEE]			
		QCT Investment Pty Limited [REGISTERED LESSEE]			
		BHP Queensland Coal Investments Pty Limited [REGISTERED LESSEE]			
		UMAL Consolidated Pty Limited [REGISTERED LESSEE]			
		QCT Resources Pty Limited [REGISTERED LESSEE]			
		BHP Australia Coal Pty Limited	Lot 3 RP894192	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		John David Lloyd & Josephine Louise Lloyd	Lot 2 RP866478	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		The State of Queensland (Represented by the Department of Transport) [REGISTERED LESSEE]	Lot 40 SP130132	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Queensland Rail (SUB LEASE)		Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		The State of Queensland (Represented by the Department of Transport) [REGISTERED LESSEE]	Lot 26 SP130669	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Queensland Rail (SUB LEASE)		Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER					
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES	
		Neville Robert Farley & Patricia Anne Farley	Lot 5 RP845780	Invite to join CRG, direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey	
		The State of Queensland (Represented by the Department of Transport) [REGISTERED LESSEE]	Lot 2 GV83	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Queensland Rail (SUB LEASE)		Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
		Beryl Anne Nielsen	Lot 5 CNS90	Invite to join CRG, direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey	
	Easement Holders (within the operational land)	Millennium Coal Pty Limited	Easement F SP184913 on Lot3 SP190266, Easement B SP190253 on Lot3 SP190266, Easement E SP190266 on Lot3 SP190266	N/A	
	Easement Holders (adjoining the operational land)	Queensland Rail	Queensland Rail	Easement B SP162522 on Lot2 GV83 and Lot3 RP866478	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Queensland Rail	Queensland Rail	Easement B SP162523 on Lot2 GV83	
		Ergon Energy Corporation Limited	Ergon Energy Corporation Limited	Easement A SP162594 on Lot1 SP187962	
		Ergon Energy Corporation Limited	Ergon Energy Corporation Limited	Easement B SP162594 on Lot1 SP187962	
		Millennium Coal Pty Limited	Millennium Coal Pty Limited	Easement D SP190252 on Lot3 SP190266	
		Millennium Coal Pty Limited	Millennium Coal Pty Limited	Easement Q SP184914 on Lot5 GV132	
		The Commissioner for Railways	The Commissioner for Railways	Easement A GV99 on Lot6 GV318	
		The Commissioner for Railways	The Commissioner for Railways	Easement B GV316 on Lot2 GV90	
		Ergon Energy Corporation Limited	Ergon Energy Corporation Limited	Easement B SP178453 on Lot2 GV165	
		Ergon Energy Corporation Limited	Ergon Energy Corporation Limited	Easement A SP162593 on Lot24 SP162593	
Tenement Holders (within the operational land)	CH4 Pty Limited	CH4 Pty Limited	EPP 364	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	
	Moorvale West Coal Pty Limited	Moorvale West Coal Pty Limited	EPC 680		
	Millennium Coal Pty Limited	Millennium Coal Pty Limited	EPC 728		N/A
	Millennium Coal Pty Limited	Millennium Coal Pty Limited	ML 70312, ML 70344	N/A	
	BHP Mitsui Coal Pty Limited	BHP Mitsui Coal Pty Limited	ML 4749, EPCA 1646	Direct mail, invite to join CRG, factsheet, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information	



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER				
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES
	Tenement Holders (adjoining the operational land)	Vale Australia (CQ) Pty Limited	MLA 70375, ML 70339, MDL 354, MDL 359	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		CH4 Pty Limited	PL 223	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	Council	Isaac Regional Council	N/A	Direct mail, face-to-face meetings, CRG, factsheets, invite to join CRG, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	Nearby Townships	Moranbah	N/A	Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey
		Coppabella	N/A	
	Indigenous Party	Barada Barna Kabalbara & Yetimarla People 3, Wiri People	N/A	Invite to join CRG, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
TIER 2A: Government Agencies & Authorities	Federal Government	Department of Environment, Water, Heritage & the Arts	N/A	Factsheets, direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	State Government	Department of Environment and Natural Resource Management (formerly the Environmental Protection Agency)	N/A	CRG, factsheets, direct mail, invite to join CRG, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Department of Environment and Natural Resource Management (formerly the Department of Natural Resources and Water)	N/A	
		Department of Employment, Economic Development and Innovation (formerly the Department of Mines and Energy)	N/A	Direct mail, factsheets, Project Contact Points, Media, Publicly available Key Project Information
		Department of Transport and Main Roads (formerly the Department of Main Roads)	N/A	
		Department of the Premier and Cabinet	N/A	
		Department of Infrastructure and Planning	N/A	
		Department of Community Safety (formerly the Department of Emergency Services)	N/A	
		Department of Communities (formerly the Department of Housing)	N/A	
		Department of Communities	N/A	
		Queensland Health	N/A	
		Department of Education and Training (formerly the Department of Education, Training and the Arts)	N/A	
		Department of Infrastructure and Planning (formerly the Department of Local Government, Sport and Recreation)	N/A	
		Department of Community Safety (formerly Queensland Ambulance Service)	N/A	
		Queensland Police Service	N/A	
		Department of Community Safety (formerly Queensland Fire Rescue Service)	N/A	
		Department of Employment, Economic Development and Innovation (formerly the Department of Primary Industries and Fisheries)	N/A	
		Department of Employment, Economic Development and Innovation (formerly the Department of Tourism, Regional Development and Industry)	N/A	
		Queensland Treasury, Transport & Industry Branch	N/A	
		Department of Transport and Main Roads (formerly Queensland Transport)	N/A	
Department of Employment, Economic Development and Innovation (formerly the Department of Employment and Industrial Relations)	N/A			
Trade Queensland C/- Department of Employment, Economic Development and Innovation	N/A			
Powerlink Queensland	N/A	Direct mail, factsheets, Community		



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER				
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES
	State Government-owned Agencies & Authorities	SunWater	N/A	Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Ergon Energy	N/A	
		Queensland Rail	N/A	
TIER 2A: Government Agencies & Authorities	State Government-owned Agencies & Authorities	Central Queensland Land Council Aboriginal Corporation	N/A	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Queensland South Native Title Services (previously Central Queensland Native Title Representative Body)	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Freshwater Fishing and Stocking Association of Queensland	N/A	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Mackay Area Fish Stocking Association	N/A	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Mackay Whitsunday NRW Group	N/A	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Fitzroy Water Resources Program (WRP) Community Reference Panel	N/A	Direct mail, invite to join CRG, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Fitzroy Basin Association	N/A	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	State Government-owned Services	Moranbah State High School	N/A	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Moranbah State Primary	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Moranbah East State School	N/A	Factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Coppabella State School	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Moranbah TAFE	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information



MILLENNIUM EXPANSION PROJECT
STAKEHOLDER CONSULTATION STRATEGY

Appendix B: Identified Stakeholders of the Millennium Expansion Project

STAKEHOLDER				
TIER	GROUP	NAME	LAND TENURE/TENEMENT (WHERE APPLICABLE)	PROPOSED CONSULTATION TOOLS/ACTIVITIES
	Local Government	Moranbah Hospital	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Moranbah Town Library	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Mackay Regional Council	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
TIER 2B: Non-government Agencies & Authorities	Conservation Groups	Members of Birds Australia & BOCA	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Capricorn Conservation Council	N/A	Direct mail, invite to join CRG, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Mackay Conservation Group	N/A	
	Industry Groups	Queensland Seafood Industry Association	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Queensland Resources Council	N/A	
	Media	Radio (ABC Tropical Queensland, ABC Radio National and 4RFM Moranbah Community Radio)	N/A	Direct mail to 4RFM, 4RFM invite to join CRG, Project Contact Points
		Newspapers (Coastal Express, Mackay Bush Telegraph, Mackay Daily Mercury, Miners Midweek, Rockhampton Morning Bulletin)	N/A	Project Contact Points
	Employees	Peabody Energy Australia Coal Pty Limited & Millennium Coal Pty Limited Workers and Contractors	N/A	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	Support Services/Organisations	Moranbah District & Support Services	N/A	Direct mail, invite to join CRG, factsheets
		Moranbah Traders Association	N/A	Direct mail, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
	Community Clubs	Sunfish (Mackay)	N/A	Direct mail, factsheets, Community Information Days, Project Contact Points, Media, Publicly available Key Project Information
		Moranbah Rotary Club	N/A	
		Moranbah Lions Club	N/A	
TIER 3: Other interested parties	Other	Customers	N/A	Community Information Days, Project Contact Points, Media, Publicly available Key Project Information, Community Survey
		Suppliers	N/A	
		General Public	N/A	
	Interested People / Groups	Peter Freeleagus (former Belyando Mayor)	N/A	Direct mail, factsheets, Project Contact Points, Media, Publicly available Key Project Information

ATTACHMENT B

FACTSHEETS SENT TO LOCAL COMMUNITIES

PROJECT LOCATIONS

Draft Terms of Reference

The draft ToR is the scope of information that may be required for dissemination to the public and by regulatory agencies when assessing the EIS for the proposed projects. The draft ToR will be made available for public viewing at the Moranbah library (Grosvenor Complex). A public notice will be advertised in one or more of Moranbah's local newspapers in January, providing information on the viewing location(s) and options to the public for comment on the draft ToR.

The public notice will specifically detail the following information:

- description of the projects and the operational land;
- where or how the draft ToR may be obtained;
- that anyone may make written comments to the chief executive about the draft ToR; and
- the period decided by the chief executive (the **comment period**) during which comments may be made.

If you wish to directly receive a copy of the public notice and/or the draft ToR, you must register as an 'interested' person to the project.

How do I become an 'interested' person?

To become an 'interested' person, and directly receive a copy of the public notice and/or the draft ToR, you must register your interest and request by **Friday 19 December 2008**. Please provide your contact name and address to Matrixplus Consulting via the contact details listed below.

How do I make a submission on the draft ToR?

The public comment period will extend for 30 business days after the public notice about the draft ToR is published in a local Moranbah newspaper. During this time, any person may make a written submission about the draft ToR. All written submissions must be addressed to Matrixplus via the below-listed contact details.



Matrixplus Consulting Pty Limited
Paula Shields - Senior Consultant
Community Liaison or
Emma Montgomery - Project Manager
P: (07) 3007 1900

E: paula.shields@matrixplus.com.au or
emma.montgomery@matrixplus.com.au
Postal Address: PO Box 10502,
Adelaide St Post Office, Brisbane
QLD 4000
W: www.matrixplus.com.au

For further information about
the projects, please contact us on
Freecall 1300 119 022.



THE PROPOSED PROJECTS

MILLENNIUM EXPANSION PROJECT

The Millennium Coal Mine is an existing open-cut coal mine, operated by Millennium Coal Pty Limited, a wholly owned subsidiary of Peabody Energy Australia Coal Pty Limited. The Millennium Coal Mine is located approximately 22 kilometres (km) east of Moranbah and 16 km southwest of Coppabella in Central Queensland.

The North Goonyella – Eaglefield Coal Mine is an existing underground and open-cut coal mine, operated by North Goonyella Coal Mines Pty Limited, a wholly owned subsidiary of Peabody Energy Australia Coal Pty Limited. The North Goonyella – Eaglefield Coal Mine is located approximately 36 km north of Moranbah and 32 km southwest of Glenden in Central Queensland.





Peabody

The Environmental Impact Statement (EIS) will ensure that all potential environmental and social impacts associated with the proposed projects are identified and appropriately mitigated.

Millennium Expansion Project

The Proponent, Millenium Coal Pty Ltd, proposes to extend the existing open-cut mining operation and increase the current production rate of up to 1.4 Million tonnes per annum (Mtpa) of product coal up to a maximum of 7 Mtpa of product coal. The proposed open-cut expansion is known as the Millennium Expansion Project (MEP).

The MEP will process the Run of Mine (ROM) coal onsite at the existing Coal Handling and Preparation Plant (CHPP). The product coal will be transported to the Dalrymple Bay Coal Terminal via the existing rail network.

Eaglefield Expansion Project

The Proponent, North Goonyella Coal Mines Pty Ltd, proposes to extend the open-cut mining operation within the existing Mining Lease and increase the current production rate from up to 3.5 Mtpa of product coal up to a maximum of 12 Mtpa of product coal. This estimated increase will extend the mine life after underground mining is complete. The proposed open-cut expansion is known as the Eaglefield Expansion Project (EEP).

The EEP will process the ROM coal from the Denham Pit onsite at the existing CHPP which may require upgrades to improve its production rate and recovery capacity. With the pending installation of the northern missing link railway line (which will join the North Goonyella—Eaglefield rail line to the Newlands rail line), flexibility and capacity will be gained to ship the product coal from either the Dalrymple Bay Coal Terminal and/or the Abbot Point Coal Terminal.

Environmental Impact Assessment Process

In accordance with Part 2 of the *Environmental Protection Act 1994 (EP Act)*, the Proponents have voluntarily applied to the Queensland Environmental Protection Agency (EPA) to prepare an EIS for each proposed project. The EIS will ensure that all potential positive and negative environmental and social impacts associated with the proposed projects are identified and appropriately mitigated. The Proponents have engaged Matrixplus Consulting Pty Limited, a highly experienced consultancy, to manage a diverse and comprehensive range of environmental and social impact assessments, including community consultation, which are necessary to support the EIS process. The legislative process for preparing and assessing an EIS is illustrated below.

THE COMMUNITY CONSULTATION PROCESS

EIS PROCESS FLOW CHART

CURRENT STATUS:
Preparation of draft Terms of Reference (ToR)

ToR
The EPA will release the draft ToR which identifies the specific requirements for the EIS content for public comment. The final ToR will be released following consideration and incorporation of written submissions made by stakeholders.

Draft EIS
The draft EIS is released for public comment.

Supplementary EIS
A supplementary EIS report may be required to address specific matters raised by stakeholders during the public consultation period.

EPA's Assessment Report
At the completion of the EIS process, the EPA will issue a report evaluating the EIS and related material, providing an assessment of the projects and outlining any environmental protection conditions that will apply to the developments.

A “Stakeholder” is any affected or interested person to the projects. Stakeholder consultation will be undertaken as part of the EIS assessment process to:

- Ensure all affected and interested persons are aware of the benefits and impacts of the proposed developments;
- Ensure stakeholder concerns and ideas are recorded, considered and implemented in the EIS assessments; and
- Inform stakeholders on how their concerns and ideas will be addressed and incorporated into the EIS process.

Consultation Initiatives

- Community information days will be held during the EIS process. A range of project material will be displayed and provided to community residents.
- Members of the community will be provided with opportunities to ask questions or seek clarification on the projects from the project team members.
- The project team will keep the local community informed of the project's progress through newsletters, local media articles and updates on Peabody's website: www.peabodyenergy.com.au
- The initial community information days will allow for the community consultation process to be explained, outlining how and when stakeholders can make written submissions on the draft ToR and EIS.
- Additional community information days will be held during the EIS assessment process to provide feedback on the assessment findings and to obtain additional feedback from the community.

We take the future very seriously.

ATTACHMENT C

CRG CHARTER



**Eaglefield and Millennium
Expansion Projects**

**Community Reference Group
Charter 2009**

EAGLEFIELD EXPANSION PROJECT (EEP) and MILLENNIUM EXPANSION PROJECT (MEP)

COMMUNITY REFERENCE GROUP CHARTER

Vision

The purpose of the Community Reference Group (CRG) is to:

- Provide a formal communications process between directly and indirectly affected landholders, local community representatives including traditional owners, local government, conservation groups and a cross section of other key individuals and groups, to represent the broad community interests. The CRG will be an open and honest forum for discussing all aspects of the EEP and MEP and beyond.

Objectives

The objectives of the CRG are to:

- provide factual, accurate information about the projects and any environmental, social and economic impacts;
- identify and understand existing community values and concerns;
- identify and discuss any issues of concern;
- rapidly develop strategies to mitigate any potential negative impacts;
- demonstrate that the opinions and views of the local community will be considered during the planning and operation of both projects;
- encourage a level of confidence within the community that the mining operations are environmentally responsible;
- liaise with established CRGs from nearby mines where there is the potential for cumulative impacts, for sharing information; and
- to foster long term collaborative relationships with the local community and Peabody.

Peabody's responsibilities

- provide the CRG with factual, accurate information about the projects and any environmental, social and economic impacts;
- report and present information in an open, honest and transparent way;
- provide professional advice and expertise;
- provide a meeting agenda;
- record minutes of the meeting;
- arrange a venue for the meeting.

If requested, Peabody will also provide the CRG with copies of:

- the mine's environmental authority and mining lease;
- results of environmental and social assessments; and
- copies of documentation such as the draft and final Terms of Reference, Environmental Impact Statement, Environmental Management Plans, Plans of Operations and marketing materials.

Peabody will respond in a timely fashion to any advice or recommendations the CRG may contribute concerning both projects.

Peabody will forward to each CRG member within 28 days of the meeting:

- a copy of the minutes;
- the company's response to any recommendations by the CRG; and
- reply to requests for information.

In addition to the current EEP and MEP, Peabody will consult with the CRG if it intends to seek amendments to its existing operations for conditions of approval, to change operational requirements, or to expand the operations of the mine.

Peabody will also organise an inspection of the project sites and existing mine operations for the CRG. Additional site visit requests will be considered on an individual basis.

Responsibility for oversight of the mine's compliance, project approvals and all other Government approvals remains with external agencies.

CRG roles and responsibilities

- to identify, raise and monitor stakeholder and community issues or concerns regarding the projects;
- disseminate information to the broader community;
- collate community feedback for consideration by the CRG and referral to Peabody;
- seek professional advice, if required;
- advise on and monitor the resolution of issues and concerns; and
- interact constructively with regards to any issues and concerns raised.

Committee meetings¹

- it is suggested that the CRG meet at least four times a year during the process for preparing and assessing the environmental and social impacts of the proposed expansion projects. After the Environmental Approval has been issued and Plan of Operations finalised, it is suggested that the CRG should meet twice a year;
- any member may request that the Chairperson convene an extraordinary meeting of the CRG to discuss any matter warranting urgent consideration. The Chairperson shall determine whether an extraordinary meeting is warranted;
- at least one weeks' notice will be given to all members of any meeting of the CRG (except extraordinary meetings where less than one weeks notice can be given).
- meetings shall be held at a time and place generally convenient to the CRG;

¹ Adapted from NSW Department of Planning guidelines, *Community Consultative Committees for Mining Projects*

- Peabody will provide facilities for CRG meetings;
- all agenda items need to be given to the Chair seven days before the meeting;
- an agenda will be circulated to members five days in advance of the meeting;
- minutes will be recorded by a Peabody representative and circulated within 28 days; and
- attendance is an expectation of all members. Failure to attend on three consecutive occasions without leave of absence may result in the member being asked to leave the CRG.

Meeting proceedings

The Chairperson shall convene and chair meetings of the CRG. The CRG is not a decision-making body and it is not a requirement that consensus be reached amongst members on issues discussed. Meetings of the CRG should follow standard good practice for meetings.

The Chairperson shall determine the agenda items. Any member may propose a matter of inclusion on the agenda, either before or during a meeting, providing the matter is within the purpose of the CRG. The Chairperson should ensure that issues of concern raised on behalf of the community are properly considered. Late items may be deferred to the next meeting.

Agenda items would normally include:

- Apologies
- Declaration of financial or other interests
- Confirmation of Minutes of the previous meeting
- Business arising from previous Minutes
- Response to issues raised or provision of additional information requested
- Reports and overview of activities
- General business
- Next meeting

Government departments are not represented on the Reference Group but can be invited to provide advisers as required.

Minutes of meetings

Peabody is responsible for taking Minutes of the CRG meetings. The Minutes shall record issues raised and actions to be undertaken, who is responsible for taking those actions and by when. If a member so requests, then the Minutes shall record that member's dissenting views on any matter. Meetings can only be tape recorded with the agreement of the Chairperson and the CRG.

Peabody shall ensure that a copy of the Minutes is distributed to each member and a copy made available on the company's website within 28 days of each meeting. The Chairperson must endorse the Minutes prior to their distribution.

The Environmental Impact Statements for the EEP and MEP will fully describe the Stakeholder Consultation Program undertaken, the issues raised and any conclusions or agreements.

Conduct of members

Members of the CRG shall at all times and to the best of their abilities:

- act properly, honestly and in accordance with an open and transparent process;
- perform their functions impartially and in the best interests of the local and broader communities²;
- be respectful to fellow members and not engage in threatening, intimidating or disorderly behaviour; and
- refrain from any form of conduct which may cause any reasonable person unwarranted offence or embarrassment.

The Chairperson should bring any breach of these requirements to the attention of the member concerned. Following three such breaches, the Chairperson may request Peabody to replace that member.

Dispute resolution

The CRG is encouraged to discuss all matters that may be the subject of substantial disagreement between its members. The Chairperson carries a particular responsibility in respect of dispute resolution, in respect of both disputes between members of the Reference Group and also between the CRG and Peabody.

In the case of an unresolved dispute, Peabody will advise the EPA of the issues and request advice.

Communication with the broader community

CRG members are encouraged to discuss issues and disseminate information about the mine with the wider community, including special interest groups. If appropriate, the Chairperson of the CRG may also give approved briefings to community organisations such as special interest groups, the local Chamber of Commerce, environmental or heritage organisations or P&C Reference Groups.

However, only Peabody may release statements or other information to the media or adopt other approaches to the public for dissemination of information relating to company activities. Individual CRG members may make comments to the media or in public forums on behalf of themselves or the stakeholders which they represent, but not on behalf of the CRG or Peabody.

If any CRG member is approached by or asked to make comment on CRG activities by the media, the enquiry should be passed on to the Chair, who will discuss the request with Peabody.

Antoinette Ward
Manager – Environment
Peabody Pacific Pty Ltd
GPO Box 164
Brisbane Qld 4001

² It is recognised that company representatives also have responsibilities to their employer.

ATTACHMENT D

COPY OF WEB PAGE CONTENT

Millennium Expansion project Web site

This screenshot shows the homepage of the Millennium Expansion project website. The browser window title is "Millennium - Peabody Energy Australia/millennium.expansion - Windows Internet Explorer". The address bar shows the URL "http://www.peabodyenergy.com.au/qld/millennium.html#millennium_expansion". The page features a large "Peabody" logo at the top center. Below the logo is a navigation menu with links for "Welcome", "Profile", "Operations", "Stewardship", "Environment", "Careers", and "Peabody Energy (U.S.)". The "Operations" menu is expanded, showing options for "Burton", "North Goonyella and Eaglefield", "Millennium", "Wilkie Creek", "Wiligong", "Wambo Mine", and "Metropolitan Mine". The "Millennium" option is selected. The main content area is titled "Millennium" and contains a detailed description of the mine's location, production capacity, and strategic advantages. It includes a map of the Bowen Basin showing the mine's location relative to other mines and infrastructure. There are also several images showing mining equipment and workers. A "CELEBRATING 125 YEARS A TIMELINE" banner is visible in the bottom left corner.

This screenshot shows a detailed page on the Millennium Expansion project website. The browser window title is "Millennium - Peabody Energy Australia/millennium.expansion - Windows Internet Explorer". The address bar shows the URL "http://www.peabodyenergy.com.au/qld/millennium.html#millennium_expansion". The page features a large "Peabody Energy (U.S.)" logo at the top left. Below the logo is a navigation menu with links for "News releases" and "CELEBRATING 125 YEARS A TIMELINE". The main content area is titled "Millennium Expansion Project" and contains a detailed description of the project's goals, environmental impact assessment, and contact information. It includes a map of the Bowen Basin showing the mine's location relative to other mines and infrastructure. There are also several images showing mining equipment and workers. A "CELEBRATING 125 YEARS A TIMELINE" banner is visible in the bottom left corner.

ATTACHMENT E

**ARTICLE PUBLISHED IN THE MACKAY DAILY MERCURY, TUESDAY, 2 JUNE
2009**

Peabody expands mines near Moranbah

Owen Jacques | 2nd June 2009

TWO mines near Moranbah will more than triple their production as one of the world's largest miners, Peabody, pushes ahead with massive expansions in the face of harsh global conditions.

The Millennium Mine, 22km east of Moranbah, will lift its annual production rate from two million tonnes a year up to 7.5 million tonnes, while the Eaglefield Mine's expansion will lift its maximum production capacity from 5 million tonnes of coal a year to a huge 18 million tonnes a year.



Image supplied - Queensland Resources Council

Both the expansions are going through environment impact assessment by the State Government and if their plans pass scrutiny without major hurdles, work could be completed in early 2011.

A spokesperson for Peabody Energy said the company was expecting Millennium to begin production by the end of the first quarter of 2011.

"It's a significant investment by Peabody," she said.

"They're in the embryonic stage, so they're a fair way out, but it's a significant investment in the Bowen Basin community."

She said the Eaglefield and Millennium expansions could require 200 new staff per mine.

But according to the miner's website, Eaglefield could employ more than double that, although final numbers would not be clear until assessments were finished.

Eaglefield, especially, would need additional workers because, she said, it would take up to nine weeks to strip overburden.

The expansions would largely rely on the infrastructure already there, although Eaglefield will have the benefit of some new infrastructure, including a second planned facility to rail coal to Abbot Point Coal Terminal, north of Bowen.

The Peabody spokesperson did not identify exactly how much the American mining giant would pour into the region with these expansions, except to say that it would be "significant".

"Peabody made these commitments before the onset of the global financial crisis," she said.

"And Peabody is committed to investing in Australia for it to be in the best possible position when the markets turn around."

The spokesperson said the projects were not just about the sustainability of the coal industry but also for the communities in the mining areas, west of Mackay.

"We would look at getting these projects done as quickly as possible," she said.

"And we want the smoothest transition possible through this process."

Peabody is not the only company making sizeable investments in this region when other areas have been hit much harder by the world economic situation.

Jellinbah Resources, a much smaller mining company compared to the American goliath, has completed its Lake Vermont project north-east of Dysart.

The new mine has been built and will be operated under contract to Thiess. It is understood to have begun production in February.

The \$264 million project will produce up to four million tonnes of coal a year.

About 280 people are employed at the new venture.

Lake Vermont will sell its coal to steel producers in Japan, South Korea, China, Taiwan, Brazil and Europe.

The management of Jellinbah Coal did not return calls when contacted by the *Daily Mercury*.

Peabody is committed to investing in Australia for it to be in the best possible position when the markets turn around

Today Mostly cloudy 21°C/27°C Tomorrow Mostly sunny 21°C/27°C
Mackay forecast »

Most Popular

- Business owners await end of works
- Poker players pack Pavilion
- Cultural blend proves popular
- Fur flies over delay in RSPCA shelter
- Moranbah reassured over FIFO
- Tamika sees beyond geekiness
- Speak up on future of showgrounds
- Man pokes security officer in eye
- Testing the mind and legs
- Technology unlocks secrets to past

Due Date - Win tickets here!



Win a Barina with Bushmans Bread



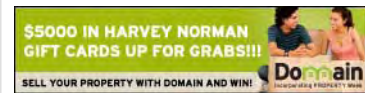
Win a \$2500 Bullet Bikes fun package!



Win a Nissan Micra!



Your chance to win a \$5000 gift card.



Register as Mercury's Best Mate!



Khaki it! Over \$12,000 in prizes to win!



Your Local Accommodation Guide



Win a Uniden GPS with Drive



ATTACHMENT F

EXAMPLE LETTERS

6 August 2009

Rob Whiddon
General Manager
Trade Queensland
GPO Box 1412
Brisbane
QLD 4001

Dear Rob

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

Peabody is writing to thank you for your comments received during the draft Terms of Reference (TOR) public comment period. The Department of Environment and Resource Management (DERM) passed your comments to Peabody for consideration.

Peabody has revised the draft TOR based on the comments received and submitted a proposed final TOR to DERM for their review and approval.

The final TOR has been approved by DERM and is now available to view at the following:

http://www.epa.qld.gov.au/environmental_management/impact_assessment/current_eis_processes/millennium_expansion_project.html
<http://www.peabodyenergy.com.au/qld/millennium.html>

Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Tony Dartnell
Regional Design Manager – Central
Ergon Energy
PO Box 308
Rockhampton
QLD 4700

Dear Tony

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
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6 August 2009

Mr Brian Hodge
Manager, Strategic Planning and Reporting Branch
Office of the Commissioner
Queensland Police
GPO Box 1440
Brisbane
QLD 4001

Dear Brian

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Matthew English
Liaison Officer
Office of the Associate Director-General
Department of Employment, Economic Development and Innovation
PO Box 15168
City East, Brisbane
QLD 4002

Dear Matthew

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Mr Phil Dash
Assistant Coordinator General
Significant Projects Coordination
Department of Infrastructure and Planning
PO Box 15009
Brisbane
QLD 4002

Dear Phil

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

David Coffey
Senior Project Officer, Industrial Development
Mines and Energy
Department of Employment, Economic Development and Innovation
PO Box 15216
Brisbane
QLD 4002

Dear David

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Linda Apelt
Director-General
Department of Communities
GPO Box 806
Brisbane
QLD 4001

Dear Linda

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Mr Gary Mahon
Executive Director
Department of Community Safety
GPO Box 1425
Brisbane
QLD 4001

Dear Gary

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Paul Walmsley
Director (Regional Services)
Central
Department of Primary Industries and Fisheries
PO Box 6014
Rockhampton
QLD 4701

Dear Paul

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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<http://www.peabodyenergy.com.au/qld/millennium.html>

Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Michael Ross
Department of Primary Industries and Fisheries
PO Box 46
Brisbane
QLD 4001

Dear Michael

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Mark Crawley
Chief Executive Officer
Isaac Regional Council
PO Box 97
Moranbah
QLD 4744

Dear Mark

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Jaco Ackerman
Acting Manager Strategic Planning
Mackay Regional Council
PO Box 41
Mackay
QLD 4740

Dear Jaco

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Alison Gray
Manager Transmission Environment
Powerlink
PO Box 1193
Virginia
QLD 4014

Dear Alison

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Mr Lawrence Hannah
Executive Director (Rail, Ports and Freight)
Queensland Transport
GPO Box 1549
Brisbane
QLD 4001

Dear Lawrence

Re: Proposed Millennium Expansion Project – final Terms of Reference

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Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Vincent Hickey
Treasury Analyst
Queensland Treasury
GPO Box 611
Brisbane
QLD 4001

Dear Vincent

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Thank you once again for your interest in the Project.

Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

6 August 2009

Tom Wallwork
SunWater
Flaherty Street
PO Box 226
Eton
QLD 474

Dear Tom

Re: Proposed Millennium Expansion Project – final Terms of Reference

Peabody Energy Australia Pty Limited (Peabody) is the Proponent of the proposed Millennium Expansion Project. The Proponent seeks to extend its current open-cut mining and processing operations at the existing Millennium Coal Mine. Matrixplus Consulting Pty Limited (Matrixplus) has been engaged by Peabody to project manage the Environmental Impact Assessment (EIA) process for the proposed expansion.

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Yours sincerely



Colleen Fish
Project Manager - Matrixplus

T: 07 3007 1926
F: 07 3007 1999
E: colleen.fish@matrixplus.com.au

ATTACHMENT G

WRITTEN SUBMISSIONS ON DRAFT TOR



Enquiries Greg Tkal
Telephone 3224 8803
Your reference
Our reference BNE38381

9 June 2009

Peabody Pacific Pty Limited
C/- Ms Colleen Fish
Manager – Environmental
Matrixplus Consulting (Australia)
PO Box 10502
Adelaide St Post Office
BRISBANE QLD 4000

Dear Ms Fish

**COMMENTS ON THE DRAFT TERMS OF REFERENCE –
MILLENNIUM EXPANSION PROJECT, PEABODY PACIFIC PTY LIMITED**

I refer to your submission of draft terms of reference (TOR) for the Environmental Impact Statement (EIS) for the proposed Millennium Expansion Project (MEP).

The draft TOR was advertised for the period beginning 9 April 2009 until 25 May 2009. The Department of Environment and Resource Management (DERM) received thirteen submissions on the draft TOR within the comment period from the Australian Government Department of Environment, Water Heritage and the Arts; the Queensland Department of Community Safety; the Queensland Police Service; the Department of Infrastructure and Planning; individual submissions from the Rail, Port and Freight Division and the Main Roads Division of the Department of Transport and Main Roads; individual submissions from Housing and Homelessness Services, and Community and Youth Justice Services of the Department of Communities; SunWater Limited; Ergon Energy; Powerlink Queensland; Isaac Regional Council and the Mackay Regional Council.

Four submissions were also received after the comment period. Two submissions were received from Queensland Primary Industries and Fisheries, and one submission was received from Mines and Energy of the Department of Employment, Economic Development and Innovation; and one submission was received from the Office of Government Owned Corporations within Queensland Treasury. It would be appreciated if the comments and issues from these submissions were also addressed.

Copies of all submissions regarding the draft TOR for the MEP received by DERM are enclosed. Also enclosed is a submission from DERM which provides comment on the draft TOR.

Section 45 of the *Environmental Protection Act 1994* (EP Act) requires you to provide the

following items to DERM within 20 business days of receiving copies of the comments:

- a written summary of the comments;
- a statement of your response to the comments; and
- any amendments of the draft terms of reference you propose as a result of the comments.

To continue the EIS process, you should consider all the comments and provide your response under section 45 of the EP Act within the required period.

Please contact Greg Tkal on 3224 8803 if you have any queries regarding this matter.

Yours sincerely

A handwritten signature in black ink, appearing to read "S. D. Cameron". The signature is written in a cursive style with a large initial "S".

Stuart Cameron
Director, Assessment

Greg Tkal

From: Peter Blumke
Sent: Monday, 18 May 2009 9:01 AM
To: Greg Tkal
Subject: FW: Emailing: MILLENIUM EXPANSION PROJECT- comments on TOR.doc [SEC=UNCLASSIFIED]

Attachments: MILLENIUM EXPANSION PROJECT- comments on TOR.doc



MILLENIUM
PANSION PROJECT-

Peter Blumke
Development Assessment
Department of Environment and Resource Management PO Box 15155 BRISBANE QLD 4001

Ph: (07) 3227 7678
Email: peter.blumke@epa.qld.gov.au

Visit us on: <http://www.epa.qld.gov.au>

-----Original Message-----

From: Small, Anna [mailto:Anna.Small@environment.gov.au]
Sent: Thursday, 14 May 2009 2:56 PM
To: Peter Blumke
Subject: Emailing: MILLENIUM EXPANSION PROJECT- comments on TOR.doc [SEC=UNCLASSIFIED]

<<MILLENIUM EXPANSION PROJECT- comments on TOR.doc>> Hi Peter

Please find attached DEWHA's comments on the draft TOR for the Millenium Expansion Project. I am now the contact Officer for this Project.

Cheers

Anna Small

email: Anna.Small@environment.gov.au
phone: 02 6274 1730

If you have received this transmission in error please notify us immediately by return e-mail and delete all copies. If this e-mail or any attachments have been sent to you in error, that error does not constitute waiver of any confidentiality, privilege or copyright in respect of information in the e-mail or attachments.

Please consider the environment before printing this email.

MILLENIUM EXPANSION PROJECT – COMMENTS ON DRAFT TOR

15 May 2009

Page	Section	Comment
3	Background	<p>On 27 March 2009, Peabody Pacific Pty Ltd referred the project (EPBC 2009/4821) to the Department of the Environment, Water, Heritage and the Arts (DEWHA) for assessment under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). On 28 April 2009 the proposal was deemed a controlled action with listed threatened species and communities (sections 18 and 18A) as the controlling provision.</p> <p>The State's EIS process has been 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.</p>
6	1.7	As the State EIS process has been accredited, it will be necessary for the ToR to address potential impacts on the matters of national environmental significance (NES) that were identified in the 'controlling provisions' when the project was declared a controlled action ie Listed threatened species and communities (sections 18 and 18A).
6	1.7	Point 4 at the bottom of the page should read as follows: Assessment of impacts on matters of NES including avoidance, mitigation and/or offset measures.
16	Environmental Values	If applicable include a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible.
30	4.7.1	Listings in dot point 1 and 2 should also contain – critically endangered as a listing.
30	4.7.1	Dot point 6 (at bottom of page) should also make reference to ROKAMBA (Republic of Korea and Australia Migratory Bird Agreement)
31	4.7.1.2	Dot point 3 – habitats sensitive to changes; including movement corridors, edge related effects, barriers to movement and waterways.



**Queensland
Government**

**Strategic Policy and
Executive Services**

Department of
Community Safety

Pam Davis
Ph: 07 3247 8802
Our Ref: SPP36-140409

21 MAY 2009

Mr Greg Tkai
The EIS Co-ordinator – Millennium Expansion Project
Department of Environment and Resource Management
PO Box 15155
CITY EAST QLD 4002

Dear Mr Tkai

**Millennium Expansion Project – Draft Terms of Reference for Voluntary
Environmental Impact Statement (EIS)**

I refer to the letter received on 14 April 2009 from Dr Bill Dixon, Manager, Development Assessment inviting the Department of Community Safety (DCS) to provide comment regarding the draft Terms of Reference (ToR) for the Millennium Expansion Project.

DCS officers have reviewed the ToR and provide the following comments regarding State Planning Policy 1/03 (SPP 1/03) compliance and emergency response considerations.

SPP 1/03

4.1 Climate (Page 16)

This section commits to addressing natural hazards flood and bushfire, neglecting landslide. DCS recommends consideration of landslide in addition to bushfire and flood to align with the requirements of SPP 1/03.

ToR Sections 4.1, 4.2.1.1 and 4.2.1.2 are already committed to analysis of the causative factors of landslide, dealing with geological, morphological, physical and human issues. These analyses should also establish whether the development site will be subject to landslide hazard, either internally or from sloping land above the site. If there is susceptibility, the forthcoming EIS should describe measures to be put in place to ensure site stability and negate adverse impacts of any landslide activity occurring adjacent and upslope to the site.

The outcomes of SPP 1/03 should also be addressed specifically in the EIS.

Emergency Services Complex
Cnr Kedron Park Road & Park Road
Kedron Qld 4031

GPO Box 1425 Brisbane
Queensland 4001 Australia

Telephone +61 7 3247 8797
Facsimile +61 7 3247 8865
Website www.emergency.qld.gov.au

ABN 11 577 654 890

Emergency Response

4.12.2 Potential impacts and mitigation measures (page 49)

With reference to the paragraph commencing: *'The proponent will develop an integrated risk management plan for the whole of the life of the MEP.....'* The sentence *'The assessment will outline the implications for and the impact on the surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service.'*

The underlined section above should be replaced with *'the Department of Community Safety, including regional representatives from the Queensland Fire and Rescue Service, Emergency Management Queensland and the Queensland Ambulance Service.'*

DCS supports this consultation commitment and recommends establishing contact well prior to the detailed design phase of the project.

DCS may require details regarding the following issues in order to provide effective operational responses:

- Site access and egress;
- Construction staging;
- Road closures and traffic hazards;
- On-site workers camp details
- Storage and location of hazardous goods on-site; and
- Other concerns as identified.

Appropriate regional contacts for the Queensland Fire and Rescue Service, Queensland Ambulance Service and Emergency Management Queensland are attached.

DCS looks forward to participation in the next stage of the EIS assessment process.

Should you require any further information regarding this matter, please contact Ms Pam Davis, Policy Advisor, Strategic Policy and Executive Services on telephone number (07) 3247 8802.

Yours sincerely



Gary Mahon
Executive Director

Enc

Department of Community Safety

Central Region Contacts

Queensland Fire and Rescue Service

Assistant Commissioner Telephone Number (07) 4938 4896

Queensland Ambulance Service

Assistant Commissioner Telephone Number (07) 4938 4896

Emergency Management Queensland

Central Regional Director Telephone Number (07) 4938 4981

Greg Tkal

From: Greg Tkal
Sent: Monday, 25 May 2009 10:41 AM
To: 'Hodge.BrianV@police.qld.gov.au'
Cc: CER-D-ProjectsCER@QPS.nrm.qld.gov.au; Miley.MichaelJ@police.qld.gov.au;
Fuller.ClaetonJ@police.qld.gov.au
Subject: RE: PROPOSED MILLENNIUM EXPANSION PROJECT DRAFT TERMS OF REFERENCE

Good morning Brian,

Thank you for the Queensland Police Service comments on the draft terms of reference for the Millennium Expansion Project.

The Department of Environment and Resource Management (DERM) will forward all comments received to the proponent after the comment period ends.

The proponent must then provide DERM with:

- A written summary of the comments;
- A statement of the proponent's response to the comments; and
- Any amendments of the draft terms of reference the proponent proposes because of the comments.

DERM will then consider the documents outlined in the dot points above, prepare and then publish the final terms of reference for the project.

I look forward to the continued participation of the Queensland Police Service on this project.

Regards
Greg

Greg Tkal
Principal Environmental Officer
Development Assessment EIS Assessment
Environmental Services
Department of Environment and Resource Management
288 Edward Street
BRISBANE QLD 4000
GPO Box 2771
BRISBANE QLD 4001
Tel: (07) 3224 8803
Fax: (07) 3225 8723
Email: greg.tkal@epa.qld.gov.au
Visit us at: www.epa.qld.gov.au

From: Hodge.BrianV@police.qld.gov.au [mailto:Hodge.BrianV@police.qld.gov.au]
Sent: Monday, 25 May 2009 8:44 AM
To: Greg Tkal
Cc: CER-D-ProjectsCER@QPS.nrm.qld.gov.au; Miley.MichaelJ@police.qld.gov.au;
Fuller.ClaetonJ@police.qld.gov.au
Subject: FW: PROPOSED MILLENNIUM EXPANSION PROJECT DRAFT TERMS OF REFERENCE
Importance: High

Greg

25/05/2009

Enclosed is a response prepared by the Central Police Region on the proposed Millennium Expansion Project draft Terms of Reference.

The submission from Central Region addresses a number of areas of concern which can be summarised as follows:

- 1) Wide loads and special services – impact on QPS personnel and equipment
- 2) Road safety – the capacity of road infrastructure to accommodate increased usage by employees, heavy vehicles, including the impact of driver fatigue
- 3) Cumulative impact of multiple operations on policing and communities – 23 other infrastructure, energy and mining growth projects in Central Region at either EIS or ToR phase
- 4) Housing and accommodation – high cost of living resulting in inability to attract police staff to support industry and community policing requirements
- 5) Increased Calls for Service – Increased workers both at sites and regional areas impacting on Moranbah Division
- 6) Disaster and Incident Management - Developing plans to assist in the management of mining incidents

Staff at Central Police Region remain available to continue the consultation process to address the potential areas of concern

The contact officers for this project are:

Central Region:

Inspector Virginia Nelson
Project Officer,
Central Police Region
Rockhampton Police Complex
Bolsover Street, Rockhampton Q 4700
PO Box 221 Rockhampton Q 4700

Nelson.VirginiaA@police.qld.gov.au

Tel: (07) 4932 3420
Fax: (07) 4932 3465

Police HQ

Brian Hodge
Manager, Strategic Planning and Reporting Branch
Office of the Commissioner
Tel: 3364 6195
Fax: 3364 6353
Mob: 0418 883 376
Email: Hodge.BrianV@police.qld.gov.au

or in my absence

Senior Sergeant Michael Miley
Strategic Planning and Reporting Branch
Office of the Commissioner
Queensland Police Service
200 Roma Street
Brisbane Qld. 4001
Miley.MichaelJ@police.qld.gov.au
P: +61 7 3364 8170

25/05/2009

F: +61 7 3364 6353

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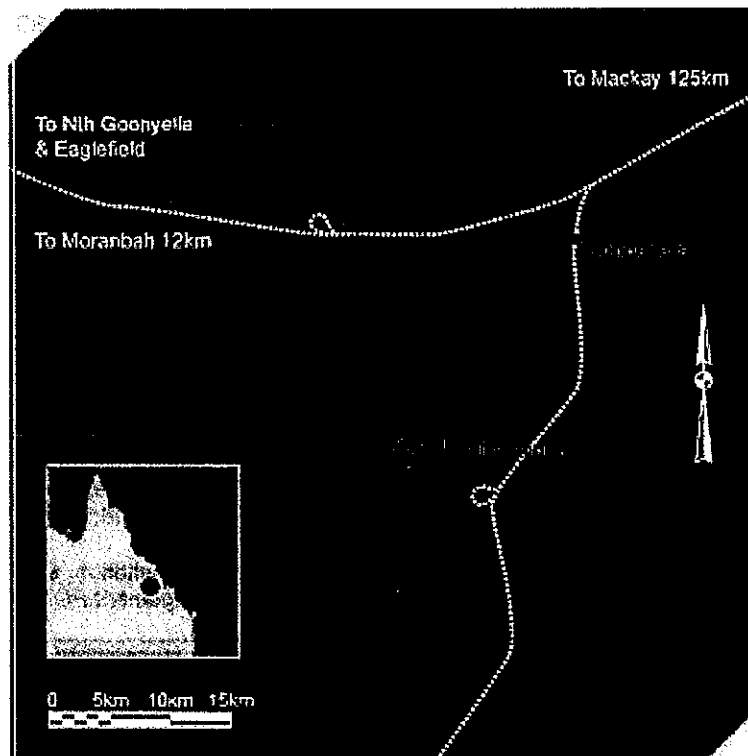
This footnote also confirms that this email message has been checked for the presence of computer viruses.

25/05/2009

**QUEENSLAND POLICE SERVICE RESPONSE
TO THE
DRAFT TERMS OF REFERENCE
FOR THE
MILLENNIUM EXPANSION PROJECT**

Background

The proponent for the Millennium Expansion Project is Millennium Coal Pty Limited which is a wholly owned subsidiary of Peabody Pacific Pty Limited. The Millennium Expansion Project involves the expansion of current mining operations from 1.9 million tonnes per year (Mt/y) to 7.5 Mt/y increasing the mine life for a further ten years. The project is located in the Bowen Basin 22 kilometres east of Moranbah and 16 kilometres southwest of Coppabella. The location of the mine is within the Moranbah Police District and the Isaac Regional Council area and is adjacent to the BHP Mitsui Coal's Poitrel Project.



**Location Map of Mine Location relative to Coppabella MAC Camp
& Moranbah Township**

Status of Project

The Proponent has released the Initial Advice Statement and draft Terms of Reference (ToR) for consultation and the Queensland Police Service has been invited to provide comment on the draft ToR.

Coordination of the Environmental Impact Assessment Process is being undertaken by the Department of Environment and Resource Management (DERM)

Draft Terms of Reference

The Central Police Region has undertaken a review of the Initial Advice Statement, Draft ToR and identified some issues that will require further consideration for inclusion in the EIS. It should be noted that the review has also considered the development of other mining, energy and infrastructure projects in the region and their cumulative impact to policing activities.

The inclusion of these areas of interest in the draft ToR will enable the Queensland Police Service to assess the impact of the project on service delivery within the Mackay Police District and more importantly policing within the Bowen Basin area. Table 1 highlights the areas that will require further review as part of the Environmental Impact Assessment Process.

Issue	Solution / Mitigating Measures
<p>Workforce and Accommodation: QPS is required to assess the impact on calls for service.</p>	<p>This section should describe the management plan for accommodation facilities for the workforce during the construction phase and subsequently once operations have commenced. Profile of workforce and transport arrangements.</p>
<p>Transport / Infrastructure Requirements The EIS should examine the expected phasing of wide and over dimensional loads required to transport equipment for construction of the pipeline and pumping infrastructure along the route of the pipeline. There is no inclusion of this in the current ToR.</p>	<p>This section should develop a schedule for wide load over dimensional vehicle movements required for construction of the mine expansion. QPS is required to plan in advance adequate police logistics. This section should also include in detail vehicle volumes and identify heavy vehicle movements to assist QPS in determining resourcing for road safety and traffic management. QPS to be engaged as consultation stakeholder in the development of a <i>Traffic Management Plan</i>.</p>
<p>Transport Methods and Routes: This EIS should adequately describe support arrangements such as the transportation of fuel to the sites during the construction and operational phases.</p>	<p>This section should develop an estimate of requirement for the transportation of fuel required to sustain the dam construction and operations.</p>
<p>Transport Methods and Routes: Fatigue management strategy</p>	<p>This section should adequately describe a fatigue management plan for workers / contractors travelling from the workers village after cessation of shifts / duty. Particularly those involved in drive in/out arrangements.</p>
<p>Social Environment</p>	<p>Consultation should occur btrn the proponent and senior</p>

	police management at Mackay to identify mitigating measures in particular for cumulative impacts of various mine expansions in the Bowen Basin.
Issue	Solution / Mitigating Measures
Health and Safety	The ToR should include an assessment of the cumulative impacts of projects and in particular those in close proximity to the MEP.
Hazard & Risk - Emergency Management Plan: The emergency risk management plan does not include reference to the Queensland Police Service.	This section should include reference to the Queensland Police Service for site access for investigation as part of incident and recovery management. This section should adequately include QPS role in planning, response, coordination, investigation of natural disasters, criminal incidents, major incidents (fuel spills, major traffic crashes, deaths)

Table 1 – ToR Areas of Assessment for further consideration

Development Phases

The phases of development of the mines from construction to operations will have differing impacts on policing. Between the period 2009 – 2012 major infrastructure development will occur at a number of mine sites in the Bowen Basin whilst post 2013, the nature of the impact will shift back to the major areas such as Moranbah township and Mackay City. The attached map outlines the status (development, construction, operational phase) and number of projects within the Moranbah, Nebo, Dysart and Middlemount Police divisions.

Wide Loads and Special Services

The movement of wide loads associated with the infrastructure development will impact on road safety and road infrastructure. The flow on effect is the capacity of the Police Service to respond to requests for permit approvals and special services. The availability of officers and police vehicles to undertake the wide load movements will need to be included in police planning. It is considered the current capacity to respond to requests for special services cannot be maintained without additional resources and without some impact on fatigue management. It can also be expected that there will be an impact on core policing due to the absence of officers and vehicles from police divisions to undertake wide load movements. Mackay District is already impacted by increases in requests for special services in the current year of more than 30%. Resources (vehicle purchases & administration) to support this impact will need to be sourced and funded. The Queensland Police Service is unable to continue to support this growth from existing resources.

Road Safety

The expected impact on road safety and traffic policing /management will require consideration of a number of issues:

- Simultaneous wide load movements on the same stretch of roadway/highway may impact on safety due to the numbers and physical size of load width.
- The capacity of road infrastructure to take increased traffic flow from both miners and wide loads will require ongoing monitoring and management.
- Fatigue management for miners travelling from mining camps and mining sites to major centres as part of the proposed fly in fly out employment could impact on community safety and road safety generally.
- Movement between developments and between various mining companies and an increase in heavy vehicle movements will need ongoing monitoring and management.

The cumulative impacts of multiple operations on policing and communities

There are 23 other infrastructure, energy and mining growth projects in the Central Region either in EIS, ToR or construction phase. The capacity of the Queensland Police Service to respond to the policing requirements of these projects is limited. Preliminary information suggests Moranbah Station will require an additional five officers while smaller stations such as Dysart and Middlemount will also require staffing increases. The consequences of these increases will need to identify accommodation for additional officers in these locations.

The number and nature of wide load movements across the region will mean there are significant periods where simultaneous wide load operations are required on the same day. This will impact on policing and road safety.

Housing and Accommodation

Mackay, Moranbah and Mackay Northern Beaches are already experiencing significant difficulty in attracting staff due to the high cost of accommodation in the area which is comparable to areas such as the Gold Coast. A high proportion of the police officers moving to these areas are second year constables. Rental accommodation places a significant burden on their disposable income.

Increased Calls for Service – Alternative Service Delivery Options

The influx of construction workers and housing options both at mining sites and in regional town locations in particular Moranbah will impact on the delivery of policing services. The likely impact will need to be discussed further following the release of the Environmental Impact Statement

Disaster and Incident Management

Disaster and Incident Management will also be impacted and consideration will need to be given to developing police response plans with mining companies including Peabody Pacific Pty Limited to manage incidents involving mining deaths or mining disasters that may have an impact on the environment.

The energy projects will involve above ground gas pipeline facilities as well as major processing plant facilities. This will impact on protest activity, identification of critical infrastructure associated with possible terrorism activity and security issues associated with policing. There is also current unknown radio coverage in the areas identified for new mining developments. The QPS will need to undertake survey activity to determine the extent of QPS radio network coverage to ensure we have communications capacity in the event of a disaster or incident at any of the mining sites or other areas.

Conclusion

The Millennium Expansion Project can reasonably be expected to have some impact on service delivery for the Queensland Police Service when considered separately or as part of a cumulative assessment of energy, infrastructure and resource development projects within the Mackay Police District, in particular within the Bowen Basin area. The Police Service will need to consider the resourcing associated with road safety and traffic policing activities and wide load escorts. The above issues demonstrate some areas of impact to the delivery of policing services that will need to be considered in developing the EIS for the Millennium Expansion Project. The Police Service will need to continue its engagement with Millennium Coal Pty Limited and other mining companies in the near future to determine policing impacts and how the Service can best support the development of mining, energy and infrastructure projects and management of service delivery to affected communities.



Queensland
Government

TN 139401

Department of
Infrastructure and Planning

Mr Greg Tkai
The EIS Coordinator (Millennium Expansion Project EIS)
Department of Environment and Resource Management
PO Box 15155
City East QLD 4002

- 1 MAY 2009

Dear Mr Tkai

**Draft Terms of Reference
Millennium Expansion Project EIS**

Thank you for the opportunity for the Social Impact Assessment Unit, Department of Infrastructure and Planning to contribute to the formulation of the Terms of Reference for the Millennium Expansion Project Environmental Impact Statement (EIS).

The comments attached refer to Section 4.9 (Social) pp.34-36. Please note that the suggested amendments are in track changes.

Thank you again for the opportunity to contribute to this project. I look forward to participating on the project's advisory panel.

Yours sincerely

Phil Dash
Assistant Coordinator General
Significant Projects Coordination

DEPARTMENT OF ENVIRONMENT
AND RESOURCE MANAGEMENT

05 MAY 2009

BNE 2009 / 3930

Attachment

4.9 Social environment

4.9.1 Description of environmental values

This section of the EIS will profile the existing social values and characteristics of communities, groups and individuals likely to be impacted by the MEP. The EIS will describe the social amenity values for the affected communities and populations in terms of the: integrity of social conditions; including amenity and liveability; harmony and well being; sense of community; access to recreation; and access to social and community services and infrastructure. The EIS will describe the social amenity and use of the MEP area and adjacent areas for rural, agricultural, forestry, fishing, aquaculture, recreational, industrial, educational or residential purposes.

Consideration will be given to:

- *The population and demographics of the affected communities:*

The definition of the local community area including affected communities should be developed in consultation with the Social Impact Assessment Unit, Department of Infrastructure and Planning

The description will address all communities likely to be impacted directly and indirectly by the MEP, including source communities for the project workforce. Characteristics to be described include the community size, history, age, structure, ethnic characteristics, gender composition, education and skill level by age and gender, residency, labour force, average income profile, the number and proportion of low income households, household size, health and wellbeing indicators and employment rates in the community, disability prevalence, crimes, including domestic violence and crimes against the person, major trends/changes in the population make-up that may be occurring irrespective of the project, as well as additional information identified as relevant through consultation and engagement with affected and interested persons.

Deleted: ,

- *Local community values, vitality and lifestyles:*

A separate description, developed in consultation with stakeholders, will be provided of social values of indigenous communities, and may include both quantitative and qualitative data which reports on communities' vitality, population, employment, educational characteristics and other essential social indicators.

- Community infrastructure and services, access and mobility.
- Social issues currently faced by the affected communities
- Key social and political organisations including local government, non-government organisations and other civil society organisations
- The identity, characteristics and aspirations of affected communities including Indigenous communities
- Number of families directly affected by the project (including Indigenous Traditional Owners and their families) counting not only property owners but also families of workers either living on the property or workers where the property is their primary employment
- Recreational, cultural, leisure and sporting facilities and activities in relation to the MEP area.

- Health and educational facilities.
- On farm activities near the proposed activities.
- The housing sector in any affected community, including: current property values; home ownership rates; rates of housing stress; the size of the private rental market; typical rents for the area; the vacancy rate of rental accommodation with an assessment of seasonal fluctuations; comparative affordability for ownership and renting relative to other towns and centres; and constraints and opportunities for new housing construction in the local communities, including the capacity of the local land development and housing construction industries to provide new housing/accommodation.
- Source communities for the proposed workforce.

Social, economic and cultural values are not as easily separated as physical and ecological values. Therefore it may be necessary for some material in this section to be cross-referenced with section 4.11 Economy.

4.9.2 Potential impacts and mitigation measures

This section will define and describe:

- the immediate and cumulative adverse and beneficial impacts of all stages of the MEP on social values and the social amenity of the area;
- objectives and practical measures for protecting or enhancing social values and the areas social amenity;
- nominated quantitative standards and indicators that may be achieved for social impacts management; and
- how the achievement of the objectives will be monitored, audited and managed.

This section will also propose a community engagement strategy for affected parties and how affected parties will be involved in designing, monitoring and auditing social impacts through the life of the project.

Deleted: describe feedback mechanisms

The social impact assessment of the MEP should be carried out in consultation with affected local authorities and relevant State authorities including the Department of Communities and the DIP Social Impact Assessment Unit. The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts should be considered both at the local and regional level.

Deleted: is

Cumulative impacts—direct, indirect and secondary impacts resulting from existing projects, the proposed project and anticipated future projects should be identified including the important cause and effect relationships between human activities and resources, ecosystems, traditional Indigenous lands, and human communities. The nature, magnitude and significance of these cumulative effects should be determined and mitigation strategies included in the mitigation section.

Deleted: to be carried out in consultation with affected local authorities and relevant State authorities, such as the: Department of Infrastructure and Planning; Department of Communities; Department of Housing; Department of Tourism; Regional Development and Industry; Department of Local Government, Sport and Recreation; Queensland Health; and Education Queensland.

The assessment of impacts will describe the likely response of all affected communities in the immediate and longer timeframes, and cumulatively with the impacts of other known existing and planned projects. These impacts will be considered both at the local and regional level.

Deleted: r

The assessment of impacts will take account of relevant demographic, social, cultural and economic profiles. The social impact assessment of the MEP will consider the relevant information gathered in the community engagement program and the analysis of the existing socio-economic environment. For the construction, operational and post-closure phases of the MEP, this section will describe the effects of the proposal on local and regional residents, including land acquisition and relocation issues. The assessment will address the number of properties and the number of families directly affected by the MEP. This should include not only property owners but also the families of workers whose livelihood is dependent on property or activities potentially affected by the MEP.

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The nature and extent of the community engagement program will be described and a summary of the results incorporated in the EIS, with a description of how consultation feedback has identified and informed the assessment of impacts and development of mitigation measures.

Deleted: consultation

The social impact assessment will include sufficient information to enable affected local authorities and State authorities to make informed decisions about how the proposal may affect their business and plan for the continuing provision of health, education, community services, recreational activities and other services in the region.

In the case of indigenous people, social impact assessment should be undertaken in close consultation with local stakeholders from those communities and will include both quantitative and qualitative data that reports on the communities' vitality, population, employment, education characteristics and other essential social indicators. This report will describe the potential beneficial and detrimental impacts on these communities as reported by stakeholders.

In particular, this section of the EIS will address the following matters where relevant:

- Potential demographic changes in the profile of the region.
- The sufficiency of current infrastructure and services to meet expected demands.
- The number of personnel to be employed, the skills base of the required workforce and the likely sources (i.e. local, regional or other) for the workforce during the construction and operational phases for each aspect of the MEP and initiatives for local employment opportunities.
- Identify any new skills and training to be introduced in relation to the MEP. Adequate provision will be made for apprenticeship and worker training schemes. The EIS will address the required occupational skill groups, and anticipated potential skill shortages.
- Include a description of the planned accommodation facilities and the type of accommodation (e.g. single or accompanied) and services to be provided.
- Include an assessment of impacts on local residents' values, aspirations, existing lifestyles and enterprises.

- The EIS will address impacts of both the construction and operational workforces and associated contractors on housing. This section of the EIS will discuss the capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the MEP, including:
 - Identify where staff will reside during construction and operation; whether a commuting model will be adopted; and what the commuting model will be (fly in-fly out, drive in-drive out).
 - Identify the number of workers who are likely to: reside at or near the project site; reside elsewhere; and be accompanied by dependents.

-An analysis of the consequential impact and mitigation measures of increased demand for, and uptake of affordable accommodation, particularly rental accommodation, in any affected region including the reduction in available affordable housing in the local government areas, and the potential displacement of existing residents who may no longer be able to afford accommodation.

-An assessment of the impacts of the project on property valuations and marketability.

-Identify any opportunities and constraints for new housing construction in the catchment area, including the capacity of the local land development and housing construction industries to provide new housing.

- Assess potential impacts on local communities with regard to family wellbeing, community cohesion and demand for family and community services. Where possible, reference will be made to the cumulative impacts of any similar projects on affected local and regional communities.
- Assess potential impacts on the likely source communities of the workforce due to rostering and shift schedules (such as fly-in, fly-out) in regard to family wellbeing, community cohesion and demand for family and community services.
- Provide comment on how much service revenue and work from the MEP (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the project particularly if a fly in/fly out workforce is proposed.
- Specify the indigenous education, employment and training strategy to be developed, how and when this will occur, and how relevant Traditional Owner groups will be engaged.
- In regard to affected indigenous and non-indigenous communities respectively, particular attention should be paid to the effects on:
 - the ability of both indigenous and non-indigenous people, to live in accordance with their own values and priorities;
 - the use of, and access to, culturally important areas and landscapes; and
 - the ability to participate in regional and local employment and training opportunities.
 - the influx of new project workforce and their families, particularly if any part of the workforce is sourced from overseas.

Deleted: environment and

Discuss the potential harm on the amenity of adjacent areas used for cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential purposes. Describe the implications of the proposal for future developments in the local area including constraints on surrounding land uses.

The educational impacts of the proposed development will be addressed with particular regard to:

- primary, secondary and tertiary educational sectors;
- improved appreciation of conservation areas; and
- environmental education for the general public.

For identified impacts on social values, the EIS will develop mitigation and enhancement measures and facilitate negotiations towards acceptance of these measures with affected communities. The EIS will develop an accommodation strategy, developed in consultation with relevant State government agencies, which will detail proposals that avoid, mitigate or offset any short and medium term adverse effects on the local housing market.

- The EIS will also develop a community engagement plan that promotes an active and on-going role for impacted communities throughout the life of the MEP; which ensures the informed participation of all impacted communities (including Indigenous families and communities and relevant demographic groups such as young people, men, women, elders etc). Uncertainty should be addressed through the design of an effective monitoring system. A procedure to establish a complaints register and a conflict resolution mechanism should be incorporated.

Deleted: consultation

Deleted: management

Deleted: Practical monitoring regimes will also be recommended where appropriate.

The EIS should discuss any social responsibility initiatives proposed by the proponent, including:

- modifications or alternatives to avoid, minimise, or mitigate significant cumulative effects
- key policies and procedures to be adopted or used by the proponent that would mitigate or enhance impacts
- key government documents outlining proposed local, state or Australian Government initiatives or plans that would mitigate or enhance impacts.



Queensland
Government

18 MAY 2009

Queensland Transport

Mr Greg Tkai
The EIS Coordinator – Millennium Expansion Project
Department of Environment and Resource Management
PO Box 15155
Brisbane City East QLD 4002

Dear Mr Tkai

**Proposed Millennium Expansion Project – Draft Terms of Reference for Voluntary
Environmental Impact Statement**

I refer to the letter dated 7 April 2009 from the Department of Environment and Resource Management seeking written submissions in relation to the Proposed Millennium Expansion Project – Draft Terms of Reference for Voluntary Environmental Impact Statement (EIS).

Rail, Port and Freight Division (Department of Transport and Main Roads), comments on the draft of Terms of Reference are enclosed at **Attachment 1**.

Should you have any queries regarding these comments to please call Mr Greg Hollands, Senior Advisor (Coal and Mineral Transport) on (07) 3306 7376.

Yours sincerely

Lawrence Hannah
Executive Director (Rail, Ports and Freight)

Rail, Ports and Freight
Ports, Planning and GOC Liaison
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Brisbane Qld 4000
GPO Box 1549 Brisbane Qld 4001
ABN 13 200 330 520

Our ref E160114
Enquiries Greg Hollands
Telephone +61 7 3306 7376
Facsimile +61 7 3306 7455
Website www.transport.qld.gov.au
Email greg.s.hollands@transport.qld.gov.au

Attachment 1

Rail, Ports and Freight Division (Department of Transport and Main Roads) Comments on the Millennium Expansion Project - Draft Terms of Reference for Voluntary EIS.

Section	Description of issue	Requested amendments.
3.5 Infrastructure Requirements (Page 10)	This section requests description of infrastructure requirements for the project. The Initial Advice Statement (Page 2) indicates that the project will be using conveyors as part of raw materials handling and transport run-of-mine coal. In the second sentence, specific reference should also be made to include "conveyors", in the list of matters to be considered.	Amend the text to read: "The matters to be considered include such infrastructure as roads, rail, conveyors, bridges, jetties, ferries, tracks, pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), and pipelines for any service (whether underground or above)."
3.5.1 Transport – road/rail/ship (Page 10)	Paragraph 3: First dot-point. Information about transport requirements on public roads should also include tonnage details.	Amend the dot-point to read: "the volume, tonnage, composition (types and quantities), origin and destination of goods to be moved...." etc.
3.6 Waste Management 3.6.1 Air emissions (Page 13)	Particulate emissions are also produced by transport of product coal by train.	In Paragraph 1, amend the second sentence to read as follows: Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles or conveyors, or by transportation equipment (e.g. trucks, trains, either by entrainment from the load or by passage on unsealed roads)."

<p>4.5 Air</p> <p>4.5.2 Potential impacts and mitigation measures (Page 26)</p>	<p>This section addresses Air Quality, and related matters including the management of coal dust emissions.</p> <p>The improved management of coal dust emissions along all coal transport corridors in Central Queensland is a high priority for the Queensland Government.</p> <p>As a reflection of this priority, in 2007 the Environmental Protection Agency (Qld), requested that QR Limited (QR) undertake an <i>Environmental Evaluation of the impact of coal dust from trains in Central Queensland</i>.</p> <p>This Environmental Evaluation has now been completed and the evaluation report has recommended a number of dust mitigation measures for implementation including:</p> <ul style="list-style-type: none"> • The use of spray-on chemical dust suppressants on loaded coal wagons; • The installation of improved coal-train loading infrastructure at coal mines (to control over-loading and minimise spillage of parasitic coal onto sills and bogies during loading); and • Improved load profiling systems to create a more streamlined and consistent surface of coal in each wagon. <p>The EPA has accepted the Environmental Evaluation report as meeting its requirements and requested that QR prepare a Transitional Environmental Program for implementing the recommendations of the report. The Transitional Environmental Program outlines short, medium and long-term mitigation methods for improved coal dust management, and is to be further developed in a <i>QR Coal Dust Management Plan (CDMP)</i> for</p>	<p>To ensure that all relevant coal rail-transport related dust mitigation measures are implemented at the Millennium Expansion Project, the proponent is requested to consult with QR Limited's QR Network Division to determine the likely requirements for new or upgraded coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of the implementation of the Transitional Environmental Program and <i>QR Coal Dust Management Plan</i>.</p> <p>Enquiries regarding the timing and implementation of the Transitional Environmental Program and <i>QR Coal Dust Management Plan</i> should be directed to:</p> <p>Graham Stockwell Project Manager Coal Loss Management Project QR Network Telephone: (07) 3235 5620 E-mail: graham.stockwell@qr.com.au</p>
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	<p>completion by December 2009.</p> <p>To ensure that all relevant coal rail-transport related dust mitigation measures are implemented at the Millennium Expansion Project, the proponent should consult with QR Limited's QR Network Division to determine the likely requirements for new or upgraded coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of the implementation of the Transitional Environmental Program.</p> <p>Enquiries regarding the timing and implementation of the Transitional Environmental Program should be directed to:</p> <p>Graham Stockwell Project Manager Coal Loss Management Project QR Network Telephone: (07) 3235 5620 E-mail: graham.stockwell@qgr.com.au</p>	
<p>4.5 Air 4.5.2 Potential impacts and mitigation measures (Page 27)</p>	<p>Consistent with the comments (made immediately above), and to ensure that coal rail-transport impacts and measures are properly addressed we request that the following sentence is added at the end of the last paragraph of Section 4.5.2:</p> <p>"In relation to the rail transport of coal, the EIS will describe the proposed measures designed to minimise coal-wagon over-loading, coal loss during transit and coal dust emissions from trains during the haulage of coal from the project to the proposed export port".</p>	<p>At the end of Section 4.5.2, add the following sentence:</p> <p>"In relation to the rail transport of coal, the EIS will describe the proposed measures designed to minimise coal-wagon over-loading, coal loss during transit and coal dust emissions from trains during the haulage of coal from the project to the proposed export port".</p>



18 May 2009

EIS Project Manager

Department of Environment and Resource Management

PO Box 15155

Brisbane City East QLD 4002

Attn: Mr Greg Tkai

Dear Mr Tkai

Main Roads' Response: Comments on Draft ToR for the Millennium Mine Expansion Project

Thank you for inviting Main Roads to comment on the Draft Terms of Reference (ToR) for the Millennium Mine Expansion Project.

Main Roads has reviewed the Initial Advice Statement and Draft ToR and is generally supportive of the overall content. However, further clarification is needed to fully address road impact issues; these are detailed in Attachment A.

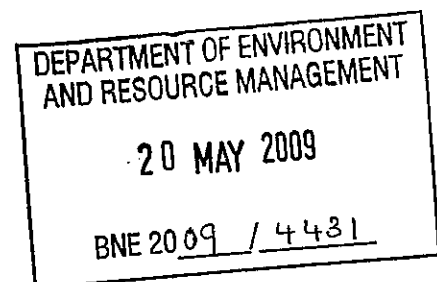
Main Roads would like to work closely with the proponent's consultant about the level of detail required in the assessment of road impacts and subsequent mitigation strategies. Therefore, while preparing the EIS, the proponent should consult with Mr Pat Aprile, Manager (Corridor Management and Road Operations) in Main Roads' Mackay/Whitsunday office on 4951 8577.

Should you have any queries regarding these comments, please contact Mr Ferdinand Joeffry of Main Roads Development Impact Branch, (07) 3137 7688.

Yours sincerely,

Tom Orr

Principal Advisor (Development Impact Branch)



Enc(1): Attachment A.

Main Roads' Submission on the Terms of Reference for the Environmental Impact Statement



Submission on the Terms of Reference for the environmental impact statement Millennium Expansion Project

Name: Tom Orr, Principal Advisor, Development Impact **Organisation** **Department of Main Roads**
Address: Floor 21 Hitachi Building, 239 George St **Contact details:** Ferdinand Jeffry on 3137 7688
 Brisbane QLD 4000
 GPO Box 1412 Brisbane QLD 4001

Section	Describe the issue	Suggested solution
PROJECT APPROVALS Section 1.6 Page 6	Reference should be made to Main Roads approvals.	<p>Insert: For road infrastructure assessment reference should be made to the:</p> <ul style="list-style-type: none"> • <i>Transport Infrastructure Act (Qld) 1994;</i> • <i>Transport Planning and Coordination Act (Qld) 1994;</i> • <i>Transport Operations (Road Use Management) Act (Qld) 1995;</i> and • Guidelines for Assessment of Road Impacts of Development (GARID) 1994 (as amended)
LOCATION Local Context Subsection 3.1.2 Page 8	Appropriate identification of site and associated facilities in relation to the State-controlled road network.	<p>Insert: The EIS should provide a map showing the location of the project site in relation to the State-controlled and key local road network. This map should also show the project in relation to other major infrastructure (for example key intersections) along the road network to enable the potential traffic impacts of the site to be understood in context. In addition, other associated mines in this area such as Poitrel and Daunia should also be identified.</p>
CONSTRUCTION Section 3.2 Page 8	Appropriate identification of construction impacts.	<p>Insert: Details and assessment of the impacts of proposed construction activities should include the methods of transport; routes (origin-destination); quantities with respect to plant and equipment as well as the transport of goods, over-dimensional vehicles and workers.</p>
OPERATIONS Section 3.3 Page 8	Appropriate identification of operational impacts.	<p>Insert: Details and assessment of the impacts of proposed operational activities should include the methods of transport; routes (origin-destination); quantities with respect to plant and equipment as well as the transport of goods, over-dimensional vehicles including movement of workers and associated project activities, for example, any necessary material processing.</p>





<p>INFRASTRUCTURE REQUIREMENTS Transport-Road/Rail/Ship Subsection 3.5.1 Page 10</p>	<p>Further clarification is needed to ensure the EIS identifies transport infrastructure required as a result of project traffic.</p>	<p>Insert: Details of expected traffic generated are to be provided for both construction and operational phases of the project. The EIS must describe any proposed new, or alterations to existing transport-related infrastructure required by the project (as distinct from impact mitigation works). This includes modifications to roads for access works and realignments, rail lines (including level crossings and services) and air and sea port facilities. The EIS must also include details of the construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority.</p>
<p>ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS Transport Subsection 4.2.2.10 Pages 22-23</p>	<p>Further information is needed to ensure mitigation strategies are adequately addressed.</p>	<p>Insert: The EIS must include:</p> <ul style="list-style-type: none"> • Details of the assessment methodology adopted including a summary of consultation undertaken with transport authorities (for example Department of Transport and Main Roads), regarding the scope of the impact assessment and methodology to be used; • Details of all base data assumptions, including an assessment of the current condition of the affected network and its performance; • Details on possible interruptions to transport operations, in particular any school bus routes and services; • Details of any impacts on the natural environment within the jurisdiction of an affected transport authority (for example road and rail corridors); • Details of the project impacts concerning the amenity and health of sensitive land uses and ecological areas adjacent to transport corridors as a result of environmental nuisances from project related traffic; <p>For impacts on roads:</p> <ul style="list-style-type: none"> • The EIS report is to discuss likely impacts on the intersection of the Peak Downs Highway and Millennium Access Road. In performing this analysis traffic generation from proposed and approved mines (Poitrel and Daunia) is to be considered. • An assessment of project impacts on overland water-flows and their interaction with the current and future road network and its operation; • An assessment of project impacts on any existing or proposed pedestrian and cycle networks; • Impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings i.e. those crossings which form part of private access pathways to and from residential or business sites; <p>Mitigation strategies to address project impacts should be detailed clearly in the EIS for each project affected transport mode. The proponent is to discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. These mitigation strategies are to be prepared by the proponent in close consultation with relevant transport authorities. Mitigation strategies must include:</p> <ul style="list-style-type: none"> • Consideration of any transport authority's works program and forward planning; • Consideration of other transport generated from other proposed/approved mines (Poitrel and Daunia). • Proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority



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		standards and practices;
		<ul style="list-style-type: none">• Details on the timing of these works including parties responsible; and• A summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the project.

Signature: Tom O. 18 MAY 2009

BNE 38381
Vol 1



**Queensland
Government**

Your Ref: 192436
Ref: HS01442/09

Department of
Communities

22 MAY 2009

Mr J Bradley
Acting Director-General
Department of Environment and Resource Management
GPO Box 2454
BRISBANE QLD 4001

Dear Mr Bradley *John*

I refer to a letter from your Department dated 7 April 2009 inviting the Department of Communities (Housing and Homelessness Services) to act as an advisory body in the environmental impact statement process for the Millennium Expansion Project. The Department has considered and reviewed the Draft Terms of Reference and has the following comments.

The Department's interest in this project relates to potential cumulative adverse impacts on local housing issues in the Moranbah region of the Bowen Basin. The Department has performed extensive research into housing issues in this region and has found that the housing market across all tenures is under increasing stress from rising costs, limited land availability in many locations and a rapidly increasing population in response to the expansion of the resources sector.

The Department advises that the proponent should address mitigation strategies and manage potential cumulative adverse impacts with respect to housing issues in the forthcoming Environmental Impact Statement. In particular, accommodation strategies for both the construction and operational phases should be addressed, as outlined in Section 4.9 'Social Environment' of the Draft Terms of Reference.

For further assistance, your officers may contact Mr Mark Wall, Acting Director, Private Housing Support, Housing and Homelessness Services, on 322 76223.

Yours sincerely

Linda A Apelt
**Director-General
Department of Communities**

cc EIS Coordinator—Millennium Expansion Project

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Brisbane Queensland 4000
GPO Box 806 Brisbane
Queensland 4001 Australia
General Enquiries
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Facsimile +61 7 3235 4327
Email dgooffice@disability.qld.gov.au
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Website www.disability.qld.gov.au
DOC ABN 38 872 506 567
DSQ ABN 25 791 185 155



Your reference: 192436

Department of
Communities

22 May 2009

The EIS Coordinator – Millenium Expansion Project
Department of Environment and Resource Management
P O Box 15155
BRISBANE CITY EAST QLD 4002

Attention: Greg Tkai

Dear Dr Dixon

Thank you for the opportunity to comment on the draft Terms of Reference for a Voluntary Environmental Impact Statement for the Millennium Expansion Project.

Community and Youth Justice Services within the Department of Communities strives to influence the way in which community wellbeing is addressed in local and regional planning mechanisms, with a view to enabling effective planning for community and social infrastructure, and avoiding future problems and reducing demand for human services.

The draft Terms of Reference meets the requirements of this Service Area within the Department. However, section 4.9.1 could be strengthened by the incorporation of 'local and regional' into the first sentence: so as to read, This section of the EIS will profile the existing social values and characteristics of **local and regional** communities, groups and individuals likely to be impacted by the MEP. This will clarify that Moranbah, Coppabella, Mackay, and potentially other centres in Queensland, should be profiled if they are likely to be impacted by the MEP.

Other than this one suggestion, this Service Area has no other comment on the draft Terms of Reference.

If you require further information on this matter, please contact John Mallett, Regional Planner, at 4967 1030, or email John.Mallett@communities.qld.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'D Knight'.

Dianne Knight
Regional Executive Director
Community & Youth Justice Services
Mackay Whitsunday Region

Mackay Whitsunday Regional Service Centre
Level 2 Healthpoint Pharmacy Building
67-69 Sydney Street
Mackay Qld 4740

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www.sunwater.com.au

ABN 17 020 276 523

Flaherty Street PO Box 226 Eton Qld 4741

Water Supply Services

Operations & Maintenance

Engineering Services

Corporate

Our ref: 07-009225/001
Contact Name: Tom Wallwork
Telephone: 07 4954 2218

23 April 2009

The EIS Co-ordinator – Millennium Expansion
Department of Environment & Resource Management
PO Box 15155
CITY EAST QLD 4002

Dear Mr Tkai

RE: MEP – DRAFT TERMS OF REFERENCE FOR VOLUNTARY ENVIRONMENTAL IMPACT STATEMENT

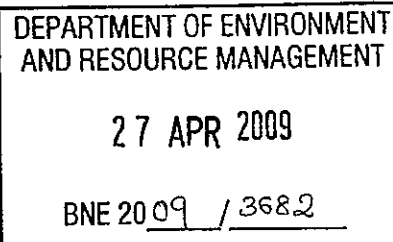
I refer to your correspondence of 7 April 2007 seeking comment on the Draft TOR for the proposed Voluntary Environmental Impact Statement.

We have received the Initial Advice Statement for the proposed mine expansion and as SunWater Limited, nor its subsidiary Eungella Water Pipeline Pty Ltd, have any infrastructure in this immediate area, we have no issues in relation to the project nor the Draft TOR.

I have noted that one of the sources of proposed water supply is the allocation held by Millennium Coal Pty Ltd from SunWater's Burdekin to Moranbah pipeline. We would be happy to provide the proponent any information held regarding the water quality from this source in support of their Voluntary EIS.

Yours sincerely

Tom Wallwork
REGIONAL MANAGER



Enquiries to: Bernadette Wallace
Our ref: TDBw 09 002095
Your Ref: TOR Millennium Expansion Project

23rd April 2009

Annemarie Skelly
Peabody Millennium Coal
Locked Bag 1005
Moranbah Qld 4744



Cnr Fitzroy & Alma Streets
Rockhampton QLD 4700
PO Box 308
Rockhampton QLD 4700
Telephone 131 046
Facsimile 07 4922 7562

Dear Annemarie

**Re: Proposed Millennium Project – Terms of Reference
Easements within L1 on SP187962 L2 on GV165 L24 on SP162593 & L24 on SP162593**

In reference to your correspondence dated 6th April 2009, I advise that Ergon Energy has 66kV overhead powerlines in the subject area of the proposed Millennium Expansion Project site. Ergon Energy has no objections to the Terms of Reference provided the following conditions are met:-

1. Our interests in the electrical works located on the Easements described as Easement A & B on SP162594, Easement B on SP178453, Easement A on SP162593 and Easement B on SP185583 are adequately protected and access for maintenance and operational needs are not obstructed.
2. Any relocation, repairs, or alterations to the works that may be required by the proposal shall be at the applicants' expense.
3. The developer will be required to negotiate electricity supply arrangements for any additional points of supply required as a result of this development by calling Ergon Energy's National Contact Centre on 13 10 46 and requesting a quote for additional electricity supply.
4. Working around electrical parts *Electrical Safety Regulation 2002* and Schedule 2 Exclusion Zones for electrical parts need to be observed. More specifically, Code of Practice Working Near Exposed Live Parts *Electrical Safety Act 2002* particularly section 5 and its sub-sections dealing with Operating Cranes and Plant Near Overhead Electric Lines. Also Appendix B which sets out the exclusion zones

If you have further enquiries, please contact Bernadette Wallace on 49 311 017.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Tony Dartnell'.

**For Tony Dartnell
Regional Design Manager – Central**

cc Isaac Regional Council Executive Officer
PO Box 1 St Lawrence Qld 4707

Greg Tkal

From: Greg Tkal
Sent: Tuesday, 28 April 2009 9:22 AM
To: 'Annemarie Skelly'
Cc: Colleen Fish
Subject: RE: Submission for Millennium ToR

Hi Annemarie,

As discussed, thank you for forwarding the attached comment you received from Ergon Energy onto the Department of Environment and Resource Management (DERM). I have contacted Ms Bernadette Wallace (Ergon Energy) this morning and confirm that the DERM will accept the submission.

Regards

Greg

Greg Tkal
Principal Environmental Officer
Development Assessment EIS Assessment
Environmental Services
Department of Environment and Resource Management
288 Edward Street
BRISBANE QLD 4000
GPO Box 2771
BRISBANE QLD 4001
Tel: (07) 3224 8803
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Email: greg.tkal@epa.qld.gov.au
Visit us at: www.epa.qld.gov.au

From: Annemarie Skelly [<mailto:annemarie.skelly@matrixplus.com.au>]
Sent: Tuesday, 28 April 2009 8:56 AM
To: Greg Tkal
Cc: Colleen Fish
Subject: Submission for Millennium ToR

Greg,
Peabody has received a submission from Ergon Energy for the draft terms of reference (refer to attached). Section 55 of the EP Act states that the submission must be made to chief executive; can you please confirm if this will be accepted?

Cheers
Annemarie

Annemarie Skelly | Senior Consultant - Environment | Matrixplus (Australia)
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 Please consider the environment before printing this email

28/04/2009



Ref. A573093

20 April 2009

Mr Greg Tkal
The EIS Coordinator – Millennium Expansion Project
Department of Environment and Resource Management
PO Box 15155
CITY EAST QLD 4002

Dear Mr Tkal,

**REQUEST FOR COMMENT ON THE DRAFT TERMS OF REFERENCE
FOR THE MILLENNIUM EXPANSION PROJECT**

I refer to the letter from Dr Bill Dixon, Manager Development Assessment, dated 7 April 2009 (your ref – 192436) providing Powerlink with a copy of the Draft Terms of Reference (ToR) and Initial Advice Statement (IAS) for the Millennium Expansion Project (MEP), and inviting comments on the Draft ToR.

Powerlink has reviewed both documents and has no comments to make regarding the Draft ToR.

However, with reference to the IAS, Powerlink notes that further studies will be undertaken to identify whether additional electricity infrastructure is required to accommodate an increase in electrical demand for the project. Powerlink recommends that the proponent keep the local electricity distributor, Ergon Energy, fully informed of its electricity demand requirements and possible new infrastructure needs.

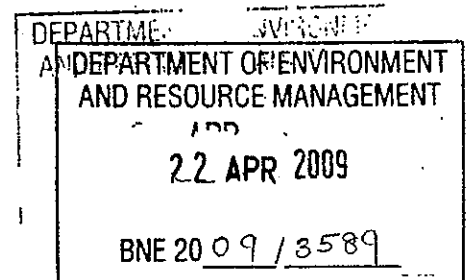
Ergon Energy also includes these projected customer loads in its forecasts to Powerlink. This information is then used to forecast future loadings on Powerlink's transmission network and to identify sections of the network that will require augmentation to address statutory reliability of supply standards.

In this regard, Powerlink's 2008 Annual Planning Report noted that due to potential mining growth in the Bowen Basin area, thermal limitations are expected to occur in the 132kV network supplying the area without action to augment supply. Powerlink anticipates initiating consultation on potential supply augmentation within the next 12 months.

Please contact Michael Brown from Powerlink's Transmission Environment Group on 3866 1138 should you have any questions regarding this letter.

Yours sincerely,

Alison Gray
MANAGER TRANSMISSION ENVIRONMENT



33 Harold Street, Virginia
PO Box 1193, Virginia, Queensland 4014, Australia
Telephone: (07) 3860 2111 Facsimile: (07) 3860 2100
Website: www.powerlink.com.au



Please quote
Our reference: 0905 - IX10157 -MC;ib

Your reference: 192436

21 May 2009

PO Box 97
Moranbah QLD 4744

Telephone
1300 ISAACS
(472227)
(07) 4941 4500

Facsimile
(07) 4941 8666

Email
records@isaac.qld.gov.au

Website
www.isaac.qld.gov.au

ABN: 39 274 142 600

The EIS Coordinator
Millennium Expansion Project
Department of Environment and Resource Management
PO Box 15155
CITY EAST QLD 4002

Attention: The EIS Coordinator,

RE: DRAFT TERMS OF REFERENCE - MILLENNIUM EXPANSION PROJECT

Isaac Regional Council welcomes the opportunity to comment on the Draft Terms of Reference for the Millennium Expansion Project Environmental Impact Statement.

Whilst the impacts that the current project will have on the area are addressed in the Draft Environmental Impact Statement the accumulative impacts of all the coal mining operations are not touched on as part of the EIS process. Council has raised its concerns in this regard on a number of occasions and the accumulative impacts are yet to be satisfactorily addressed as part of the EIS process.

Please find listed below a summary of the concerns raised by Isaac Regional Council's Elected Members in relation to the Draft Terms of Reference.

1. The mining operation shall not emit particulate dust contamination levels beyond the mining tenement lease above the existing pre development background levels measured at the property boundary as the proposed operations cumulative effect will affect the health and residential amenity of Moranbah residents. The reduction in dust emissions shall be focused on industry best practice by enclosing all the operational components of the mine including wash plant, crushing plants and conveyors to reduce dust inputs into the environment. A real time, on line integrated monitoring system of high volume air sampling and dust deposition will need to be established to ensure a scientific approach to the protection of residential well being within the Region.
2. All disturbed mining areas shall be rapidly re-vegetated and stabilised to prevent dust and surface water pollution from the site exceeding the pre-development levels at the property boundary. Council views a maximum period of 1 month for all disturbed surfaces to be left exposed prior to revegetation and stabilisation being implemented as a minimum standard to protect local amenity and ecological integrity.

■ (Reply to)

Broadsound Business Unit
PO Box 1
St Lawrence Q 4707
PH: (07) 4984 5400

■ (Reply to)

Belyando Business Unit
PO Box 229
Clermont Q 4721
PH: (07) 4983 1133

■ (Reply to)

Nebo Business Unit
PO Box 21
Nebo Q 4742
PH: (07) 4950 5133

3. Rehabilitation works are to be designed and implementation factored towards rapid ecosystem re-establishment on the sites to facilitate the maximum opportunity for stabilisation of the terrestrial ecosystems prior to further underlying mineral resource exploitation and disturbance. Council views a maximum period of 1 month for all disturbed surfaces to be left exposed prior to re-vegetation and stabilisation being implemented as a minimum standard to protect amenity.
4. The mining operation shall not emit noise contamination levels beyond the mining tenement lease above the existing pre development background levels measured at the property boundary at any given time day or night. This should include the assessment of all equipment operations to reducing noise generation and transmission. The implementation of sound reduction and suppression equipment on mine coal haul trucks needs to be implemented to reduce the noise pressures being emitted from the site which will affect an external amenity.
5. The mining operation shall not emit vibration levels beyond the mining tenement lease above the existing development background levels. Notification is to be made to the EPA and Councils Chief Executive Officer on each occasion a blast is to take place at the mine site to assist with Complaint validation.
6. Mine operation needs to satisfactorily address the ingress of invasive weed species within the lease area and implement management strategies to prevent further expansions of existing infestations into the surrounding rural landscape.
7. The proponent needs to amend the EIS to facilitate a movement away from the philosophy of "pollution for profit" as the cumulative impacts on the Moranbah community well being have not been satisfactorily addressed. Noise, dust and vibration monitoring needs to be undertaken on an integrated format incorporating long-term and 24 hr sampling. A real time, on line integrated monitoring system of high volume air sampling, dust deposition and vibration will need to be established to ensure a scientific approach to the protection of Urban Residential area. The establishment of a vibration register to record and monitor damage to Urban assets is considered fundamental to ensuring that long-term effects are well managed.
8. The EIS needs to reflect the cumulative impacts of numerous mining operations in the vicinity with a focus on the triple bottom line being economic, environmental and social outcomes. There needs to be action taken on a broad spectrum cumulative study contributed to by the mining industry, which establishes the base line effects being experienced by the Urban community.
9. The EIS document should address how the ROM coal stock piles should be buffered to protect against dust generation. The enclosure of plant and facilities, watering of all stock piles should be fully considered and a comprehensive analysis undertaken on the benefits to the urban area and the links to reducing cumulative effects.
10. The EIS document should address the process of disposal of additional sewerage waste waters from the operation and the likely increase in the volume of this waste.
11. The EIS report should address the process of storing additional explosives on the expanded area and the safety of additional materials.
12. The EIS should address the process of the social impacts from the change in operational work method of operating transitional work forces and not housing workers locally.
13. The EIS should address the process of the road transport impacts from the change in operational work method of operating transitional work forces and not housing workers locally.

14. The assessment should address the process of allocating additional water and housing resources to the Moranbah community from the economic stimulant the expanded operation will have on the economy, both direct and indirect. The process needs to make a firm and unbiased assessment of the triple bottom line of economical, environmental and social impacts on the Urban community. The proposal is now located within the amalgamated Local Government area of Isaac Regional Council and the presentation of the project in a light of isolation does not reflect the guiding intent of the integration process of the local communities.
15. The EIS report should accurately address the process of ensuring that sufficient water is available of ordinary operations of the proposed mine under drought conditions.
16. The terms of reference should establish an analysis of managing and protecting aquifers in the area. The present document does not reflect the ongoing sustainable management of this finite water resource.
17. Council calls on EPA, Department of Mines and Energy and Isaac Regional Council representatives to conduct a study tour of environmental protection measures of the Hunter Valley Coal Mines in NSW, taking in mines at Mt Arthur (BHP), Bengal (Anglo) to asses first hand the effectiveness of the implemented water quality, dust and noise control measures with a view to implementing similar industry best practice control parameters at the Millennium Expansion Coal Project.
18. The EIS should clearly identify the shut down parameters and thresholds for dust, noise and vibration of the mining operation when metrological conditions are such that impacts upon the Urban area are unavoidable. The identification of metrological conditions should be linked to real time monitoring of conditions and provide historical data to the EPA for use in the assessment and validation of complaints received.

Council seeks the above concerns to be taken into consideration when finalising the EIS. If you have any queries or wish to discuss this matter further please contact me on 07 4941 4500.

Yours faithfully



MARK CRAWLEY
Chief Executive Officer

KNE 38381
VOL 1



YOUR REF MILLENNIUM PROJECT
OUR REF JACO ACKERMAN:SE

14 May 2009

The EIS Co-ordinator –Millennium Expansion Project
Department of Environment and Resource Management
PO Box 15155
CITY EAST QLD 4002

Dear Sir,

RE: PROPOSED MILLENNIUM EXPANSION PROJECT
DRAFT TERMS OF REFERENCE FOR AN ENVIRONMENTAL IMPACT STATEMENT

I refer to your request for comment on the draft Terms of Reference pertaining to the proposed Millennium Expansion Project.

The following general comments are made:

1. Environmental Impact Statements for mining projects in the Bowen Basin should be considered collectively and not in isolation. That is, the EIS should consider and include the social amenity and use of the project site and adjacent areas. The impact on infrastructure (for example, road and rail networks, schools, hospitals, housing) for towns not directly associated with the mining project requires careful consideration.

While there are many positive impacts associated with mining projects, there are also other issues that need consideration with regard to how they impact on the region as a whole. The cumulative impact of mining ventures requires a full and thorough assessment.

Yours faithfully

Jaco Ackerman
Acting Manager Strategic Planning

DEPARTMENT OF ENVIRONMENT
AND RESOURCE MANAGEMENT

21 MAY 2009

BNE 2009 / 4481

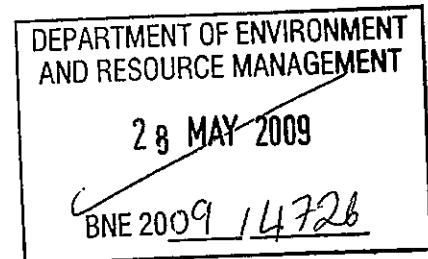


Reference: CST No. 04421/09

Department of
Primary Industries and Fisheries

25 May 2009

The Chief Executive
Department of Environment and Resource Management
PO Box 15155
City East Qld 4002



Attention: The EIS Coordinator (Millennium Expansion Project)

Email: gregtkal@derm.qld.gov.au

Dear Sir

Draft Terms of Reference – Proposed Millennium Expansion Project, Moranbah

Please find following comments from our Fisheries group of the Queensland Primary Industries and Fisheries (QPIF) on the Proposed Millennium Expansion Project.

1.6.1 Relevant Legislation and Policy Requirements

Add *Fisheries Act 1994* and *Integrated Planning Act 1997*.

The proponent should be aware that an approval is required under the *Integrated Planning Act 1997* to construct or raise waterway barriers and they may be assessed against the *Fisheries Act 1994*. That is unless the works are self-assessable and meet the criteria set out in the relevant "*Code for Self-Assessable Development, Minor Waterway Barrier Works on Low Order Inland Waterways (WWBW01)*"¹. Any proposed dams, weirs, creek crossings or stream diversions may trigger the requirement for an approval under the above mentioned acts.

4.7.1.3 Aquatic Biology

The following points should be added to this section:

- A description of aquatic communities at the site and up and downstream of the site.
- A description of fish and crustacean species upstream of the proposed impoundment, within the impounded area and downstream as far as the effect of the proposal will extend. This should include distribution, diversity, some population descriptors (eg. size classes / length frequency) and relative abundance. Historical information (eg. former distribution, diversities *etc.* should be included where available.
- Discussion of fish habitat requirements and usage at the site and up and downstream of the site, including life cycle, seasonal or flow related variations in those requirements.
- Fish movement requirements through the site need to be determined (including any seasonal changes to those requirements) (This may be determined from existing biological studies, historical or anecdotal evidence and results from the fisheries surveys).

4.7.2 Potential Impacts and Mitigation Methods

Determine the potential impacts of the proposal on fish communities at the site and up and downstream of the site as far as the effect of the proposal will extend. These should include:

- impacts on reproduction
- impacts on different life stages
- impacts on movement up and downstream and between the waterway and floodplains
- impacts on access to and availability of different habitats

Determine the potential impacts of the proposal on fish habitat at the site and up and downstream of the site including impacts on features such as: riparian vegetation; aquatic flora; distribution of pool and riffle environments; water quality: instream and bank profiles; floodplain habitat (such as wetlands, waterbodies) *etc.*

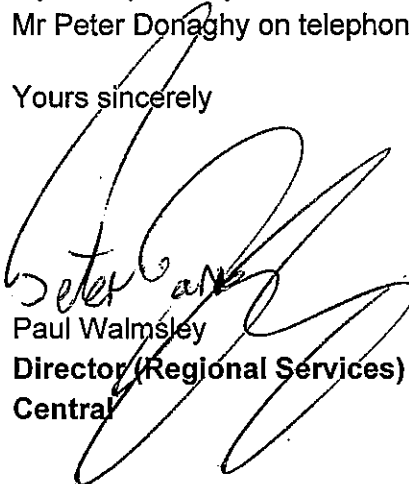
This should include potential impacts and mitigation methods that each of the dams, weirs or proposed waterway diversions might have on aquatic faunal communities.

¹Contact the DPI&F Business Information Centre on 13 25 23, the Northern Fisheries Centre on 4035 0112, or visit the Fishweb website at

http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/28_9109_ENA_HTML.htm for copy of the documents referred to above.

If you require any further information regarding this matter, please do not hesitate to contact Mr Peter Donaghy on telephone 07 49360306 or email peter.donaghy@dpi.qld.gov.au.

Yours sincerely


Paul Walmsley
Director (Regional Services)
Central

Greg Tkal

From: Matthew English [Matthew.English@dtirdi.qld.gov.au]
Sent: Tuesday, 26 May 2009 2:52 PM
To: Greg Tkal
Subject: Millennium Expansion Project EIS - request for comments
Attachments: Attachment 1.doc; Attachment 2.doc

I refer to correspondence received 7 April 2009 seeking comments on the Millennium Expansion Project – Draft Terms of Reference for voluntary Environmental Impact Statement.

All relevant officers within the Department of Employment, Economic Development and Innovation (DEEDI) have reviewed the Draft ToR for the voluntary EIS.

The following comments have been provided by Jodi Norris, 3237 1783, Employment and Indigenous Initiatives and Michael Ross, 3247 5545, Primary Industry and Fisheries. David Coffey from Mines and Energy has previously provided comments on the paper via an email on 24 April 2009.

The Primary Industries and Fisheries (PIF) area of DEEDI has provided significant comments regarding Fisheries, Biosecurity and Plant and Animal pest diseases (**Attachment 1**). The Mines and Energy (M&E) area of DEEDI has previously provided comments to DERM via an email dated 24 April 2009 (**Attachment 2**).

Suggested Response (Position)

DEEDI supports the draft ToRs on the basis that the issues raised by PIF and M&E in attachments 1 and 2 are addressed; and that the following references to labour market issues are included under either Social environment (section 4.9) or Economy (section 4.11):

- The employment requirements and skills base of the required workforce for the project.
- The impacts on local, regional and state labour markets, with regard to the source and occupational groupings of the workforces and any new skills and training to be introduced in relation to the project.
- The employment strategies for local residents including recently retrenched workers.
- The use of locally sourced goods and services with regard to the Local Industry Policy.

DEEDI is assisting local disadvantaged jobseekers, under-employed people and working age people who are currently not in the labour force, into employment and training through the Skilling Queenslanders for Work initiative. DEEDI is keen to assist the proponents of the project to maximise employment opportunities for local people, including local retrenched workers and Indigenous people.

26/05/2009

<<Attachment 1.doc>> <<Attachment 2.doc>>

I apologise for the delay.

thanks

Matthew English, Liaison Officer,

Office of the Associate Director-General (Employment, Industry Development and Innovation)

Department of Employment, Economic Development and Innovation

Level 26, 111 George Street, Brisbane Queensland 4000

PO Box 15168, City East Queensland 4002

T+61 7 3224 2421 F +61 7 3225 1719

E matthew.english@dtrdi.qld.gov.au

www.dtrdi.qld.gov.au

This message has been scanned for malware by Websense. www.websense.com

Millennium Mine Expansion Project ToR

QPIF Comments 22 May 2009.

Contact Officer: Michael Ross, 3247 5545.

General comments:

QPIF would like to stress the need for the ToR to address the cumulative impacts of this Mine expansion and other mines operating in the region on; agricultural land, ground and surface water quality, aquatic fish habitats/fish passage, and the management of pest weeds and animals. If these assessments are conducted on a project by project basis then their true impact on primary industries, fisheries and biosecurity may not be sufficiently accounted for.

Fisheries Comments:

The main impact to fisheries is associated with waterway crossings and impact of the development along the waterways.

Waterway crossings could be associated with construction of temporary or permanent roads to provide transport along the pipeline and transport for moving material required for the pipeline construction. Road crossings such as culverts, causeways are defined as waterway barrier works and require development approval under the Fisheries Act and IPA. In addition bridges may also have impact on the fish passage depends on their designs.

Other waterway barriers may include temporary damming of waterways for the purpose of laying the pipeline across the waterway. Sometimes pipes are not buried under the waterway beds but cross the waterway in the air. They create fish barrier as they may trap debris upstream.

Lastly waterway barrier works (dams) are also constructed in certain areas to harvest water required for the development.

All these waterway barrier works require development approval unless they are self-assessable. Some temporary barriers and minor impact permanent barriers are considered self-assessable and they could be constructed without a development approval as long as they comply with the requirements of the code.

The Terms of Reference need to investigate the impacts of these barriers not only on the fish passage but also on the fish habitat and how these impacts will be reduced and/or mitigated. Further more ToR need to look at the hazards associated with other activities such as storage of dangerous goods (fuel etc) and how to avoid and spills and emergency plans in case of a spill. Waste management (including sewerage and waste water) within the development area and around the waterways should be explained, and rehabilitation of the waterways and riparian vegetation along the pipeline after the work is completed. In relation to riparian vegetation which would also have carbon emission mitigation role, ToR should specify how long term success of the revegetation would be obtained. Some areas because of short or long terms lack of water riparian revegetation may not be successful unless there is a long term commitment to nurse the revegetated area until plants are well established.

Any fish habitats which has significant ecological importance and/or include nationally, state or locally endangered aquatic species such as fish, crustaceans etc, should be determined and avoided. If such areas can not be avoided, the ToR must address how impacts on the ecology and fisheries resources will be avoided and how these areas will be rehabilitated. Any snags removed from the waterways for the pipeline, should be returned back to

Attachment 1

waterway at the same location after the pipe being laid or placed in another location within the waterway close to the development area.

Fish habitats where acid sulfate soils a problem should be identified and the method of ASS treatment before, during and after the development should be explained.

ToR should also include issues related to erosion, not only during the construction but particularly the design of any structure or the way pipeline buried under a waterway bed, so that after the construction no erosion will occur around these structures.

From social perspective important recreational, commercial or indigenous fishing location should be identified and be avoided. If these location can not be avoided any mitigation or rehabilitation measured should be put in place to ensure that the development does not have significant impact on those social issues or the commercial fishery in the area.

Biosecurity Comments:

The mitigation and management of Biosecurity risks (weeds, pest animals, contaminants, diseases, pathogens) is a high priority for the protection of Queensland's economy, environment, social amenity and human health.

Invasive species have major impacts on natural resources, the environment and conservation of biodiversity, and the economic and social benefits (way of life) from their use. They destroy the functioning of terrestrial, freshwater and marine ecosystems through competition, predation, contamination, spread of diseases and erosion. Successful invasive species management will depend on shared ownership and responsibility for action across government, stakeholders and the community.

According to the Queensland Biosecurity Strategy 2009-14 Biosecurity means mitigating the risks and impacts to the economy, the environment, social amenity or human health associated with pests and diseases. Biosecurity deals with the risks from pests and diseases that impact on:

- Plant and animal industries including agriculture, horticulture, aquaculture, fisheries, forestry and racing
- Biodiversity and the natural environment (terrestrial and aquatic)
- Cultural heritage, recreation, sport and social amenity
- Infrastructure and service industries, including power, communication, shipping and water supplies
- Tourism, lifestyle and pleasure industries
- The built environment
- Human health through the transfer of diseases from animals to humans

The goals for biosecurity in Queensland are to:

- Prevent exotic pests and diseases from entering, spreading or becoming established in Queensland
- Ensure significant pests and diseases already in Queensland are contained, suppressed or managed
- Contribute to the maintenance of Australia's favourable national and international reputation for freedom from many pests and diseases, market access for agricultural commodities, product safety and integrity, and diverse ecosystem sustainability.

Preventative measures need to be put in place in the ToR to reduce the Biosecurity risk of the spread of weeds, pest animals, plant pest diseases and animal pest diseases as a result of this project.

Weed Spread

The Queensland Weed Prevention Strategy identifies ten pathways for potential weed spread involving human activity (Table 1). An assessment of the risk associated with pathways below on the project should be based on the declared weed species impacting along the pipeline route as set out in the Initial Advice Statement. A set of management activities will need to be developed to minimise the spread of these weeds.

Table 1: Pathways for potential weed spread - pathways 2, 3, 5 and 6 do not apply.

	Pathway	Examples
1	Transportation over land	Agricultural machinery, stock carriers, cars, trucks, buses, all-terrain vehicles, construction equipment and fire fighting equipment, trains, hikers, horses, and pets, and also via tankers and pipelines when transferring water (containing aquatic weeds) from one storage to another.
2	Transportation over water	All types of ships (including cruise ships), recreational boats and other large or small craft including industrial, tourist, recreational and law enforcement vessels, military crafts, barges, semi-submersible dry docks, oil derricks (freshwater, marine or both), and stowaways in holds.
3	Tourism	For recreation, business or relocation purposes. A particular risk in national parks and protected areas.
4	Movement of plants and plant parts	Fruit, vegetables, nuts, roots, seeds and edible flowers; plants 'in trade' (intentionally released - authorised or unauthorized - or escaped); 'hitchhiker seed' such as weed seeds that have contaminated other seed for sowing or eating, or transported in water, food, growing media, nesting or bedding; and particularly, the dumping of garden waste in parks, reserves and council dumps.
5	Transportation of live food animals and animal parts	Movement of stock and/or their contaminated waste (containing viable weed seed from a food source such as

Attachment 1

		prickly acacia) and 'hitchhikers' on or in live animals and in their water, food; growing medium, nesting or bedding.
6	Plant and aquarium trade	Importation and supply of plants, plant parts, seeds and aquatics, and sites of deliberate introduction such as botanical gardens, nurseries, landscaping and garden suppliers, research facilities, public and private plantings, and aquariums/water gardening facilities.
7	Movement of construction and landscaping material	Extraction and storage of soil, gravel, sand, mulch and rocks.
8	Gas, power and mineral resources	Mining of resources and development and maintenance of movement corridors.
9	Waste disposal	Illegal dumping, unsafe disposal and movement of weed waste.
10	Ecosystem disturbance	Habitat creation, restoration or enhancement; forestry use; road construction; provision of utilities; land clearing; development; stream channels; construction of highways, railroads and utility rights of way; bushfires and fire management; grazing; agriculture; and extreme weather events such as cyclones and drought.

State Legislation

In Queensland the *Land Protection (Pest and Stock Route Management) Act 2002* (The Act) governs the actions of land owners with respect to the control and management of declared plants and animals in the state. It also provides local governments with the legal instrument they need to enforce the management of high-priority weeds and pest animals. The Act declares plants and animals that are considered serious or potentially serious pests in Queensland. Biosecurity Queensland imposes a range of restrictions on declared plants and animals in Queensland (including introduction, possession, spread and sale) but allows certain activities under declared pest permits.

Under the Act it can be an offence to:

- supply contaminated things without a written notice
- move vehicles and loads that are known to be contaminated.
- Supplying contaminated things

Attachment 1

(Example of thing - fodder, grain, gravel, machinery, mulch, packing material, sand, soil, stock, vehicles or water)

For Class 1 plants: It is illegal to supply a thing that is, or could be, contaminated with the reproductive parts (e.g. seeds) of a Class 1 declared plant. Failure to do so can incur a penalty of up to \$60,000.

For Class 2 plants: It is illegal to fail to provide a Weed Hygiene Declaration or other written notice before supplying a thing that is, or could be, contaminated with the following Class 2 declared plants:

- parthenium (*Parthenium hysterophorus*)
- prickly acacia (*Acacia nilotica*)
- giant rat's tail grass (*Sporobolus pyramidalis* and *S. natalensis*)
- American rat's tail grass (*Sporobolus jacquemontii*)
- giant Parramatta grass (*Sporobolus fertilis*)
- Parramatta grass (*Sporobolus africanus*).

Both the supplier and receiver need to keep a copy of the written notice for five years. Failure to supply a written notice can incur a penalty of up to \$30,000.

Moving contaminated vehicles and their loads (on roads): It is an offence to move or transport a vehicle on a road, if it is known, or ought to be known, that it or its load is contaminated with a declared plant, unless the load is contained.

Reasonable steps must be taken to prevent weed seeds from escaping. Examples of reasonable steps include cleaning your vehicle and covering contaminated loads. Failure to do so can incur a penalty of up to \$15,000.

Local Government Areas

The Act specifically requires local governments to coordinate the development, implementation and periodic review of pest management plans for their areas as part of an integrated planning framework for managing pest plants and animals across the state. Local governments also have the opportunity to declare and prioritise under their local laws pest species not listed in the Act and these species are also included in the LGAPMP.

Any assessment of the risk associated with pathways in table 1 in relation to this project should also include the weed species locally declared under the Local Government model laws.

Further to this the Draft Code of Conduct being developed by the Land Access Working Group http://www.dme.qld.gov.au/mines/land_access_working_group.cfm indicates the obligations of mining and exploration groups for the prevention of spread of declared pests.

Plant pest diseases and animal pest diseases

There is a duty of care obligation to prevent the establishment or spread of plant and animal diseases during the mine expansion.

Biosecurity Management Plan

The development of a biosecurity management plan for the Project would provide risk mitigation and coordination of biosecurity risk of the spread and proliferation of weeds, pest animals, plant pest diseases and animal pest diseases

Attention: Mr Greg Tkal
EIS Co-ordinator - Millennium Expansion Project
Environmental Protection Agency
Department of Environment and Resource Management
160 Ann Street
Brisbane
QLD 4000

re: Draft Terms of Reference - Millennium Expansion Project

Dear Greg

On behalf of the Industry Development business group within Mines and Energy of the Department of Employment, Economic Development and Innovation, I offer the following comments with regard to the draft Terms of Reference for the Millennium Expansion Project. Comments follow.....

1. Resource Impacts-potential resource sterilisation

The draft Terms of Reference for the Millennium Expansion Project satisfactorily deals with the issues of resource identification, resource recovery/utilisation and potential resource sterilisation - (sub-sections 3.3.2, 4.2.1.3 and 4.2.2.1 on pages 9, 17 and 19 respectively).

2. Potential resource sterilisation – EPA Terms of Reference Template

It is noted that there is additional wording to that used previously by EPA in the section that deals with 'Resource Sterilisation'. This wording relates to low-grade/ remnant resources. Industry Development (Mines and Energy) notes and endorses the intent of this additional wording (second paragraph in the section on 'Resource Utilisation' -Section 4.2.2.1 - page 19) relating to the management / potential sterilisation of low grade, remnant and/or residual resources. Accordingly, Industry Development recommends that this wording or words to this effect, be included in the Terms of Reference template used by the EPA for future mining and energy related projects where an EIS is required.

Note that in section 4.2.2.1 ('Resource Utilisation' on page 19), there appears to be a typographical error in the last sentence, second paragraph - namely the phrase '*any low lying grade stockpiles:.....*' should read as: '*any low grade stockpiles*'.

3. Recommended amendments to Section 3.3.1 - EPA Terms of Reference Template

It is recommended that Section 3.3.1 of the draft Terms of Reference be rephrased slightly and also include reference to geothermal tenure. Also, the reference to geothermal tenure should be included into the TOR template used for future mining and energy related projects. Section 3.3.1 ('Tenements and tenures') on page 9 currently reads as follows:

"Describe and illustrate any existing mining tenements and petroleum tenures overlying and adjacent to the MEP site, and any to be applied for the MEP."

Suggest replace the existing paragraph with the following:

"Describe and illustrate any existing mining tenements, geothermal and petroleum tenures overlying and adjacent to the project site and any proposed tenure applications for the project."

Please note that the *Greenhouse Gas Storage Act 2009* has been assented to but is not yet in force. Accordingly, in due course, EPA will need to amend this section in the draft Terms of Reference template to include Greenhouse Gas (GHG) tenure.

Comments end.

Please note that further comment from Central Region, Mines and Energy-Department of Employment, Economic Development and Innovation, will be sent to you in due course – probably coming from either Russell Dann (Acting Regional Director, Central Region) or Neil Hoy from that office.

When the Environmental Impact Statement it is released for comment, Mines and Energy will need 1 hard copy and 2CD ROM versions of the document for review purposes.

Attachment 2

When available, could you please send this material to me directly (postal address below) and I will arrange for its distribution to relevant officers within the Mines and Energy component of what is now the Department of Employment, Economic Development and Innovation. It would also be appreciated if you could send me an email confirming that you have received this message.

Many thanks.

Regards

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Greg Tkal

From: vincent.hickey@treasury.qld.gov.au
Sent: Tuesday, 2 June 2009 2:46 PM
To: Greg Tkal
Cc: Bernice.Manickam@treasury.qld.gov.au
Subject: Millennium Expansion Project - Environmental Impact Statement (EIS)

Hi Greg,

Below are comments on the draft Terms of Reference provided by OGOC relating to the Millennium Expansion Project Environmental Impact Statement.

- * Section 3.5.1 should:
 - require the EIS to identify above and below rail options/requirements in relation to the expansion/upgrading of rail infrastructure; and
 - address whether the proponent will require a larger allocation at DBCT and, if so, how much larger this allocation will need to be.
- * In addressing these issues, the EIS should consider the impacts of the expanded production levels and extended operational timeline at the mine, detailing how infrastructure requirements will change over time.

Please do not hesitate to contact me should you have any questions.

Regards,
Vincent Hickey
Treasury Analyst
Transport, Infrastructure & Government Services Queensland Treasury
Phone: 07 3225 1408

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Response from the Department of Environment and Resource Management (DERM) on the draft terms of reference (TOR) for the Millennium Expansion Project (MEP) - Millennium Coal Pty Limited

General Comment

Issue: References and acronyms to government departments

All references to departments of government and their acronyms in the TOR should be changed to reflect recent machinery of government changes.

Specific Issues

1. Issue: Wording in the section Background

The TOR should provide additional background information about the project.

Recommendation:

Amend the following text to provide the necessary information to adequately address this section of the TOR. Delete the struck-through and insert the underlined text:

~~"The Millennium Coal Mine ("Mine") is an existing open-cut coal mine, operated by Millennium Coal Pty Limited (MCPL), a wholly owned subsidiary of Peabody Pacific Pty Limited (Peabody Pacific). The Proponent, MCPL, proposes to extend the open-cut mining operation within two leases namely, Mining Lease Application (MLA) 70401 and Mineral Development Licence (MDL) 136. Mining will continue within Mining Lease (ML) 70313. The proposed open-cut extension is referred to as the Millennium Expansion Project (MEP).~~

The Millennium Coal Mine is located in the Bowen Basin approximately 22km east of Moranbah and 16km southwest of Coppabella, within the Isaac Regional Council area. The Mine is located adjacent to the Poitrel Coal Mine which is owned and operated by ~~BHP Mitsui Coal Pty Limited (BHPMC)~~.

The Mine has been operating since 2005 with approval to produce at a rate of ~~2.0-1.9~~ 2.0-1.9 Mmillion tonnes a annum ~~year (Mtpa) (Mt/y)~~. The MEP proposes to increase the extraction rate to approximately 7.5 Mtpa Mt/y Run-of-Mine (ROM) coal. This estimated increase would extend the current mine life for a further 10 years from when the environmental approvals would be granted. The MEP proposes to continue the existing open-cut truck and excavator terrace mining methods, though the use of electric shovels and/or a dragline may be considered at a later stage in the life of the mine. The size of current ROM and product stockpile areas would be increased to meet the additional throughput. The MEP will process the ROM coal onsite at the existing Coal Handling and Preparation Plant (CHPP) and product coal will would be transported via the existing rail network to the established Dalrymple Bay Coal Terminal (DBCT) for export to international markets."

Water would be sourced from the West Creek Environmental Control Dam, CH4 Coal Seam Gas operation and the Burdekin Pipeline. The MEP may require an upgrade to the current power supply.

Accommodation facilities would be provided for construction and operational contractors and personnel at the Mac Camp at Coppabella. Additional staff may be housed in Moranbah.

~~The MEP requires approval from ... accordance with the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.~~

~~This report documents the Proponent's ... will be publicly notified to each 'affected' and 'interested' person to the MEP.~~

The proponent applied for, and has been granted, approval to prepare a voluntary environmental impact statement (EIS) for the project. The MEP is a controlled action that requires approval under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. The controlling provisions under Division 1, Part 3 of the EPBC Act are section 18 and 18A (listed threatened species and communities). The State's EIS process has been 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 (2004)."

2. Issue: Wording in the Executive summary

The function of the executive summary should be to convey the most important aspects and options relating to the project to the reader. Its focus should be on the key issues and conclusions. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"The Executive Summary will be written as a stand alone document, able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole.

The function of the executive summary is to convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms.

The structure of the Executive Summary ~~will generally~~ should follow that of the EIS, ~~but~~ and focus strongly on key issues and conclusions to enable the reader to obtain a clear understanding of the MEP and its potential adverse and beneficial environmental, social and economic impacts, as well as the management measures to be implemented by the Proponent to mitigate all adverse impacts."

3. Issue: Wording of section 1.4.2 Objectives of the EIS

The depth and scope of assessment in the EIS should be commensurate with the values to be impacted and the scale of those impacts. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text. Text shown in paragraphs 3, 4 and 5 of the TOR should be shown in bold font:

"If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the MEP, those matters will be included in the EIS.

In addition, it is essential that the main text of the EIS addresses all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft environmental management plan (EM plan).

The depth and scope of the assessment in the EIS will need to be commensurate with the values to be impacted and the scale of the impacts. When considering whether an impact is or is not significant, the Proponent will take account of both the intensity of the impact and the context in which it would occur.

4. Issue: Wording of section 1.6.1 Relevant legislation and policy requirements

The EIS will be required to address all relevant legislation and policies controlling the approvals process. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"This section will explain the legislation and policies controlling the approvals process. The requirements for any approval under relevant State legislation will be discussed. Any exemption that may apply will also be discussed. Reference will be made to the Queensland *Environmental Protection Act 1994*, *Water Act 2000*, *Water Resource (Fitzroy Basin) Plan 1999*, *Fitzroy Basin Resource Operations Plan* and other relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* will also be included."

5. Issue: Wording of section 1.7 Accredited process for controlled actions under Commonwealth legislation

On 27 March 2009 the project was referred to the Commonwealth for assessment under the EPBC Act. The MEP was declared a controlled action with listed and threatened species and communities (section 18 and 18A) as the controlling provisions. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete all existing section 1.7 Accredited process for controlled actions under Commonwealth legislation text, and insert the underlined text:

"The MEP is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requiring approval from the Federal Minister for the Environment, Heritage and the Arts. The controlling provisions under Division 1, Part 3 of the EPBC Act are: section 18 and 18A (listed threatened species and communities). The State's EIS process has been 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 (2004).

It will be necessary for the EIS to address potential impacts on the matters of national environmental significance (NES) that are identified in the controlling provisions. Schedule 4 of the Commonwealth's Environment Protection and Biodiversity Conservation Regulations 2000 sets out the matters to be addressed in the EIS. The EIS will provide separate discussions under subheadings in the relevant sections of the EIS that address the prescribed matters. Alternatively, a stand-alone report could be provided and presented as a separate chapter of the EIS that exclusively and fully addresses the matters relevant to the controlling provisions. Whichever method is used, those parts of the EIS addressing matters of NES will be readily identifiable from the table of contents.

6. Issue: Wording of section 2.2 Alternatives to the MEP

Power and transport are likely elements to be discussed in the TOR. A discussion is required of the rationale for preferring certain options and courses of action and rejecting others. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

~~"... enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. The comparative environmental impacts of each alternative will be summarised.~~

~~..... and any infrastructure requirements relate to the viability of the MEP. A rationale for Should water supply, power, transport and/or storage infrastructure will be described, be included as an element of the MEP, this section should include a description of and rationale for such infrastructure. The relationship of options chosen for waste management and any emissions produced will be detailed.~~

~~Reasons for selecting the preferred options will include technical, commercial, social and natural environment aspects. In particular, the principles of ESD and sustainable development ..."~~

7. Issue: Wording of section 3.3 Operations

The TOR should consider the potential for additional future operations or arrangements. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled including the maximum capacity for washing coal from other sites (referred to as 'toll washing') as well as the storage and stockpiling of raw materials will be described."

8. Issue: Wording of section 3.5.3 Water supply, demand and storage

The EIS should include a discussion of any overland flow can be taken for mining purposes. By September 2010 the Fitzroy Basin Water Resource Plan review will be complete. This will include new rules for the take of overland flow for mining purposes. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"The EIS will provide information on water usage by the MEP, including the quality and quantity of all water supplied to the site. In particular, the proposed and optional sources of water supply will be described (e.g. bores, any surface storages such as dams and weirs, municipal water supply pipelines). This section will detail the proposed construction of any water supply or storage works required. Any storages to take overland flow water will be detailed along with their storage capacities.

The EIS will discuss dewatering if it is proposed to be used as a water source. It will detail any treatment required of this water source.

This section will detail any investigative work required in determining the availability of the supply.

Reference will be made to the regulatory requirements under the Water Act 2000 that may be associated with access to water supply, including a water licence to take water for dewatering under the Water Act 2000.

Estimated rates of supply from each source (average and maximum rates) will be given..."

9. Issue: Wording of section 3.5.4 Stormwater drainage

The TOR should include drainage contour plans at a suitable scale illustrating the site facility locations and contributing catchments

Recommendation:

Insert the underlined text:

"An illustrated description will be provided of the proposed stormwater drainage system (i.e. mine water management system) and the proposed disposal arrangements, including any off-site services. Contour plans at a suitable scale (1m contours in areas of low relief) will be provided with site facility locations superimposed to show contributing catchments for disturbed areas under the MEP."

10. Issue: Wording of title section 3.6.3 Tailings

The title of this section should include the reference to fine rejects.

Recommendation:

Insert the underlined text:

"3.6.3 Tailings or fine rejects"

11. Issue: Wording in section 3.6.3 Tailings or fine rejects

The TOR should describe the design for construction of any tailings storage facility and detail the storage volume relationships and stability of the design. The location of the storage and/or disposal site with regard to adjacent creeks and rivers should be described and illustrated. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"The construction of the tailings storage facility will be described with regards to construction material and design sufficient to determine storage volume relationships and the basic stability of the design. The EIS will address how the tailings storage facility complies with relevant codes for the construction of such containment systems.

Describe the strategies to monitor and manage seepage into ground and surface waters. The location of the storage and/or disposal site with regard to adjacent creeks and rivers will be described and superimposed with other site facilities for the MEP on contour plans at a suitable scale."

12. Issue: Wording of section 3.6.5 Liquid waste

The recommended text format should be consistent throughout the TOR. Also, a stronger commitment by the proponent to assess the potential impacts of liquid waste should be considered. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"The EIS ~~may need to~~ must consider the following effects:

- groundwater from excavations;
- rainfall directly onto disturbed surface areas;
- run-off from roads, plant and industrial areas, chemical storage areas;
- drainage (i.e. run-off plus any seepage or leakage);
- seepage from other waste storages;
- water usage for:
 - process use;
 - dust suppression; and
 - domestic purposes;
 - ~~evaporation;~~
 - ~~domestic sewage treatment - disposal of liquid effluent and sludge; and~~
- evaporation;
- domestic sewage treatment - disposal of liquid effluent and sludge; and
- water supply treatment plant - disposal of wastes."

13. Issue: Wording of section 3.7 Rehabilitation and decommissioning

The TOR does not reference the current DERM Guideline 18, *Rehabilitation requirements for mining projects (2008)* which addresses progressive and final rehabilitation requirements for mining projects and presents four general rehabilitation goals. Guideline 18 updates the DERM 2004 policy titled *A Policy Framework to Encourage Progressive Rehabilitation of Large Mines*. Guideline 18 addresses current approaches to important aspects of mine rehabilitation including indicators and completion criteria. Land suitability assessment should follow the *Technical guidelines for the environmental management of exploration and mining in Queensland, 1995*. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"The strategies and methods presented for progressive and final rehabilitation of disturbed areas at the mine will demonstrate compliance with the objectives of the ~~Environmental Management Policy for Queensland, 1991, and the EPA's (2004) A Policy Framework to Encourage Progressive Rehabilitation of Large Mines, or with updated versions of that policy as they become available or with updated versions of that policy as they become available.~~ Guideline 18: Rehabilitation requirements for mining projects and the Land suitability assessment should follow the Technical guidelines for the environmental management of exploration and mining in Queensland (1995) except where superseded by Guideline 18. In particular, the strategies and methods will have ..."

14. Issue: Wording of section 3.7 Rehabilitation and decommissioning

The EIS should consider and recommend appropriate levee protection required for any pits, voids, uncompacted overburden and workings arising in the MEP that might be subject to inundation during operation or decommissioning. The EIS should demonstrate that final voids and uncompacted overburden and workings at the end of mining will be protected from the "probable maximum flood level" based on the Bureau of Meteorology's "probable maximum precipitation" forecast for the locality. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation

Insert the underlined text:

"Describe any proposals to divert creeks during operations, and, if applicable, the reinstatement of the creeks after operations have ceased. The EIS will consider and recommend the levee protection required for any pits, voids, uncompacted overburden and workings arising in the MEP that might be subject to inundation during operation and decommissioning. Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. Also, the final drainage and seepage control systems and long-term monitoring plans should be described. The EIS will also demonstrate that final voids and uncompacted overburden and workings at the end of mining will be protected from the "probable maximum flood level" based on the Bureau of Meteorology's "probable maximum precipitation" forecast for the locality."

15. Issue: Wording of section 4 Environmental values and management of impacts

The TOR should state that environmental offsets will be proposed consistent with specific issues off-set policies under the framework of the *Queensland Government Off-set Policy 2008*. Insert the following text to provide the necessary guidance to this section of the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"Environmental offsets: Information is required to show that measures have been taken to avoid and minimise potential adverse impacts of the proposal. Environmental offsets ~~may~~ will be proposed to counterbalance any remaining loss of environmental values, consistent with the specific-issue offset policies under the framework of the Queensland Government *Environmental Offset Policy 2008*."

16. Issue: Wording of section 4 Environmental values and management of impacts

Experience has shown that the final TOR and the EIS should follow the heading structure set out in section 4. Insert the following text to provide the necessary guidance to this section of the TOR.

Recommendation:

Insert the underlined text:

"It is recommended that the final TOR and the EIS follow the heading structure shown below. The mitigation measures, monitoring programs, etc., identified in this section of the EIS will be used to develop the environmental monitoring program for the MEP (refer to section 5, EM Plan)."

17. Issue: Wording of section 4.2.1.3 Mineral Resources and ore reserves

The TOR should clearly identify and locate the area of the MEP which delineates the mineral resources and ore reserves. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"The EIS will provide a summary of the results of studies and surveys undertaken to identify and delineate the mineral resources and ore reserves within the MEP ~~open-cut area~~ mining leases (including any areas underlying related infrastructure).

The location, tonnage and quality of the mineral resources and ore reserves within the proposed ~~open-cut area~~ mining leases will be described in detail as indicated below and, where possible, it will be ..."

18. Issue: Wording of section 4.2.1.4 Soils

Insert the following updated reference documents in the TOR.

Recommendation:

Delete the struck-through and insert the underlined text:

"A soil survey of the sites affected by the MEP will be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land. Soil surveys will be undertaken in accordance with the *Guideline for Surveying Soils and Land Resources* (McKenzie et al. 2008). Information will also be provided on soil stability and suitability for construction of proposal facilities.

Soils profiles will be described and mapped at a suitable scale of 1:10 000 or better. The soils will be mapped and described according to the *Australian soil and land survey field handbook* (McDonald et al, 1990 National Committee on Soil and Terrain, 3rd Edition, 2009) and *Australian soil classification* (Isbell, 1996 Revised Edition, 2002). An appraisal of the depth and quality of useable soil will be undertaken. An assessment information will be made of each soils agricultural land suitability in accordance with presented according to the standards required in the *Guidelines for agricultural land evaluation in Queensland* (Land Resources 1990), *Planning guidelines: the identification of Good Quality Agricultural Land* (DPI, DHLGP, 1993), and the *State Planning Policy 1/92: Development and the conservation of agricultural land*. The land impacted outside of the proposed mining lease(s) should also be investigated."

19. Issue: Wording of section 4.2.1.7 Sensitive environmental areas

The EIS should provide detailed plans illustrating sensitive environmental areas and their proximity to MEP infrastructure. Insert the following text to provide the necessary information to adequately address this section of the TOR

Recommendation:

Delete the struck-through and insert the underlined text:

"The proximity of the proposal to any environmentally sensitive areas should be shown on a map of suitable scale and with outlines of the MEP infrastructure superimposed. This section of the EIS should then identify whether any of those environmentally sensitive areas could be affected, directly and indirectly, by the proposal."

20. Issue: Wording of existing section 3.5.1 Transport – road/rail/ship and new wording to be include as section 4.3 Transport

The treatment of transport issues will be improved in DERM's next revision of the generic TOR at the request of the Department of Transport and Main Roads. The following recommendation will bring the Millennium TOR in accordance with the new approach. Some of the information on existing transport infrastructure and values, and the potential impacts and proposed mitigation measures currently provided in section 3.5.1 Transport – road/rail/ship should be provided in the new section 4.3 Transport.

Recommendation:

Delete the existing section 3.5.1 Transport – road/rail/ship and insert the suggested new text:

"3.5.1 Transport – road/rail/conveyor/air/ship

Provide an overview of the Arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction phase and operational phases of the MEP. The description will cover address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

Details of the proposed use of rail for transport of materials, products or wastes to or from the MEP site will be provided. In relation to shipping of products, details of the number of ships and their size will be documented.

Information will be provided on road transportation requirements on public roads for both construction, operational and decommissioning phases, including:

- the volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials, finished products;
- the volume of traffic generated by workforce personnel, visitors and service vehicles;
- method of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- the proposed transport routes; and
- need for increased road maintenance and upgrading.

The MEP will also consider public transport requirements and links to, or development of, pedestrian and cycle networks. These modes of transport:

- reduce dependency on cars (more transport choices);
- reduce emissions and therefore improve air quality; and
- provide opportunities for recreation and contribute to social and community wellbeing."

Delete all of the existing section 4.2.2.10 Transport and insert the underlined text as a new section 4.3 Transport:

4.3 Transport

The transport section of the EIS will have separate subsections describing infrastructure associated with the various modes of transport, such as road, rail, air and sea.

4.3.1 Description of existing infrastructure and values

Provide details of the proposed use of existing infrastructure for the transport of materials, products or wastes to and from the MEP site. Also provide details, either in the transport section of the EIS or by cross reference to other sections, of the environmental values that would be affected by the altered use of existing transport infrastructure or the construction of new or altered infrastructure. The EIS will provide details of any MEP related plant or utilities within, or impacting on, the jurisdiction of any transport authority. Also provide details of the likely traffic to be generated by workforce personnel and service providers.

For road and rail transport, describe separately and in detail the existing or new road and rail networks that would be used by the MEP. Provide illustrations of the networks at suitable scales. For each mode of transport and each phase of the MEP, the EIS will describe: the expected volumes and weights of materials, products, hazardous goods or wastes; the likely number and timing of trips; the types of vehicles to be used; and the routes. The description will include, but not necessarily be limited to, details of access and haul roads, realignments, rail loops and load-out facilities, and level crossings used by any transport associated with the MEP. Provide details of any heavy or oversized loads, including the number and type of vehicles, with a description of the likely timing and routes of those loads highlighting any vulnerable bridges or other structures along the proposed routes.

In relation to air transport, describe the existing, new, and/or altered air fields and associated infrastructure that would be used by the MEP. Describe the likely additional number of flights, frequency, timing (particularly any increase in night arrivals or take-offs), and size of aircraft. Describe any features of the MEP that could impact on air transport (e.g. the placement of waste dumps, stacks or flares beneath flight paths).

In relation to the importation or export of materials and products, the EIS will identify any aspects of the MEP that will increase the shipment of materials through any port. Details will be provided of the ports that will be used, the berths at those ports, likely size and number of vessels, and the associated infrastructure that moves and stores materials between the ships and the rail and/or road networks.

4.3.2 Potential impacts and mitigation measures

The EIS will provide sufficient information to make an independent assessment of how transport infrastructure will be affected by each phase of the MEP at a local and regional level. Similarly, sufficient information will be provided to make an independent assessment of how transport used by the MEP will impact on environmental values. In both cases, the impacts along the whole length of each affected route will be discussed and measures proposed to avoid or mitigate the impacts.

Details will be provided of the:

- results of any modelling of transport impacts;
- assessment methodology used, including a summary of consultation undertaken with transport authorities regarding the scope of the impact assessment and methodology to be used;
- base data assumptions, including an assessment of the current condition of the affected network and its performance;
- possible interruptions to transport operations; and
- likelihood and nature of spills of products or hazardous materials during transport, and the requirements for dealing with any spills.

This section of the EIS will outline, and cross-reference to more detailed descriptions with the EIS, the impacts of transport associated with the MEP on amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental effects.

The assessment of road impacts will be in accordance with the latest version of the Department of Main Road's *Guidelines for Assessment of Road Impacts of Development*, available from the website: <http://www.mainroads.qld.gov.au>.

In relation to road impacts, the EIS will include an assessment of impacts on:

- the safety, efficiency and condition of road operations and assets;
- any existing or proposed pedestrian cycle networks;
- any existing public transport networks (assets and services); and
- watercourses and overland flows, and their interaction with the current and future road network (note: impacts on water values due to transport infrastructure will be outlined in the transport section of the EIS and cross-referenced to a detailed assessment in the water resources section).

The assessment of impacts on the rail network itself, or on environmental values affected by changes in rail traffic (e.g. due to dust, noise and vibration) will also consider the following matters:

- impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings (i.e. those crossings which form part of private access pathways to and from residential or business sites); and
- impacts on passenger transport and services.

The EIS will assess any impacts on any port due to the import or export of materials or products.

Matters to be assessed will include the need for:

- new coastal works, such as berth construction or alteration, land reclamation, etc.;
- any dredging for shipping channels and swing basins;
- new or altered stockpile areas; and
- new or altered infrastructure to handle materials between ships and road or rail transport.

The EIS will also assess any impacts on nearby areas due to the handling or storage of materials at ports (e.g. because of dust, noise or lighting).

Any potential impacts of the MEP on water traffic in rivers and dams will be assessed.

The EIS will assess: any impacts of the MEP on existing air fields and flight paths; any impacts on environmental values due to the need to redevelop or construct new airfields; and any impacts on amenity due to increased air traffic. The proposal and assessment will have regard to State Planning

Policy 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities. With regard to air safety, matters to be assessed include the raising of landforms or the construction of stacks, flares or lighting within flight paths.

If the works that could result in impacts, or the associated mitigation works for identified impacts, are the responsibility of the proponent then the EIS will fully assess those impacts, detail the mitigation works and carry the environmental protection commitments forward into the MEP's EM plan.

If the proponent will not be responsible for the works associated with the impacts (e.g. for dredging at a port) the EIS will clearly identify the entity that will be responsible and what approvals would be needed. Nevertheless, in this case, the EIS will provide enough assessment of the likely impacts of all associated activities for the regulatory authorities to have confidence that approval of the MEP subject to this EIS process would not have unacceptable flow-on impacts due to necessary works farther down the transport chain.

The proponent will detail measures to avoid or mitigate impacts on each transport mode. The mitigation measures will ensure the safety, efficiency and condition of each mode is maintained. These mitigation measures are to be prepared by the proponent in close consultation with the relevant transport authorities. Any residual impacts that cannot be avoided will be identified and quantified.

Mitigation strategies must include:

- consideration of any transport authority's works program and forward planning;
- proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority standards and practices;
- the responsible parties for any works;
- estimates of costs;
- details on the timing of the works; and
- a summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the MEP.

The EIS will consider public transport requirements and links to, or development of pedestrian and cycle networks."

21. Issue: Wording of section 4.3.1 Description of environmental values

Wastes streams described in section 3.6 should be clearly referred to and cross-referenced in this section.

Recommendation:

Insert the underlined text:

"This section will introduce and briefly describe the existing environment values that may be affected by the MEP's wastes. Refer to each of the waste streams described in section 3.6 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS."

22. Issue: Wording of section 4.4.1. Description of environmental values

This section of the TOR should be updated to include relevant legislative references. Insert the following text to provide the necessary guidance to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"This section describes the existing environment for water resources that may be affected by the MEP in the context of environmental values as defined or considered in such documents as the Environmental Protection Act 1994, Environmental Protection (Water) Policy 1997 (EPP (Water)), ANZECC 2000, the National Water Quality Management Strategy (NWQMS), the DERM Guideline: Establishing draft environmental values and water quality objectives and the Queensland Water Quality Guidelines 2006, the Water Act 2000, the Water Resource (Fitzroy Basin) Plan 1999 and associated Resource Operations Plan, and the Water Resource (Great Artesian Basin) Plan 2006 and

associated Resource Operations Plan. The definition of waters in the EPP (Water) includes the bed and banks of waters, so this section will address benthic sediments as well as the water column."

23. Issue: Wording of section 4.4.1.1 Surface waterways

The TOR should provide more specific guidance on the for surface water assessment. Insert the following text to provide the necessary guidance to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the MEP. The basis for this assessment will be a monitoring program, with sampling stations located upstream and downstream of the MEP, including reference locations (i.e. non-impacted sites). Downstream monitoring will include sites located near to any proposed discharge points in addition to further downstream locations. Sites will include permanent and semi-permanent ponded water holes or known aquatic habitat. Complementary stream-flow data will also be obtained from historical records (if where available) to aid in interpretation. The condition of the water environment should be assessed by making comparison against water quality objectives and relevant water quality guidelines (based on ANZECC & ARMCANZ 2000 and Queensland Water Quality Guidelines 2006).

The water quality will be described, including seasonal variations or variations with flow where applicable. Monitoring of ephemeral streams will primarily focus on times of natural flow. A relevant range of physical, chemical and biological parameters will be measured to gauge the environmental harm on any affected creek or wetland system. This should include, but not be limited to, water quality indicators likely to be affected by the MEP such as electrical conductivity, metals (dissolved), turbidity, suspended sediments and pH. Biological indicators should include macro-invertebrate assessment according to published methods.

Describe the environmental values of the surface waterways of the affected area in terms of:

- values identified ...; ...
- sustainability, ...; ...
- physical integrity, fluvial processes and morphology of watercourses, ...; and
- any water resource plans, water quality improvement plans, land and water management plans relevant to the affected catchment."

24. Issue: Wording of section 4.4.1.2 Groundwater

The TOR should provide more specific guidance on groundwater investigations and the requirements and potential for a licence to take groundwater. Insert the following text to provide the necessary guidance to adequately address this section of the TOR

Recommendation:

Insert the underlined text:

"...The EIS will review the quality, quantity and significance of groundwater in the MEP area, together with groundwater use in neighbouring areas.

This section of the EIS will reference the requirement for a licence to take groundwater for dewatering purposes if preliminary groundwater investigations demonstrate the need for a licence. A groundwater model will be required if a significant groundwater resource is encountered at the MEP and will be impacted by mining activities. This would depend upon the results of preliminary groundwater investigations in the MEP. Results from investigations should be submitted to DERM in report format, for review prior to the EIS being finalised."

25. Issue: Wording of section 4.4.2.1 Surface water and water courses

The TOR should provide more specific guidance on surface water and water course impact assessment/mitigation measures. Insert the following text to provide the necessary guidance to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

“Quality characteristics discussed will be those appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters will be discussed along with toxicity of effluent constituents to flora and fauna. Consideration will be given to impacts on seawater quality all local and downstream connected waterways due to discharge from the site. Stream flow data will be used in combination with proposed discharge rates to estimate in-stream dilution and water quality. Consideration will be given to the available assimilative capacity of the receiving waters given existing background levels and other potential point source discharges in the catchment. ...”

The Australian and New Zealand Environment and Conservation Council (ANZECC & ARMCANZ 2000) *National Water Quality Management Strategy*, *Australian Water Quality Guidelines for Fresh and Marine Waters*, *Queensland Water Quality Guidelines 2006* and the Environmental Protection (Water) Policy 1997 will be used as a reference for evaluating the effects of various levels of contamination.

Options for mitigation and the effectiveness of mitigation measures will be discussed with particular reference to sediment, acidity, salinity, metals and other emissions of a hazardous or toxic nature to human health, flora or fauna.”

26. Issue: Wording of section 4.4.2 Potential impacts and mitigation measures

This section of the TOR should provide further guidance on the potential impacts on the flows in watercourses upstream and downstream of the MEP. Although the MEP may only impact on overland flow from a relatively small percentage of the total catchment area, the impacts at a local scale, and the cumulative impacts of mining over the whole of the Isaac Connors catchment need to be recognised. To achieve environmental objectives at nominated end of subcatchment points it is necessary to consider probable impacts at a local or reach scale. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

“Where a licence or permit will be required under the *Water Act 2000* to take or interfere with the flow of water, this section of the EIS will provide sufficient information for a decision to be made on the application.

The EIS will contain a summary of potential impacts of the MEP on flows in the watercourse(s) immediately downstream of the MEP and overland flow at points immediately downstream of the MEP.

Water management controls ...”

27. Issue: Wording of section 4.4.2 Potential impacts and mitigation measures

This section should describe the key water management strategy objectives including maintenance of dependent biota. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text in dot point 3:

“Key water management strategy objectives include:

- protection of the integrity of the marine environment ...;
- protection of important local aquifers ...; ...
- maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters including maintenance of dependent biota; and
- minimisation of impacts on flooding levels.”

28. Issue: Wording of section 4.5.1.1 Greenhouse gas emissions

The TOR does not address emissions resulting from such activities as transportation of products and consumables, and energy use by the MEP. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"The Australian Greenhouse Office Factors and Methods Workbook will be used as a reference source for emission estimates and ~~where practicable will be supplemented by other sources~~ where practicable and appropriate. The MEP will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the MEP."

29. Issue: Wording of section 4.5.1 Description of environmental values

The TOR should consider gaseous compounds as part of any description of existing air environment. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"A description of the existing air shed environment will be provided having regard for particulates and gaseous compounds. The EIS will discuss the background levels and sources of suspended particulates and any other relevant constituent of the air environment that may be affected by the MEP."

30. Issue: Wording in section 4.5.1.1 Greenhouse gas emissions

The MEP should estimate the emissions resulting from such activities as transportation of products and consumables, and energy use by the MEP. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"The Australian Greenhouse Office Factors and Methods Workbook will be used as a reference source for emission estimates and where practicable, will be supplemented by other sources. The MEP EIS will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the MEP."

31. Issue: Wording of section 4.5.2 Potential impacts and mitigation measures

A comprehensive assessment of the potential air impacts and mitigation measures is required to be addressed as part of the EIS. As a minimum, the following dot points should be included in the assessment on air quality for the MEP. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"...The proposed levels of particulate emissions will be provided in terms of the *Environmental Protection (Air) Policy 2008* and the *National Environment Protection (Ambient Air Quality) Measure* (July, 2003).

The predicted average ground level concentrations at nearby sensitive areas (e.g. residences) will be modelled and described. These predictions will be made for both normal and expected maximum emission conditions and the worst case meteorological conditions will be identified and modelled where necessary. Ground level predictions will be made at any residential, industrial and agricultural developments believed to be sensitive to the effects of predicted emissions. The techniques used to obtain the predictions will be referenced and key assumptions and data sets will be explained.

The assessment of the MEP's impact on air quality will consider and describe:

- the air quality modelling results in light of the limitations and accuracy of the applied atmospheric dispersion models;
- the air quality results with relevance to the goals in the *Environmental Protection (Air) Policy 2008* and the *National Environmental Protection (Ambient Air Quality) Measure*;
- air shed management and the contribution of the MEP to air shed capacity i.e. in view of existing and future users of the air shed for assimilation and dispersion of emissions;
- A description of the pollution control equipment and pollution control techniques to be employed on the MEP and the features of the proposal designed to suppress or minimise dust emissions.
- A description of the back up measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts.
- Provide an air emission inventory of the proposed site for all potential sources including fugitive emissions such as from rail or road transport of product or wastes. Provide a complete list of emissions to the atmosphere including particulates and PM₁₀.
- For other than insignificant emissions, undertake an impact assessment with relevant inputs of emissions and local meteorology using an air dispersion model to provide estimates of the likely impacts on the surrounding environment. The model inputs should be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Estimate ground level concentration (GLC) at the nearest sensitive receptor(s) based on 1-hour average for maximum concentration (99.9 percentile). Simulate monthly average dust deposition at the nearest sensitive receptor(s). Results of the dispersion modelling must be presented as maximum hourly and annual average concentration contour plots and maximum monthly average dust deposition contour plots. The predicted ground level concentrations should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. The techniques used to obtain the predictions should be referenced, and key assumptions and data sets explained.
- The limitations and accuracy of the applied atmospheric ... applied models.
- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.
- The averaging period for ground level concentrations of pollutants that are modelled should be consistent with the relevant averaging periods for air quality the results indicators with relevance to the and goals in the Environmental Protection (Air) Policy 2008 and the National Environmental Protection (Ambient Air Quality) Measure (NEPM) Air.
- Identify 'worst case' emissions that may occur during operating conditions. If these emissions are significantly higher than those for normal operations, it will be necessary to evaluate the worst-case impact, as a separate exercise to determine whether any planned buffer distance(s) between the facility and neighbouring sensitive receptors will be adequate.
- Modelled air quality concentrations at the most exposed existing or likely future off-site sensitive receptors must be compared with the appropriate national and international ambient air quality standards including the Environmental Protection (Air) Policy 2008 and the National Environmental Protection Council (Ambient Air Quality) Measure.
- The potential human health risk associated with emissions from the operation; and of all hazardous or toxic pollutants should be assessed whether they are or are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 2008.
- Evaluate the cumulative impacts of the proposed emissions on the receiving environment by considering the MEP in conjunction with existing and known likely future emission sources within the region. Describe air shed management and the contribution of the proposal to air

shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

- For any proposal that does not meet the Environmental Protection (Air) Policy 2008 air quality objectives, the proponent may undertake a risk assessment to determine the level of risk of adverse impact off site. Risk management strategies also need to be developed that identify options that will reduce exposure of local communities to levels of indicators that may be of concern and how to meet the objectives of Environmental Protection (Air) Policy 2008 progressively over the long-term.

The EIS will define and describe measures to suppress or minimise emissions, including dust from all potential emission sources. The environmental impact/nuisance of coal dust caused by the transportation of coal by road/rail will also be addressed as part of the EIS process. In relation to rail transport, the EIS will describe the proposed measures designed to minimise coal dust emissions from trains during the haulage of coal from the MEP to proposed export ports.

32. Issue: Wording of section 4.6.1 Description of environmental values

The TOR should include reference to the noise requirements of the Environmental Protection Regulation 2008. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

“... Monitoring methods will adhere to accepted best practice methodologies, relevant DERM guidelines and Australian Standards, and any relevant requirements of the Environmental Protection Regulation 2008 and the Environmental Protection (Noise) Policy 2008.

33. Issue: Wording of section 4.6.2 Potential impacts and mitigation measures

This section should be introduced by defining and describing the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration. The assessment of noise impacts should include matters raised in the document *The health effects of environmental noise – other than hearing loss* published by the enHealth Council.

Recommendation:

Delete the struck-through text and insert the underlined text:

“This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed. The assessment of noise impacts will include matters raised in the document *The health effects of environmental noise – other than hearing loss* published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9.”

34. Issue: Wording of section 4.7.1 Description of environmental values

The TOR should include description and assessment of the significance of native vegetation from a local perspective and any approved aquatic conservation assessment. The TOR should describe areas of critical habitat, vegetation mapped as essential habitat and areas which are under consideration for proclamation as protected areas under the *Nature Conservation Act 1992*. The TOR should address the potential palaeontologic sites of significance in the MEP area, the bilateral agreement between Australia and the Republic of Korea and areas of critical habitat declared under the *Nature Conservation Act 1992*.

Recommendation:

Amend the following text to provide the necessary information to adequately address this section of the TOR. Delete the struck-through text and insert the underlined text:

“A discussion will be presented on the nature conservation values of the areas likely to be affected by the MEP. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including ~~(where relevant)~~ waterways, riparian zone, rainforest remnants, old growth

indigenous forests, wilderness and ecological corridors will be described. The description will include a plant and vertebrate species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local and regional and state perspective. The description will indicate any areas of state or regional significance identified in an approved biodiversity planning assessment (BPA) or approved aquatic conservation assessment (ACA), if available produced by the DERM (e.g. see the draft Regional Nature Conservation Strategy for SE Qld 2001-2006). ~~A plant a vertebrate species list will also be provided. ...~~

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features (and which will be identified, mapped, avoided or effects minimised):

- protected areas which have been proclaimed under the *Nature Conservation Act 1992* or are under consideration for proclamation;
- critical habitat identified under the *Nature Conservation Act 1992*;
- vegetation mapped as essential habitat;
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas;
- important habitats of species listed under the *Nature Conservation Act 1992* and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as presumed extinct, endangered, critically endangered, vulnerable or rare;
- regional ecosystems listed as 'endangered' or 'of concern' under State legislation, and/or ecosystems listed as presumed extinct, endangered, critically endangered or vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at DERM's website;
- high value regrowth vegetation;
- ~~• sites listed under international treaties such as Ramsar wetlands and World Heritage areas;~~
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species;
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA), Australia and China (CAMBA), or Australia and the Republic of Korea (ROKAMBA);
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance;
- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
 - natural vegetation in good condition or other habitat in good condition (e.g. wetlands); and/or
 - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area;
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism;
- ecosystems which provide important ecological functions such as: wetlands of national, state and regional significance; riparian vegetation; important buffer to a protected area or important habitat corridor between areas;
- ~~• protected areas which have been proclaimed under the *Nature Conservation Act 1992*;~~
- ~~• areas of major interest including essential habitat listed under the *Vegetation Management Act 1999*.~~
- sites of palaeontologic significance such as fossil sites.

35. Issue: Wording of section 4.7.1.1 Terrestrial flora

The TOR should include vegetation mapping of adjacent areas to illustrate interconnectivity. All mapping should be described at a maximum scale of 1:10 000. Terrestrial flora should also include other vegetation categories including: Not of concern regional ecosystems; Non-remnant vegetation on State Lands; and high-value regrowth vegetation. Any plant of cultural, commercial or recreational significance should be described. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"...The existence of important local and regional weed species will also be discussed, including their impact on existing biodiversity values.

Vegetation mapping will include adjacent areas to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas.

The terrestrial vegetation communities within the affected areas will be described at an appropriate scale (maximum 1:10 000) with mapping produced from aerial photographs and ground truthing, showing the following:

- location and extent of ecosystems listed as 'endangered', 'of concern' and 'not of concern' under State legislation, non-remnant vegetation on State Lands, and high-value regrowth vegetation;
- location and extent of ecosystems listed as presumed extinct, endangered, critically endangered or vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999;
- Location and extent ...
- location of vegetation types ...
- the current extent (bioregional and catchment) ...
- any plant communities of cultural, commercial or recreational significance should be identified; and
- location and abundance of any exotic or weed species."

36. Issue: Wording of section 4.7.1.1 Terrestrial flora

The TOR does not address the survey effort required to adequately address flora values. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text as new paragraph 5:

~~"The surveys will include targeted searches for significant plant species known to occur the local area. The surveys will be conducted during favourable conditions to improve detection of the targeted species, at a scale/intensity commensurate with the size of the habitat and the growth form of the plant. Specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 1994 will be obtained (where possible) and provided to the Queensland Herbarium for identification and entry into the HERBRECS database. Details pertaining to the occurrence, or potential occurrence, of any species threatened under the EPBC Act or Nature Conservation Act 1992 will be documented and mapped.~~

Within each defined (standard system) vegetation community, a minimum of three sites (numbers should be discussed with the EPA) should be surveyed for plant species, preferably in both summer and winter, as follows:

- site data shall be recorded using the Queensland Herbarium methodology and proformas in the latest version of the Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland, (DERM, 2005).
- the minimum site size should be 10 by 50 metres;
- a complete list of species present at each site should be recorded;

- the relative abundance of plant species present should be recorded;
- any plant species of conservation, cultural, commercial or recreational significance should be identified; and
- specimens of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006*, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database."

37. Issue: Wording of section 4.7.1.2 Terrestrial fauna

The TOR should not limit the fauna likely to be present in the project area. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text:

The description of the fauna present or likely to be present in the MEP will include:

- species diversity (i.e. a species list) ... mammals;
- any species that are poorly known ...;
- ~~habitats sensitive requirements and sensitivity to changes; including movement corridors and waterways barriers to movement; ..."~~

38. Issue: Wording of section 4.7.1.2 Terrestrial fauna

The TOR should describe the occurrence of fauna of conservation significance be geocoded to mapped vegetation units. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"Apart from the species recorded in the survey, an indicative list of all known and potential species and threatened species in the project area should be provided, by reference to the regional ecosystems within the project area and a 100km buffer, and knowledge of species present in the local bioregion. The occurrence of fauna of conservation significance should be geocoded to mapped vegetation units or habitats, which can then be used in section 4.7.2 to propose areas to be protected."

39. Issue: Wording of section 4.7.2 Potential impacts and mitigation measures

The EIS should identify describe and assess areas that may result in clearing of native vegetation where Operation Works Permits for clearing of native vegetation and Material Change of Use applications will be required. Any applications will be required to be against the Regional Vegetation Management Code for Brigalow Belt and New England Tablelands Bioregions. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"The EIS will address any actions of the MEP or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*. The EIS will detail any areas proposed to be cleared that that will not be exempt from the provisions of *Integrated Planning Act 1997* and the *Vegetation Management Act 1999*. The EIS will also detail any proposed infrastructure that may trigger approval as a Material Change of Use."

40. Issue: Wording of section 4.7.2 Potential impacts and mitigation measures

The TOR should reference the ROKAMBA bilateral agreement for migratory bird agreement, potential environmental harm to benthic communities and any strategies for collecting and preserving any significant fossils. In any groundwater aquifers found to contain stygofauna, the EIS should describe the potential impacts on stygofauna of any changes in the quality and quantity of the groundwater, and

describe any mitigation measures that may be applied. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

"... any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA and ROKAMBA) will be discussed.

In any groundwater aquifers found to contain stygofauna, describe the potential impacts on stygofauna of any changes in the quality and quantity of the groundwater, and describe any mitigation measures that may be applied.

Strategies for collecting and preserving any significant fossils will be described.

The potential environmental harm to the ecological values ..."

41. Issue: Wording of section 4.7.2 Potential impacts and mitigation measures

The TOR does not adequately address the capacity of the aquatic environment to assimilate potential mine discharges. The EIS will be required to address the key flora and fauna indicators for future ongoing monitoring in the project area. The monitoring of rehabilitation should include reference sites for monitoring rehabilitation. The EIS should specifically discuss the potential environmental harm to benthic communities. Where the rehabilitation outcome includes native vegetation, the outcome should include locally indigenous species. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Delete the struck-through text and insert the underlined text:

"... Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. The capacity of the environment to assimilate discharges and emissions should be assessed.

Mitigation measures and/or offsets will be proposed for adverse impacts, ~~where relevant~~. Any departure from no net loss of ecological values will be described.

Key flora and fauna indicators will be identified for future ongoing monitoring. Reference sites for monitoring rehabilitation should be established. There will be at least two for each ecosystem type to be rehabilitated. This will provide benchmarks against which to measure progress and success of rehabilitation. ...

The potential environmental harm on flora and fauna due to any alterations to the local surface and ground water environment should be discussed with specific reference to environmental impacts on riparian vegetation or other sensitive vegetation communities. Emphasis will be given to potential environmental harm to benthic communities. Measures to mitigate the environmental harm to habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains will be described ~~where possible~~.

~~Methods for the provision of fauna sensitive features (e.g. nest hollow and ground litter)~~ Rehabilitation of disturbed areas will incorporate, where relevant appropriate, provision of nest hollows and ground litter. ~~Where the rehabilitation outcome of the EIS includes native vegetation, local indigenous species should be sourced from a local seed bank."~~

42. Issue: Wording of section 4.9.1 Description of environmental values

The TOR should provide separate population figures and demographics for affected indigenous and non-indigenous populations and communities. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text:

- "The population and demographics of the affected communities: The description will address all communities likely to be impacted directly and indirectly by the MEP, including source communities for the project workforce. Characteristics to be described include the community size,

age, structure, gender composition, education level, residency, labour force, average income profile, the number and proportion of low income households, household size, health and wellbeing indicators and employment rates in the community, as well as additional information identified as relevant thorough consultation with affected and interested persons. Separate population figures and demographics should be provided for affected indigenous and non-indigenous populations and communities."

43. Issue: Wording of section 4.9.2 Potential impacts and mitigation measures

The TOR should ensure that an adequate assessment of impacts on local and state labour markets is provided in the EIS. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text in dot point 3:

"In particular, this section of the EIS should address the following matters where relevant:

- Potential demographic changes in the profile of the region.
- The sufficiency of current infrastructure and services to meet expected demands.
- The number of personnel to be employed, the skills base of the required workforce and the likely sources (i.e. local, regional or other) for the workforce during the construction and operational phases for each aspect of the project and initiatives for local employment opportunities. Include an assessment of impacts on local and state labour markets. This information is to be presented according to occupational groupings of the workforce.

44. Issue: Wording of section 4.9.2 Potential impacts and mitigation measures

The EIS should discuss the impacts and proposed mitigation measures arising from alternative options for infrastructure required for accommodation. Insert the following text to provide the necessary information to adequately address this section of the TOR.

Recommendation:

Insert the underlined text as a new dot pit:

- "The EIS should address impacts of both construction and operational workforces and associated contractors on housing. This section of the EIS should discuss the capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project, including:
 - Identify where staff will reside during construction and operation;
 - Identify any opportunities and constraints for new housing construction in the catchment area, including the capacity ...
 - The impacts arising from alternative options for infrastructure required for accommodation will be addressed. The proposed mitigation measures for each option will also be provided."

ATTACHMENT H

COMMUNITY SURVEY

A comprehensive Stakeholder and Community Engagement program was carried out as part of the Millennium Expansion Project (MEP).

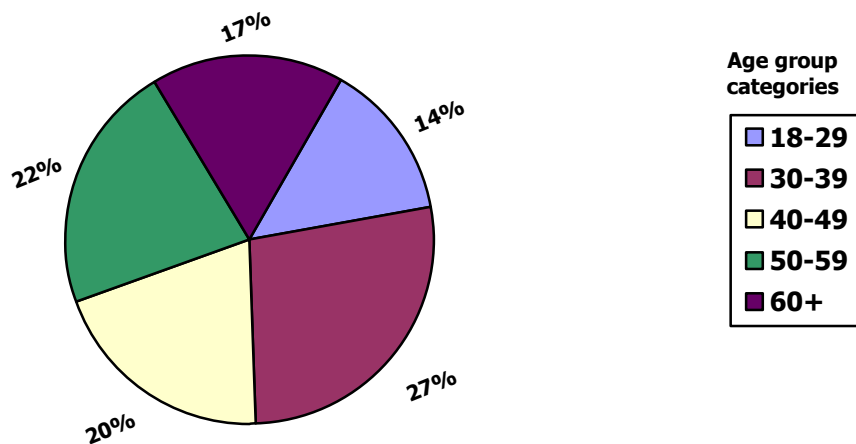
A community survey was undertaken as part of this process at a local level during the community information days held at the Clermont Show (26 and 27 May 2009) in Clermont and the Moranbah Lions Market (28 June 2009) in Moranbah. Peabody undertook the survey in order to further understand community opinion on the Project and how the Project may have, or be perceived to have, an affect on existing lifestyles, future growth in the area and people and their families.

In total, there were 149 completed community surveys from both Community Information sessions at Clermont and Moranbah. The results of the survey are explained below.

Q1 WHICH AGE GROUP ARE YOU?

The largest single age group category for respondents was the 30-39 year old age group accounting for 27% (40 out of 149) of all respondents. The combined age groups of 18-49 represents 60% of all respondents which is similarly representative of ABS Census figures from 2006 where a population that are predominantly from mining towns has a majority of persons aged between 15 and 44 years.

Percentage of respondents per age group



Q2 WHAT IS YOUR GENDER?

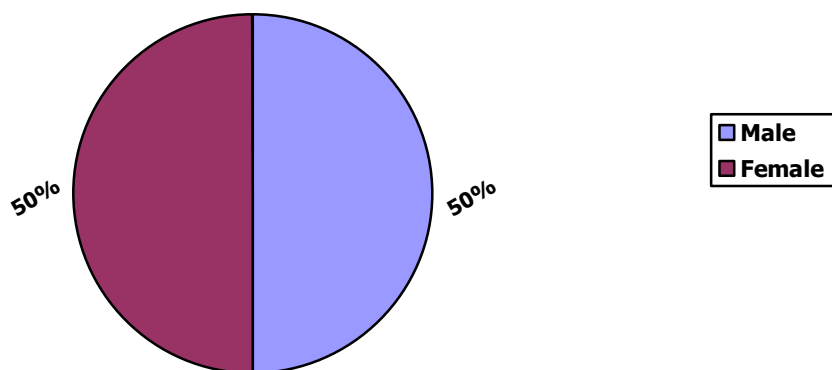
There was a total of 149 community surveys completed with an almost even gender spread of respondents, 50% male (74) and 50% female (75).

Historically, in mining towns, the male population is higher than females although over time the total percentage of males has been decreasing, possibly due to an increased female representation in the mining workforce.

The almost equal number of male and female respondents shows that females have an equal interest in the mining industry in the area regardless of mining predominantly being represented by a male workforce.

The location of the information sessions may also account for a more even gender distribution as both the Clermont Show and Moranbah markets are more likely to appeal to a family demographic rather than having specific appeal to either gender.

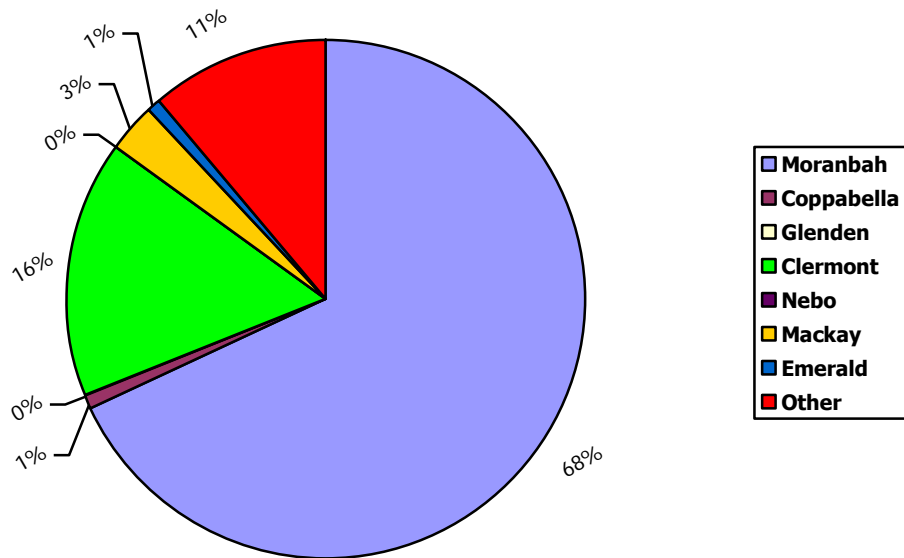
Percentage of respondents by Gender



Q3 WHICH LOCAL AREA DO YOU LIVE IN?

The majority of respondents, 68% (101), lived in Moranbah and the second most popular area was Clermont with 16% (24) of respondents. These figures are representative of the towns in which the community information days were held, Moranbah and Clermont. 11% (17) respondents chose 'other' as their local area. These were mainly short-term visitors to the area visiting family or persons on holiday.

Percentage of survey respondents according to location



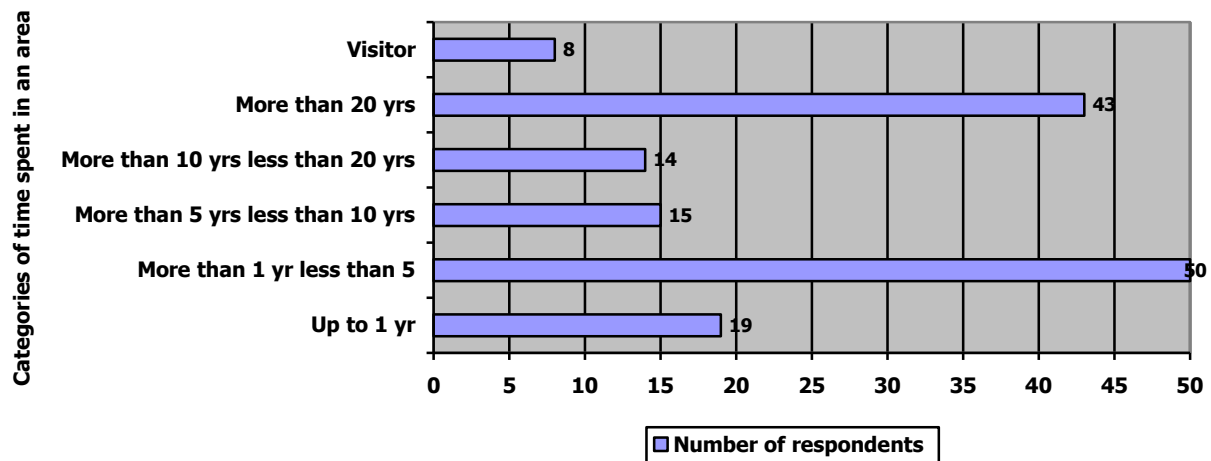
Q4 HOW LONG HAVE YOU BEEN LIVING IN THE AREA?

A large proportion of respondents, 34% (50), had been living in the area for more than one year but less than five years, closely followed by persons who had lived in the area for more than 20 years, 29% (43).

Of the respondents who had lived in the area for more than 20 years, the vast majority of these people were born and raised locally, and then chose to remain in the area. These respondents are more likely to be involved in the agricultural industries of the region with strong, often multi-generational ties to the land.

The high number of respondents who had been living in the area for more than one year but less than five years are more likely to be involved with the mining industry and associated support services, reflecting those who have been attracted to the region for employment reasons and who live in the area based largely on the period of their employment.

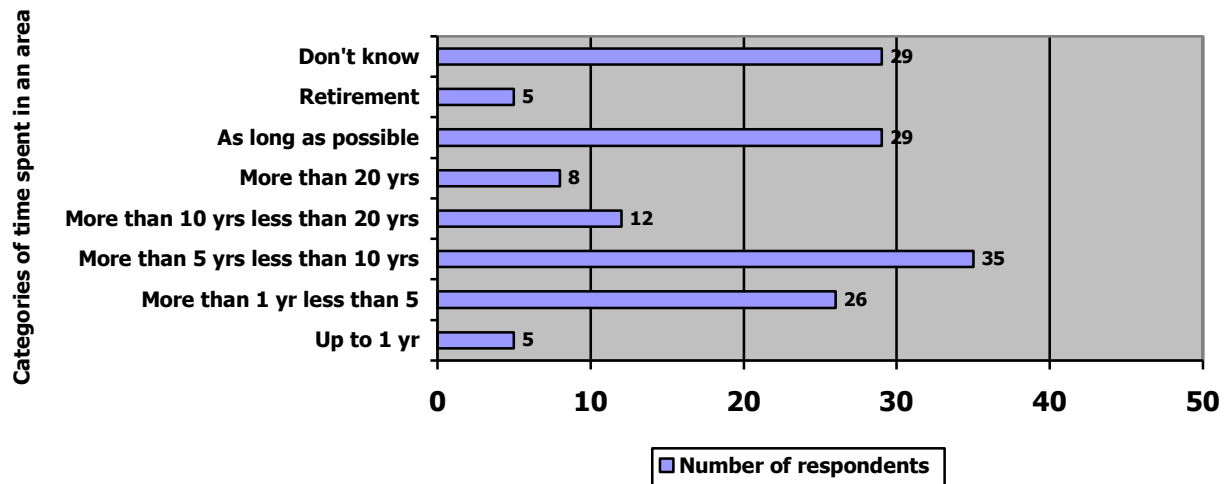
Period of time respondents have been living in the area by number



Q5 HOW LONG DO YOU INTEND ON LIVING IN THE AREA?

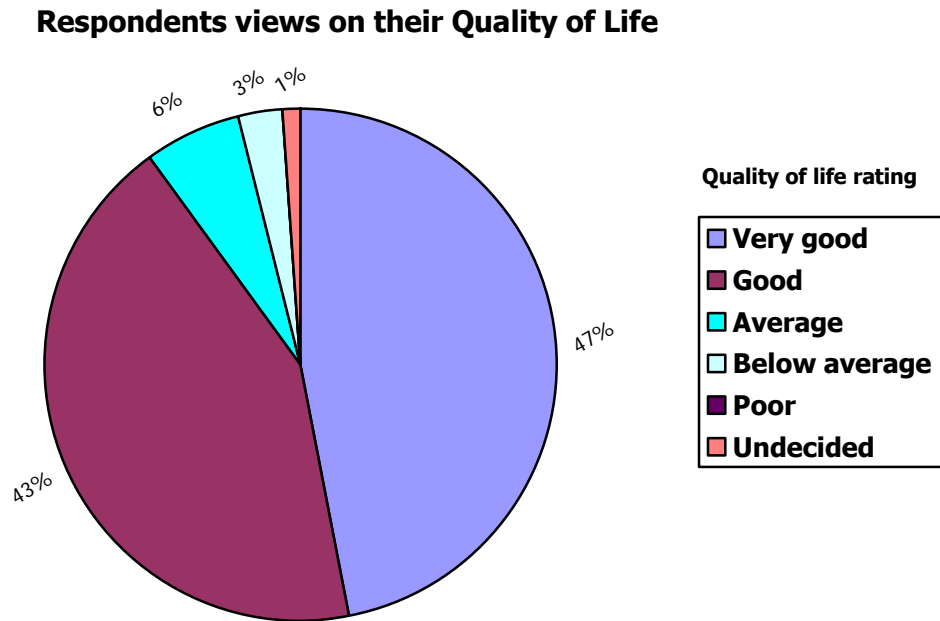
A large proportion, 19% (29), of respondents did not know how long they would remain living in the area with the main reason being the uncertainty of employment. These respondents indicated they would stay in the area as long as they remained in employment. However, the largest group of respondents, 24% (35), would remain in the area for more than 5 years but less than 10 years, stating the main reason for this would be for the length of time of their employment locally.

Period of time and number of respondents intend on staying on living in the area



Q6 OVERALL, HOW WOULD YOU RATE YOUR QUALITY OF LIFE IN THE COMMUNITY?

Of the 149 respondents, 91% (135) rated their quality of life as either 'very good' or 'good'. No-one felt that their quality of life was poor and only 3% (4) of respondents felt that their quality of life was below average.



Q7 WHAT DO/DON'T YOU LIKE ABOUT LIVING IN THE AREA?

In general, the most frequent answers relating to the question 'What do you like about living in your area', were:

- a sense of community;
- an ideal place to raise children;
- good for families; and
- it's quiet and relaxed.

In general, the most frequent answers relating to the question 'What don't you like about living in your area', were:

- too remote;
- lack of shopping;
- local cinema had closed down;
- lack of facilities; and
- limited services.

Q8 ARE THERE ANY MAJOR ISSUES AFFECTING YOUR COMMUNITY AND LIFESTYLE?

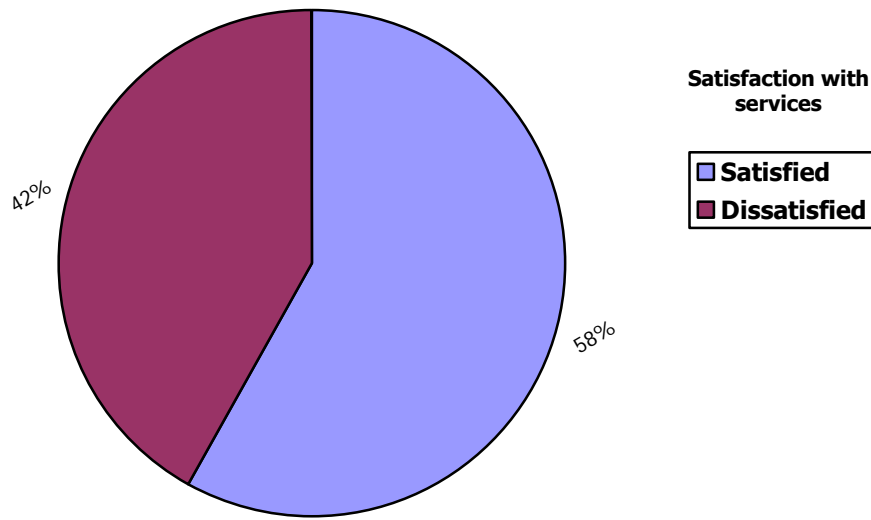
Of the respondents who answered this question the major issues highlighted, were:

- a lack of employment in the area;
- the cost of housing (both purchasing and renting); and
- that the area is an expensive place to live.

Q9 ARE YOU SATISFIED WITH THE QUALITY OF AND ACCESSIBILITY OF SERVICES PROVIDED IN YOUR AREA?

Overall, more than half, 58% (97), of respondents are satisfied with the quality and accessibility of services in their area.

Percentage of respondents satisfied/dissatisfied with quality and accessibility of services



If dissatisfied, respondents were asked to explain why they were dissatisfied with the quality and accessibility of services provided to them in their area. The main reasons provided were:

- the lack of shopping and facilities;
- only having one supermarket for choice;
- no Sunday trading;
- lack of entertainment facilities; and
- inadequate medical services, particularly in emergency medical support.

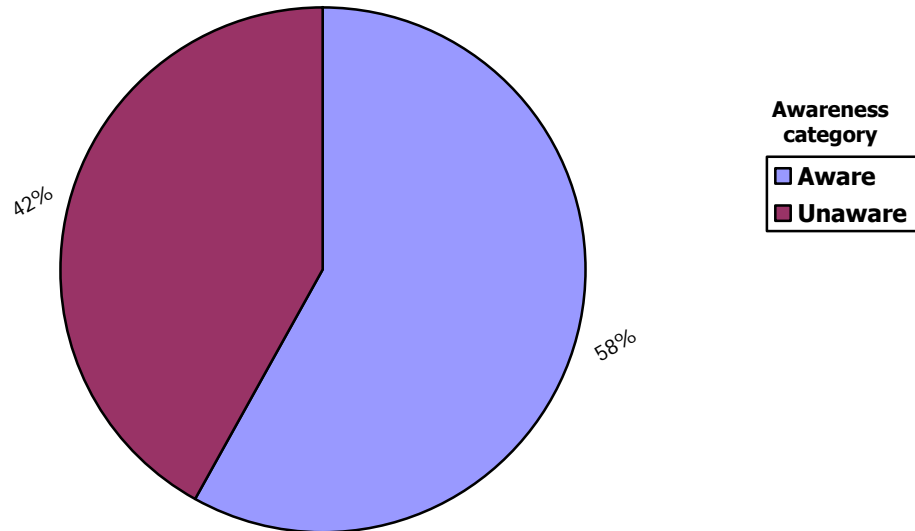
Q10 WHAT COMMUNITY ORGANISATIONS OR CLUBS ARE YOU INVOLVED WITH AND HOW ARE YOU INVOLVED?

There were 67% (100) of respondents who were involved with a local community organisation or club. The vast majority of those were involved in one or more local sporting organisations as an active participant, including rugby, AFL, soccer, squash, netball and cricket. Some respondents had volunteer roles for organisations such as the Lions Club, Aged Care, Playgroup and their local Church.

Q11 ARE YOU AWARE OF THE PEABODY PROJECT AT THE MILLENNIUM SITE?

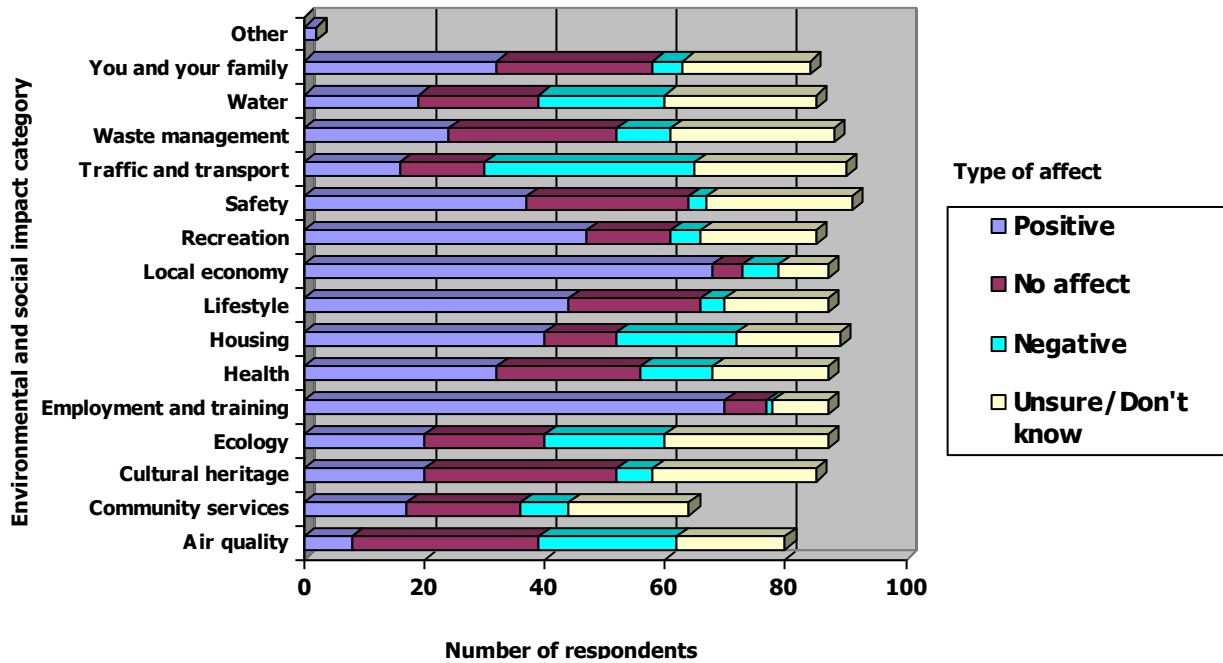
There were 58% (86) of respondents who were aware of the Millennium Expansion Project.

Percentage of respondents aware of the Millennium Expansion Project



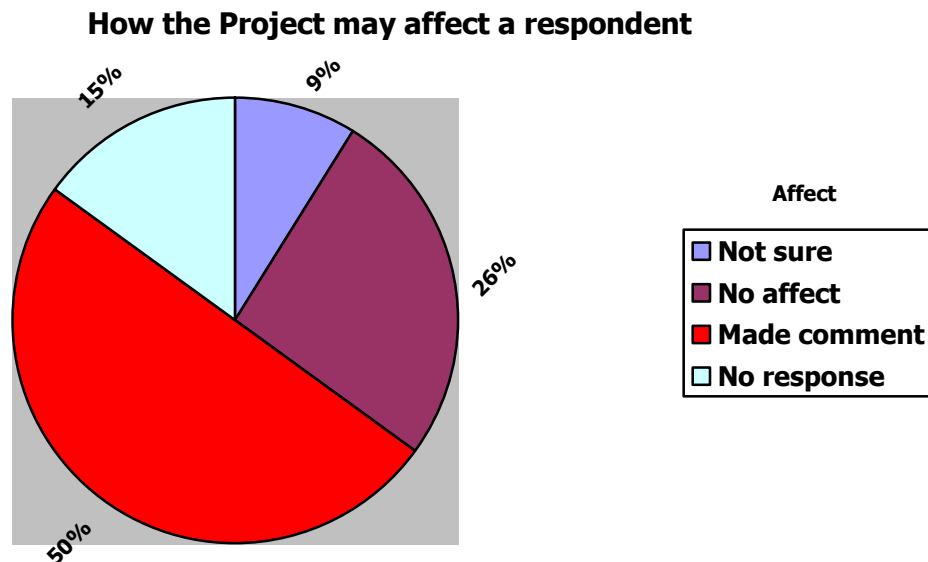
Respondents who were aware of the Millennium Expansion Project were asked if they thought the Project may have an affect on a number of environmental and social impacts. The results show that the majority of respondents believe the Project would have a positive affect on training and employment and the local economy. A large number of respondents felt that the Project would have a negative affect on Traffic and Transport due to the perceived increase of vehicles on local roads. Although the lack of available and affordable housing has been cited as a major problem for the area, almost half of the respondents, 45% (40), stated that the Project would have a positive affect on housing in the area.

Respondents replies to environmental and social impacts as a result of the Project



Q12 HOW WOULD THESE PROJECTS AFFECT YOU?

Respondents were asked how the Projects may affect them. Of those who replied, 26% (38) of respondents stated that the Millennium Expansion Project would have no affect on them, while 9% (14) were unsure.



Almost 50% (74) of respondents made comment on how the Project may affect them and a large majority of those stated:

- the Project may provide increased employment opportunities;
- the Project may increase the population of the area;
- the Project may provide opportunities for investment in housing; and
- the Project may affect traffic numbers with increased levels of traffic on local roads.

As a result of the Community Survey an additional 118 members of the community requested that their contact details were added to the Project 'Consultation Manager' database. These persons will receive direct communications and regular updates regarding the Project.

ATTACHMENT I

EXAMPLE OF CONSULTATION MANAGER MONTHLY REPORT

Project Millennium Stakeholder Consultation

Report Parameters:

Start Date: 1 Sep 2009

End Date: 30 Sep 2009

Action Type: all actions

<p>Elizabeth Yeo Community Development Advisor, Queensland Resources Council Level 13 133 Mary Street Brisbane QLD 4000</p>	
<p>Meeting_Formal 1 Sep 2009</p>	<p>Summary: Meeting held with Elizabeth Yeo (QRC) regarding the MEP Social Impact Management Plan.</p> <p>Stakeholder Comments: Elizabeth gave an overview of the new requirement for a Social Impact Management Plan (SIMP) as part of the Social Impact Assessment for a Project.</p> <p>Although this is now a requirement in the final Terms of Reference, there have been no guidelines produced by the Social Impact Assessment Unit of the DIP to assist proponents in preparing an SIMP.</p> <p>QRC are actively involving companies in the resource sector to provide feedback to the DIP regarding this new requirement and are urging the DIP to produce guidelines.</p> <p>Elizabeth will keep us updated on any progress. No further meeting arranged.</p> <p>Team Response: Attendees: Elizabeth Yeo - QRC Dale DuMee - Peabody Colleen Fish - Matrixplus Paula Shields - Matrixplus</p> <p>Peabody and Matrixplus raised concerns about the level of detail and commitment required for the SIMP, taking into consideration that Peabody has a small profile in the region of the proposed Project area when compared to the larger mining companies and that, so far, feedback from community consultation for the Project had raised very little concern.</p> <p>The company recognises that it has a contribution to make to the socio-economics of the community in which it operates but needs some guidance on the level of commitment expected for the SIMP.</p> <p>The review period for the SIMP is another area that is unclear.</p>
<p>Phone Call In 8 Sep 2009</p>	<p>Summary: Further to the meeting with Elizabeth from QRC, she called Paula with an update from a meeting she had with the DIP Social Impact Assessment Unit, where she discussed some of the concerns/ideas we (Peabody and Matrix) raised.</p> <p>Stakeholder Comments: Elizabeth will keep us updated of any progress.</p> <p>Team Response: · Our concerns regarding having to provide an SIMP with the EIS as required by the final ToR, despite DIP saying that the Proponents understand they only need to supply one with the supplementary report</p> <p>Response: DIP is now aware of concerns surrounding not adhering to the requirements of the ToR and will have to refer this matter higher up internally</p> <p>· A suggestion was made at Elizabeth's meeting with DIP that the EIS may only require an outline of the SIMP and the completed SIMP provided in the supplementary after the EIS has been made available for public consultation</p> <p>Response: Elizabeth to confirm and also suggested that something be provided in writing by the DIP for inclusion in the EIS if this is what is decided</p> <p>· Draft guidelines for the SIMP are still in progress Response: Elizabeth suggested that we hold off on doing anything with the SIMP until a clearer indication of what is required to be included has been made available</p>

Project Millennium Stakeholder Consultation

<p>Elizabeth Yeo Community Development Advisor, Queensland Resources Council Level 13 133 Mary Street Brisbane QLD 4000</p>	
<p>Email In 17 Sep 2009</p>	<p>Summary: Elizabeth emailed Paula to request feedback on the compilation of comments from the Social Policy Working Group (SWPG) for presentation to the SIA Unit of the DIP.</p> <p>Stakeholder Comments: Dear Social Policy Working Group members,</p> <p>At the last SPWG meeting we discussed the recent changes to the SIA component of the EIS ToRs. Over the past month I have received a range of feedback from members, and have compiled this into a short paper outlining industry's concerns with the current government approach to SIA ToRs and identifying possible areas for improvement which may be supported by industry, such as development of a framework to support government in undertaking cumulative impact assessments.</p> <p>The SIA Unit in DIP have indicated willingness to consider industry feedback on the recent ToR, and I would like to provide this paper to them at the end of September to start discussions.</p> <p>Thanks to those people who have already provided input. Any comments or suggestions on the attached draft paper are very welcome - feedback by Monday 28 September 2009 would be appreciated.</p> <p>Any questions, please don't hesitate to give me a call.</p> <p>Thanks, Elizabeth.</p> <p>Elizabeth Yeo Community Development Adviser Queensland Resources Council t: 07 3316 2513 f: 07 3295 9570 m:0409752606 Level 13 133 Mary Street Brisbane Queensland 4000 www.qrc.org.au</p>
	<p>Action Set By: Georgina Thrum Assigned To: Paula Shields Deadline: 28 Sep 2009 5:00 PM Date Resolved: 21 Sep 2009 9:37 AM Action Requested: Hey Paula</p> <p>Can you please advise as to whether you provided feedback on the SIA ToR.</p> <p>Thanks</p> <p>Action Taken: Elizabeth sent me the details for my information only. There was no action necessary on my part.</p>

ATTACHMENT J

LIST OF STAKEHOLDERS CONSULTED

Appendix E: Stakeholder Consultation Deliverables – Methods, Timeframes Responsible Project Personnel

CONSULTATION/EIS STAGE	STAKEHOLDER	CONSULTATION ACTIONS		
		METHOD	TIMEFRAME	RESPONSIBLE PROJECT PERSONNEL
Stage 1 - Introducing the EIS Process and draft ToR	DAS Landholders (within or adjoining the operational MEP area)	Face to Face meeting to provide brief background on project and pending consultation initiatives	Prior to release of draft ToR	Peabody
		Factsheet #1	Prior to release of draft ToR	Matrixplus
	Easement and Tenement Holders (within or adjoining the operational MEP area)	Phone calls to provide brief background and pending consultation initiatives	Prior to release of draft ToR	Peabody
		Factsheet #1	Prior to release of draft ToR	Matrixplus
	Isaac Regional Council	Phone call to introduce Peabody and provide brief background and pending consultation initiatives	Prior to release of draft ToR	Peabody
		Factsheet #1	Prior to release of draft ToR	Matrixplus
	Moranbah and Coppabella Community Residents	Factsheet delivered direct to letterbox/PO box inviting people to become an 'interested' party for the EIS process	Prior to release of draft ToR	Matrixplus
		Factsheet #1	Prior to release of draft ToR	Matrixplus
	Barada Barna Kabalbara and Yetimarla People 3	Phone call to provide brief background and pending consultation initiatives	Prior to release of draft ToR	Peabody
		Factsheet #1	Prior to release of draft ToR	Matrixplus
	Environmental Protection Agency	Copies of Factsheet provided to Stakeholders regarding the Release of the draft ToR	Prior to release of draft ToR	Matrixplus
	Employees	Face to Face meeting to provide brief background on project and pending consultation initiatives	Prior to release of draft ToR	Peabody
Newsletter to all employees providing information on the project		Prior to release of draft ToR	Peabody	
Ross Flohr	Phone call to provide brief background and pending consultation initiatives	Prior to release of draft ToR	Peabody	
	Factsheet #1	Prior to release of draft ToR	Matrixplus	
Stage 2 - Final ToR	DAS Landholders (ie landholders within the operational MEP area)	Written letter advising that ToR has been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus
	Easement and Tenement Holders	Written letter advising that ToR has been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus
	Isaac Regional Council	Written letter advising that ToR has been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus
	Moranbah and Coppabella Community Residents	Written letter to registered 'intersted' members of the community advising that ToR have been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus
	Barada Barna Kabalbara and Yetimarla People 3	Written letter advising that ToR have been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus
	Environmental Protection Agency	Copies of letters provided to Stakeholders regarding finalisation of ToR	Immediately following finalisation of ToR	Matrixplus
	Employees	Newsletter to all employees providing information regarding finalisation of ToR	Immediately following finalisation of ToR	Peabody
		Introduce Stakeholder Engagement Workshops for employees to become familiar with the project and key messages and how to interact with stakeholders	Immediately following finalisation of ToR	Peabody
Ross Flohr	Written letter advising that ToR has been finalised and (where applicable) acknowledgement of submissions to the draft ToR	Immediately following finalisation of ToR	Matrixplus	
Stage 3 - EIS Preparation	DAS Landholders (within or adjoining the operational MEP area)	Face to face meeting to provide project updates and summary of impact assessment findings	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Easement and Tenement Holders (within or adjoining the operational MEP area)	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Isaac Regional Council	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah and Coppabella Community Residents	Community Information Day/Information Booth at local shopping centre or similar	TBC	Matrixplus and Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Barada Barna Kabalbara and Yetimarla People 3	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Environmental Protection Agency	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Employees	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus and Peabody
	Department of Environment, Water, Heritage and the Arts	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Natural Resources and Water	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Mines and Energy	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Main Roads	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
	Department of the Premier and Cabinet	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Infrastructure and Planning	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
Department of Emergency Services	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Department of Housing	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Department of Communities	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus and Peabody	

Appendix E: Stakeholder Consultation Deliverables – Methods, Timeframes Responsible Project Personnel

CONSULTATION/EIS STAGE		CONSULTATION ACTIONS		
STAKEHOLDER	METHOD	TIMEFRAME	RESPONSIBLE PROJECT PERSONNEL	
Queensland Health	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Stage 3 - EIS Preparation..Continued	Department of Education, Training and the Arts	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Local Government, Sport and Recreation	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Queensland Ambulance Service	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Emergency Management Queensland	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Queensland Fire and Rescue Service	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Queensland Police Service	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Primary Industries and Fisheries	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Tourism, Regional Development and Industry	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Queensland Transport	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Department of Employment and Industrial Relations	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Trade Queensland	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Powerlink Queensland	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	SunWater	Consultation Meeting	Each quarter following formal commencement of EIS Process	Matrixplus and Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Peabody
	Ergon Energy	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Queensland Rail	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Central Queensland Land Council Aboriginal Corporation	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Fitzroy Basin Association	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody
		Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah State High School	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah State Primary	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah East State School	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Coppabella State School	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah TAFE	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
	Moranbah Hospital	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus
Moranbah Town Library	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Mackay Regional Council	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Mackay Conservation Council	Consultation Meeting	Each quarter following formal commencement of EIS Process	Peabody	
	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Queensland Resources Council	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Moranbah Rotary Club and Moranbah Lions Club	Factsheets #2, #3, #4, #5 and #6+	TBC	Matrixplus	
Customers	Interested customers can be added to the database to receive regular updates via the Factsheets and a follow up phone call with a project representative to ascertain their requirements	TBC	Matrixplus and Peabody	
Suppliers	Interested suppliers can be added to the database to receive regular updates via the Factsheets and a follow up phone call with a project representative to ascertain their requirements	TBC	Matrixplus and Peabody	
Ross Flohr	Added to datatabase to receive regular updates via the Factsheets	TBC	Matrixplus	
General Public	Members of the public can be added to the database to receive regular updates via the Factsheets	TBC	Matrixplus and Peabody	
Stage 4 - draft EIS Release	DAS Landholders (within or adjoining the operational MEP area)	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Immediately following release of draft EIS	Matrixplus
		Face to Face as follow-up to letter	ASAP after providing written letter	Peabody
	Eaement and Tenement Holders (within or adjoining the operational MEP area)	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Immediately following release of draft EIS	Matrixplus
	Isaac Regional Council	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Immediately following release of draft EIS	Matrixplus

Appendix E: Stakeholder Consultation Deliverables – Methods, Timeframes Responsible Project Personnel

CONSULTATION/EIS STAGE	STAKEHOLDER	METHOD	TIMEFRAME	RESPONSIBLE PROJECT PERSONNEL
		Face to Face as follow-up to letter	ASAP after providing written letter	Peabody
	Moranbah and Coppabella Community Residents	Written letter to registered 'interested' parties advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Immediately following release of draft EIS	Matrixplus
		CONSULTATION ACTIONS		
	Barada Barna Kabalbara and Yetimarla People 3	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Immediately following release of draft EIS	Matrixplus
	Environmental Protection Agency	Copies of letters provided to Stakeholders regarding draft EIS release	ASAP after providing written letters to Stakeholders	Matrixplus
	Employees	Newsletter advising the status of the EIS	Immediately following release of draft EIS	Peabody
	Department of Environment, Water, Heritage and the Arts	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	Matrixplus
	Department of Natural Resources and Water	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Mines and Energy	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Main Roads	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of the Premier and Cabinet	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Infrastructure and Planning	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Emergency Services	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Housing	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Communities	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Health	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Education, Training and the Arts	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Local Government, Sport and Recreation	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Ambulance Service	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Emergency Management Queensland	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Fire and Rescue Service	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Police Service	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Primary Industries and Fisheries	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Department of Tourism, Regional Development and Industry	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Transport	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	

Stage 4 - draft EIS Release...Continued

Appendix E: Stakeholder Consultation Deliverables – Methods, Timeframes Responsible Project Personnel

CONSULTATION/EIS STAGE	STAKEHOLDER	CONSULTATION ACTIONS		
		METHOD	TIMEFRAME	RESPONSIBLE PROJECT PERSONNEL
	Department of Employment and Industrial Relations	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Trade Queensland	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
Stage 4 - draft EIS Release...Continued	Powerlink Queensland	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	Matrixplus
	SunWater	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Ergon Energy	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Rail	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Central Queensland Land Council Aboriginal Corporation	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Fitzroy Basin Association	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah State High School	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah State Primary	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah East State School	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Coppabella State School	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah TAFE	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah Hospital	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah Town Library	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Mackay Regional Council	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Mackay Conservation Council	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Whitsunday Regional Council	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Queensland Resources Council	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Moranbah Rotary Club and Moranbah Lions Club	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Customers	Customers who are registered on the database. Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Suppliers	Suppliers who are registered on the database. Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
	Ross Flohr	Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS	
General Public	Members of the public who are registered on the database. Written letter advising that draft EIS has been finalised and (where applicable) information on how submission to the draft EIS can be made	Prior to the public release of draft EIS		
Stage 5 - Finalised EIS	DAS Landholders (within or adjoining the operational MEP area)	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS Face to Face as follow-up to letter	Immediately following release of Final EIS	Matrixplus
	Adjacent Tenement Holders	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS	Immediately following release of Final EIS	Matrixplus and Peabody
	Isaac Regional Council	Isaac Regional Council Face to Face as follow-up to letter	Immediately following release of Final EIS	Matrixplus
	Moranbah and Coppabella Community Residents	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Matrixplus and Peabody
	Barada Barna Kabalbara and Yetimarla People 3	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Matrixplus
	Employees	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Peabody
	Environmental Protection Agency	Copies of response letters provided to Stakeholders	Immediately following release of Final EIS	Matrixplus
	CONSULTATION ACTIONS			

Appendix E: Stakeholder Consultation Deliverables – Methods, Timeframes Responsible Project Personnel

Stage 5 - Finalised EIS...Continued	Suppliers	Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Peabody
	Ross Flohr	If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS	Immediately following release of Final EIS	Matrixplus
	General Public	Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Peabody
		If a written submission has been made by this stakeholder, a written letter acknowledging their submissions on draft EIS	Immediately following release of Final EIS	Matrixplus
		Depending on the details of the stakeholders submission to the draft EIS, a face to face follow-up meeting	Immediately following release of Final EIS	Peabody

PURPOSE and DESCRIPTION OF FACTSHEETS		PURPOSE and DESCRIPTION OF CONSULTATION MEETINGS
Factsheet #1	Introduction to project, Public Notice, ToR and EIS process and invite to become and interested party	To provide a face to face consultation process between the proponent and the stakeholder(s) Address any issues/concerns that may arise during the EIS process, then through to operation and beyond Build strong relationships with interested stakeholders to allow the process of communication to flow in both directions
Factsheet #2	ToR have been finalised and EIS investigations begun	
Factsheet #3	Work progressing, people/community stories etc	
Factsheet #4	Draft EIS submitted and Public Notice issued	
Factsheet #5	Successful approval of project, work commencing	
Factsheet #6+	Ongoing works and community information	

COLOUR KEY	
	Face-to-Face Meetings
	Factsheets
	Phone calls
	Newsletters
	Written letters
	Copies of all submissions to EPA
	Consultation Meeting
	Other



Millennium Expansion Project Environmental Impact Statement

APPENDIX F1:

SOILS

SOILS AND LAND SUITABILITY

MILLENNIUM EXPANSION PROJECT



JULY 2010

Report for Matrix Plus Consulting

SOILS AND LAND SUITABILITY MILLENNIUM EXPANSION PROJECT

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1.1 INTRODUCTION

The Millennium Expansion Area Project (MEA) is located immediately north of the existing Millennium Mine operation and is approximately 22 kilometres south east of Moranbah Township. A large proportion of the area has been cleared for grazing use with remnant original vegetation largely restricted to sandstone mesas and steeper topography such as rising flanks of mesas and riparian vegetation along New Chum Creek.

The original vegetation of the area included Brigalow / Dawson gum on the clay soils, Poplar Box on duplex soils and mixed riverine vegetation along watercourses. Soils across the site include a variety of non cracking and cracking clays which include uniform grey brown clays, melon holed clay lowlands, linear gilgai undulating plains, duplex sandy loams of variable thickness, hard setting sandy clays in drainage lines and skeletal clays on mesas and ridges.

Most of the survey area is suited to grazing at varying stocking rates with very marginal potential for opportunistic cropping on limited areas of the undulating Brigalow clays. No cropping activity was observed during the survey and the area has largely been de-stocked although intermittent grazing does still occur over portions of the MEP. No evidence of previous cropping activity was evident on any of the soils.

Much of the area is typical of Humboldt Brigalow communities as described by Gunn et al (1967) in that considerable variation in soil attributes may occur over quite small areas. Consequently soil mapping tasks often require boundaries which are not clear-cut as inter-fingering of different and varied soils occurs. In some instances a single soil mapping unit may include separate soils which occur in association but cannot be mapped separately at a 1:25,000 scale (Land Resources Branch 1989). Nevertheless, the scale of soil sampling conducted in this survey has identified the extent of the significant soil types. The main interface between soil types in the survey area involves medium uniform Brigalow clays and sandy Poplar Box duplex loams.

Pre-mine land suitability has been assessed for grazing and cropping uses and recommendations made for retrieval of topsoil for mine rehabilitation. Projections for post-mining land suitability have also been included. Overall, most of the soils in the area have some use for future rehabilitation.

This survey was conducted by Graham Tuck of GTES Pty Ltd on behalf of Matrixplus Consulting. Graham is a very experienced soil surveyor with almost 20 years experience with the Queensland Department of Primary Industries conducting various scale soil mapping and land suitability assessment in the Emerald and Kilcummin areas of the Central Highlands. He participated in the field survey component of the Kilcummin survey (Shields and Williams 1991) for 2 years and is a co-author of the Central Highlands agricultural field manuals (Bourne and Tuck 1993). In addition, Graham has conducted over 20 soil surveys in the Bowen Basin for mining and EIS applications since this time.

Laboratory analyses was coordinated through Dennis Baker who is a Soil Chemist and ex Manager of the DPI Agricultural Soils Laboratory utilising Phosyn laboratories for soils chemistry and ESSA Pty Ltd for soil physical analysis and overall interpretations of soil quality. Soils tests and interpretations were undertaken in accordance with Bruce, R.C. and Rayment, G.F. (1982) guidelines.

Field work for this survey was conducted in May 2009 when soil profiles were relatively moist and pasture cover over much of the site was greater than 70%. In the development of soils and land suitability for this area, it was possible to draw on comprehensive and recent work within the actual Millennium Expansion area conducted by Baker and Tuck who mapped the Mavis Downs block (MDL136) in 2006 and the North Poitrel portion (ML70401) of the Poitrel EIS in 2004. Accordingly, most field work for this survey focused on Millennium West block (ML70313). In addition, Baker and Tuck compiled the 'Soils and Land Suitability' component of the adjoining Daunia EIS in 2008.

The first soil and land suitability work in the survey area was completed by CSIRO who mapped land system boundaries (Gunn et al 1967) and described soil types which comprised each. Bourne and Tuck (1993) described agricultural management units (AMU's) for the Central Highlands region of Queensland which includes this survey area. Gunn et al and Bourne and Tuck produced soils and land information at a scale of 1:500 000 which is far too large for the purpose of mine planning but nevertheless relevant and useful. Other work relevant to the area is the Kilcummin Land Suitability Survey conducted by Shields and Williams (1991) which covers an area to the west of this survey but has directly transferable soils and land suitability information.

Survey Methodology

The survey method was designed to provide sufficient information on land resources to allow the determination of soil type distributions, land suitability, soil erosion, rehabilitation potential and storm water runoff quality. The methods used were selected as appropriate for these objectives and meet established standards for this type of work in the Queensland mining industry.

The method used in this survey was selected following consideration of the Guideline for Surveying Soils and Land Resources (McKenzie et al, 2008). McKenzie states that the criteria for soil boundary placement should relate to the basic purpose of the survey e.g, boundaries should coincide with critical limits which determine the suitability of different forms of land use (in this case agricultural land suitability). In addition to this objective, the MEA survey also seeks to determine spatial distributions of soil types with a view to topsoil management for re-use in mine rehabilitation programs. McKenzie further states that the required descriptions of soil horizon sequences may be effectively achieved using the methodology of Gunn et al (1988).

Accordingly, the method adopted in this survey is referred to by McKenzie et al (2008) as a Qualitative Free Soil Survey and is based on specific standards and methodology referenced by McKenzie. The primary reference documents are;

- Bruce, R.C. and Rayment, G.F. (1982)
- Gunn et al (1988)
- Isbell (2002)
- McDonald et al (1984)
- DME (1995)

The MEA survey area covers some 1,300 hectares in total which is approximately comprised of a 300 ha block known as North Poitrel (ML70401), 400ha Mavis Downs (MDL136) and 600 ha ML70313. Almost half the survey area has been mapped by Baker and Tuck for the purpose of mining expansion projects separate from the MEA. This work is the Mavis Downs Soil Survey (2006) and Poitrel Soil Survey (2004). The Mavis Downs survey was an internal Millennium Mine owner document and the Poitrel survey formed part of the EIS which is on public record. In the current 2009 survey, most field work focused on proposed disturbance within ML70313. The Poitrel sites which occur in this survey area are included in Attachment 1 and have had 70 added to each original number to avoid direct duplication of the Mavis Downs site numbering system. (i.e original site 2 from Poitrel is 72 in this survey).

A review of available information, published or not, was undertaken prior to commencement of fieldwork and included where appropriate. Initial site mapping based on accurate high resolution rectified aerial photogrammetry (with DTM contour detail overlay) has been undertaken to provisionally identify landform and vegetation patterns to assist with site inspections and ground observation location selections. The map was progressively refined during the field work phase and completed following review of collected results including chemical and physical analyses.

Techniques for 'Qualitative Free Survey' (Gunn et al 1988) have been used to verify proposed soil types and assign boundaries to each. Free survey is a commonly used method in broader scale agricultural lands as it enables flexibility in site selection (over grid mapping techniques), to achieve a more accurate and time effective result. It is particularly appropriate in this survey as topographic, vegetative and soil associations were quite uniform across most of the area.

Soils in future disturbance areas have been mapped at approximately 1:25,000 scale in general accordance with guidelines provided by Gunn et al (1988). This guideline is flexible and recognises complexity of landform, surveyors experience and purpose of survey in the determination of location and number of ground observations.

Land suitability assessments were made for grazing and cropping land uses for each soil type which followed the methods of Land Resources Branch (1989) with due regard to government guidelines for the Identification of Good Quality Agricultural Land (Department of Local Government and Planning and Department of Primary Industries 1993) which supports the State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

Major soil characteristics were determined from examination of soil profile morphology and determination of key chemical attributes for major soil horizons. Physical properties such as permeability and drainage characteristics were inferred from profile morphological characteristics such as concretions, depth to rock, observed root depth, colour and mottling. Typical depths of useable topsoil for future mine rehabilitation were determined using Department of Mines and Energy, Queensland (DME 1995) guidelines which are based on Gunn et al (1988) and McDonald et al (1984). Topsoil will be salvaged from the surface horizons of areas to be disturbed, is relatively stable, contains seeds and micro-organisms and is relatively fertile.

Sampling and profile inspection points were spread across the entire project area to characterise all landform elements and geological units (See **Figure 1**). Profile descriptions have been established with due regard to the Australian Soil and Land Survey Field Handbook (Gunn et al 1988), the Australian Soil Classification (Isbell, 1996) and Revised Edition (2002). Profiles have been exposed using 40mm and 75mm hand augers and back-hoe excavations of representative sites. Where possible, profiles at cuttings and eroded channels have also been recorded. Slope, landform, vegetation, land condition and geology were also assessed at inspection points. Sampling and observation points were recorded using a global positioning system data logger.

The guidelines suggest a range between 4 and 16 sample points per 100 hectares for a 1:25,000 scale survey depending on pre existing resource information as well as the local knowledge and experience of the surveyor. Further, the guideline also recommends that between 1 and 5% of all sites are sampled and subject to laboratory analysis and that between 10 and 30% of sites are described in detail (i.e. field profile morphological description).

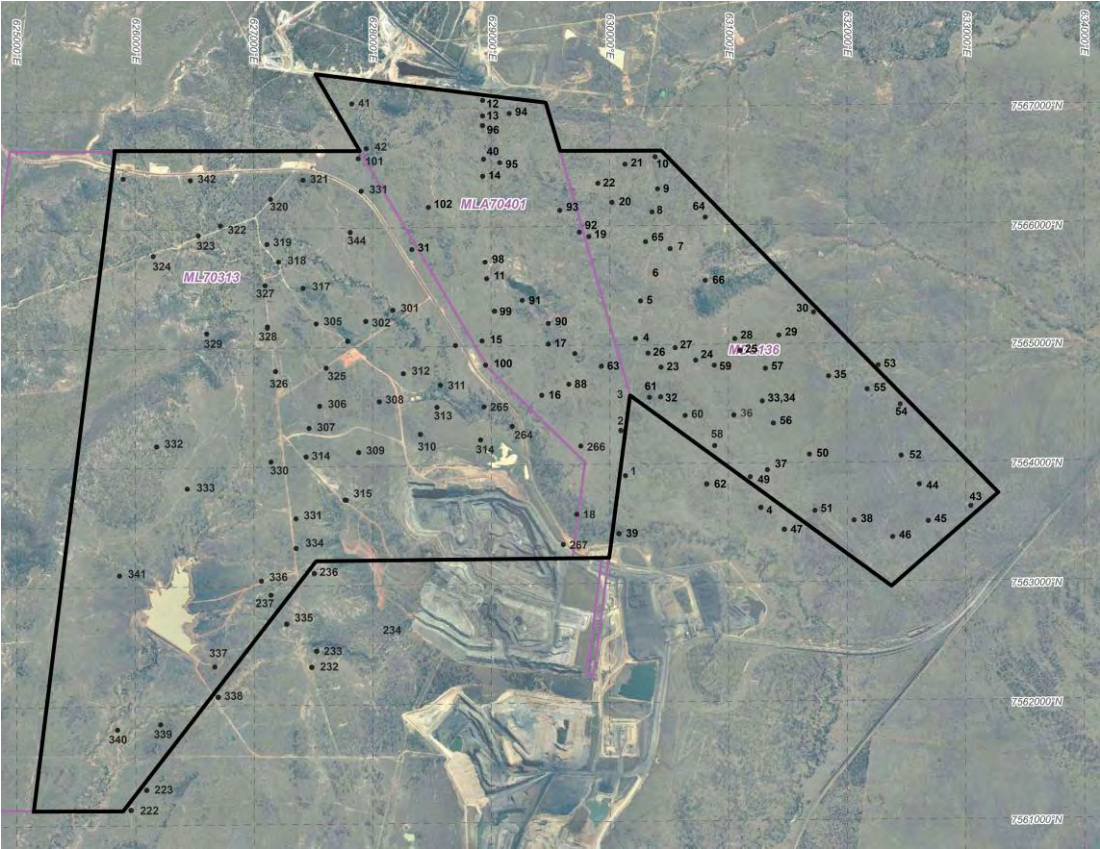
In total, some 143 sites were mapped across all areas and recorded using GPS equipment. Of this total, soil samples from various depths at representative sites have been subject to laboratory analysis for chemical and physical characterisation. In accordance with Gunn et al (1988), 69 sites have been described at a 'detailed' level with the remaining 74 sites established at lower descriptive levels to confirm soil type, land condition and soil unit boundaries.

Soils were described from profiles in freshly dug drilling pits, backhoe excavations or soil auger borings. Augured sites were generally up to 1.5 m depth unless refusal due to very hard clay or rock or irretrievable media was encountered. Many non-detailed sites were also excavated, but only sufficient to confirm depth of A horizon and upper B seam characteristics. Photographs were taken at all representative sites and also at many of the non-detailed observation sites to assist with final interpretation on soils and suitability.

Section 1.2 provides detailed descriptions of representative sites, including landform perspective, surface condition, profile description, chemical and physical characterisation as well as a summary of the soil type and recommended stripping depth and rehabilitation landform application.

Attachments 1 and 2 include copies of all observation data and laboratory results.

FIGURE 1 SOIL SAMPLING LOCATIONS



Soil Origins and Mapping Units

Gunn et al (1967) includes a section compiled by Galloway which describes geology of the area. He considers most soils in the survey area to have formed from sediments originating from exposed shale strata or the old Tertiary weathered zone. The subsequent survival, partial or complete removal of the old Tertiary land surface and deep weathered zone determine major characteristics of soils and the land in general. The area includes remnants of the original Tertiary land surface and outcropping sandstone beds in the form of partially intact ridgelines. During field investigations sandstones were often encountered at shallow depth, a strong indication that many soils in the area have been formed directly on sandstone and related sediments. **Table 1** provides a linkage between soil types described in this survey with those from previous surveys over the area.

Overall, the soils of the project are either uniform or thin duplex Brigalow clays with quite coarse structured subsoils or sandy duplex eucalypt plains. Some notable exceptions occur which are localised areas of reddish brown sandy clays on sandstone. Alluvial clay soils are common in the central portion of the survey area.

In this survey a total of 10 soil types are described with the distribution of each shown on **Figure 2**. Soil types have been developed on the basis of similarity in morphology, laboratory data, original vegetation, soil origin and topographic position. **Table 2** provides a summary description of soil types.

Soil name nomenclature divides soil types into 3 broad groups;

- A – Recent alluvial soils,
- B – Brigalow soils and,
- E – Eucalypt dominated soils.

Soil Analysis

The selection of soils for chemical analysis was undertaken on the basis of that site being most representative of the soil-mapping unit. Analysis results were used to determine chemical limiting factors and utilised to assist in pre-mining suitability assessments for cropping and grazing. In addition, this data helped determine soil potential in future rehabilitation and stripping depths. Representative sites were sampled for detailed analysis of major horizons or assessed simply for potential problems from salinity, dispersion or pH.

Table 3 lists site numbers which were sampled for laboratory analysis. This data originates from the Mavis Downs (MDL136) Survey (Baker & Tuck 2006), Millennium West (ML70313) Survey (Tuck 2009) and the Poitrel EIS (ML70401) Survey (Baker and Tuck 2004).

TABLE 1 RELATIONSHIP BETWEEN STUDY AREA SOILS & OTHER SURVEYS

Soil ID	Description	Gunn et al (1967)	AMU (Bourne & Tuck 1993)	Poitrel EIS Baker & Tuck (2006)
A1	Active Alluvial Deep Sandy Duplex and Earths	Connors / Springwood	Lascelles Isaac	A1 and A2
A2	Alluvial – uniform Brigalow clay drainage lines	Connors	Rolleston	A3
B1	Red / brown shallow uniform clay undulating plains	Rolleston	Glengallan	B1
B2	Red / brown deeper uniform clay undulating plains with significant linear gilgai	Daunia / Rolleston	Glen Idol	B2
B3	Gravelly clay on ridgelines	Monteagle / Taurus,	Glengallon Highlands	B4
B4	Uniform Brigalow grey / brown clays	Daunia / Teviot	Rolleston Glen Idol	B3
B5	Melon holed Brigalow clay lowlands	Pegunny and Rolleston	Lonesome Rolleston	B3 variant
E1	Residuals (Mesas)		Highlands	E2
E2	Sandy Duplex Of Poplar Box	Monteagle / Luxor	Lascelles	E1
E3	Thin well structured duplex. Poplar Box/ Brigalow	Monteagle	Glengallan	E3

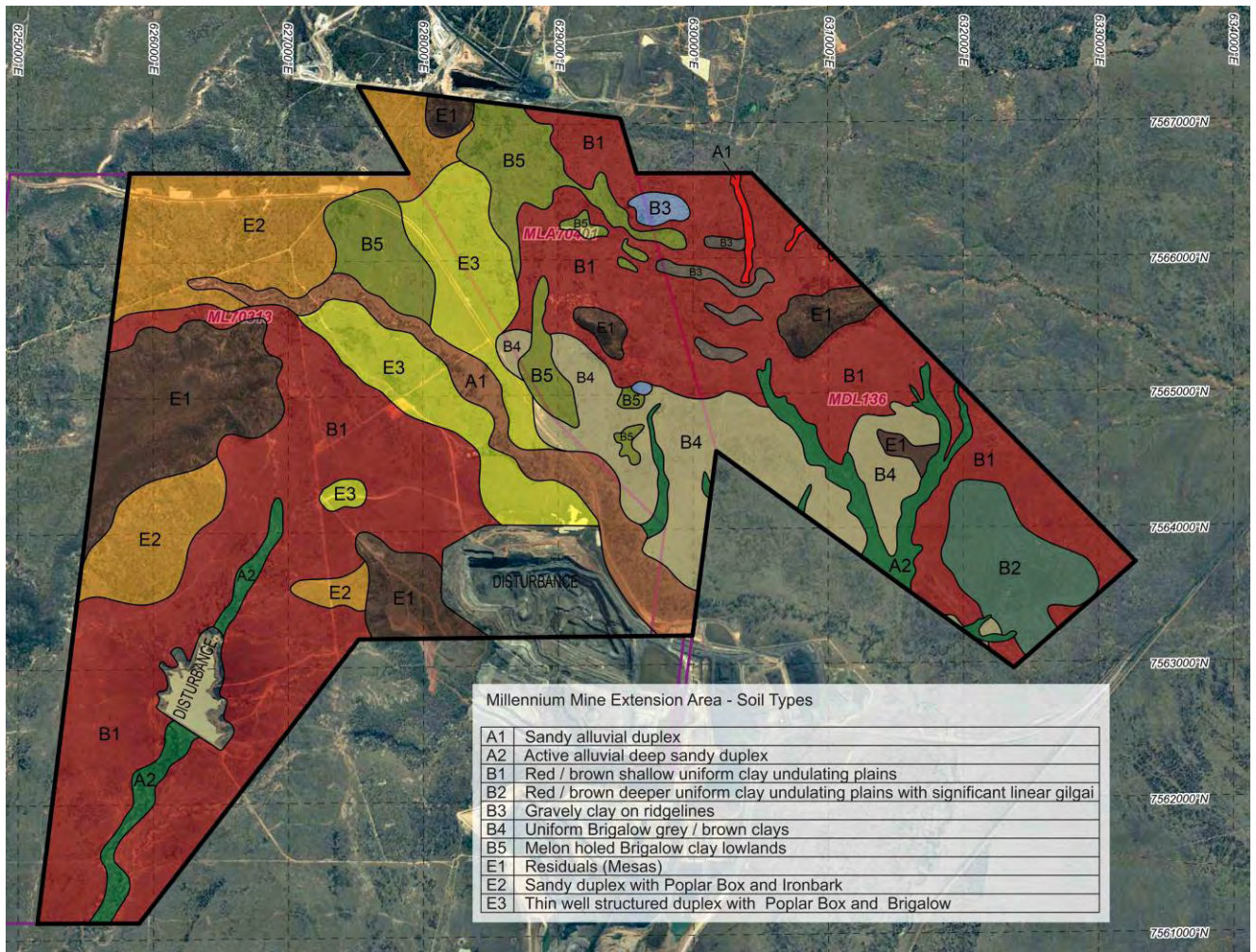
TABLE 2 PRINCIPAL SOIL TYPES – MILLENNIUM EXTENSION AREA

Soil Type	Concept	Description
A1	Riverine deep hard setting uniform to duplex sandy clays.	Medium to hard setting sandy clays alongside New Chum Creek and in minor drainage lines throughout the area. Clays become coarser and harder with depth. Riverine species such as Moreton Bay Ash, Bauhinia, Forest Red Gum and River Red Gum predominate. Minor areas of deep alluvial sands in New Chum creek and minor tributaries included.
A2	Alluvial – Uniform Brigalow clay drainage lines	Deep, generally alkaline with carbonate nodules, possibly bleached A2 horizon, uniform medium sandy clay which is non-cracking. This soil occupies clay drainage lines leading into the New Chum Creek. Brigalow regrowth predominates with Blackbutt and Bauhinia also present.
B1	Red / brown uniform clay and thin duplex undulating plains on weathered sandstone	Undulating plains up to 5 % slope of mostly cleared Brigalow, Blackbutt and Bauhinia. A firm to hard setting clay loam or sandy clay surface, often cracking and very gravely overlies stiff medium sandy clays which are pale brown coloured. Ironstone and silcrete gravels typically cover 10 -15% of surface. Weathered sandstone parent material or gravels generally predominate at 80 cm depth or greater.
B2	Red / brown deeper uniform clay undulating plains with significant linear gilgai	Similar soil to B1 but with quite prominent linear gilgai pattern. Undulating plains up to 5 % slope of mostly cleared Brigalow, Blackbutt and Bauhinia. The shallow parallel linear gilgai pattern appears to be reflective of weathering processes developed on the folded sequences of shallow underlying sedimentary rock.
B3	Gravelly clay on Ridgelines	A common inclusion with B1. Relic ridgelines and scree slopes associated with residual mesas. Rocky / gravelly non-cracking, crusting red brown clay or thin duplex surface overlaying very pale and coarse structured light sandy clays and weathering soft sandstones. Weathering sandstones may outcrop in some areas. Mostly cleared of Brigalow, Blackbutt and Poplar Box. Current bush and Leichhardt Bean are common.
B4	Deep uniform Brigalow grey / brown clay on level plains.	Generally deep uniform non-cracking grey/brown to red brown clay on level to undulating plains, The surface is generally sandy clay with occasional sandstone rocks and gravels. Includes areas of normal gilgai (up to 40cm deep) which may crack. Mostly cleared of Brigalow and Blackbutt
B5	Melon holed Brigalow clay lowlands	Approx. 50% or more of land surface is melon holed (40-100cm deep) with massive hard yellow brown to brown cracking clays. Outcrops of ironstone, silcrete gravels, cobbles and rocks commonplace. Some melon holes up to 1.5 m deep and 20m across. A highly irregular landscape. Area supported Brigalow before clearing.
E1	Residuals (Mesas)	Mixture of outcropping sandstone and silcrete rock, skeletal and shallow, gravely duplex soils with a range of vegetation. Includes mesa tops and rugged margins. Variable profile but surface often Very hard, Reddish Brown 5YR5/3 sandy loam, no mottles, few coarse fragments, poor structure. Field pH 6.0 and deeper profile is sandy clay reddish to yellowish Brown 7.5YR5/6, field pH 6.0, extensive gravels and rock.
E2	Deeper sandy duplex Eucalypt plains	Undulating plains of Poplar Box, Narrow Leaf Ironbark and occasional Blackbutt and minor areas of Brigalow. Duplex soils with 30-50cm sandy loam over hard yellow/ brown clays, often with a bleached A2. The sandy upper layer thickens considerably in localised areas where sand wash from mesa erosion has occurred for very long periods.
E3	Moderately thin sandy duplex soils	Hardsetting duplex soils with thin (<30cm) sandy loam A horizon. Brigalow and Poplar Box.

TABLE 3 SAMPLING SITES

Soil Type	Representative / Laboratory Sites	Sites in ML 70401 described in Poitrel EIS (2004)		Sites in ML70401 and MDL136 described in Mavis Downs Survey (2006)		Sites in ML70313 described in MEP Survey (2009)	
		Detailed	Non- detailed	Detailed	Non- detailed	Detailed	Non- detailed
A1	39, 111	100, 111	263,264,265, 267	39,47		311,	301, 323
A2	36, 79	79		2, 9, 35,36	24	318, 340	
B1	27, 71, 306	71	157,262	10,14,20,25,27, 34,45,50,51,55, 64.	18,11,21,26,28, 29,43,46,52,53, 54,59,65.	306, 308, 309, 325, 326, 328, 330, 333, 334, 337, 341,	307, 336, 338,339,
B2	38	113	159	38	44	-	-
B3	6	160,164,	156	5, 6, 7, 8, 19.	17, 22.		314, 335
B4	1, 88	88,	266	1, 3, 33, 48, 57, 61, 62.	4, 12, 16, 23, 30, 32, 37, 49, 56, 58, 60, 63.		
B5	40A, 40B, 94	94, 96	95,97,98,99	15,40a, 40b,	13	321	344
E1	-	-			66		310, 315, 329
E2	31	91		31,41,42		319, 322,	320, 324, 342, 343
E3	302, 317, 75	101,	102,222,223,23 5,236, 237,238, 239, 242			302, 313, 316, 317	303,304, 305,312, 327.

FIGURE 2 SOIL TYPES IN MILLENNIUM EXPANSION AREA



1.2 SOIL TYPES

A1 : Sandy Alluvial Duplex



CONCEPT Active alluvia with sandy texture contrast soils.

MAJOR SOIL FEATURES

- Alluvial profile which is mostly a duplex soil with loamy sands generally extending in a range 15 - 40cm over hard brown clay. Isolated areas have a much deeper sandy upper layer.
- The surface is firm sandy.
- Reaction trend is neutral becoming alkaline.
- Generally low plant available water which varies with depth of the upper layer.
- Overall the surface soil layer has low fertility, non dispersive, saline or sodic but is best used in level rehabilitation due to a predisposition to set hard and erode.

SUMMARY

The soil is productive grazing land but is not suited to cropping. It occupies the floodplain and channel of New Chum Creek. The soil is generally a hard setting sandy loam with a bleached A2 over hard, coarse structured medium yellow clay often heavily mottled. The depth of the sandy upper horizon is generally in a range of 35-50cm but may exceed 100cm. Poplar Box mixed woodlands predominate with occasional associated Brigalow. It occurs on 0 - 2% slopes, is susceptible to occasional flooding and supports generally sparser levels of Buffel than found elsewhere on the site.

The surface soil is dominated by fine to coarse sand over alkaline clay subsoils which may be saline and sodic. Nutrient levels are very low, typical of duplex country in the region. The surface has very low fertility and may tend to set hard given the proportion of fine sand and silt sized fraction. The effective soil depth is restricted mainly to the depth of the A horizon. Nitrogen and phosphorus is low, hence this soil will respond well to superphosphate application for pasture establishment.

Topsoil stripping for rehabilitation should avoid any contamination from the clay subsoil. The soil may be stripped moist or dry. Typically the soil can be stripped between 20 cm to 40 cm and should not extend into the bleached layer (if present) and/or the clayey B horizon. The upper sandy layer will be useful on rehabilitation of level surfaces such as dump tops.


Trafficability is poor when wet, particularly once the subsoil wets out. This soil unit is susceptible to erosion, particularly on slopes leading into New Chum Creek. Thus clearing and or compacting of slopes above the Creek should be undertaken with this in mind.

REPRESENTATIVE SITES

Two representative sites have been sampled.

- Site 39 (deep sandy duplex with 80cm A horizon over clay) and,
- Site 111 (thin duplex with 15cm A horizon over clay). The most common type.


A1 Representative Site 39

Soil Type	A1	
Concept	Well drained deep sandy clay alluvia, gradational and duplex of mixed Riparian vegetation including Moreton Bay Ash, Bauhinia and Forest Red gum and Bloodwood.	
AMG Reference:	630133E, 7563507N	
Site No	39	
Australian Soil Classification	Stratic Rudosol	
Landform Element	Flat	
Landform Pattern	Relic alluvial plain.	
Slope %	0	
Microrelief	None	
Surface condition	Firm sandy.	
Land Condition	Good condition.	
Land Use	Was grazed by beef cattle	
Major Vegetation Form and Type	Alluvial creek channel 5 -10 m wide. Tall Open Forest, riparian vegetation. Moreton Bay Ash, Bauhinia, Forest Red Gum, River Red Gums, Occasional Blood wood. Buffel>50%.	
Samples for analysis	0-10cm, 80-90cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – Class 5 unsuitable with major limiting factor(s) moisture availability and flooding susceptibility Grazing: Class 3 suitable with limitations from possible flooding, soil physical factors and moisture availability. Stocking rate*: 8-10 ha/AE	


SOIL PROFILE: Site 39

Horizon	Depth cm	Description
A11	0-35	5YR3/4, hard setting massive sandy clay, Field pH 7.0
A12	35 – 80	5YR4/3, massive hard setting sandy clay, Field pH 7.0
B21	80-120+	5YR4/3, hard setting medium heavy silty clay ph 6.5
Recommended Topsoil Strip Depth		30cm
Preferred Rehabilitation Application		Hard setting media – only for use on level ground.

SURFACE FEATURES: SITE 111 (from Poitrel EIS)

Soil Type	A1	
Concept	<i>Sandy duplex alluvial plain with mixed poplar box scrub.</i>	
AMG Reference	631239 mE 7554582 mN	
Site No	41 (Poitrel EIS) – Site 111 in Millennium Expansion Area Survey	
Australian Soil Classification	Brown Sodosol	
Landform Element	Drainage line	
Landform Pattern	199m Flat alluvial plain	
Slope %	<0.5%	
Microrelief	None.	
Surface condition	Sandy, non cracking, hardsetting, no stone or rock	
Land Condition	Quite bare and eroding in drainage line, stable above	
Land Use	Being grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with remnant Blackbutt, Bauhinia, Leichardt bean, Poplar Box and Brigalow. Buffel pasture 40% cover	
Samples for analysis	0-10, 50-60 cm	
Land Suitability Summary.	Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	<p>Cropping – Class 5 unsuitable with major limiting factor(s) moisture availability (5).</p> <p>Grazing – Class 3 suitable with major limitations from moisture (3), fertility (3).</p> <p>Stocking rate 8 - 10 ha/AE</p>

SOIL PROFILE: SITE 111

		Horizon	Depth	Description
	0.0m	A11	0-15	Dark Brown 10YR4/3 , sandy loam, no mottles or coarse fragments, loose and massive. Field pH 6.5, clear to;
	0.2m	B21	15-45	Brown 7.5YR5/6, medium clay (sandy), field pH 7.0, some yellow mottles and fine sandstone gravel (<10%), very hard angular blocky. Gradual to;
	0.4m	B22	45 – 100+	Brown 7.5YR4/4, medium clay (sandy), field pH 8.0, mottles increasing with calcium carbonate nodules and gravel, very hard angular blocky.
		Recommended Topsoil Strip Depth		10 -15 cm
	0.8m	Preferred Rehabilitation Use		Flat sites only due to high erosion potential. Place to 250mm depth

CHEMICAL ANALYSIS : Site 39 and 111 (Poitrel EIS)

ANALYTE	UNIT	Site 39		Site 111		Comments
		0-35cm	100-110	0-10cm	50-60 cm	
pH - Water		6.83	7.48	6.4	8.3	Neutral to slightly alkaline
Electrical Conductivity	dS/m	0.02	0.05	0.02	1.00	Very low throughout
Phosphorus - Colwell extr	mg/kg	9		2		low
Organic Matter	%	0.8				low
Nitrogen	mg/kg	445.0				low
NO3-N ppm				3.7		low
Boron	mg/kg	<0.5		0.1		low
Sulphur - KCl	mg/kg	<1.0		2		low
Calcium	mg/kg	830		0.3		low
Sodium	mg/kg	4.4				low
Potassium	mg/kg	72				low
Magnesium	mg/kg	120		8.9		Non limiting
Aluminium	mg/kg	0				low
Exch Calcium	meq/100g	4.15		3.75	27.72	ok
Exch Sodium	meq/100g	0.02	<1	0.18	3.65	Very low
Exch Potassium	meq/100g	0.18		0.28	1.11	ok
Exch Magnesium	meq/100g	0.99		1.40	9.74	ok
Exch Aluminium	meq/100g	0.00		0.10	0.21	ok
CEC	meq/100g	5.34		5.71	42.43	Very low but increasing in subsoil
Ca/Mg Ratio		4.2		2.7	2.85	Strong stability indicated
Exchange Calcium	%	77.7				High - good
Exchange Sodium Percentage	%	0.4		3	8.6	Site 111 dispersive at 50cm
Chloride	mg/kg	31	15	9		Non saline throughout
Manganese	mg/kg	22				
Iron	mg/kg	19		27		
Copper	mg/kg	0.7		0.3		
Zinc	mg/kg	0.6		0.3		
Dispersion R1				0.72		Non dispersive

PARTICLE SIZE ANALYSIS

Site / depth	Coarse Sand%	Fine Sand%	Silt%	Clay%	comment
39 0-35cm	51	41	3	3	A classic coarse sand. Highly permeable and loose structure
111 0-10 cm	18	65	8	11	Very sandy but much higher proportion of fine sand.

A2 : Alluvial Brigalow Clay

CONCEPT Active alluvia with grey/ brown Brigalow clays

MAJOR SOIL FEATURES

- Deep, alkaline brown clay.
- The surface is usually cracking and quite firm and the sandy clays may extend beyond 2 metres.
- The surface 30-40 cm layer is a light sandy clay which usually becomes coarser and heavier textured with depth.
- May be saline and sodic at depth.
- Good plant available water storage potential.
- Very marginal crop potential due to hard, coarse structured clays at below 30cm depth.
- The depth of useable topsoil will vary with depth to the hard clay subsoil.

This soil occupies clay drainage lines leading into New Chum Creek with Brigalow regrowth predominating. The soil unit is susceptible to occasional flooding and once cleared, erosion processes become quite apparent, gully lines can be pot-holed and incised.

The soil is typical of Brigalow soils in the region in that nutrient levels are reasonable, salinity increases with depth, nitrogen levels are good and cation exchange is adequate. Phosphorus is low, hence this soil will respond well to superphosphate application for pasture establishment. Levels of salt are increasing down the profile and are moderate by 40 cm and saline by 80 cm.

Topsoil stripping for rehabilitation should avoid contamination from saline clay subsoil and a recommended maximum of 30 cm is proposed for topsoil stripping. Overall, the soil is reasonable with the major restrictions being plant moisture availability due to saline and coarse subsoils and tendency to seal due to the proportion of fine sand and silt.


The soil unit is not as susceptible to erosion as nearby duplex soils, however a predisposition for hard setting/surface sealing makes the media more suitable for level to near level slopes in future rehabilitation. The soil should not be stripped wet due to compaction potential.

REPRESENTATIVE SITES


Two representative sites have been sampled;

- Site 36 and,
- Site 79 (derived from Poitrel EIS)


REPRESENTATIVE SITE DESCRIPTION: A2

Soil Type	A2	
Concept	Clay drainage lines in Brigalow plains.	
AMG Reference:	630133E, 7563507N	
Site No	36	
Australian Soil Classification	Brown Vertosol	
Landform Element	<1%	
Landform Pattern	Relic alluvial plain.	
Slope %	0	
Microrelief	None	
Surface condition	Firm sandy clay. Weak cracking	
Land Condition	Good, minor back cutting in channel.	
Land Use	Was grazed by beef cattle	
Major Vegetation Form and Type	Alluvial creek channel 2 -5 m wide. Dense buffel and parthenium weed above channel with young Brigalow regrowth and occasional Poplar Box	
Samples for analysis	0-40cm, 100-110cm.	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – Class (5) unsuitable with major limiting factor(s) flooding susceptibility and erosion. Grazing: Class 3 suitable with limitations from soil physical factors, moisture availability, flooding potential. Stocking rate: 8 - 10 ha/AE	


SOIL PROFILE: SITE 36

	A11 0 – 3 cm Firm sandy crust
	B21 3 – 35cm : Dark grey 10YR3/3, hard angular blocky, field pH 8.0, no inclusions or segregations
	B22 35-100+ cm : Dark grey 10YR3/3, coarse very hard blocky, field pH 9.0, increasing carbonate nodules.
Recommended Topsoil Strip Depth : Typically 30 cm – do not strip into mottled zones	
Preferred Rehabilitation Application: Flat to moderately sloping sites only due to moderate erosion potential.	

REPRESENTATIVE SITE DESCRIPTION: Site 79 (from Poitrel EIS)

Soil Type	A2	
Concept	Uniform clay drainage lines with mixed Brigalow scrub.	
AMG Reference:	627847 mE 7559909 mN	
Site No	79 (from Poitrel EIS site 9)	
Australian Soil Classification	Brown Dermosol	
Landform Element	Lower drainage line	
Landform Pattern	Gently undulating plains.	
Slope %	1%	
Microrelief	Incised channels up to 1m deep. Some gilgai up to 20cm deep	
Surface condition	Fine sandy crust, non cracking, no stone or rock	
Land Condition	Evidence of minor sheet wash. Vegetation water stressed, some gully lines highly eroded.	
Land Use	Being grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with regrowth of Blackbutt, and Brigalow. Harissa cactus. Buffel pasture 30% cover.	
Samples for analysis	0-10, 40-50, 80-90 cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – Class 5 unsuitable with major limiting factor(s) soil physical factors, flooding, moisture and nutrient availability (5). Grazing – Class 3 suitable with major limitations from moisture (3), fertility (3). Stocking rate 15 ha/AE	

SOIL PROFILE: SITE 79 (from Poitrel EIS)

	0.0m	Horizon	Depth	Description
	0.1m	A11	0 - 10	Yellowish brown 10YR5/4, Medium clay (sandy), no mottles or Coarse fragments, weak subangular blocky. Field pH 6.0, clear to
	0.2m	A21	10 - 11	Sporadic bleach, field pH 5.5
	0.3m	B21	11 - 65	Dark brown 10YR3/3, medium heavy clay, field pH6.5, no mottles Few mixed small gravel (<10%), hard sub angular blocky. Gradual to;
	0.4m	B22	65 - 120+	Yellowish brown 10YR5/4, medium heavy clay, field pH 8.5, mottles increasing with calcium carbonate, manganese nodules and gravel, very hard angular blocky
	0.5m	Recommended Topsoil Strip Depth		30 cm
	0.6m	Preferred Rehabilitation Application		Flat areas

Laboratory Summary - Sites 36 and 79

Attribute	Unit	Site 36		Site 79			Comments
	cm	0-40cm	100-110cm	0-10cm	40-50cm	80-90cm	
Electrical Conductivity	dS/m	0.06	0.12	0.16	0.43	0.63	Site 36 Non saline throughout Site 79 saline below 50cm
pH - Water		7.45	8.83	6.2	7.3	9.1	desirable mildly alkaline in surface horizon
Total Nitrogen	mg/kg	1151.0					medium
NO3-N	ppm	59.4					high
Manganese	mg/kg	23		33.1			medium – non limiting
Iron	mg/kg	30		30			non limiting
Copper	mg/kg	1.4		1.4			medium – non limiting
Zinc	mg/kg	0.8		0.6			medium – non limiting
Calcium	mg/kg	2900					moderate / high
Sodium	mg/kg	12					low - non limiting
Potassium	mg/kg	150					ok - non limiting
Magnesium	mg/kg	460					ok - non limiting
Aluminium	mg/kg	0					ok - non limiting
Exchangeable Calcium	meq/100g	14.39		11.06	27.6	9.55	non limiting
Exchangeable Sodium	meq/100g	0.05		0.42	4.1	0.5	low - non limiting
Exchangeable Potassium	meq/100g	0.39		0.79	0.54	0.39	non limiting
Exchangeable Magnesium	meq/100g	3.83		3.25	13.7	3.15	non limiting / high
Exchangeable Aluminium	meq/100g	0.00		0.36	0.17	0.12	ok
CEC	meq/100g	18.66		15.9	46.1	13.7	moderate
Calcium/Magnesium Ratio		3.8		3.4	2.0	3.0	high - good
Exchange Calcium	%	77.1					ok
Exchange Sodium	%	0.3	0.7	4	8.9	3.8	Low dispersible tendency
Exchange Potassium	%	2.1					ok
Exchange Magnesium	%	20.5					ok
Exchange Aluminium	%	0.0					ok
Sulphur - KCl	mg/kg	1.7		6			very low
Boron	mg/kg	0.5		0.2			low
Organic Matter	%	2.8		3.7			Moderate / high
Chloride	mg/kg	13	14	54			very low throughout
Phosphorus - Colwell extr	mg/kg	12					low
P (Olsen)	ppm	2					Very low
R1 dispersion				0.46			Very low

PARTICLE SIZE ANALYSIS 0-10CM: SITE 79 (from Poitrel EIS)

Coarse Sand%	Fine Sand%	Silt%	Clay%	Comments
11	30	29	34	Soils with proportions of fine sand and silt exceeding 50% in the presence of about 30% (as this soil is) tend to exhibit more severe physical problems leading to sealing and coarse, hard structure.

B1 : Red Brown Deeper Uniform Clay Undulating Plains

CONCEPT Uniform non-cracking red brown clays on mostly cleared undulating plains previously with mixed Brigalow scrub.

MAJOR SOIL FEATURES

- Non cracking alkaline red/brown clay.
- The surface is firm to hard setting and sandy and is often very gravelly and cobbled.
- The surface 20-25 cm layer is a light sandy clay which usually becomes coarser and heavier textured with depth.
- Non saline to 20cm but saline by 50cm.
- Restricted plant available water storage potential.
- Unsuitable for cropping due to hard, coarse structured clays below 30cm depth.
- The depth of useable topsoil will vary with depth to the hard clay subsoil (average 20 cm).
- Includes areas of B3 soil too small to map out at this scale.

This soil covers a substantial proportion of the survey area and occupies undulating plains up to 5 % slope of mostly cleared Brigalow, Blackbutt and Bauhinia. The surface is firm to hard setting and sandy and is often very gravelly and cobbled. Below lay stiff medium sandy clays which are neutral and red to brown coloured. Sheet wash erosion is common place following clearing. Ironstone and silcrete gravels can be typically up to 10 -15% of surface cover. Deeper in the profile 70-150cm, weathered sandstone parent material or gravels generally predominate.

The soil is not susceptible to flooding. Nitrogen levels are quite good but phosphorus is low. Cation exchange is adequate and this soil will respond well to superphosphate application for pasture establishment.

One probable limiting aspect of this soil (which was also noted by Baker and Tuck in the nearby Poitrel EIS) is related to the proportion of fine sand and silt which predisposes the medium to sealing and compaction, thus inhibiting water movement and root development; as well as the sporadic presence of ironstone cobbles and gravels, exposed by sheet wash.


Salinity and ESP may be problematic below 50cm depth and topsoil stripping for rehabilitation should avoid contamination from this saline, very hard and coarse structured clay subsoil. A recommended maximum of 20 cm is proposed. Overall, the soil is reasonably fertile with the major restrictions being the physical makeup which predisposed poor drainage and high erosion rates. The soil should not be stripped wet due to compaction potential.

REPRESENTATIVE SITES

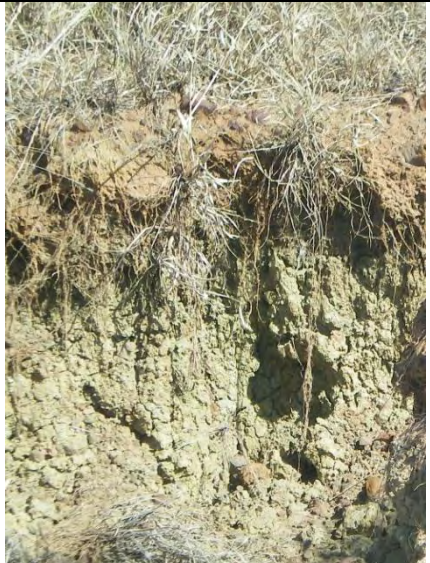
Two representative sites have been sampled;

- Site 27 and,
- Site 71 (derived from Poitrel EIS site 1)

SURFACE FEATURES: SITE 27


Soil Type	B1	
Concept	Uniform non cracking red brown clays on mostly cleared undulating plains previously with mixed Brigalow scrub.	
AMG Reference:	630256 E 7565310 N	
Site No	27	
Australian Soil Classification	Red Brown Dermosol	
Landform Element	Crest	
Landform Pattern	Undulating plains.(remnant ridge)	
Slope %	3	
Microrelief	none	
Surface condition	Hardsetting and sandy, non cracking. Mixed lateritic, hard conglomerates, silcretes and siliceous sandstones (<6mm) 10% cover and rocks (6 – 25mm) 5%,	
Land Condition	Significant sheet wash	
Land Use	Previously grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with small droughted regrowth of Bauhinia, Current Bush and Brigalow. Quite thin vegetation cover with buffel pasture 20% and less. Suggestions of heavy grazing pressure.	
Samples for analysis	0-20, 50-60 cm.	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.		Cropping - Class 5 unsuitable with major limiting factor(s) moisture availability and susceptibility for erosion. Grazing - Class 3 with erosion susceptibility, moisture limitations. Stocking rate - 8 ha/AE

SOIL PROFILE: SITE 27


	<p>A1 0-25 cm Reddish brown 5YR3/4. Sandy clay. Field pH 7.0, occasional gravel, no inclusions or no bleach or mottles, clear to; Clay becomes very massive below about 25cm.</p> <p>B21 25-150+ cm Hard and massive sandy clay. Yellow brown 7YR5/6 with field pH 8.0. Carbonate and manganese nodules common. Some mottling. Roots to 35cm.</p>
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Recommended Topsoil Strip Depth	20 cm
Preferred Rehabilitation Application	Offers better erosion resistance than duplex soils generally, but nonetheless is prone to sheet wash and care needs to be taken with its use on sloping ground.

SURFACE FEATURES: SITE 71

Soil Type	B1	
Concept	Uniform non cracking clay on mostly cleared undulating plains previously with mixed Brigalow scrub.	
AMG Reference:	627618 mE 7556677 mN	
Site No	71 (from Poitrel EIS site 1)	
Australian Soil Classification	Red Dermosol	
Landform Element	Crest	
Landform Pattern	Undulating plains.(remnant ridge)	
Slope %	3	
Microrelief	none	
Surface condition	Mixed lateritic stone (<6mm) 35% cover and rocks (6 – 25mm) 5%, Hardsetting and sandy, non cracking.	
Land Condition	Significant sheet wash	
Land Use	Being grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with a few Poplar Box remaining. Regrowth of Bauhinia, Current Bush and Brigalow. Quite thin vegetation cover with buffel pasture 10%. Suggestions of heavy grazing pressure.	
Samples for analysis	0-10, 30-40, 60-70 cm.	
Land Suitability Summary. Stocking rate recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.		Cropping - Class 5 unsuitable with major limiting factor(s) moisture, workability, nutrients Grazing – Class 3 with major limiting factor(s) erosion susceptibility, moisture availability and nutrient availability. Stocking rate – 8-10 ha/AE

SOIL PROFILE: SITE 71

0.0m		Horizon	Depth cm.	Description	
0.1m		0.7m	A1	0 - 15	Reddish brown 5YR4/4. Sandy clay. Field pH 6.5, no inclusions or gravel, no bleach or mottles, clear to;
0.2m		0.8m	B21	15 – 55	Red 2.5YR4/6 , Medium clay (sandy), no mottles or Coarse fragments, weak sub-angular blocky. Field pH 6.0, clear to;
0.3m		0.9m	B22	55 - 100	Dark brown 7.5YR4/6, medium clay, field pH 6.0, some grey mottles. Few mixed small gravel (<10%), hard sub angular blocky. Gradual to;
0.4m		1.0m	BC	100 - 120+	Yellowish brown 10YR5/4, medium clay, field pH 6.5, mottles with increasing weathered sandstone and gravel.
0.5m		1.1m	Recommended Topsoil Strip Depth		20-25 cm
0.6m		1.2m	Preferred Rehabilitation Application		Place 25cm. All areas – preferably flatter areas

Laboratory Summary - Sites 27 and 71

Attribute	Unit	Site 71			Site 27		Comments
		0-10 cm	40-50 cm	60-70 cm	0-20 cm	50-60 cm	
Depth sampled	cm	0-10 cm	40-50 cm	60-70 cm	0-20 cm	50-60 cm	
Electrical Conductivity	dS/m	0.09	0.06	0.06	0.11	0.76	Non saline to 20cm (site 27) and 70cm (site 71). Site 27 saline below 30cm
pH - Water		6.9	7.8	7.9	7.00	8.94	desirable mildly alkaline in surface horizon becoming more alkaline
Total Nitrogen	mg/kg				2341.0		moderate
NO3-N	ppm	23.5					high
Manganese	mg/kg				35		medium – non limiting
Iron	mg/kg	13			22		non limiting
Copper	mg/kg	0.8			1.6		medium – non limiting
Zinc	mg/kg	0.5			2.0		medium – non limiting
Calcium	mg/kg				3600		moderate / high
Sodium	mg/kg				37		low - non limiting
Potassium	mg/kg				170		ok - non limiting
Magnesium	mg/kg	60.3			280		ok - non limiting
Aluminium	mg/kg	0.11			0		ok - non limiting
Exchangeable Calcium	meq/100g	11.0	14.8	12.7	18.16		non limiting
Exchangeable Sodium	meq/100g	0.41	0.38	0.39	0.16		low - non limiting in surface
Exchang Potassium	meq/100g	1.39	0.88	0.34	0.43		non limiting
Exch Magnesium	meq/100g	1.96	3.94	4.39	2.35		non limiting
Exchangeable Aluminium	meq/100g	0.11	0.17	0.38	0.00		ok
Cation Exchange	meq/100g	14.7	20.2	18.2	21.10		Ok - moderate
Calcium/Magnesium Ratio		5.6	3.8	2.9	7.7		high – good throughout
Exchange Calcium	%				86.1		ok
Exchange Sodium	%	2.8	1.9	2.1	0.8	14.7	non dispersible in surface but becoming sodic by 50cm site 27
Exchange Potassium	%				2.0		ok
Exchange Magnesium	%				11.1		ok
Exchange Aluminium	%				0.0		ok
Sulphur - KCl	mg/kg	8			5.9		low
Boron	mg/kg	0.8			0.7		low
Organic Matter	%	1.9			5.1		high
Chloride	mg/kg	25			21	861	very low at surface but high by 50cm.
Phosphorus - Colwell extr	mg/kg				14		low
P (Olsen)	ppm	3					low

PARTICLE SIZE ANALYSIS 0-10CM: SITE 71 (Poitrel EIS)

Coarse? Sand%	Fine? Sand%	Silt%	Clay%	Comments
17	28	12	46	Overall, no problems are indicated. Fine sand content may facilitate some degree of sealing and hardsetting but not severe

B2 : Red Brown Uniform Clay with Linear Gilgai

CONCEPT Similar soil to B1 but with prominent dark clay linear gilgai pattern.


MAJOR FEATURES

- Non cracking alkaline red/brown clay with prominent dark clay linear gilgai pattern.
- The surface of the redder soil is firm to hard setting and sandy. The dark gilgai areas are usually crusting and possibly cracking.
- The surface 20-25 cm layer of the red material is a light sandy clay which becomes coarser and heavier textured with depth.
- Non saline to 80cm but hard coarse structure evident below 30cm depth
- Restricted plant available water storage potential.
- Unsuitable for cropping due to hard, coarse structured clays below 30cm depth.
- The depth of useable topsoil averages 20 cm.

These soils are restricted to the southern portion of MDL136 and comprise undulating plains up to 5 % slope of mostly cleared Brigalow, Blackbutt, Bauhinia and Currant Bush. The soil has a firm to hard setting sandy surface, which is often very gravelly and cobbled. Below the soil comprises a stiff medium sandy clay which is neutral and red to brown coloured. Weathered parent material or gravels generally predominate by 80 cm depth. Shallow parallel linear gilgai is present and appears to be reflective of weathering processes developed on the folded sequences of shallow underlying sedimentary rock.

The surface soil is reasonably fertile, non sodic or saline. Subsoil horizons are also non saline or sodic with major limitations being physical factors.

SURFACE FEATURES: SITE 38

Soil Type	B2	
Concept	Uniform non cracking red brown clays on mostly cleared undulating plains with strong shallow linear Gilgai presence.	
AMG Reference:	6302080 E 7563554 N	
Site No	38 (Mavis Downs Survey 2006)	
Australian Soil Classification	Red Brown Dermosol and Red Chromosol	
Landform Element	Crest	
Landform Pattern	Undulating plains	
Slope %	2-5%	
Microrelief	None	
Surface condition	Hardsetting and sandy, non cracking. Mixed lateritic, hard conglomerates, silcretes and silicious sandstones (<6mm) 10% cover and rocks (6 – 25mm) 5%, Shallow parallel Gilgai difficult to distinguish at ground level, but clearly evident from aerial photo or elevated vantage point.	
Land Condition	Significant sheet wash	
Land Use	Grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with regrowth of Bauhinia, Currant Bush and Brigalow. Quite thin vegetation cover with buffel pasture 20% and less. Suggestions of heavy grazing pressure.	
Samples for analysis	0-20, 50-60 cm.	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	<p>Cropping - Class 5 unsuitable with major limiting factor(s) moisture, erosion potential, nutrient availability</p> <p>Grazing - Class 3 with major limiting factor(s) erosion susceptibility, moisture limitations.</p> <p>Stocking rate – 8-10 ha/AE</p>	
Topsoil Stripping Depth	20 cm	

SOIL PROFILE: SITE 38



A1 0-30 cm
Sandy clay, 5YR4/4 , Weak blocky structure, no gravel or inclusions, Field pH 6.5

B21 30 – 50 cm
Light clay with increasing carbonate concentration and mottles, 5YR4/4, Field pH 8.0

B22 50-120cm+
Sandy clay merging into soft weathered grey sandstone parent material, 5YR5/4, Field pH 8.0.

120+ cm grey weathered sandstone

Laboratory Summary - Site 38

Attribute	Unit	Site 38			comments
		0-40	40-50	100-110	
Depth sampled	cm	0-40	40-50	100-110	
Electrical Conductivity	dS/m	0.13	0.10	0.08	Non saline throughout
pH - Water		7.60	8.57	8.88	desirable mildly alkaline in surface horizon
Nitrogen	mg/kg	877.0			low
Manganese	mg/kg	19			medium – non limiting
Iron	mg/kg	8			non limiting
Copper	mg/kg	1.0			medium – non limiting
Zinc	mg/kg	0.9			medium – non limiting
Calcium	mg/kg	2800			moderate / high
Sodium	mg/kg	14			low - non limiting
Potassium	mg/kg	370			ok - non limiting
Magnesium	mg/kg	170			adequate
Aluminium	mg/kg	0			ok - non limiting
Exchangeable Calcium	meq/100g	13.83			high - non limiting
Exchangeable Sodium	meq/100g	0.06			low - non limiting in surface but becoming sodic by 50cm.
Exchangeable Potassium	meq/100g	0.95			non limiting
Exchangeable Magnesium	meq/100g	1.38			slightly limiting
Exchangeable Aluminium	meq/100g	0.00			ok
Cation Exchange	meq/100g	16.22			good- non limiting
Calcium/Magnesium Ratio		10.0			high - good
Exchange Calcium	%	85.3			ok
Exchange Sodium	%	0.4	0.2	0.3	non dispersible throughout
Exchange Potassium	%	5.9			ok
Exchange Magnesium	%	8.5			ok
Exchange Aluminium	%	0.0			ok
Sulphur - KCl	mg/kg	3.7			very low
Boron	mg/kg	<0.5			low
Organic Matter	%	1.8			moderate
Chloride	mg/kg	25	18	10	very low throughout
Phosphorus - Colwell ex	mg/kg	28			moderate
Coarse Sand%	Fine Sand%	Silt%	Clay%	Comments	
17	28	12	46	Overall, no problems are indicated. Fine sand content may facilitate some degree of sealing and hardsetting but not severe	

B3 : Gravely Brigalow Grey Brown Clays on Ridgelines

CONCEPT Soils associated with ridgelines and scree slopes of residual mesas.


MAJOR FEATURES

- Minor soil type in this area
- Uniform non-cracking red brown clay and thin duplex with hardsetting sandy clay surface.
- The surface is firm to hard setting, sandy and is often very gravely and cobbled.
- The surface 20-25 cm layer is a light sandy clay which becomes coarser and heavier textured with depth.
- Non saline to 80cm but hard coarse structure evident below 30cm depth
- Restricted plant available water storage potential.
- Unsuitable for cropping due to hard, coarse structured clays below 30cm depth.
- The depth of useable topsoil averages 20 cm.

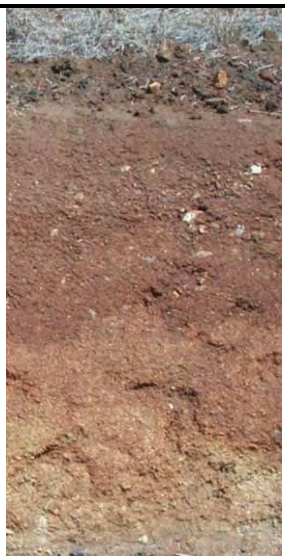
The soils are basically shallow light sandy clays over weathering soft sandstone parent material. Occasional weathering sandstones outcrop on ridgelines. Mostly cleared of Blackbutt, Brigalow and associated Poplar Box. Currant bush and Leichardt bean is common.

The soil is reasonably fertile, non saline or sodic throughout and non dispersive however they are quite shallow with very hard and often gravely subsoil which significantly limits moisture availability for plants.

REPRESENTATIVE SITE DESCRIPTION: B3

Soil Type	B3	
Concept	Uniform non-cracking red brown clay and thin duplex with hardsetting sandy clay surface associated with ridgelines and scree slopes of residual mesas..	
AMG Reference:	630296E, 756552N	
Site No	6 (from Mavis Soil Survey 2007)	
Australian Soil Classification	Brown and Red Dermosol	
Landform Element	Crest of small ridge	
Landform Pattern	Gently undulating plain	
Slope %	Level to 4%	
Microrelief	Occasional slight gilgai.	
Surface condition	Surface tends to be hard, non-cracking and sandy with areas of ironstone gravel cover.	
Land Condition	Generally good, with minor areas of sheet erosion.	
Land Use	Was grazed by beef cattle.	
Major Vegetation Form and Type	Previous Brigalow with associated scrub species including Current Bush, Bauhinia and Whitewood. Occasional Poplar Box.	
Samples for analysis	0-20cm, 50-60cm and 80-90cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	<p>Cropping – Class 5 unsuitable with major limiting factor(s) moisture availability (5), effective soil depth for crops,</p> <p>Grazing: Class 4 suitable with limitations from moisture (3/4), effective rooting depth (2), fertility (2), erosion (2).</p> <p>Stocking rate: 10-12 ha/AE</p>	
Recommended Topsoil Strip Depth:	20cm	
Preferred Rehabilitation Application:	Place 20 cm depth. Preferred on sloping areas ahead of sandy duplex soils.	

SOIL PROFILE: SITE 6

	0 cm	A1 0-20 cm Coarse sandy clay, weak blocky structure, reddish brown 5.0YR4/4 , field pH 7.0. Non cracking,
	20 cm	B21 20-60 cm Sandy clay, hard angular blocky , light brown 7.5YR6/4 , field pH 7.5
	60 cm	BC 60 – 90 cm Decomposing soft grey-brown sandstone, 7YR6.4, field pH 8.0, soft carbonate common.
	90 cm	C 90+ cm fine to medium grained sandstone 7YR6/4, field pH 8.0

Laboratory Summary - Site 6

Depth sampled	cm	0-20	50-60	80-90	Comments
Electrical Conductivity	dS/m	0.14	0.10	0.10	Non saline throughout
pH - Water		8.43	8.70	8.81	moderately alkaline throughout
Nitrogen	mg/kg	1153.0			low
Manganese	mg/kg	12			medium – non limiting
Iron	mg/kg	8			non limiting
Copper	mg/kg	0.4			medium – non limiting
Zinc	mg/kg	0.5			medium – non limiting
Calcium	mg/kg	4900			moderate / high
Sodium	mg/kg	17			low - non limiting
Potassium	mg/kg	360			ok - non limiting
Magnesium	mg/kg	53			adequate
Aluminium	mg/kg	0			ok - non limiting
Exchangeable Calcium	meq/100g	24.65			high - non limiting
Exchangeable Sodium	meq/100g	0.07			low - non limiting in surface but increasing
Exchangeable Potassium	meq/100g	0.93			non limiting
Exchangeable Magnesium	meq/100g	0.44			slightly limiting
Exchangeable Aluminium	meq/100g	0.00			ok
Cation Exchange	meq/100g	26.09			good- non limiting
Calcium/Magnesium Ratio		56.0			high - good
Exchange Calcium	%	94.5			ok
Exchange Sodium	%	0.3	0.5	1.3	non dispersible throughout
Exchange Potassium	%	3.6			ok
Exchange Magnesium	%	1.7			ok
Exchange Aluminium	%	0.0			ok
Sulphur - KCl	mg/kg	6.7			very low
Boron	mg/kg	0.8			low
Organic Matter	%	2.4			moderate
Chloride	mg/kg	28	18	22	very low throughout
Phosphorus - Colwell extr	mg/kg	20			moderate
PSA 0-10cm depth					
Coarse Sand%	Fine Sand%	Silt%	Clay%	comment	
12	54	10	26	Soils with proportions of fine sand and silt exceeding 50% in the presence of about 30% clay tend to exhibit more severe physical problems leading to sealing and coarse, hard structure.	

B4 : Better Structured Brigalow Red Brown Clays

CONCEPT Deeper and better structured clays over weathered sandstone.

MAJOR FEATURES

- The most productive soil type in the survey area.
- Quite widespread in lower slope positions adjacent to New Chum Creek.
- Uniform cracking and non-cracking red brown clays.
- The surface is usually firm and sandy.
- The surface 20-25 cm layer is a light sandy clay which becomes coarser and heavier textured with depth.
- The subsoils are reasonably well structured and drained to about 40 cm but somewhat dispersive. Below this depth they become harder and mottled.
- May become saline, sodic and dispersive below 40 cm
- Restricted plant available water storage potential below 40 cm.
- Excellent grazing soil but very marginal cropping due to restricted effective soil depth of about 50cm maximum.
- The depth of useable topsoil may extend to 50cm (Averages 40 cm).

This is the better soil unit of the local area which is a generally non-cracking uniform friable grey/brown to red brown light textured clay on level to undulating plains. Brigalow regrowth is generally in better condition than on other clay soil units, generally more moisture noted deeper into the profile.

The surface is generally sandy clay with occasional sandstone rocks and gravels and includes areas of normal gilgai (up to 30cm deep) which may crack.


Overall the soil has reasonable surface fertility. Phosphorus and nitrogen are low to just adequate and cation exchange capacity is high and reflected by very high calcium and magnesium. Organic matter levels are moderate in the surface. The profile becomes sodic and saline below about 50cm and Ca:Mg ratios are good to 60cm. From a chemical viewpoint, site 1 could be stripped to 40 cm but site 88 only to 30cm due to increasing salinity and sodicity below this depth.

REPRESENTATIVE SITES


Two representative sites have been sampled;

- Site 1 and,
- Site 88 (derived from Poitrel EIS)


REPRESENTATIVE SITE DESCRIPTION: B4

Soil Type	B4	
Concept	Generally deep well structured clays over weathered sandstone	
AMG Reference:	630089E, 7563966N	
Site No	1	
Australian Soil Classification	Brown Dermosol	
Landform Element	Midslope	
Landform Pattern	Part of undulating plain.	
Slope %	<1%	
Microrelief	None	
Surface condition	Firm non cracking sandy surface, little gravel, near level, moist to 80cm	
Land Condition :	Excellent condition with no surface erosion.	
Land Use :	Was grazed by beef cattle	
Major Vegetation Form and Type	Small healthy Brigalow regrowth. 70% buffel or greater.	
Samples for analysis	0-15cm, 60-80cm, 90-100cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – marginal Class 4. Insufficient moisture storage most years. Grazing: productive grazing Class 2 (erosion potential major limitation) Stocking rate: 6-8 ha/AE	
Recommended Topsoil Strip Depth	Average 30cm but possible up to 50 cm	
Preferred Rehabilitation Application	All areas would benefit from this material.	

SOIL PROFILE: SITE 1


	A11 0 – 2 cm fine granular light clay
	B21 2 – 15cm Fine sandy clay, dark yellowish brown 10YR3/4, strong sub-angular blocky, well drained, no carbonate nodules. Field pH 7.0.
	B22 15-60 cm. Medium clay, dark brown 10YR3/3, firm sub-angular blocky, moderate carbonate nodules, no mottling, field pH 8.5.
	B23 60-120cm Medium heavy clay, strong brown 7.5YR5/6, yellow and light brown mottles increasing, carbonate nodules. Field pH 9.0.

SURFACE FEATURES: SITE 88 (from Poitrel EIS)

Soil Type	B4	
Concept	Deep, uniform grey / brown clays on undulating plains with Brigalow regrowth	
AMG Reference:	629510 mE 7564802 mN	
Site No	88	
Australian Soil Classification	Brown Dermosol	
Landform Element	Flat	
Slope %	< 0.5%	
Landform Pattern	Gently undulating plains.	
Microrelief :	Nil	
Surface condition	No rock, weak sandy crust, non cracking.	
Land Condition	Stable.	
Land Use	Being grazed by beef cattle	
Major Vegetation Form and Type	Mostly cleared with regrowth of scattered Brigalow. Cover of buffel > 75%.	
Samples for analysis	0-10, 40-50, 80-90 cm.	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping - Class 5 unsuitable with major limiting factor s restricted effective root depth and moisture availability. Grazing - Class 2 with moisture availability main limiting factor. Possible opportunist forage in good years	

SOIL PROFILE: SITE 88

Horizon	Depth	Description
	0.0m	
A1	0 - 25	Dark brown 10YR4/3. Sandy clay. Field pH 6.0, no surface carbonate nodules, no gravel, no bleach or mottles, clear to;
B21	25 – 65	Dark yellowish brown 10YR4/4 , Medium clay (sandy), few yellow mottles, some gravel, Very hard subangular blocky. Field pH 6.5, gradual to;
B22	65 – 120+	Easier consistence, medium clay, Strong brown 7.5YR4/6, pH 7.0, no sign of weathered (PM)???
Recommended Topsoil Strip Depth		30 cm.
Preferred Rehabilitation Application		All areas. Ensure stripping is not into saline sodic material.
	0.1m	
	0.2m	
	0.3m	
	0.4m	
	0.5m	
	0.6m	



CHEMICAL ANALYSIS – Sites 1 and 88

Depth sampled	cm	Site 1			Site 88 (Poitrel EIS)			Comments
		0-15	60-80	90-100	0-10	40-50	80-90	
Electrical Conductivity	dS/m	0.14	0.47	1.14	0.12	0.74	1.31	Increasing salinity below 60cm both sites. Very high by 90cm
pH - Water		8.18	8.70	8.83	7.9	9.0	9.0	alkaline throughout
Total Nitrogen	mg/kg	1057.0						Moderately low
NO3-N	ppm	15.2						reasonable
Manganese	mg/kg	10						medium – non limiting
Iron	mg/kg	15			28			non limiting
Copper	mg/kg	1.9			1.6			medium – non limiting
Zinc	mg/kg	0.5			1.2			medium – non limiting
Calcium	mg/kg	4800						high
Sodium	mg/kg	120						low - non limiting
Potassium	mg/kg	130						ok - non limiting
Magnesium	mg/kg	610			41.9			ok - non limiting
Aluminium	mg/kg	0						ok - non limiting
Exchangeable Calcium	meq/100 g	24.07			22.15	16.70	13.60	high - non limiting
Exchangeable Sodium	meq/100 g	0.51			0.94	4.41	4.09	non limiting in surface
Exchangeable Potassium	meq/100 g	0.33			1.03	0.67	0.66	non limiting
Exchangeable Magnesium	meq/100 g	5.12			5.60	16.79	9.66	non limiting
Exchangeable Aluminium	meq/100 g	0.00			0.30	0.20	0.04	ok
CEC	meq/100 g	30.03			30.02	38.77	28.05	moderate non limiting
Ca/Ma Ratio		4.7			3.96	0.99	1.41	high - good
Exchange Calcium	%	80.2						ok
Exchange Sodium	%	1.7	10.4	17.8	3.1	11.4	14.6	non dispersible in surface but increasing with depth.
Exch Potassium	%	1.1						ok
Exch Magnesium	%	17.0						ok
Exchange Aluminium	%	0.0						ok
Sulphur - KCl	mg/kg	2.1			6			very low
Boron	mg/kg	<0.5			0.8			low
Organic Matter	%	2.4			4.9			moderate
Chloride	mg/kg	20	463	1202	22			very low in surface but high by 90cm.
Phosphorus - Colwell extr	mg/kg	17						low
P (Olsen)	ppm	6						low
Dispersion R1		0.33						no problems indicated
Coarse Sand%	Fine Sand%	Silt%	Clay%	Comments				
12	28	20	44	Well balanced physical makeup overall. Slight tendency to crust.				

B5 : Melon Holed Brigalow Clay Lowlands

CONCEPT Very coarse and saline grey and brown clays.

MAJOR FEATURES

- Very poor soil.
- Significant melon hole development dominates the surface landscape
- Uniform crusting non-cracking brown clay mounds (puffs) and crusting and cracking depressions.
- The surface 10-20 cm layer of the mounds is a light sandy clay which becomes coarser and heavier textured with depth. The depression soils are poorly drained and mottled almost to the surface.
- The subsoils are hard and poorly structured and usually highly saline, sodic and dispersive from about 20cm. They are extremely alkaline.
- Depressions will remain waterlogged for extended periods.
- Very restricted plant available water storage potential.
- Useful grazing soil but not suitable for cropping due to severe physical aspects and restricted effective soil depth.
- The depth of useable topsoil is very restricted to 10 - 15 cm from mound areas only.

The significant gilgai (melon hole) development dominates the surface landscape to the extent that it is very irregular. Approx. 50% or more of land surface is heavily melon holed (typically 40-100cm deep) with massive hard yellow brown to brown cracking clays. Outcrops of sandstone occur, (some as vertical sandstone bands with quartz) as well as ironstone, silcrete gravels, cobbles and rocks. Some melon holes are up to 1.5 m deep and 20m across. This highly irregular landscape supported Brigalow before clearing, post clearing the land has been used for grazing, however because of the mounding and associated heaving of gravels and rocks as well as the frequently bare Gilgai bases, the suitability potential is somewhat restricted.

Chemically, the 'puff' of the melon hole is very saline and sodic by 30cm depth and increasing with depth. Moderate salt was found to the surface and very little of this soil would offer value in rehabilitation due to a high probability of incorporation of saline / sodic / highly alkaline subsoil. The melon hole depression at site 40B is markedly different to the mound with low salinity and sodicity throughout with desirable pH and better overall fertility. However, this is not typical of Brigalow melon holes and should be viewed with caution. However the clays are very poorly structured and hard in the melon holes and would set hard in rehabilitation.

Also the highly alkaline subsoil conditions may impede plant take-up of key metals. Apart from very low phosphorus, the surface horizon has reasonable fertility. Nitrogen levels are quite good as is cation exchange capacity.

REPRESENTATIVE SITES

Three representative sites have been sampled;

- Sites 40A and 40B (mound and depression) and,
- Site 94 (mound site derived from Poitrel EIS)

REPRESENTATIVE SITE DESCRIPTION: B5

Soil Type	B5	
Concept: Heavily melon holed massive Brigalow clay over weathered folded sandstone.		
AMG Reference:	628984E, 7566585N	
Site No	40A on mound and 40B in depression	
Australian Soil Classification	Grey Vertosol and Brown Dermosol	
Landform Element	Mid slope	
Landform Pattern	Undulating plain.	
Slope %	<1%	
Microrelief	Approx. 50% or more of land surface is heavily melon holed (typically 40-100cm deep)	
Surface condition	Frequently gravely to rocky surface (usually as mounds). Hard setting sandy surface on massive hard yellow to brown clays.	
Land Condition	Little sheetwash, otherwise ok.	
Land Use	Sparse grazing	
Major Vegetation Form and Type	Brigalow regrowth.	
Samples for analysis	0-20cm, 40-50cm and 80-90cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – Class 5 (soil physical factors, moisture) Grazing: Class 4 (regrowth, salinity –effective soil depth in mounds, wetness in depressions). Stocking rate: 10-15ha/AE	
Recommended Topsoil Strip Depth	Overall very marginal use - Very shallow stripping between mounds to 10-15cm – use on level sites only. Nil in depressions	
Preferred Rehabilitation Application	Use carefully. Note potential to collect mound rocks and gravels and mix with better clays for rock mulch application on steep slopes.	



SOIL PROFILE: SITE 40A - Mound position

	<p>Note near vertical column of remnant hard fractured sandstone layer – two such layers were observed in the embankment of the melon hole.</p> <p>Mound A1 0-20 cm Yellow brown hard blocky clay. 10YR5/4, field pH 8.0. B21 20 – 50 cm Brown hard blocky clay 10YR5/6 field pH 9.0. Soft lime concretions B22 50- 100 cm Brown hard massive clay 10YR5/6 Field pH 9.0. Soft lime concretions</p>
	<p>Mounds of hard conglomerates, sandstones, ironstones and silcrete rocks and gravels are very common in this soil type. The mounds are probably associated with Melon formation involving the movement of deeper media to the surface over extended periods of time.</p>

SOIL PROFILE: SITE 40B - Depression position



During the Mavis Downs soil survey a large trench approximately 10m long and 1.8 m deep was excavated from the melon hole crest into the base. From a morphological view point the soil changes down gradient were not pronounced. Colour and texture were similar; however clays became progressively more mottled and heavier further into the depression.

Depression

- A11 0-20 cm Medium clay, hard and weak blocky, grey mottles, field pH 8.5
- B21 40-50 cm Massive heavy clay with extensive red and grey (gleyed) mottles. Field pH 9.0.
- B22 80-90 cm As above with increasing carbonate Field pH 9.0



Crusting and cracking surface of the depression (Melon hole) positions.

SOIL PROFILE: SITE 94 (from Poitrel EIS) - MOUND

		Horizon	Depth	Description
0.0m		A1	0 - 35	Dark yellowish brown 10YR4/4. Sandy clay. Field pH 7.5, some surface carbonate nodules, no gravel, no bleach or mottles, clear to;
0.2m		B21	35 – 100+	Brown 10YR5/4 , Medium heavy clay, few yellow mottles, little gravel, Very hard subangular blocky. Field pH 7.0.
0.3m		Recommended Topsoil Strip Depth		10-15cm (inter melon hole flat and mounds only)
0.4m		Preferred Rehabilitation Application		Other soil types preferred. High risk of inclusion of poorly structured saline and dispersive material which will impede rehabilitation development
0.5m				
0.6m				

Laboratory Summary - Site 40B (Depression)

Depth sampled	cm	0-20	50-60	80-90	Comments
Electrical Conductivity	dS/m	0.10	0.08	0.13	Non saline throughout
pH - Water		6.48	6.80	7.46	neutral going to desirable mildly alkaline in lower horizon
Nitrogen	mg/kg	1596.0			moderate
Manganese	mg/kg	28			medium – non limiting
Iron	mg/kg	73			non limiting
Copper	mg/kg	2.5			medium – non limiting
Zinc	mg/kg	1.2			medium – non limiting
Calcium	mg/kg	2300			moderate / high
Sodium	mg/kg	26			low - non limiting
Potassium	mg/kg	590			ok - non limiting
Magnesium	mg/kg	670			ok - non limiting
Aluminium	mg/kg	0			ok - non limiting
Exchangeable Ca	meq/100g	11.72			non limiting
Exchangeable Na	meq/100g	0.11			low - non limiting
Exchangeable K	meq/100g	1.50			non limiting
Exchangeable Mg	meq/100g	5.61			non limiting
Exchangeable Al	meq/100g	0.00			ok
Cation Exchange	meq/100g	18.94			moderate non limiting
Calcium/Magnesium Ratio		2.1			moderate - good
Exchange Calcium	%	61.9			ok
Exchange Sodium	%	0.6	3.4	9.4	non dispersible increasing slightly with depth
Exchange Potassium	%	7.9			ok
Exchange Magnesium	%	29.6			ok
Exchange Aluminium	%	0.0			ok
Sulphur - KCl	mg/kg	5.1			very low
Boron	mg/kg	0.6			low
Organic Matter	%	3.5			moderate
Chloride	mg/kg	17	23	58	very low throughout
Phosphorus - Colwell ex	mg/kg	33			low

Laboratory Summary - Sites 40A and 94 (Mound Positions)

Depth sampled	cm	Site 40			Site 94		Comments
		0-20	30-50	80-90	0-10	40-50	
Electrical Conductivity	dS/m	0.38	0.72	0.86	0.54	0.77	Some salinity in surface which is high by 30cm and increasing with depth. Both sites
Org Matter	%				2.4		high
pH - Water		8.41	9.17	9.33	8.4	9.0	alkaline in surface horizon becoming very strongly with depth
Total Nitrogen	mg/kg	930.0					low
NO3-N	ppm				20.6		good
Manganese	mg/kg	8			21.9		medium – non limiting
Iron	mg/kg	11			17		non limiting
Copper	mg/kg	0.8			1.1		medium – non limiting
Zinc	mg/kg	0.4			-0.1		Very low - medium
Calcium	mg/kg	5100					moderate / high
Sodium	mg/kg	160					low - non limiting
Potassium	mg/kg	470					ok - non limiting
Magnesium	mg/kg	900					ok - non limiting
Aluminium	mg/kg	0					ok - non limiting
S	ppm				9		low
B	ppm				2.3		moderate
Exchangeable Ca	meq/100g	25.74			29.89	1.66	non limiting
Exchangeable Na	meq/100g	0.72			41.63	2.74	low - moderate
Exchangeable K	meq/100g	1.20			0.93	5	non limiting
Exchangeable Mg	meq/100g	7.46			7.75	0.68	non limiting
Exchangeable Al	meq/100g	0.00			0.26	0.08	ok
Cation Exchange	meq/100g	35.12					high - non limiting
ESP					6.7	6.3	Non dispersive
Dispersion R1					0.45		ok
Chloride	ppm				698		becoming high
Ca/Mg ratio					3.86	2.44	good
Phosphorus (Olsen)	ppm				-1		very low

PARTICLE SIZE ANALYSIS 0-10CM: SITE 94

Coarse Sand%	Fine Sand%	Silt%	Clay%	Comment
8	22	21	53	No major problems with tendency to form sandy crust.

E1 : Residual Mesas



A number of remnants of the old Tertiary land surface remain in the form of elevated mesas. The land types in these areas varies from steep and very shallow skeletal loams in association with outcropping sandstone and silcrete rock on the margins to quite deep red gradational soils in localised areas of the larger remnant areas. Most soils in the actual survey area are reddish brown skeletal and shallow duplex soils with a range of vegetation dominated by Acacia and Eucalypt species.

The extent of proposed active mining disturbance does not extend to most significant mesa areas. So this unit only occupies a relatively small portion of the soilscape within the lease areas likely to be significantly disturbed. The inaccessible nature of the mesa terrain coupled with the rockiness makes the area poorly suited to grazing or any other agricultural purpose. No samples were taken for analysis for this reason. In the limited areas of deeper duplex soils on the mesa surface, analysis data for the E3 unit is considered applicable to these areas.

The restricted soil depth and extreme rockiness will basically prevent any significant recovery for rehabilitation purposes, except as a source of rocks and gravels for blending with overburden and soil to produce a rock mulch for steep slopes.

REPRESENTATIVE SITE DESCRIPTION E1

SURFACE FEATURES: SITE 66

Soil Type	E1	
Concept	<i>Relic surface of mesas and rugged scree slopes</i>	
AMG Reference:	629250 mE 7565450 mN	
Site No	66	
Australian Soil Classification	Variable Mainly shallow Sodosol or Dermosol	
Landform Element	Upper slope / top of mesa.	
Landform Pattern	Jump-up – Low hill.	
Slope %	0% on mesa top, 7% on scree slope.	
Microrelief :	None.	
Surface condition	Sandy hardsetting with extensive rock and gravel.	
Land Condition	Quite bare and eroding.	
Land Use	Previously grazed by beef cattle – very low intensity	
Major Vegetation Form and Type	A variety of vegetation (not described) on mesa tops and margins. Mixed grasses cover < 20%.	
Samples for analysis	Minor unit - not sampled	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping – Class 5 not suitable cropping, significant moisture, workability, nutrients, and erosion potential. Grazing - Class 4/5 - Broad acre grazing if under sound management Stocking rate - >30 ha/AE	
	0-10 cm	Very hard, Reddish Brown 5YR5/3, sandy loam, no mottles, few coarse fragments, poor structure. Field pH 6.0, clear to;
	10-80cm	Reddish to Yellowish Brown 7.5YR5/6, sandy clay, field pH 6.0, extensive weathered sandstone, gravels and rock.
	80+ cm	Sandstone and gravels.
Recommended Topsoil Strip Depth	Nil	
Preferred Rehabilitation Application	Unsuitable media	

E2 : Eucalypt Woodlands on Sandy Duplex Soils

CONCEPT Moderately hard setting sandy loam surface layer often with bleached A2 over hard, coarse structured medium yellow clay.

MAJOR FEATURES

- Hard country with broad acre grazing potential but not suitable for any form of cropping.
- The surface layer typically extends 25 – 50cm and is a sandy loam overlying hard, mottled clay subsoils.
- The subsoils are poorly structured and usually dispersive but non-saline.
- Nutrient levels are very low.
- Soil reaction is neutral tending slightly alkaline.
- Very low plant available water storage potential and plant rooting depth restricted to the sandy upper layer.
- The depth of useable topsoil is restricted to the A horizon which may run to almost a 100cm deep in isolated areas. The average nominated useable depth is 20cm.


This sandy soil unit includes extensive areas of both cleared and remnant poplar box vegetation and regrowth. The soil is typical of many Poplar Box regimes in Central Queensland. Poor drainage is indicated by the presence of a thick bleached A2 horizon and heavy subsoil mottling at some sites. Deeper sands occur to the north on the foot slopes of the nearby remnant mesa and the area supports quite good buffel pasture.

The sandy surface layer can exploit short duration thunderstorm rain. Water tends to accumulate above the clay B horizon which causes the soils to become quite boggy and saturated after rain. This soil type is suitable for grazing at fairly broad scale stocking rates. The 20 cm depth of the sandy surface has low overall fertility but tends to set hard although Ca: Mg suggests reasonable physical conditions. Cation levels are low as are nitrogen, phosphate and organic matter. Trace elements and organic matter are OK.


Below the surface 20cm horizon sodium exchangeable percentage is in the dispersive category, however salt is low. The subsoil pH is slightly alkaline which is not limiting. The clay subsoil has indications of very coarse structure, mottling and tendency to form a dense cloddy medium. The subsoil is not considered suitable for use in rehabilitation.

Associated vegetation includes Narrow Leaf Ironbark and minor occurrences of Bauhinia, Blackbutt and small clumps of Brigalow. The soil can thicken considerably in localised areas where sand wash from mesa erosion has occurred for very long periods. See image of 'Minor variant' on following page.


REPRESENTATIVE SITE DESCRIPTION: E2

Soil Type	E2	
Concept:	Sandy duplex with eucalypt vegetation	
AMG Reference:	628376E, 7565750N	
Site No	31	
Australian Soil Classification	Brown Sodosol	
Landform Element	Level plain	
Landform Pattern	Gently undulating	
Slope %	0.5%	
Microrelief	None	
Surface Condition	Generally hard setting sandy, no stone or rock, occasional sheet wash.	
Land Condition	Good.	
Land Use	Previously grazed by beef cattle	
Major Vegetation Form and Type	Poplar Box with Currant Bush, Whitewood, Dead Finish and occasional Bauhinia	
Samples for Analysis	0-40cm, 40-50cm, 60 -120cm	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	<p>Cropping: Class 5 unsuitable with major limiting factor(s) moisture availability (5), physical (5).</p> <p>Grazing: Class 3/4 suitable with moderate limitations from moisture (3), physical problems (3), fertility (3) and erosion susceptibility (3).</p> <p>Stocking rate: 12-15 ha/AE</p>	
Recommended Topsoil Strip Depth	<p>Quite variable.</p> <p>Site 31 is almost 40cm but the average useable depth over most sites is about 20cm. Deeper coarse sand sites to the north have almost 100 cm useable topsoil .</p> <p>Basically, all the sandy upper layer can be taken but do not strip into clay.</p>	
Preferred Rehabilitation Application	Flat to moderately sloping sites only due to high erosion potential.	

SOIL PROFILE: SITE 31

	A11 0-40 cm Fine sandy loam, 7.5YR 3/4, structureless, Field pH 6.0
	A12 40-60 cm fine sandy loam bleach, 7.5YR6/6, field pH 6.0
	B21 0-120 cm massive yellow brown sandy clay 7.5YR5/8, field pH 7.5, Manganese nodules, extensive grey tallow mottling

Minor Variant – Localised area of deep sand.

	<p>To the north of the survey area (this photo 627805E, 7567000N) in Narrow Leaf Ironbark woodlands, the fine sandy loam thickness increases locally up to 2m depth. It grades from a loamy sand at the surface to a fine bleached sand at depth.</p> <p>This material would have use as construction sand.</p>
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Laboratory Summary - Site 31

Depth sampled	cm	0-40	40-50	Comments
Electrical Conductivity	dS/m	0.02	0.02	Non saline throughout
pH - Water		6.64	7.50	neutral to mildly alkaline
Nitrogen	mg/kg	554.0		very low
Manganese	mg/kg	19		medium – non limiting
Iron	mg/kg	27		non limiting
Copper	mg/kg	0.4		low/medium – non limiting
Zinc	mg/kg	0.6		low
Calcium	mg/kg	670		moderate / high
Sodium	mg/kg	0		low - non limiting
Potassium	mg/kg	110		ok - non limiting
Magnesium	mg/kg	71		ok - non limiting
Aluminium	mg/kg	0		ok - non limiting
Exchangeable Calcium	meq/100g	3.35		non limiting
Exchangeable Sodium	meq/100g	0.00		low - non limiting
Exchangeable Potassium	meq/100g	0.27		low
Exchangeable Magnesium	meq/100g	0.59		non limiting
Exchangeable Aluminium	meq/100g	0.00		ok
Cation Exchange	meq/100g	4.21		moderate non limiting
Calcium/Magnesium Ratio		5.7		high - good
Exchange Calcium	%	79.6		ok
Exchange Sodium	%	0.0	13	non dispersible surface but dispersible subsoil
Exchange Potassium	%	6.4		ok
Exchange Magnesium	%	14.0		ok
Exchange Aluminium	%	0.0		ok
Sulphur - KCl	mg/kg	<1.0		very low
Boron	mg/kg	<0.5		low
Organic Matter	%	1.9		low to moderate
Chloride	mg/kg	10	3.1	very low throughout
Phosphorus - Colwell extr	mg/kg	9		low

PARTICLE SIZE ANALYSIS 0-10CM: SITE 81 (Poitrel EIS)

Coarse Sand%	Fine Sand%	Silt%	Clay%	Comment
33	37	15	19	Fine sand & silt (with 19% clay) predisposes hard setting and sealing

E3 : Old Alluvial Plains of Thin Duplex Soil

CONCEPT Thin sandy loam surface layer over moderately well structured sandy clay with Poplar Box and Brigalow.

MAJOR FEATURES

- Quite good grazing potential but very marginal for cropping.
- The surface layer typically extends 10 – 25cm and is a sandy loam overlying medium sandy clay subsoils.
- The subsoils are reasonably well structured and usually non dispersive, saline or sodic.
- Nutrient levels are reasonable.
- Soil reaction is neutral tending alkaline.
- Moderate plant available water storage potential and plant rooting depth.

The soil unit is older alluvial plains and occurs in local proximity to New Chum Creek. It is a contrast texture soil with variable Poplar Box dominance in association with Brigalow and Bauhinia and intergrades into upland uniform non cracking Brigalow clay.

Erosion of the surface has reduced thickness of the sandy A horizon in some areas bringing this soil closer to uniform clays such as B1 unit. Site 306 (below) is a representative site which meets this criterion.

The effective soil depth is considered better than most duplex soils in the area as structure of the clay B horizon is reasonable allowing deeper root exploitation. Apart from low phosphorus the surface horizon has reasonable fertility and the major agricultural aspect limiting this soil is the proportion of fine sand which predisposes sealing. Nitrogen levels are usually good and cation exchange is adequate. There is no indication of a salinity or sodicity (dispersion) problem with levels of salt not increasing down the profile. Overall, the soil is reasonable with the major restrictions being a tendency to seal and set hard predisposing high erosion rates.

The depth of useable topsoil varies with opportunity for deeper stripping with more intensive profile observations. A nominal strip depth of 25 cm is applied. The soil may be stripped moist or dry and should not extend into any bleached layer (if present) and or hard pale, mottled clayey B horizon. If stripped, the soil will be useful on rehabilitation of level surfaces such as dump tops.


REPRESENTATIVE SITES

Three representative sites have been sampled;


- Site 302 and,
- Site 75 (derived from Poitrel EIS site 5)

REPRESENTATIVE SITE DESCRIPTIONS : E3

SURFACE FEATURES: SITES 302

Soil Type	E3	
Concept: <i>Thin Duplex On Mostly Cleared Undulating Plains Previously With Mixed Poplar Box with Brigalow Scrub</i>		
AMG Reference:	627950 7565122	
Site No	302	
Australian Soil Classification	Red Brown Dermosol	
Landform Element	Flat	
Landform Pattern	Very gently undulating plains.	
Slope %	0.5	
Microrelief :	None	
Surface condition	No stone or rock, possible weak sandy crust, non cracking. Some sheet wash	
Land Condition	Mostly cleared with approx 60% mixed buffel cover.	
Land Use	Recent grazing	
Major Vegetation Form and Type	Re-growth of Poplar Box and Brigalow	
Samples for analysis	Site 75 : (Poitrel EIS) : 0-10, 30-40 cm. Site 302 : 0-10cm, 40-50 cm. Site 306 : 0-15cm, 40-50 cm.	
Land Suitability Summary. Stocking rates recommended by Bourne & Tuck (1993) for cleared pasture as hectares / adult equivalent beast (AE) for long term sustainability.	Cropping - Class 5 unsuitable with major limiting factor(s) moisture, workability, nutrients Grazing - Class 2 suitable with erosion susceptibility, moisture limitations.	

SOIL PROFILE: SITE 302

0.0m 0.1m 0.2m 0.3m 0.4m 0.5m 0.6m 0.7m 0.8m		Horizon	Depth cm	Description
		A1	0 - 25	Reddish brown 5YR4/4. Fine sandy loam. Field pH 6.5, no nodules, gravel or bleach or mottles, abrupt change to;
		B21	25 – 90+	Light Brown 7.5YR4/4, Medium clay, 10% yellow / grey mottles, few Mn nodules, coarse sub-angular blocky. Field pH 8.0.
		Recommended Topsoil Strip Depth		30 cm
		Preferred Rehabilitation Application		Generally suitable for flatter sites such as dump tops.

Laboratory Summary – Sites 302 and 317 (ML 70313)

Attribute	Unit	Site 302		Site 317			Comments
		0-10	50-60	0-10	50-60	80-90	
Depth sampled	cm	0-10	50-60	0-10	50-60	80-90	
Electrical Conductivity	dS/m	0.06	0.07	0.03	0.03	0.03	Non saline to at least 60cm
pH - Water		7.2	7.2	6.6	7.4	7.4	desirable neutral in surface horizon becoming slightly alkaline
Total Nitrogen	mg/kg	0.095		0.084			low
NO3-N	ppm	<0.1		1.5			low
Manganese	mg/kg	17.8		48			medium – non limiting
Iron	mg/kg	60		24			non limiting
Copper	mg/kg	0.7		1.3			medium – non limiting
Zinc	mg/kg	0.7		1.4			medium – non limiting
Calcium	mg/kg	1962	1072	1576	1392	1338	moderate / high
Sodium	mg/kg	28	202	28	48	147	low - non limiting throughout
Potassium	mg/kg	117	94	160	121	117	ok - non limiting
Magnesium	mg/kg	100	615	174	295	531	ok - non limiting
Aluminium	mg/kg	3	13	4	3	5	ok - non limiting
Exchangeable Calcium	meq/100g	9.8	5.4	7.9	7	6.7	non limiting
Exchangeable Sodium	meq/100g	0.1	0.9		0.2	0.6	Very low - non limiting throughout
Exchang Potassium	meq/100g	0.3	0.24	0.4	0.3	0.3	non limiting
Exch Magnesium	meq/100g	0.8	5	1.4	2.4	4.4	non limiting
Exchangeable Aluminium	meq/100g	0.03	0.14	0.4	0.03	0.06	ok
Cation Exchange Cap.	meq/100g	11.2	11.7	9.9	10	12	low throughout
Calcium/Magnesium Ratio		11.8	1.1	5.5	2.9	1.5	good all depths
Exchange Calcium	%	88.5	46	80	70	55.4	ok
Exchange Sodium	%	1.1	7.5	1.2	2.1	5.3	non dispersible throughout
Exchange Potassium	%	2.7	2	4	3	2.5	ok
Exchange Magnesium	%	7.5	43	14.6	24.5	36	ok
Exchange Aluminium	%		1.2	0.4	0.3	0.5	ok
Sulphur -	ppm	4		3			low
Boron	ppm	0.5		0.6			low
Organic Matter	%	2.5		2.4			high
Chloride	mg/kg	5		7			very low throughout
P (Olsen)	ppm	10		6			low

PARTICLE SIZE ANALYSIS and DISPERSION:

SITE	Depth cm	C Sand %	F Sand %	Silt %	Clay %	R1	ADMC %	Comments
302	0-10	14	44	24	16	0.82	1.1	Fine sand + silt content may facilitate sealing and hardsetting. Possible dispersion indicated by R1
	50-60	9	33	17	38	0.81	1.8	
317		23	37	15	23	0.65	1.5	Physically, a similar soil to site 302 however with reduced dispersion and higher moisture storage.
		17	30	11	43	0.56	2.1	
		14	24	8	56	0.66	2.6	

CHEMICAL ANALYSIS: SITE 75 (Poitrel EIS)

ANALYTE	Unit	0-10 CM	COMMENT	30-40 CM	COMMENT
NO3-N	ppm	19.8	adequate		
P (Olsen)	ppm	-1	extremely low		
K	meq/100g	0.65	ok	0.66	ok
Mg	meq/100g	3.23	ok	5.55	high
Ca	meq/100g	15.32	ok	32.29	high
S	ppm	5	low		
Mn	ppm	26.2	moderate		
B	ppm	0.8	low		
Cu	ppm	0.8	moderate		
Fe	ppm	14	moderate		
Zn	ppm	-0.1	very low		
OM	%	3.5	good		
CEC	meq/100g	19.87	moderate	39.29	good
Ca/Mg ratio		4.74	good	5.82	good
pH(H2O)		7.2	neutral	8.4	
EC	dS/m	0.09	very low	0.09	very low
Al	meq/100g	0.10	ok	0.05	ok
Cl	ppm	26	very low		
Na	meq/100g	0.57	very low	0.74	
ESP		2.9	non sodic	1.9	non sodic
Dispersion R1		0.28	no problems indicated		

PARTICLE SIZE ANALYSIS 0-10CM: SITE 75

	Coarse Sand%	Fine Sand%	Silt%	Clay%	Comments
Site 75 (0-10cm)	24	39	12	28	Soils with proportions of fine sand and silt exceeding 50% in the presence of about 30% (as this soil is) tend to exhibit more severe physical problems leading to sealing and coarse, hard structure.

1.3 TOPSOIL STRIPPING

A significant proportion of the survey area is programmed for disturbance as a result of open-cut mining and will require stripping of topsoil for reuse in rehabilitation programs. The following comments are relevant for stripping of topsoil.

The basic principle in determining useable depths of topsoil for rehabilitation is its quality in comparison to the spoil requiring rehabilitation. As a rule of thumb, the quality of the topsoil must exceed that of the spoil. While this may seem obvious, there are situations where additional problems have been created with the inappropriate use of topsoil. In addition, spoil can be expected to improve with years of exposure, leaching and plant colonisation and in some cases may provide better coverage than poor topsoil after an appropriate time-span. Often, Brigalow soils associated with Tertiary sediments in Central Queensland (Bourne and Tuck 1993) are sodic and saline at depth. The depth to the salt accumulation layer (or salt bulge) may be quite variable but greater than 400 mm in most cases. Most Brigalow subsoil suspected of having accumulations of salt is not recommended for reuse in rehabilitation, not only because of salt but also the associated sodic conditions predisposing coarse handsetting behaviour.

Overall, the area includes considerable reserves of topsoil that may be used in mine rehabilitation programs. The following comments are included to assist management decisions for topsoil. As a guide, all soils used in rehabilitation should be applied to no less than 250mm. This provides sufficient depth for re-ripping should follow-up maintenance work be required. Soils placed to 150mm or less can be significantly contaminated by spoil when a single pass of deep ripping occurs. **TABLE 4** summarises soil stripping guidelines for all soils in the survey area.

TABLE 4 SOIL STRIPPING DEPTH GUIDELINE

Soil Type	Recommended Stripping depth (cm)	Stockpile Recommendation	Comments
A1	30cm. Possible 50cm	Up to 5m height. Scraper dumps ok	Generally lighter textured (i.e., sandier), and higher fertility although they may be quite variable and are generally prone to hard setting. Stripping depth is similarly variable and the operator should seek advice from the Rehabilitation Officer but generally, most of this unit can be conservatively stripped to 30cm and deeper if no hard or clay layer is encountered. Salinity is not of concern. These soils are not suited to application on sloping sites due to erosion potential. However these soils readily germinate and support both grasses and native trees.
A2	30cm. Possible 50cm	Max 3m height. Preferable truck dumping in 'free' configuration. Avoid scraper dumps (compaction)	Deeper more clayey alluvia available in limited quantities in Brigalow drainage lines. This soil covers a relatively minor area and occupies some small clay drainage lines leading towards New Chum Creek. Soils are suitable for sloping rehabilitation.
B1	20 cm. No deeper		Suitable for rehabilitation for modest slopes but with limitations due to the firm to hard setting nature as a result of the fine sandy clay texture. In addition, they are often very gravely and cobbled at surface. The stiff subsoil clays are usually saline, dispersive and sodic and it is important that stripping depths not go too deep.
B2	20 cm. No deeper		A firm to hard setting sandy surface, often very gravely and cobbled at surface, overlies stiff medium sandy clays which are neutral and red to brown coloured. Useful on level to gently sloping sites – avoid steeper slopes due to hard setting disposition.
B3	20 cm. No deeper		Relic ridgelines and scree slopes associated with residual mesas. Uniform non-cracking red brown clay and thin duplex with hardsetting sandy clay surface overlaying shallow light sandy clays and weathering soft sandstones parent material. As with B2 useful for flatter rehabilitation sites.
B4	40cm . Possible 50cm		Probably the most preferred soil in the survey area and has better application on sloping rehabilitation than all other media surveyed.
B5	15cm on mounds. Nil in depressions.	Limited usefulness in rehabilitation. Stripping between gilgai may not be practicable in some areas and soils are quite saline. Where gilgai are not so pronounced, strip no more than 10cm between gilgai. Use on flat surfaces only.	
E1	Very limited. See comment	Up to 5m height. Scraper dumps ok	Variable profile but surface usually very hard with extensive gravels and rock. Generally not strippable terrain. Although if practicable, recover rock for use in rock mulch mix for steeper rehabilitation slopes.
E2	20 cm. Possible 40cm		The soil may thicken in localised areas offering more strippable soil. Do not strip into clay. Useful for flatter areas of rehabilitation. High erosion potential.
E3	30cm		Quite good soil but do not strip if presence of pale bleached layer of hard pale encountered.

1.4 PRE- MINING AGRICULTURAL LAND SUITABILITY

The methodology used to identify agricultural suitability in this survey follows guidelines established by Land Resources Branch (1989), which is the basis for DME (1995), in addition to the work of Shields and Williams (1991) in the Kilcummin area. Other internet resources were utilised as considered necessary. Land suitability classification is based on specific land uses assessed using the following classes (based on Shields and Williams, 1991 and DME, 1995):

Class 1	Suitable land with negligible limitations and is highly productive requiring only simple management practices;
Class 2	Suitable land with minor limitations which either reduce production or require more than simple management practices to sustain the use;
Class 3	Suitable land with moderate limitations – Land which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use;
Class 4	Marginal land with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long term;
Class 5	Unsuitable land with extreme limitations that precludes its use.

The land suitability classification identifies the types and severity of limiting factors for each land use on the different soil types present. Basically, suitability class is determined by the most severe limitation, or a combination of varying limitations. Class 1 to 3 grazing land is considered suitable for significant pasture improvement, Class 4 offers marginal potential for pasture improvement, and Class 5 is not suitable for improvement and restricted to grazing of native pastures with low productivity. Major limiting factors are assigned a severity rating (1-5) with the most severe being the overall suitability class for that soil type.

Normally, only the most severe two or three limiting factors would determine suitability and the remainder become irrelevant. For this reason, only the major limiting factors determining suitability are presented. In this survey, the main limiting factors (using the DPI&F nomenclature in brackets) which determined crop and grazing suitability class include one or more of the following:

- plant available water capacity (m)
- susceptibility to erosion (e)
- nutrient deficiency (n),
- salinity (s)
- soil physical factors (p)
- susceptibility to flooding (f)

All land within the survey area has been used for beef cattle grazing for many years. A range of grazing land exists from quality Brigalow soils which include soil types B2, B4 and E3, broader scale grazing lands of B1, B5, and E2 and the very marginal residual mesas of E1. The great majority of the site has been cleared for improved pasture and Buffel Grass is well established and was in good condition across most soil units. There is no evidence of cropping ever having been undertaken other than possibly limited areas of forage. None of the soils exhibit good surface mulching characteristics and all are relatively hard setting at the surface with quite hard blocky clays mostly within 40 cm of the surface. Unreliable and insufficient rainfall is also a significant limitation to ventures dependent on annual cropping.

Therefore, no land is considered suitable for a sustained, economically viable cropping use but all soil units are suited to beef cattle grazing at varying intensities. Variations in grazing suitability class occur mainly through limitations from restricted soil water availability, erosion susceptibility and fertility. Much of the area would be prone to degradation from erosion caused by overstocking pressure, however land management practices appear to have been sound and dense pasture cover on most soils in the area was noted at the time of the survey. Destocking has been actively encouraged by the mining company since the start of operations.

Major Limiting Factors to Agricultural and Pastoral Production

Plant Available Water Capacity (m)

Plant available water capacity (PAWC) is the moisture stored in the soil profile that is available to the plant and is a significant soil property in this locality as cash cropping is based on fallow storage of moisture in the soil profile.

PAWC for soil groups has been assessed from site specific chemistry and effective rooting depth estimations developed in accordance with guidelines of Bourne and Tuck (1991) and DME (1995). Effective rooting depth and PAWC estimations were further refined from observed field morphology which facilitated the alignment and comparison of PAWC profiles determined in Shields and Williams (1991). The determination of effective rooting depth for each soil type came from morphological indicators in the field that were reinforced by soil chemistry trends. Field morphology observations and chemical data used included presence of hardpans, bleaching, soil texture, barriers to root growth such as high sodium, gravel, poor soil structure, high electrical conductivity and chloride.

Effective rooting depth is defined as the depth to which approximately 90% of plant roots will extract water. It is normally limited either by the presence of underlying rock or other hard materials, or by chemical or physical attributes within the subsoil that restrict root growth (QDPI 1990). Field morphology observations and chemical data used included soil texture and barriers to root growth such as high sodium, gravel, poor soil structure, high electrical conductivity and chloride.

Table 5 shows the criteria which Shields and Williams (1991) proposed for assessment of the moisture availability limitation for crops in the Central Highlands region and considered appropriate in this survey. PAWC suitability estimates for soils in this survey area are shown in **Table 6**.

Table 6 indicates that the better structured Brigalow clay soil (B4) holds sufficient water (80-100mm) which plants may access to about 60cm depth. Nevertheless, restrictions from the prevailing climate would drop them into the unsuitable class for most years. Shields considered crops on clay soils in this area with a level 4 limitation for moisture availability would only succeed in 4 of every 10 years. The harder subsoils of all other soils result in a cropping limitation level of 5 which makes them unsuitable for dryland cropping. Thus no land at this site is considered suitable for a sustained, economically viable cropping use.

TABLE 5 PAWC CRITERIA FOR ASSESSING CROPPING LIMITATIONS (SHIELDS AND WILLIAMS (1991))

LIMITATION LEVEL	Dryland Cropping PAWC (MM)	Grazing PAWC (mm)
1	>150	>125
2	130-150	100 - 125
3	90-130	75 - 100
4	70-90	50 - 75
5	<70	< 50

TABLE 6 ESTIMATED PAWC AND LIMITATION LEVELS – CROPPING AND GRAZING

Soil	Description	Effective root depth (cm)	PAWC (mm)	Dryland cropping	Grazing
A1	Alluvial deep sandy clays.	40 - 50	50 - 70	5	3
A2	Alluvial clay	50 - 60	70 -90	5	3
B1	Red / brown clay on weathered sandstone	40 – 50	60 - 80	5	3
B2	Red / brown deeper uniform clay with linear gilgai	40 - 50	60 - 80	5	3
B3	Gravelly clay on Ridgelines	30 – 40	60 - 80	5	4
B4	Deep grey / brown clay on level plains.	50 - 70	80-100	4/5	2
B5	Melon holed clay lowlands	30 - 50	60 - 80	5	4
E1	Residuals (Mesas)	<50	20	5	5
E2	Deeper sandy duplex	40 - 50	60 - 80	5	4
E3	Moderately thin better structured duplex	40-60	60 - 80	5	2

Susceptibility to Water Erosion (e)

The risk of soil loss from water erosion magnifies with increased slope gradient combined with water velocity when land is devoid of vegetation. During this survey, some evidence of water erosion was noticed in the survey area with the major areas of concern confined to clay soils in sloping areas adjacent to creek lines. Based on soil analytical data (dispersion, Ca to Mg ratios) in addition to slope limits of DME (1995), most of the undulating Brigalow clay soil types described have some limitation levels due to susceptibility to erosion although not significant.

Table 7 summarises general ratings of Shields and Williams (1991) for grazing in this area as well as those for cropping which were developed using the Criteria for Determining Water Erosion Limitation for Rainfed Cropping (DME, 1995) guideline.

TABLE 7 - LAND SUITABILITY LIMITATION LEVEL – EFFECTS OF SLOPES (DME 1995)

Limitation rating for cracking clays	1	2	3	4	5
Grazing (cracking clay soils)	<3% slope	Slopes 3-6%	Slopes 6-9%	Slopes 9-15%	>15%
Grazing (Sodic rigid soils)	<1% slope	Slopes 1-3%	Slopes 3-6%	Slopes 6-12%	>12%
Cropping (cracking clay soils)	<0.5% slope	Slopes 0.5 – 1%	Slopes 1-3%	Slopes 3-7%	Slopes >7%

Nutrient deficiency (n)

Nutrient limitations for grazing and rainfed cropping uses were rated using DME (1995) from soil analysis data of surface horizons. In this survey, fertility analysis was only done on the upper horizon which forms the major root zone in the grazing environment.

Shields and Williams (1991) state that a major limiting factor to pasture production in northern Australia is reduced pasture quality as a result of deficiencies in nitrogen and phosphorus. Other elements which also play key roles are potassium and calcium. However all soils in this survey were not significantly limited by nutrient deficiency for grazing. Accordingly, no soil has attracted a major fertility limitation level, with 2 the highest estimate.

Salinity (s)

This refers to the reduction in dry matter yield as a result of soluble salt in the soil profile. It also contributes to reduced moisture availability limitation. In most Brigalow clay soils, the presence of elevated salt below 30cm depth is common and has contributed to an increase in severity of this limitation.

Soil Physical Factors (p)

Physical factors refer to restrictions in the establishment and vigour of pastures as a result of soil surface condition and are typically related to size of surface aggregates which affects tendencies to seal and hardset. This limitation also deals with conditions that determine sufficient seed contact with moist soil to prevent desiccation prior to germination and establishment. Shields (1991) considers the establishment and spread of most pasture species may be somewhat restricted on hardsetting soils?

Vegetation Re-growth (v)

Shields and Williams consider that regrowth can be a serious limitation to establishment and persistence of improved pastures in Brigalow and eucalyptus woodlands. The major units where vegetation regrowth was evident were the Brigalow units however it was only considered minor.

Microrelief (g), Wetness (w), Flooding (f)

These limitations in the grazing context were considered to be relatively minor and would not contribute any significant weighting in the classification of grazing land suitability in the survey area apart from a small area of B5 (melon hole Brigalow) which may be expected to reduce the overall stocking rate potential. Depressions in Brigalow melon hole soil tend not to be pastured due to a combination of aggressive cracking, salinity and water logging.

Tables 8 and 9 summarise the major limiting factors and suitability class for each soil type for cropping and grazing land uses.

TABLE 8 MAJOR LIMITATIONS AND LAND SUITABILITY CLASSES - GRAZING

Soil	Description	Major limiting factors & severity	Class	Preferred Use	*GQAL class
A1	Active Alluvial Deep Sandy Duplex and Earths	soil physical factors (flooding/channels) – p3 moisture – m2 nutrients – n1	3	Grazing native and improved pastures. Deeper sandy A horizon improves short term water availability (e.g. storm rain is immediately available) but limits long term storage.	C1
A2	Alluvial – uniform Brigalow clay drainage lines	soil physical factors (flooding/channels) – p3 moisture – m2 erosion – e2 nutrients – n2	3	Grazing native pastures and improved pastures.	C1
B1	Red / brown shallower uniform clay undulating plains on sandstone	moisture – m3 erosion – e1 nutrients – n1	3	Grazing native and improved pastures	C1
B2	Red / brown deeper uniform clay undulating plains with significant linear gilgai	moisture – m3 erosion – e2 nutrients – n1	3	Grazing native and improved pastures	C1
B3	Gravelly clay on ridgelines	moisture – m4 erosion – e3 nutrients – n1	4	Grazing native and improved pastures. Hard and sealing sandy surface restricts moisture. Soil depth is restricted.	C2
B4	Uniform Brigalow grey / brown clays	moisture – m2 erosion – e1 nutrients – n1	2	Well suited to grazing of improved pastures if well managed to control erosion risk.	C1
B5	Melon holed Brigalow clay lowlands	moisture – m3 regrowth – r3 wetness – w3 erosion – e1 nutrients – n1	3	Broad scale grazing native and improved pastures. Regrowth and prolonged wetness can be a significant problem.	C1
E1	Residuals (Mesas)	moisture – m4 erosion – e3/4 nutrients – n3	4/5	Very marginal grazing land	D
E2	Sandy Duplex of Poplar Box Narrow and Leaf Ironbark	moisture – m4 erosion – e2 nutrients – n2	4	Moisture storage is a problem however these soils can utilise short rainfall events as little moisture is tied up in the clay matrix.	C2
E3	Thin well structured duplex. Poplar Box/ Brigalow	moisture – m2 erosion – e1 nutrients – n1	2	Moisture storage is better due to good effective rooting depth. These soils can also utilise short rainfall events as little moisture is tied up in the clay matrix.	C1

*GQAL = Good Quality Agricultural Land

TABLE 9 - MAJOR LIMITATIONS AND LAND SUITABILITY CLASSES - CROPPING

Soil Unit	Description	Major Limitations and Severity	Suitability Class - Crops
A1	Active Alluvial Deep Sandy Duplex and Earths	moisture – m5 soil physical factors – p4 flooding – f4 nutrients – n2	5 unsuitable
A2	Alluvial – uniform Brigalow clay drainage lines	moisture – m4 soil physical factors – p4 flooding – f4 nutrients – n2	5 unsuitable
B1	Red / brown shallow uniform clay undulating plains	moisture – m5 workability – k3 erosion – e3 nutrients – n2	5 unsuitable
B2	Red / brown deeper uniform clay undulating plains with significant linear gilgai	moisture – m4 erosion – e3 nutrients – n2 soil physical factors – p3	4/5 Unsuitable. Possible opportunistic forage
B3	Gravelly clay on ridgelines	moisture – m5 workability – k4 erosion – e4	5 unsuitable
B4	Uniform Brigalow grey / brown clays	moisture – m4 workability – k3 erosion – e3 nutrients – n2	4 Very marginal cropping. Possible opportunistic forage
B5	Melon holed Brigalow clay lowlands	moisture – m4 workability – k4 wetness – w4 erosion – e3 nutrients – n2	5 unsuitable
E1	Residuals (Mesas)	moisture – m5 workability – k5	5
E2	Sandy Duplex Of Poplar Box	moisture – m5 nutrients – n3 soil physical factors – p4	5
E3	Thin well structured duplex. Poplar Box/ Brigalow	moisture – m4 nutrients – n3 soil physical factors – p4	4/5 Possible opportunistic forage

Figures 3 and 4 show the distributions of land suitability classes for grazing and cropping uses.

FIGURE 3 LAND SUITABILITY CLASSES FOR GRAZING

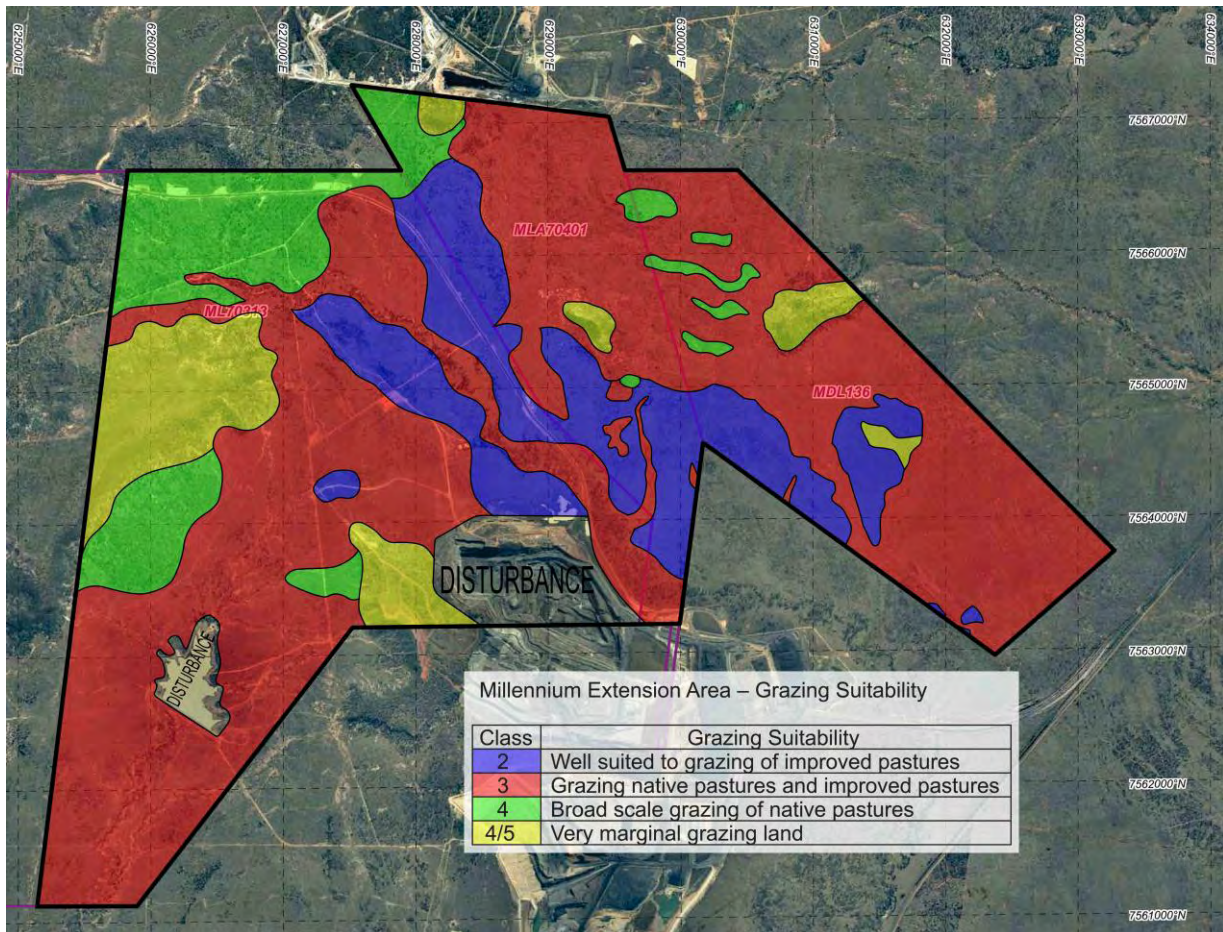
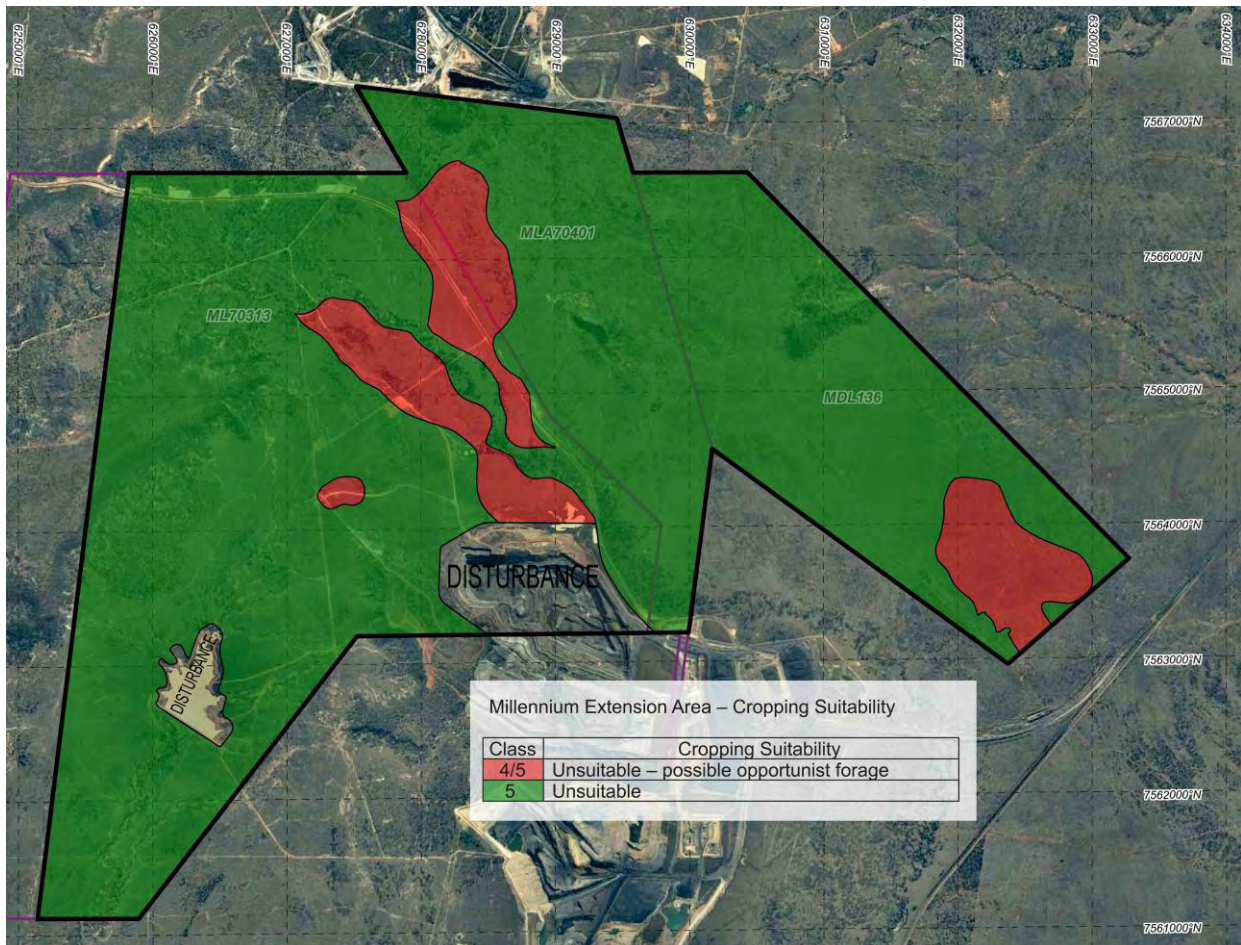


FIGURE 4 LAND SUITABILITY CLASSES FOR CROPS



Good Quality Agricultural Land

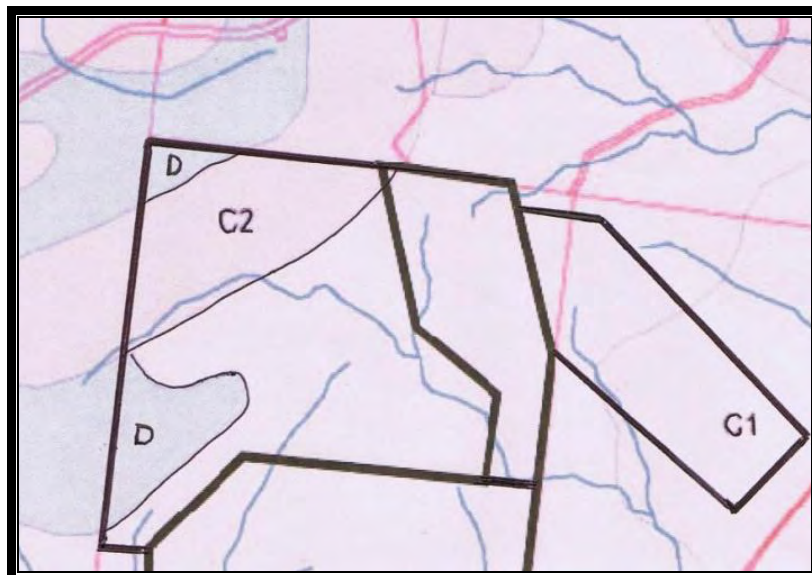
The Planning Guidelines: The Identification of Good Quality Agricultural Land (DLGP and DPI, 1993) has established four Classes of agricultural land for Queensland. This survey has followed this Guideline which has been refined following the intensive sampling undertaken in this survey.

The Department of Primary Industries and Fisheries consider Class A Land to be good quality agricultural land, some areas of Class B marginal crop land (where agricultural land is scarce) and better quality Class C1 suitable for improved pastures where pastoral industries predominate.

The extract of the GQAL map provided by Belyando Shire Moranbah office (now Isaac Regional Council) below shows that the site falls mainly within C1 with areas of lesser quality C2 and D to the western portion of the survey area. No areas of cropping land are identified. Basically, this survey has agreed with the DLGP / DPI assessment. GQAL classes assigned for each soil type are shown on **Table 8** (above).

CLASS DESCRIPTION	
Class A Crop land	– Land suitable for current and potential crops with limitations to production which range from non to moderate levels.
Class B Limited Crop Land	– Land that is marginal for current and potential crops due to severe limitations; and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for cropping.
Class C Pasture Land	– Land suitable only for improved or native pastures due to limitations, which preclude continuous cultivation for crop production; but some areas, may tolerate a short period of ground disturbance for pasture establishment. Sub categories are as follows:
C1	Land suitable for improved pastures. In some circumstances may be considered as good quality agricultural land.
C2	Land suitable for native pastures.
C3	Land suitable for limited grazing of native pastures.
Class D Non-agricultural Land	– Land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrop or poor drainage.

FIGURE 5 GQAL in the Survey Area



1.5 EROSION POTENTIAL AND CONTROL

Erosion Hazard

George Bourne (Bourne and Tuck 1993) assessed the susceptibility of major Central Highlands soil types for sheet, rill, gully and wind erosion susceptibility. He states that the erodibility ratings are based mainly on his own extensive local experience in the area rather than hard data (which is very limited). Bourne expressed a view that a large amount of erosion occurs as a result of man-made operations in such things as road construction, table drains, railways and other structures. This is particularly applicable in the mining environment.

Table 10 presents the range of erosion sensitivities for each soil type based on the views of George Bourne (deduced from Bourne and Tuck 1993). Basically, most soil types are susceptible to erosion if exposed which increases with the undulating nature of the terrain.

TABLE 10 - SUSCEPTIBILITY OF SOILS TO EROSION

Soil	Description	Sheet	Rill	Gully	Wind
A1	Active Alluvial Deep Sandy Duplex and Earths	H	L	M	M
A2	Alluvial – uniform Brigalow clay drainage lines	M	M	H	L
B1	Red / brown shallow uniform clay undulating plains	H	M	M	L
B2	Red / brown deeper uniform clay undulating plains with significant linear gilgai	H	M	L	L
B3	Gravelly clay on ridgelines	H	H	M	M
B4	Uniform Brigalow grey / brown clays	M	M	L	L
B5	Melon holed Brigalow clay lowlands	L	L	L	L
E1	Residuals (Mesas)	M	M	H	L
E2	Sandy Duplex Of Poplar Box	H	M	H	M
E3	Thin well structured duplex. Poplar Box/ Brigalow	H	H	M	M

H - High susceptibility
M - Medium susceptibility
L – Low susceptibility

The risk of erosive gullying increases significantly should the sandy A horizon be depleted or removed by sheet erosion as a result of poor land management. This is because most soil types have clay B horizons which are sodic and highly dispersive. This situation was observed in areas of E2 and B1 soils in the survey area.

Erosion Control

Disturbed areas should be stabilised as quickly as practical to limit erosion of the type mentioned above. Progressive revegetation will be undertaken and erosion and sediment control measures employed, that are consistent with the practices described in the Technical Guidelines for Environmental Management for Exploration and Mining in Queensland (DME, 1995). Such requirements are documented in appropriate Environmental Management Plans with awareness training provided for all staff with responsibility in this area.

The design parameters for the construction of erosion control work such as rock armoured or grass lined waterways will be in accordance with sound engineering and soil conservation earthworks principles. A number of variables are included such as time of concentration, rainfall intensity, erosivity, gradient, scour velocities and flow estimations.

The erosion control measures recommended throughout the life of the Project are summarised in **Table 11**.

TABLE 11 - EROSION CONTROLS FOR MINING ACTIVITIES

Area	Control Measure
Cleared Land	<ul style="list-style-type: none"> • restrict clearing to areas essential for the works • windrow vegetation debris along the contour • minimise length of time soil is exposed • divert run-off from undisturbed areas away from the works • direct run-off from cleared areas to sediment dam
Exposed Sub-soils	<ul style="list-style-type: none"> • minimise length of time subsoil is exposed • direct run-off from exposed areas to sediment dam
Active Waste Rock dump	<ul style="list-style-type: none"> • direct all run-off from dumps to sediment dams • avoid placement of sodic waste material on final external batters • control surface drainage to minimise the formation of active gullies • use soil and rock mulching to armour long slopes • direct run-off from rehabilitated areas to sediment dams
Residual Voids	<ul style="list-style-type: none"> • progressive backfill during operations. • regrade treatments for erosion and geotechnically unstable voids. • use of rock mulch to control erosion. • apply seed and fertilizer as necessary to ensure rapid re-establishment of pasture and native trees.
Dams	<ul style="list-style-type: none"> • leave useful water storages to support grazing use. • rehabilitate any dam not required post mining by: <ul style="list-style-type: none"> - regrading embankments, - capping any residual saline material, - replace topsoil, - rip on the contour, and - seed
Infrastructure	<ul style="list-style-type: none"> • provide protection in drains (e.g. rip rap, grass) where water velocity may cause scouring • confine traffic to maintained tracks and roads • install sediment traps, silt fences, hay bales where necessary to control sediment • rehabilitate disturbed areas around construction sites promptly

1.6 POTENTIAL FOR CONTAMINATION

Past land use since the development of the area in the 1960's has remained cattle grazing. The grazing blocks included in the survey have long been quite remote from homesteads with poor vehicular access. Much of the area has been cleared of original vegetation and is now under regrowth and / or thick buffel and native grass cover.

Vehicular access at the time of the soil survey was quite good across most areas and the extent of field inspection can be seen from the distribution of field sampling sites shown on **FIGURE 1**. In the course of this field work, no evidence of any potentially contaminating activities was found and good visibility from gentle rises which occur in the area supports this view. The built environment appears to be limited to cattle fences, minor access tracks and small stock dams. No buildings (or remnants), cattle yards or dips were discovered during the soil survey.

During the site inspection the surveyor did not find evidence of old tip sites or illicit dumping. It is highly unlikely that the land has been contaminated by agricultural activities to any significant extent.

It is therefore concluded that no further evaluation or investigation into possible contaminated land as a result of past activities is warranted.

1.7 REFERENCES

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ATTACHMENT 1 : SITE DESCRIPTION SUMMARIES

Sites in Mavis Downs Block

Site	Easting	Northing	Soil Type	Soil Profile	General Comments
1	630089	7563966	B4	<p>A11 0 – 2 cm : fine granular light clay</p> <p>B21 2 – 15cm : Fine sandy clay, dark yellowish brown 10YR3/4, strong sub-angular blocky, well drained, no carbonate nodules. Field pH 7.0.</p> <p>B22 15-60 cm. Medium clay, dark brown 10YR3/3, firm sub-angular blocky, moderate carbonate nodules, no mottling, field pH 8.5.</p> <p>B23 60-120cm Medium heavy clay, strong brown 7.5YR5/6, yellow and light brown mottles increasing, carbonate nodules. Field pH 9.0.</p>	Lower mid slope. 0.5% slope, Brigalow regrowth. Reasonable buffel cover 30%. No sheetwash.
2	630127	7564284	A2	<p>Firm non-cracking sandy surface, some ironstone gravel.</p> <p>0-15 sandy clay, brown, pH 8</p> <p>15-65 medium clay. yellow brown with carbonate nodules. pH 8.5.</p>	Mid slope, 1 - 2%. drainage line. Brigalow regrowth. Buffel <20%. Sheet wash and gully erosion.
3	630163	7564557	B4	<p>Firm non-cracking sandy surface, no gravel.</p> <p>0-30 sc brown, pH 8</p> <p>30-85 mc brown with carbonatenod. pH 8.5.</p>	Lower mid slope. 0.5% slope, Brig regrowth. Reasonable buffel cover 30%. Small melon holes in immediate area.
4	630230	7565050	B4: B1	Boundary site	Boundary B4:B1
5	630256	7565310	B3	<p>non-cracking hard setting coarse sandy clay surface. Gravelly</p> <p>0-30 red brown coarse sandy clay. 5YR4.4. pH 7</p> <p>30-50+ light brown sandy</p>	Crest of small ridge, minor brig, bauhinia, current bush regrowth. Very gravelly to rocky surface. Buffel <25%. Harrisia cactus common.
6	630296	7565552	B3	<p>A1 0-20 cm</p> <p>Coarse sandy clay, weak blocky structure, reddish brown 5.0YR4/4 , field pH 7.0.Non cracking,</p> <p>B21 20-60 cm</p> <p>Sandy clay, hard angular blocky , light brown 7.5YR6/4 , field pH 7.5</p> <p>BC 60 – 90 cm</p> <p>Decomposing soft grey-brown sandstone, 7YR6.4, field pH 8.0, soft carbonate common.</p> <p>C 90+ cm</p> <p>fine to medium grained sandstone, 7YR6/4, field pH 8.0</p>	Crest of small ridge, 3-5 % side slopes. Minor brig, bauhinia, current bush regrowth. Very gravelly to rocky surface, ironstones, silcrete, hard sandstone cobbles. Buffel <25%. Harrisia cactus common
7	630500	7565856	B3	<p>non-cracking hard setting clay.</p> <p>0-30 cm brown clay with extensive ironstone gravels.</p> <p>30-150 cm – decomposing sandstones.</p>	Low ridge running off mesa. <15% Buffel. Brigalow regrowth. Moderate sheet wash and gully erosion.
8	630369	7566119	B3	<p>0-25 cm Red brown fine sandy clay</p> <p>25-40cm Yellowish brown medium clay with carbonate nodules.</p> <p>40+ cm. weathered and non weathered sandstone.</p>	Shoulder of low ridge. 2% slope. >15% surface gravels and rocks. Brigalow. and bauhinia current bush regrowth. Sheet wash common. B3 and B1 interfingers in this area. B3 as small hummocks or minor ridges.
9	630387	7566274	A2	<p>0-50 yellow brown uc with outcropping sandstone.</p> <p>50+ weathering sandstone.</p>	Creek line. 1% slope. Bauhinia, Brigalow, current bush. Very gravelly with areas of outcropping rock.
10	630410	7566625	B1	<p>0-40 5YR4/2. med sandy clay. pH 7.5, no bleach or mottles.</p> <p>40-80+ hard sandy brown mottled clay. 7YR5/4. pH</p>	3% slope. Gravelly rocky surface 5- 10cm dia. Sheetwash common.

Site	Easting	Northing	Soil Type	Soil Profile	General Comments
				8.5, Ca and Mn nodules increasing.	Brigalow, bauhinia, current bush regrowth.
11	628969	7565584	B1	same as 10. A horizon is about 35cm to hard clay.	2-3% slope below Mesa.. Gravely rocky surface 5-10cm dia. Sheetwash common. Brigalow, bauhinia, current bush regrowth. Some sheetwash.
12	628950	7567044	B4	Not hard setting sandy clay surface.	Crest of low rise/hill. 1% grade. Good buffel cover>50%. Brigalow regrowth. Large hard sandstone cobbles on surface.
13	628949	7566992	B5	Puff of Yellow brown uniform clay sandy veneer surface over NON-CRACKING brown clay..	Heavily melon holed Brigalow country.
14	628960	7566360	B1	0-35 5YR4/3. sandy clay. pH 7.5, no bleach / mottles. 35-90+ hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	
15	628964	7565017	B5	Puff – hard sandy surface. 0-20 cm yellow brown hard blocky clay. 10yr5.4 pH 8. 30 – 50 cm brown hard blocky clay 10yr5.6 pH 8.5 80-90 cm brown hard massive clay 10YR5.6 pH 8.5	melon holes nearby 70cm deep.
16	629444	7564618	B4	firm sandy surface over uniform clay. Ironstone cobbles.	Level ridge. Brigalow regrowth, occasional Blackbutt. Buffel
17	629603	7565052	B3	Firm yellow to red brown sandy non cracking clay surface.	Moderate 3-4% slope. Very gravely surface, occasional rock. Buffel <20%.
18	629764	7563582	B1	Yellow - red brown surface clay.	Undulating plain 1-5% slope. Gravels and cobbles on surface. Brigalow, Bauhinia and current bush regrowth. Buffel >35%.
19	629886	7565912	B3	red brown non-cracking clay surface. 0-40 cm light red clay, little gravel. 40+ cm weathered parent material.	Crest of low ridge. 3-5% slope.
20	630045	7566218	B1	0-30 cm 5YR4/2. sandy clay. pH 7.5, no bleach / mottles. 30-90+ cm hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	Cleared Brigalow regrowth
21	630212	7566550	B1	same as 20	
22	629900	7566320	B3	same as 19	
23	630435	7564768	B4	Red brown non-cracking surface clay. Not hard setting.	Plain. 1% slope, very little erosion. Occasional ironstone cobbles and rocks. Better soil than B1 or B3. Brigalow, bauhinia, current bush regrowth. Buffel >25%.
24	630724	7564843	A2	Red – yellow brown clay surface soil. Not hard setting.	Minor drainage line. <1%. Some back cutting and bank erosion. Fine surface gravels on creek banks. Lush buffel immediately adjacent to drainage line.
25	631090	7564940	B1	0-30 cm. 5YR4/2. sandy clay. pH no bleach / mottles. 30-90+ cm. hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	Cleared Brigalow regrowth
26	630308	7564917	B1	same as 25. A horizon is about 30cm.	Slope 1-2%. Brigalow regrowth.
27	630619	7564997	B1	A1 0-25 cm Reddish brown 5YR3/4. Sandy clay. Field pH 7.0, occasional gravel, no inclusions or no bleach or mottles, clear to;	3% slope. Hard Ironstone and silicious conglomerate and quartz cobbles and small rocks common. Sheetwash

Site	Easting	Northing	Soil Type	Soil Profile	General Comments
				B21 25-150+ cm Hard and massive sandy clay. Yellow brown 7YR5/6 with field pH 8.0. Carbonate and manganese nodules common. Some mottling. Roots to 35cm.	common. Brigalow, Bauhinia and current bush regrowth. Buffel poor cover <10%.
28	631030	7565091	B1	Uniform red brown clay.	Gravelly surface with cobbles and small rocks. Poor buffel cover <15%. Some Brigalow, current bush and Bauhinia regrowth.
29	631360	7565181	B1	Hard setting uniform clay. A horizon 25cm to pale hard clay.	Close to B4 boundary. 2-3% slope. Some gravels and cobbles. Brigalow regrowth.
30	631629	7565245	B1: B4	Boundary B1 and B4.	Note B4 tends to occur on near level areas below grade changes at B1 interface.
31	628376	7565750	E2	A11 0-40 cm Fine sandy loam, 7.5YR 3/4, structureless, Field pH 6.0 A12 40-60 cm fine sandy loam bleach, 7.5YR6/6, field pH 6.0 B21 0-120 cm massive yellow brown sandy clay 7.5YR5/8, field pH 7.5, Manganese nodules, extensive grey tallow mottling	Level Plain. Cleared level poplar box country. Current bush very common. Buffel >25%. No erosion.
32	630659	7564684	B4	Non cracking brown sandy clay surface.	Gently undulating. 1-2% slope. Brigalow regrowth. Little rock and gravel. No erosion. Buffel>25%.
33	631304	7564497	B4	Firm non-cracking sandy surface, no gravel. 0-30 cm. sandy clay, 7.5YR4/3, brown, pH 7.5 30-90+ cm. medium clay yellowish brown with carbonate nodules. pH 8.5.	Brigalow regrowth
34	631521	7564553	B1	0-20cm. 5YR4/2. Sandy Medium clay. pH 7.0, no carbonate nodules, bleach / mottles. 20-60+ cm. hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	Broad low ridge below mesa. 1-3% slopes. Some gilgai, rocky gravelly surface. Brigalow, Current Bush regrowth. Buffel 20% cover.
35	631822	7564700	A2	0-40cm brown light sandy non cracking clay. 5YR4.4, pH 7.5 40-80cm+ mottled yellow brown medium clay, pH 8.5	Brigalow drainage line..
36	631080	7564420	A2	A11 0 – 3 cm Firm sandy crust B21 3 – 35cm : Dark grey 10YR3/3, hard angular blocky, field pH 8.0, no inclusions or segregations B22 35-100+ cm : Dark grey 10YR3/3, coarse very hard blocky, field pH 9.0, increasing carbonate nodules.	Brigalow drainage line. No rock occasional gravel on surface. Minor erosion and back cutting of channel. Lush Buffel >80% either side of channel. Some Parthenium. Brigalow regrowth.
37	631357	7563985	B4	Boundary site	Boundary B4 and A3. Marginal B4.
38	632030	7563554	B2	0-30 cm fine setting hard sandy clay, 5YR4.4 pH 6.5. 30 – 50 cm light clay with heavy carbonates , concentration and mottles, 5YR4.4. pH 8. 50-120cm+ from soft coarse sandy clay merging into soft weathered gray sandstone parent material.5YR5.4. pH 8. 120+ grey sandstone	Shallow linear gilgai complex on undulating plains. Brigalow, Bauhinia and Current Bush regrowth, Buffel 10 -20%.
39	630133	7563507	A1	0-35 5YR3/4, moderate to hard setting massive sandy clay, pH 7 35 – 80 5YR4/3, massive hard setting sandy clay, pH 7 80-120+ 5YR4/3, hard setting medium heavy silty clay ph 6.5	Major Drainage Line - New Chum Creek embankment. Deep alluvia. Hard setting sandy surface.– Riverine species including Bauhinia, Forest Red Gum, River gum, Moreton Bay Ash. Occasional Brigalow and Poplar Box.

Site	Easting	Northing	Soil Type	Soil Profile	General Comments
40A	628984	7566584	B5	Mound A1 0-20 cm Yellow brown hard blocky clay. 10YR5/4, field pH 8.0. B21 20 – 50 cm Brown hard blocky clay 10YR5/6 field pH 9.0. Soft lime concretions B22 50- 100 cm Brown hard massive clay 10YR5/6 Field pH 9.0. Soft lime concretions	Highly irregular landscape dominated by gilgai. Frequently gravelly to rocky surface (usually as mounds). Hard setting sandy surface on massive hard yellow to brown clays. Near vertical column of remnant hard fractured sandstone layer – two such layers were observed in the embankment of the melon hole.
40B	628984	7566584	B5	Depression A11 0-20 cm Medium clay, hard and weak blocky, grey mottles, field pH 8.5 B21 40-50 cm Massive heavy clay with extensive red and grey (gleyed) mottles. Field pH 9.0. B22 80-90 cm As above with increasing carbonate Field pH 9.0	Stiff hard semi dark brown to yellow cracking clay surface.
41	627805	7567000	E2	0-70 cm Fine Sandy loam. No inclusions stone or bleaches. 7.5YR6/4 70 – 200+cm. fine sand.	Sandy Surface. No erosion. Poplar Box and Bauhinia. Buffel 30%. Localised thickening of sands, presumably as wash from adjacent mesa. Potential source of construction sand.
42	627929	7566641	E2	0-60cm. moderately hard setting grey sandy loam. 60+ cm. massive, hard mottled yellow brown clays.	Upper Mid slope - Poplar Box duplex plain below mesa. Poplar Box. Buffel 20%. Appears that sand thickens upslope toward mesa. From site 1, 40 to 42)
43	633051	7563720	B1	Red brown non-cracking Brigalow clay. Surface horizon 35 cm to pale clay.	
44	632667	7563810	B2	Linear gilgai pattern	
45	632604	7563535	B1	0-30 cm. 5YR4/2. Medium sandy clay. over hard sandy brown mottled clay. 7YR5/6. pH 8.5, with lots Ca and Mn nodules.	Cleared mixed Brigalow regrowth
46	632388	7563289	B1	Brown Brigalow clay same as 45	
47	631402	7563406	A1	0-40 cm. 5YR4/4, hard setting massive sandy clay, pH 7 40 – 100+ cm. 5YR4/3, massive hard setting sandy clay, pH 7	Creek embankment. Deep alluvia. Hard setting sandy surface.– Riverine species including Bauhinia, Forest Red Gum, River Gum, Moreton Bay Ash. Occasional Brigalow and Poplar Box.
48	631198	7563682	B4	Firm non-cracking sandy surface, no gravel. 0-30 cm. sandy clay, 7.5YR4/3, brown, pH 7.5 30-90+ cm. medium clay yellowish brown with carbonate nodules, pH 8.5.	Brigalow regrowth
49	631175	7563904	B4	Same as 48	Gently undulating. 1-2% slope. Brigalow regrowth. Little rock and gravel. No erosion. Buffel>25%.
50	631755	7564101	B1	0-30 cm. 7.5YR4/2. Medium clay. pH 7.0, few carbonate nodules, no bleach / mottles. 30-90+ hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	Brigalow regrowth
51	631775	7563685	B1	0-25 cm. 5YR3/4. Sandy clay. pH 7.0, 5% gravel, no inclusions, bleach or mottles. 25-100+ cm. hard massive sandy yellow brown clay. 7YR5/6. pH 8.5, Carbonate and manganese nodules. Some mottling.	Brigalow regrowth
52	632435	7564044	B1	A horizon 0-30 cm to pale B horizon - same as 51	Cleared Brigalow

Site	Easting	Northing	Soil Type	Soil Profile	General Comments
53	632235	7564822	B1	0-35 cm A horizon over yellow clay - same as 64	Cleared Brigalow
54	632465	7564496	B1	0-35 cm A horizon over yellow clay - same as 64	Cleared Brigalow
55	632201	7564695	B1	0-35 cm. 7.5YR4/4. Sandy clay. pH 8.0, no inclusions, bleach or mottles. 35-90+ cm hard sandy brown clay. 7YR5/6. pH 8.5, Ca and Mn nodules. Some mottling.	2% slope. Gravelly rocky surface Brigalow, Bauhinia, Current Bush regrowth.
56	631400	7564302	B4	Surface layer 0-25cm to pale clay	Brigalow regrowth
57	631311	7564804	B4	Firm non-cracking sandy surface, 0-35 cm. sandy clay, 7.5YR5/4, brown, pH 8.5.few carbonate nodules. 30-90+ cm medium clay yellowish brown with carbonate nodules pH 8.5.	Gently undulating. 1-2% slope. Brigalow regrowth. Little rock and gravel. No erosion. Buffel>25%.
58	630900	7564175	B4	Surface layer 0-35cm to pale clay	Same as 57
59	630901	7564821	B1	0-35 cm. A horizon over yellow clay - same as 64	Cleared Brigalow
60	630688	7564402	B4	B1/B4 intergrade	Brigalow regrowth
61	630395	7564597	B4	Firm non-cracking sandy surface, no gravel. 0-30 cm. sandy clay, 7.5YR4/4, brown, pH 8 30-90+cm. medium clay yellowish brown with carbonate nodules pH 8.5.	Brigalow regrowth with Whitewood, Bauhinia.
62	630822	7563843	B4	Non cracking clay. Sandy surface, no gravels, 0-15cm 10YR3.4 dark yellowish brown, pH 7 sandy clay loam 15-80 med clay dark brown clay 10YR 3.3 with carbonate nodules pH 8.5. Strong brown clay 80-120 7YR5.6, pH 9.0. carbonate nodules.	Gently undulating. 1% slope. Brigalow regrowth. Some surface gravel. No erosion. Buffel 25-40%.
63	629910	7564811	B4	Same as 62	Brigalow regrowth
64	630803	7566075	B1	0-30 cm. 7.5YR4/2. Medium clay. pH 7.0, bit carbonate nodules, no bleach / mottles. 30-90+ cm. hard sandy brown mottled clay. 7YR5/6. pH 8.5, Ca and Mn nodules.	Cleared Brigalow
65	630266	7565894	B1	0-35 A horizon over yellow clay - same as 64	Cleared Brigalow
66	630875	7565455	E1	Mesa soil- 5cm sandy coarse loam	Mixed vegetation

Sites in survey area described in Poitrel Survey (Baker and Tuck 2004)

Site	E	N	soil	Land Features	Soil Profile
88	629510	7564802	B4	cleared Brigalow regrowth. With 30cm gilgai. Gravelly surface with sandy crust. Occasional deep (60-100cm) deep melon holes. Site described on mound. More 'traditional' Brigalow soil. Buffel 35% cover.	A1 0 - 25 Dark brown 10YR4/3. Sandy clay. Field pH 6.0, no surface carbonate nodules, no gravel, no bleach or mottles, clear to; B21 25 – 65 Dark yellowish brown 10YR4/4 , Medium clay (sandy), few yellow mottles, some gravel, Very hard sub-angular blocky. Field pH 6.5, gradual to; B22 65 – 120+ Easier consistence, medium clay, Strong brown 7.5YR4/6, pH 7.0, no sign of weathered PM.
89	629595	7565029	B2	Gravelly ridge Brigalow regrowth. 10% ironstone on surface with silcrete. Close to eastern margin this soil	
90	629542	7565269	B2	Relic low residual. Surface 80% gravel up to 60cm diameter. Mixed Brigalow	0-30 Medium clay, pale 10YR5/4, appears sodic, very rocky throughout.
91	629250	7565450	E1	Residual hill . Mixed eucalyptus and acacia. Very hard surface with extensive gravel on surface.	A11 0 - 10 Very hard, Brown 10YR5/3 , sandy loam, no mottles, few coarse fragments, poor structure. Field pH 6.0, clear to; B21 10–30 Yellowish Brown 7.5YR5/6, sandy clay, field pH 6.0, mottles increasing with no carbonate nodules, 30% gravel, very hard angular blocky. B22 30-75+ Very gravelly (50%) pale brown and hard medium clay. 10YR6/3.
92	629768	7565955	B1	Same soil as 7. reasonable Buffel cover	0-15cm Sandy clay, pH 6.0, 5YR4/6

				60%. Cleared Brigalow with tall Blackbutt and Bauhinia.	15-85cm Sandy clay, pH 6.5, hard angular, 25YR4/6 85+ cm Weathered parent material
93	629594	7566028	B1	Brigalow regrowth - thick shrubby. Some Bauhinia. 40% buffel cover. Surface gravel up to 50mm diameter.	0-15cm Sandy clay, pH 6.0, 5YR4/6 15-80 cm medium clay, pH 6.5, hard angular, 25YR4/6 80+ cm Weathered parent material
94	629194	7566920	B3	Shrubby Brigalow regrowth Bauhinia & Currant Bush. Buffel 30-40%, slope 2-5%, surface sandy crusting with carbonate nodules and 20% ironstone.	A1 0 - 35 cm. Dark yellowish brown 10YR4/4. Sandy clay. Field pH 7.5, some surface carbonate nodules, no gravel, no bleach or mottles, clear to; B21 35 - 100+ cm. Brown 10YR5/4 , Medium heavy clay, few yellow mottles, little gravel, Very hard subangular blocky. Field pH 7.0,
95	629100	7566500	B1	Same as 24	
96	628949	7566862	B5	Brigalow with melon holes 60-100cm deep. 60% of surface is mound with 40% melon hole. Good (70%) grass cover mainly on mounds	0 - 35 SC, 6.0, 10YR4/3, weak SB structure 35-90 MC with some gravel. Very hard angular blocky. 6.5, 10YR44. 90+ MC, mottled 7.5YR4/6, 7.0, moderate structure.
97	628957	7566282	B1	1.5% slope, thick grass (80% cover), melon holes ended just north of this point. Cleared eucalypt country to west.	
98	628963	7565680	B1	Sandy hard setting Brigalow regrowth with uniform clay on gently undulating plain. Ironstone gravel common. extends at least 200m west.	
99	628972	7565119	B5	Melon holes on Brigalow regrowth. With occasional Poplar Box. 70% buffel with <1% slope.	
100	628977	7564730	A1	Poplar Box, Blackbutt no Brigalow. Sandy hard setting surface. Alluvial duplex adjacent to creek.	0-40cm sandy loam, pH 6.0 10YR52 weak structure. 40-45cm conspicuous bleach. pH 6.0 45-90+ mottled, yellow sandy clay pH7.0
101	627881	7566470	B1	Brigalow regrowth with Blackbutt. Duplex soil with 60% Buffel cover.	0-15cm Sandy clay loam, pH 6.0 10YR52 weak structure. 15-20 cm. conspicuous bleach. pH 6.0 20-90+ cm. mottled, yellow sandy clay pH7.0
102	628600	7566100	B1	Same as 31	
249	629982	7563206	A1	Poplar Box, Blackbutt with 50% pasture cover. Slope 0%.	Hardsetting sandy surface no stone. Duplex soil
262	629004	7563458	B1	Thick Brigalow regrowth	Non cracking brown with sandy hardsetting surface
263	629188	7563889	A1	Alluvial with Poplar Box, Brigalow, Blackbutt Yellowwood	Duplex alluvia
264	629248	7564262	A1	Same as 193	duplex alluvia
265	628937	7564408	A1	Same as 194	
266	629802	7564150	A3	Cleared Brigalow in drainage line	Thin sandy duplex A1 0 - 15cm. yellowish brown 10YR4/3. Sandy clay loam. Field pH 7.5, some surface carbonate nodules, no gravel, B21 15 - 100+ cm. Brown 10YR5/4 , Medium heavy clay, few yellow mottles, Very hard subangular blocky. Field pH 8.0,
267	629639	7563312	B4	Linear gilgai pattern with Brigalow and Blackbutt	brown / black linear gilgai pattern

Sites in ML 70313 (May 2009)

SITE NO	EASTING	NORTHING	Soil Type	Soil Profile	General Comments
301	628262	7565281	A1	0 - 40cm fine sandy clay loam over sandy clay	New Chum Creek bank. Moreton Bay Ash, Bauhinia, Poplar Box.
302	627950	7565122	E3	Surface. Hard sandy. A1 0-25cm Fine sandy loam, greyish brown 5YR5/6, Field pH 6.5, massive, no bleach. B21 25 - 90cm+ Light brown 7.5YR5/4, sandy clay, prominent yellow mottles, coarse angular blocky, Field pH 8.0.	Brigalow and Box regrowth with thick Buffel. Slope <1%

SITE NO	EASTING	NORTHING	Soil Type	Soil Profile	General Comments
303	627711	7565266	E3	A horizon 0-35cm sandy loam over yellow clay	Mainly Box with occasional Brigalow
304	627822	7565056	E3	Sandy duplex. 40cm A horizon over clay	All Poplar Box here. Small area in mixed Brigalow / Box
305	627712	7565028	E3	Same as 302	
306	627583	7564277	B1	A11 – 5cm Dark brown 7.5YR4/6. Sandy clay loam. Field pH 8.0, no nodules, gravel or bleach or mottles, abrupt change to; B21 5-50cm Brown 7.5YR4/4, Medium clay (sandy), no mottles or coarse fragments, coarse sub-angular blocky. Field pH 8.5, gradual to; B22 50-90+cm Increasing mixed gravels (<10%) and weathered sandstone	Non cracking soil. Surface firm sandy. Slope 1-2% Cleared Brigalow
307	627330	7564277	B1	Minor gravelly thin duplex	Poplar Box regrowth Slope 3%, minor area.
308	628159	7564330	B1	Surface NON-CRACKING with minor hard set with few small rounded ironstone and minor cracking - A1 0 – 10 Very dark brown (10YR3/2), fine sandy clay, granular, field pH 8.0, no inclusions, dry, clear change to, B21 10 – 60 Very dark brown (10YR3/2), medium clay, strong blocky, field pH 7.5, no carbonate nodules, moist, clear change to, B22 60 -120 Greyish brown (10YR4/3), medium heavy clay, coarse angular blocky, field pH 7.5, no calcareous concretions, moist,	Brigalow cleared. Gently undulating plain, slope 1%, 80% Buffel cover. Stripping depth 30cm.
309	627858	7564121	B1	0-30cm light sandy clay, reddish brown 5YR4/4, mod subangular blocky, no inclusions, pH 6.0, 30-65cm hard angular blocky, 5YR4/3, pH 7. 65-100cm increasing rounded quartz ironstone 100cm weathered sandstone	Slope 1% undulating plain. Cleared Brigalow
310	628239	7564358	B1 E3	BOUNDARY	
311	628623	7564688	A1	0-40 Sandy loam, pH 6.0 10YR5/2 weak structure. 40-45 conspicuous bleach. pH 6.0 45-90+ mottled, yellow sandy clay pH 7.0	Poplar Box, Blackbutt no Brigalow. Sandy hard setting surface. Alluvial duplex adjacent to creek.
312	628189	7564632	E3	Boundary Box / Brigalow	
313	628407	7564487	E3	Surface firm sandy. A1 0-40cm Sandy loam, brown 7.5YR4/6, Field pH 7.5, granular / weak SAB, no bleach. B21 40 – 100cm+ Yellowish brown 7.5YR5/4, sandy clay, some yellow mottles, firm angular blocky, Field pH 8.5.	Brigalow and Box regrowth with thick Buffel. Slope 1.5%. No surface gravel
314	627373	7564128	B3	Gravelly brown very thin duplex – a uniform non-cracking clay in places.	Brigalow. Footslopes of mesa. Small area. Mostly duplex in this area. Too small to map out
315	627737	7563717	E1	Mesa – outcropping sandstone laterite gravels pale sandy loam – Lancewood and acacias. Very skeletal . Red gradational on plateau.	
316	628741	7565013	E3	Sandy duplex. Hardsetting surface. 20% mixed laterite gravels. 0 – 40 cm fine sandy loam, 5YR4/4, pH 7.0, sporadic bleach. Weak structure 40 – 80cm+ hard coarse sandy clay. Yellowish brown 5YR5/5, pH 8.0, some Carbonate nodules. Prominent grey / yellow mottles.	Slight ridge above Brigalow undulating plain. 3% slope. Cleared Poplar Box with some Brigalow originally

SITE NO	EASTING	NORTHING	Soil Type	Soil Profile	General Comments
317	627376	7565386	E3	A1 0 – 30cm Sandy loam, weak granular, reddish brown 5YR4/2, Field pH 6.5, No bleach or sign of impeded drainage. B21 30-65cm sandy clay loam, no coarse fragments or inclusions, red brown 5YR4/4, weak granular, B22 65-100cm Light sandy clay, 5YR5/4, weak blocky, no inclusions, some rounded quartz gravel, Field pH 8.0.	Samples 0-10cm, 40-50cm, 80-90cm. Gradational old alluvial soil. Flat plain. Slope <0.5%. Surface firm, sandy. Buffell 60% cover. Regrowth of Poplar Box, occasional Brigalow and some old Blackbutt. Acacia Salicina.
318	627221	7565680	A2	Surface sandy & non cracking. A1 0-50cm Brown fine sandy clay B21 50 + light sandy clay	Active alluvial channel of New Chum Creek. Poplar.Box, Brigalow, Bauhinia. An A2 soil here but mostly the sandy duplex A1 soil predominates.
319	627046	7565898	E2	A1 0-55cm Fine silty loam, powdery structure, pH 6.5, no gravels or inclusions. A12 55-65cm. Conspicuous bleach and fine laterite gravel layer on clay. B21 65 – 120cm Very hard coarse mottled sandy light clay. Pale yellowish brown. Very poorly drained. No roots into this layer.	Very pale (white) silty loam which sets hard and is highly erosive in disturbed road / power line. Narrow leaf ironbark, Poplar Box, Eremophila. Slope 1.5%
320	627074	7566478	E2	Same soil as 319. White fine silty	Upper crest. E crebra and Poplar Box Quite thick Buffel. Slope 2%
321	627335	7566478	B5	MOUND POSITION A1 0 – 30cm. Sandy clay, pH 8.0, 10YR4/3, weak SB structure, some carbonate nodules, B21 30-90cm. Medium clay, sandy with some gravel and mottling. Very hard angular blocky. 6.5, 10YR5/4. 90+ cm Medium heavy clay, mottled 7.5YR4/6, pH 9.0, hard structure.	Thick Brigalow regrowth. 30% of surface gilgaid up to 100cm deep (mostly about 40cm). Slope 1%. Areas of quite thick gravels on surface. Depressions crack, mounds non crack.
322	626692	7565987	E2	Same soil as 319. White fine sand with 50cm + sandy A horizon A1 0-50cm Fine silty loam, no structure, pH 6.5, no gravels or inclusions. A12 50-55cm. Conspicuous bleach B21 55 +cm Very hard coarse mottled sandy light clay. Pale yellowish brown.	Poplar Box and Bauhinia.
323	626552	7565937	A1	White coarse sand creek bed.	Creek line.
324	626176	7565750	E2	White deeper sandy duplex same as 319	Narrow leaf Ironbark, Poplar Box, eremophila. Slope 1.5%
325	627557	7564820	B1	A11 0-40 cm sandy loam, 7.5YR 4/4, structureless, Field pH 8.0 B21 0-100 cm massive yellow brown sandy clay 7.5YR5/8, field pH 7.5, Manganese nodules, extensive grey tallow mottling	Gravelly non-cracking sandy uniform clay. Brigalow R/G.Flat <0.5% slope. Minor gilgai <20cm deep.
326	627174	7564732	B1	0-40cm medium clay, 10YR4/2, subangular blocky firm, pH 7.5 40-75cm carbonate increasing. Hard structure firm angular pale mottled yellow brown 10YR3/3,	No gilgai Very gravelly, Cleared Brigalow, weak cracking, . Slope 2%. Midslope
327	627084	7565565	B1 E3	BOUNDARY	
328	627109	7565132	B1	Sandy hardsetting non-cracking. Lots surface gravel. 0-30cm red brown 5YR4/3, light sandy clay, pH 8.0, hard angular, no inclusions, 30-70cm very hard yellowish red medium clay 70+ weathered material and gravelly.	Undulating plain gravelly midslope 1.5%. Brigalow regrowth and Box
329	626500	7565144	E1	mesa	
330	627152	7564068	B1	Sandy hardsetting non-cracking. 10% surface gravel.	Undulating plain Upper midslope 2-3%.

SITE NO	EASTING	NORTHING	Soil Type	Soil Profile	General Comments
				0-30cm red brown 5YR4/3, light sandy clay, pH 6.0, hard angular, no inclusions, 30-80cm very hard yellowish red medium clay 80+ weathered sandstone bedrock.	Cleared Brigalow
331	627314	7563509	E2	Duplex A horizon 30cm over hard yellow/brown mottled clay. V poor soil	Gravelly ridge eucalyptus
332	626174	7564184	E2	Duplex of Poplar Box. Gravelly	Same as 31
333	626511	7563822	B1	Sandy hardsetting thin duplex. Lots surface gravel. 0-10cm red brown 5YR4/4, sandy clay loam, pH 6.0, hard angular, no inclusions, 10-90cm lighter coloured medium sandy clay material with increasing weathered substrate 90+ cm. Sandstone bedrock.	Undulating plain 1-2% slope. Upper slope.
334	627343	7563257	B1	Surface hard with prominent sandstone & mixed gravels. 0-30cm Reddish brown 5YR4/3, pH 6.0, light sandy clay, coarse angular, 30-55cm Reddish brown 5YR4/4, pH 7.0, no inclusions, very hard, 30% gravel, yellow mottles 55cm hard sandstone	Cleared Brigalow / Blackbutt. 70% gravels on surface
335	627400	7562720	B3	A horizon originally sandy clay loam mostly removed leaving hard, mottles pale brown sandy clay.	70-80% surface gravels. Laterite. Cleared brig / box. Extensive erosion here
336	627060	7563044	B1	Gravelly thin duplex 2% slope	Cleared Brigalow / Poplar Box with old Blackbutt.
337	626723	7562356	B1	Sandy weak non-cracking 0-30cm Firm sandy clay, light brown 7.5YR4/6, pH 8 30-90+cm hard angular yellowish brown medium clay.	UPPER SLOPE. Soil becoming lighter in colour.
338	626660	7562090	B1	Same as 37	
339	626240	7561834	B1	A1 0-20 cm. sandy clay, brownish red, no bleach B21 20 – 90cm+ very hard mottled medium clay. pH 8.5, carbonate nodules.	Cleared Brigalow box Blackbutt
340	625820	7561822	A2	0-40cm 7.5Yr4/3 hard, sandy clay, pH 8.0, no bleach, 40-70+cm yellowish brown 7.5YR5/4 medium clay, very hard, A/B structure, pH 8.5, some carbonate	Flat hard crusting and cracking surface. Old Brigalow
341	626037	7562717	B1	Sandy hardsetting non-cracking. No surface gravel. 0-3cm hard sandy clay crust, pH 6.0 3-65cm red brown 5YR4/4, light sandy clay, pH 6.0, hard angular, about 40% hard fractured sandstone rock, no inclusions, 65-90cm Sandstone bedrock.	Undulating plain and rises. 3% slope. Midslope.
342	626490	7566410	E2	White sandy duplex undulating plains	Narrow leaf ironbark, Poplar Box.
343	625880	7566406	E2	Same as 342	
344	627800	7566000	B5	Gilgaied grey / brown clay with plenty surface gravel	Brigalow regrowth

ATTACHMENT 2 : LABORATORY ANALYSIS INFORMATION

PART 1 – Analysis results for samples taken within ML 70313 by G Tuck. May 2009.

Agricultural Chemistry Pty Ltd

For Info Refer to PO Box 442

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Phone: 0403245560

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Reference:

09/33

Page: 1 of 4

Date Received: 4/6/2009

Date

Completed: 26/6/2009

FINAL REPORT

Project:

Millennium Mine

Agricultural Chemistry Pty Ltd

Soil Analysis Report

Batch Number: 09/33

Client: GTES

Lab No	Profile	Depth	Total N	PSA-CS	PSA-FS	PSA-Silt	PSA-Clay	R1	ADMC
		cm	%	%	%	%	%		%
746	2	0 - 10	0.095	14	44	24	16	0.82	1.1
747		50 - 60		9	33	17	38	0.81	1.8
748	6	0 - 15	0.108	12	37	20	31	0.62	2.4
749		40 - 50		10	19	17	53	0.78	3.9
750	17	0 - 10	0.084	23	37	15	23	0.65	1.5
751		40 - 50		17	30	11	43	0.56	2.1
752		80 - 90		14	24	8	56	0.66	2.6



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Analysis Results (SOIL)

Customer GTES
 MILLENIUM MINE EXPANSION

Distributor ENVIRONMENTAL SOIL SOLUTIONS
 5 DUNPHY ST
 SUNNYBANK HILLS
 QLD

Sample Ref 2 (0-10CM)

Sample No B040156A / SAB2909

Crop DATA ONLY

Date Received 09/06/2009

Analysis	Result
pH [H2O]	7.2
pH [CaCl2]	6.7
Organic Matter (%)	2.5
CEC (meq/100g)	11.09
EC (dS/m)	0.08
NO3-N (ppm)	< 1.0
Phosphorus [Olsen] (ppm)	10
Potassium (meq/100g)	0.30
Calcium (meq/100g)	9.81
Magnesium (meq/100g)	0.83
Sulphur (ppm)	4
Boron (ppm)	0.5
Copper (ppm)	0.7
Iron (ppm)	80
Manganese (ppm)	17.2
Zinc (ppm)	0.7
Aluminium (meq/100g)	0.03
Sodium (meq/100g)	0.1
Chloride (ppm)	5
Ca base saturation (%)	89.5
K base saturation (%)	2.7
Mg base saturation (%)	7.5
Na base saturation (%)	1.1
Ca Mg Ratio	11.8
Aluminium (ppm)	3.0
Sodium (ppm)	29.0
Calcium (ppm)	1982.0
Magnesium (ppm)	100.0
Potassium (ppm)	117.0
Aluminium Base Sat. (%)	0.30



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Analysis Results (SOIL)

Customer	GTES MILLENIUM MINE EXPANSION	Distributor	ENVIRONMENTAL SOIL SOLUTIONS 5 DUNPHY ST SUNNYBANK HILLS QLD
Sample Ref	2 (0-10CM)	Date Received	09/06/2009
Sample No	B040156A / SAB2909		
Crop	DATA ONLY		

Additional Comments

You should consult your local agronomist and/or Yara representative before deciding upon any course of action based on this report.

Please Note

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Analysis Results (SOIL)

Customer	GTES MILLENIUM MINE EXPANSION	Distributor	ENVIRONMENTAL SOIL SOLUTIONS 5 DUNPHY ST SUNNYBANK HILLS QLD
Sample Ref	6 (0-10CM)	Date Received	09/06/2009
Sample No	B040156B / SAB2910		
Crop	DATA ONLY		

Analysis	Result
pH [H2O]	7.1
pH [CaCl2]	8.8
Organic Matter (%)	2.9
CEC (meq/100g)	20.75
EC (dS/m)	0.05
NO3-N (ppm)	1.2
Phosphorus [Olsen] (ppm)	7
Potassium (meq/100g)	0.73
Calcium (meq/100g)	11.84
Magnesium (meq/100g)	7.23
Sulphur (ppm)	4
Boron (ppm)	0.7
Copper (ppm)	1.8
Iron (ppm)	30
Manganese (ppm)	21.8
Zinc (ppm)	1.1
Aluminium (meq/100g)	0.03
Sodium (meq/100g)	0.9
Chloride (ppm)	19
Ca base saturation (%)	57.1
K base saturation (%)	3.5
Mg base saturation (%)	24.8
Na base saturation (%)	4.4
Ca:Mg Ratio	1.6
Aluminium (ppm)	3.0
Sodium (ppm)	212.0
Calcium (ppm)	2368.0
Magnesium (ppm)	875.0
Potassium (ppm)	285.0
Aluminium Base Sat. (%)	0.10



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Analysis Results (SOIL)

Customer GTES
MILLENIUM MINE EXPANSION

Distributor ENVIRONMENTAL SOIL SOLUTIONS
5 DUNPHY ST
SUNNYBANK HILLS
QLD

Sample Ref 17 (0-10CM)

Date Received 09/06/2009

Sample No B040156C / SAB2911

Crop DATA ONLY

Analysis	Result
pH [H2O]	6.6
pH [CaCl2]	6.2
Organic Matter (%)	2.4
CEC (meq/100g)	8.89
EC (dS/m)	0.03
NO3-N (ppm)	1.5
Phosphorus [Olsen] (ppm)	6
Potassium (meq/100g)	0.41
Calcium (meq/100g)	7.88
Magnesium (meq/100g)	1.44
Sulphur (ppm)	3
Boron (ppm)	0.6
Copper (ppm)	1.3
Iron (ppm)	24
Manganese (ppm)	48.2
Zinc (ppm)	1.4
Aluminium (meq/100g)	0.04
Sodium (meq/100g)	0.1
Chloride (ppm)	7
Ca base saturation (%)	79.7
K base saturation (%)	4.1
Mg base saturation (%)	14.6
Na base saturation (%)	1.2
Ca:Mg Ratio	5.5
Aluminium (ppm)	4.0
Sodium (ppm)	28.0
Calcium (ppm)	1576.0
Magnesium (ppm)	174.0
Potassium (ppm)	160.0
Aluminium Base Sat. (%)	0.40



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Analysis Results (SOIL)

Customer GTES
MILLENNIUM MINE EXPANSION

Distributor ENVIRONMENTAL SOIL SOLUTIONS
5 DUNPHY ST
SUNNYBANK HILLS
QLD

Sample Ref 2 (50-80CM)

Date Received 09/06/2009

Sample No B040156D / SAB2912

Crop DATA ONLY

Analysis	Result
pH [H2O]	7.2
CEC (meq/100g)	11.70
EC (dS/m)	0.07
Potassium (meq/100g)	0.24
Calcium (meq/100g)	6.36
Magnesium (meq/100g)	6.08
Aluminium (meq/100g)	0.14
Sodium (meq/100g)	0.9
Ca base saturation (%)	45.8
K base saturation (%)	2.1
Mg base saturation (%)	43.4
Na base saturation (%)	7.5
Ca:Mg Ratio	1.1
Aluminium (ppm)	13.0
Sodium (ppm)	202.0
Calcium (ppm)	1072.0
Magnesium (ppm)	615.0
Potassium (ppm)	94.0
Aluminium Base Sat. (%)	1.20

Additional Comments

You should consult your local agronomist and/or Yara representative before deciding upon any course of action based on this report.

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Analysis Results (SOIL)

Customer STES
MILLENIUM MINE EXPANSION

Distributor ENVIRONMENTAL SOIL SOLUTIONS
5 DUNPHY ST
SUNNYBANK HILLS
QLD

Sample Ref 6 (50-60CM)

Sample No B040156E / SAB2913

Date Received 09/06/2009

Crop DATA ONLY

Analysis	Result
pH [H2O]	8.4
CEC (meq/100g)	37.13
EC (dS/m)	0.85
Potassium (meq/100g)	0.48
Calcium (meq/100g)	16.35
Magnesium (meq/100g)	16.70
Aluminium (meq/100g)	0.03
Sodium (meq/100g)	4.6
Ca base saturation (%)	41.3
K base saturation (%)	1.3
Mg base saturation (%)	45.0
Na base saturation (%)	12.3
Ca:Mg Ratio	0.9
Aluminium (ppm)	3.0
Sodium (ppm)	1051.0
Calcium (ppm)	3070.0
Magnesium (ppm)	2021.0
Potassium (ppm)	188.0
Aluminium Base Sat. (%)	0.10



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Analysis Results (SOIL)

Customer	GTES MILLENIUM MINE EXPANSION	Distributor	ENVIRONMENTAL SOIL SOLUTIONS 5 DUNPHY ST SUNNYBANK HILLS QLD
Sample Ref	17 (80-90CM)	Date Received	09/06/2009
Sample No	B040156G / SAB2915		
Crop	DATA ONLY		

Analysis	Result
pH [H ₂ O]	7.4
CEC (meq/100g)	12.08
EC (dS/m)	0.03
Potassium (meq/100g)	0.30
Calcium (meq/100g)	6.69
Magnesium (meq/100g)	4.39
Aluminium (meq/100g)	0.06
Sodium (meq/100g)	0.6
Ca base saturation (%)	66.4
K base saturation (%)	2.5
Mg base saturation (%)	36.3
Na base saturation (%)	5.3
Ca/Mg Ratio	1.5
Aluminium (ppm)	5.0
Sodium (ppm)	147.0
Calcium (ppm)	1338.0
Magnesium (ppm)	521.0
Potassium (ppm)	117.0
Aluminium Base Sat. (%)	0.50

Methods used to Analyse Samples

Analyte	ALHS*	Uncertainty %	LOQ	Unit
Ca (Alc)	15C1	7.2	0.18	meq/100g
Mg (Alc)	15C1	4.7	0.31	meq/100g
Na (Alc)	15C1	9.6	0.09	meq/100g
K (Alc)	15C1	4.8	0.02	meq/100g
CEC	15B3	5.7	1.0	meq/100g
DTPA-Cu	12A1	17.1	0.26	mg/kg
DTPA-Zn	12A1	16.4	0.10	mg/kg
DTPA-Mn	12A1	9.0	0.32	mg/kg
DTPA-Fe	12A1	13.0	0.23	mg/kg
ADMC	2A1	11.9	0.4	%
R1	NA	20.2	NA	
SO ₄ -S	10B3	11.5	0.6	mg/kg
Al	15G1	NA	NA	meq/100g
H+	15G1	NA	NA	meq/100g
15 Bar		NA	NA	

Name	Method Description
Exchangeable calcium	1M NH ₄ Cl (alcoholic) @ pH 8.5 leach, AAS
Exchangeable magnesium	1M NH ₄ Cl (alcoholic) @ pH 8.5 leach, AAS
Exchangeable calcium	1M NH ₄ Cl (alcoholic) @ pH 8.5 leach, AAS
Exchangeable calcium	1M NH ₄ Cl (alcoholic) @ pH 8.5 leach, AAS
Cation Exchange Capacity	KNO ₃ + Ca(NO ₃) ₂ extr, (AA) colorimetric
DTPA ext. copper	DTPA extraction, AAS
DTPA ext. zinc	DTPA extraction, AAS
DTPA ext. manganese	DTPA extraction, AAS
DTPA ext. iron	DTPA extraction, AAS
Air Dried Moisture Content	Gravimetric oven dry @ 105C
Dispersion Ratio	Ratio [Aqueous dispersible (Silt + Clay):Total (Silt + Clay)]
Sulfate sulfur	Ca(H ₂ PO ₄) ₂ @ pH 4.0 extractable sulfate-sulfur, ICPOES
Exchangeable Aluminium	Exch. Hydrogen and Aluminium by 1M KCl
Exchangeable Acidity	Exch. Hydrogen and Aluminium by 1M KCl
15 Bar Analysis	Pressure Plate/Gravimetric oven dry @ 105C

Australian Chemistry Pty Ltd
QUALITY CONTROL DATA

Australian Laboratory Handbook of Soil and Water Chemical Methods (1992)

Reference: 09/33

			Actual Value	Acceptance Criteria
Test Method	Units			[Range]
pH	pH	B		5.0 - 5.3
EC	dS/m	B		0.27 - 0.32
Cl	mg/kg	B		10 - 35
NO₃-N	mg/kg	B		10 - 16
NH₄-N	mg/kg	NA		NA
Bicarb.P	mg/kg	B		51 - 75
Total Kjeldahl N	%	S8	0.230	0.195 - 0.248
Total P	%	ALS		See ALS Report
Organic Carbon	%	B		1.82 - 2.3
Ca (Exch. cations)pH7	meq/100g	B		6.96 - 8.04
Mg (Exch. cations)pH7	meq/100g	B		1.88 - 2.22
Na (Exch. cations)pH7	meq/100g	B		.057 - .182
K (Exch. cations)pH7	meq/100g	B		1.209 - 1.411
Exch. Acidity	meq/100g			NA
ECEC	meq/100g	A		NA
CEC	meq/100g	S12		58 - 73
ESP	%	A		NA
Coarse sand	%	B	2.0	1.4 - 2.8
Fine Sand	%	B	18.0	13.1 - 19.1
Silt	%	B	21.0	20.2 - 26.1
Clay	%	B	58.0	55.4 - 60.2
R1		B	0.23	0.18 - 0.29

Test Method	Units	Test Soil	Acceptance Criteria
			[Range]
DTPA-Cu	mg/kg	SB	2.37 - 3.25
DTPA-Zn	mg/kg	SB	3.15 - 3.81
DTPA-Mn	mg/kg	SB	97.7 - 149.0
DTPA-Fe	mg/kg	SB	24.3 - 32.6
Suflate-sulfur	mg/kg	B	96 - 120
15 Bar	%	G	23 - 30
Ca (Exch. cations)pH8.5	meq/100g	S12	27.7 - 35.4
Mg (Exch. cations)pH8.5	meq/100g	S12	22.88 - 24.5
Na (Exch. cations)pH8.5	meq/100g	S12	2.0 - 2.28
K (Exch. cations)pH8.5	meq/100g	S12	1.64 - 2.09

PART 2 Data from the Mavis Downs (2006) survey – Undertaken by Toowoomba SGS laboratory (NATA approved)

Attribute	Units	SITE 1			SITE 6			SITE 27		SITE 31	
		0-15	60-80	90-100	0-20	50-60	80-90	0-20	50-60	0-40	40-50
Depth sampled	cm	0-15	60-80	90-100	0-20	50-60	80-90	0-20	50-60	0-40	40-50
Electrical Conductivity	dS/m	0.14	0.47	1.14	0.14	0.10	0.10	0.11	0.76	0.02	0.02
pH - Water		8.18	8.70	8.83	8.43	8.70	8.81	7.00	8.94	6.64	7.50
Nitrogen	mg/kg	1057.0			1153.0			2341.0		554.0	
Manganese	mg/kg	10			12			35		19	
Iron	mg/kg	15			8			22		27	
Copper	mg/kg	1.9			0.4			1.6		0.4	
Zinc	mg/kg	0.5			0.5			2.0		0.6	
Calcium	mg/kg	4800			4900			3600		670	
Sodium	mg/kg	120			17			37		0	
Potassium	mg/kg	130			360			170		110	
Magnesium	mg/kg	610			53			280		71	
Aluminium	mg/kg	0			0			0		0	
Exch Calcium	meq/100g	24.07			24.65			18.16		3.35	
Exch Sodium	meq/100g	0.51			0.07	0.5	1.3	0.16	14.7	0.00	
Exch Potassium	meq/100g	0.33			0.93			0.43		0.27	
Exch Mg	meq/100g	5.12			0.44			2.35		0.59	
ExchAluminium	meq/100g	0.00			0.00			0.00		0.00	
CEC	meq/100g	30.03			26.09			21.10		4.21	
Ca/MgRatio		4.7			56.0			7.7		5.7	
Exch Calcium	%	80.2			94.5			86.1		79.6	
ExchSodium	%	1.7	10.4	17.8	0.3			0.8		0.0	13
Exch Potassium	%	1.1			3.6			2.0		6.4	
Ex Magnesium	%	17.0			1.7			11.1		14.0	
ExchAluminium	%	0.0			0.0			0.0		0.0	
Sulphur - KCl	mg/kg	2.1			6.7			5.9		<1.0	
Boron	mg/kg	<0.5			0.8			0.7		<0.5	
Organic Matter	%	2.4			2.4			5.1		1.9	
Chloride	mg/kg	20	463	1202	28	18	22	21	861	10	3.1
Phosphorus - Colwell extr	mg/kg	17			20			14		9	

Attribute	Unit	SITE 36		SITE 38			SITE 39		SITE 40A		
		0-40	100-110	0-40	40-50	100-110	Site 39 0-35	100-110	0-20	30-50	80-90
Depth sampled	cm	0-40	100-110	0-40	40-50	100-110	Site 39 0-35	100-110	0-20	30-50	80-90
Electrical Conductivity	dS/m	0.06	0.12	0.13	0.10	0.08	0.02	0.05	0.38	0.72	0.86
pH - Water		7.45	8.83	7.60	8.57	8.88	6.83	7.48	8.41	9.17	9.33
Nitrogen	mg/kg	1151.0		877.0			445.0		930.0		
Manganese	mg/kg	23		19			22		8		
Iron	mg/kg	30		8			19		11		
Copper	mg/kg	1.4		1.0			0.7		0.8		
Zinc	mg/kg	0.8		0.9			0.6		0.4		
Calcium	mg/kg	2900		2800			830		5100		
Sodium	mg/kg	12		14			4.4		160		
Potassium	mg/kg	150		370			72		470		
Magnesium	mg/kg	460		170			120		900		
Aluminium	mg/kg	0		0			0		0		
Exch Calcium	meq/100g	14.39		13.83			4.15		25.74		
Exch Sodium	meq/100g	0.05		0.06			0.02		0.72		
Exch Potassium	meq/100g	0.39		0.95			0.18		1.20		
Exch Mg	meq/100g	3.83		1.38			0.99		7.46		
Exch Al	meq/100g	0.00		0.00			0.00		0.00		
CEC	meq/100g	18.66		16.22			5.34		35.12		
Ca/Mg Ratio		3.8		10.0			4.2		3.5		
Exch calcium	%	77.1		85.3			77.7		73.3		
Exch Sodium	%	0.3	0.7	0.4	0.2	0.3	0.4	<1	2.1	17.5	29.4
Exch Potassium	%	2.1		5.9			3.4		3.4		
Exch Mg	%	20.5		8.5			18.5		21.2		
Exch Al	%	0.0		0.0			0.0		0.0		
Sulphur - KCl	mg/kg	1.7		3.7			<1.0		12.7		
Boron	mg/kg	0.5		<0.5			<0.5		1.7		
Organic Matter	%	2.8		1.8			0.8		1.8		
Chloride	mg/kg	13	14	25	18	10	31	15	194	765	951
Phosphorus - Colwell extr	mg/kg	12		28			9		11		
Attribute		Unit		SITE 40B				SITE 41			
Depth		cm		0-20		50-60		80-90		70-80	
Electrical Conduct.		dS/m		6.10		0.08		0.13		0.18	
pH - Water				6.48		6.80		7.46		8.01	
Nitrogen		mg/kg		1596.0							
Manganese		mg/kg		28							
Iron		mg/kg		73							
Copper		mg/kg		2.5							
Zinc		mg/kg		1.2							
Calcium		mg/kg		2300							
Sodium		mg/kg		26							
Potassium		mg/kg		590							
Magnesium		mg/kg		670							
Aluminium		mg/kg		0							
Exchangeable Calcium		meq/100g		11.72							
Exchangeable Sodium		meq/100g		0.11							
Exchangeable Potassium		meq/100g		1.50							
Exchangeable Magnesium		meq/100g		5.61							
Exchangeable Aluminium		meq/100g		0.00							
Cation Exchange		meq/100g		18.94							
Calcium/Magnesium Ratio				2.1							
Exchange Calcium		%		61.9							
Exchange Sodium		%		0.6		3.4		9.4		15.9	
Exchange Potassium		%		7.9							
Exchange Magnesium		%		29.6							
Exchange Aluminium		%		0.0							
Sulphur - KCl		mg/kg		5.1							
Boron		mg/kg		0.6							
Organic Matter		%		3.5							
Chloride		mg/kg		17		23		58		199	
Phosphorus - Colwell extr		mg/kg		33							

PART 3 - Soil Analysis Data from Poitrel EIS (2004)

SITE 41			SITE 9		
ANALYTE	0-10 CM	50-60 CM	0-10 CM	40-50 CM	80-90 CM
NO3-N ppm	3.7		59.4		
P (Olsen) ppm	2		2		
K meq/100g	0.28	1.11	0.79	0.54	0.39
Mg meq/100g	1.40	9.74	3.25	13.70	3.15
Ca meq/100g	3.75	27.72	11.06	27.60	9.55
S ppm	2		6		
Mn ppm	8.9		33.1		
B ppm	-0.1		0.2		
Cu ppm	0.3		1.4		
Fe ppm	27		30		
Zn ppm	0.3		0.6		
OM %	0.9		3.7		
CEC meq/100g	5.71	42.43	15.88	46.09	13.73
Ca/Mg ratio	2.68	2.85	3.40	2.01	3.03
pH(CaCl2)	5.8				
pH(H2O)	6.4	8.3	6.2	7.3	9.1
EC dS/m	0.02	1.00	0.16	0.43	0.68
Al meq/100g	0.10	0.21	0.36	0.17	0.12
Cl ppm	9		54		
Na meq/100g	0.18	3.65	0.42	4.08	0.52
ESP	3	8.6	4	8.85	3.8
Dispersion R1	0.72		0.46		

PARTICLE SIZE ANALYSIS

SITE	Coarse Sand%	Fine Sand%	Silt%	Clay%
41 (0-10cm)	18	65	8	11
9 (0-10cm)	11	30	29	34

SITE 1				SITE 18		
ANALYTE	0-10 CM	40-50 CM	60-70 CM	0-10 CM	40-50 CM	80-90 CM
NO3-N ppm	23.5			15.2		
P (Olsen) ppm	3			6		
K meq/100g	1.39	0.88	0.34	1.03	0.67	0.66
Mg meq/100g	1.96	3.94	4.39	5.60	16.79	9.66
Ca meq/100g	11.00	14.81	12.73	22.15	16.70	13.60
S ppm	8			6		
Mn ppm	60.3			41.9		
B ppm	0.8			0.8		
Cu ppm	0.8			1.6		
Fe ppm	13			28		
Zn ppm	0.5			1.2		
OM %	1.9			4.9		
CEC meq/100g	14.87	20.18	18.23	30.02	38.77	28.05
Ca/Mg ratio	5.61	3.76	2.90	3.96	0.99	1.41
pH(H2O)	6.9	7.8	7.4	7.6	9.0	9.0
EC dS/m	0.09	0.06	0.03	0.12	0.74	1.13
Al meq/100g	0.11	0.17	0.38	0.30	0.20	0.04
Cl ppm	25			22		
Na meq/100g	0.41	0.38	0.39	0.94	4.41	4.09
ESP	2.8	1.9	2.1	3.1		
R1 dispersion				0.33		

PARTICLE SIZE ANALYSIS

SITE	Coarse Sand%	Fine Sand%	Silt%	Clay%
1	17 (0-10cm)	28	12	46
18	12	28	20	44

SITE 24			SITE 5	
ANALYTE	0-10 CM	40-50 CM	0-10 CM	30-40 CM
NO3-N ppm	20.6		19.8	
P (Olsen) ppm	-1		-1	
K meq/100g	0.93	0.15	0.65	0.66
Mg meq/100g	7.75	0.68	3.23	5.55
Ca meq/100g	29.89	1.66	15.32	32.29
S ppm	9		5	
Mn ppm	21.9		26.2	
B ppm	2.3		0.8	
Cu ppm	1.1		0.8	
Fe ppm	17		14	
Zn ppm	-0.1		-0.1	
OM %	2.4		3.5	
CEC meq/100g	41.63	2.74	19.87	39.29
Ca/Mg ratio	3.86	2.44	4.74	5.82
pH(H2O)	8.4	9.0	7.2	8.4
EC dS/m	0.54	0.77	0.09	0.09
Al meq/100g	0.26	0.08	0.10	0.05
Cl ppm	698		26	
Na meq/100g	2.80	0.17	0.57	0.74
ESP	6.7	6.3	2.9	1.9
Dispersion R1	0.45		0.28	

PARTICLE SIZE ANALYSIS

SITE	Coarse Sand%	Fine Sand%	Silt%	Clay%
24 (0-10cm)	8	22	21	53
5 (0-10cm)	24	39	12	28

CONTAMINATED LAND



Level 8, 400 George St • Brisbane, Queensland • GPO Box 2454 • Brisbane • QLD 4001 •
AUSTRALIA
Telephone (07) 3330 5685 • Facsimile (07) 3330 5754 •
www.derm.qld.gov.au/environmental_management/land/contaminated_land

SEARCH RESPONSE
ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Jessie Keast
PO Box 306
Fortitude Valley Post Office
Fortitude Valley QLD 4006

Transaction ID: 1273941 EMR Site Id: 23 November 2010
Cheque Number:
Client Reference: 14807709

This response relates to a search request received for the site:

Lot: 2 Plan: GV165
null POITREL ROAD
COPPABELLA

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

**EMR/CLR Searches may be conducted online through the State Government Website
www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.**

If you have any queries in relation to this search please phone (07) 3330 5685.

Darryl Byers
Registrar, Contaminated Land Unit



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SEARCH RESPONSE
ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Jessie Keast
PO Box 306
Fortitude Valley Post Office
Fortitude Valley QLD 4006

Transaction ID: 1273942 EMR Site Id: 23 November 2010
Cheque Number:
Client Reference: 14807709

This response relates to a search request received for the site:

Lot: 3 Plan: SP190266
null POITREL ROAD
COPPABELLA

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

**EMR/CLR Searches may be conducted online through the State Government Website
www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.**

If you have any queries in relation to this search please phone (07) 3330 5685.

Darryl Byers
Registrar, Contaminated Land Unit



Millennium Expansion Project Environmental Impact Statement

APPENDIX F2:

TRANSPORT

Eaglefield Expansion Project EIS Road Impact Assessment

Final Report



9 September 2009

Prepared for

Peabody Energy Australia Pty Ltd

Eaglefield Expansion Project EIS Road Impact Assessment

Prepared for
Peabody Energy Australia Pty Ltd

This report has been issued and amended as follows:

Rev	Description	Date	Prepared by	Approved by
0	Draft for internal review	21/07/09	Robertson T	Hulbert M
1	Draft for client review	21/07/09	Robertson T	Hulbert M
2	Draft following client review and modified parameters	10/08/09	Robertson T	Hulbert M
3	Final Report	09/09/09	Robertson T	Hulbert M

Halcrow MWT

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Halcrow MWT has prepared this report in accordance with the instructions of Peabody Energy Australia Pty Ltd for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

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1 Introduction

1.1 Background

Halcrow Pacific Pty Ltd (Halcrow) was commissioned by Matrix Plus Consulting Pty Ltd (MPC), representing Peabody Energy Australia Pty Ltd (Peabody) to undertake a Road Impact Assessment (RIA) for the proposed expansion of the Eaglefield Coal Mine, located approximately 36km north of Moranbah and 32km southwest of Glenden, Central Queensland. The site locality is shown in Figure 1.

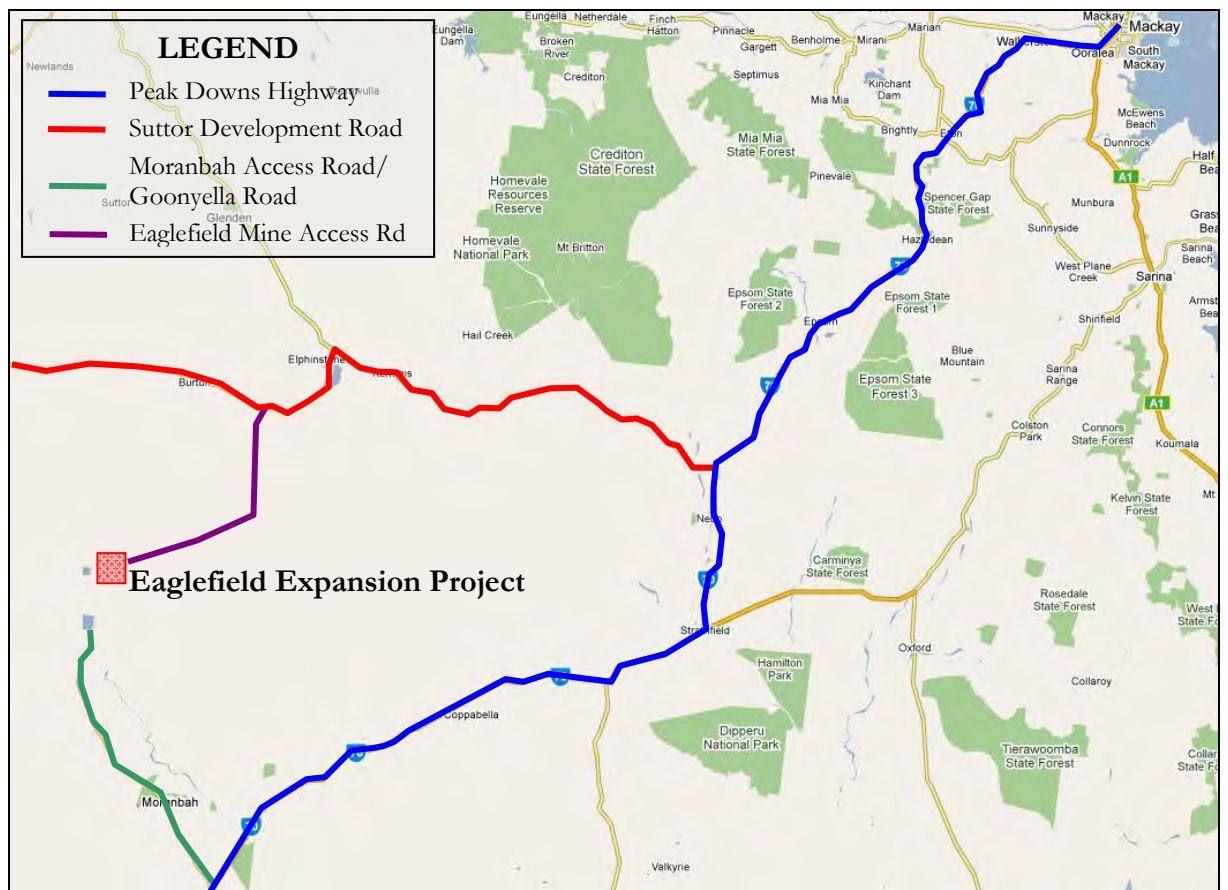


Figure 1 Study Locality

This report will accompany the Environmental Impact Statement for the development of this site. The project is referred to herein as the Eaglefield Expansion Project (EEP).

1.2 *Information and Supporting Documentation*

The assessment of the proposed development's traffic and transport elements considers the requirements of the Final Terms of Reference and the following Department of Transport and Main Roads (DTMR) planning documents and standards:

- Guidelines for Assessment of Road Impacts of Development (GARID) (DTMR, 2006); and
- Road Planning and Design Manual – Chapter 13 Intersections at Grade (RPDM) (DTMR, 2006).

1.3 *Study Methodology*

The following table outlines the study methodology to undertake the RIA.

Table 1 Study Methodology

Site Investigation	Under the direction of MPC, Halcrow has not undertaken a site investigation for this project. The information presented in this report is therefore reflective of the information provided by MPC, Peabody, Main Roads and Isaac Regional Council.
Consultation	The following authorities were contacted as part of this study: <ul style="list-style-type: none"> • Department of Main Roads – Mackay/Whitsunday District • Isaac Regional Council West, Technical & Civil Services Directorate
Data Collection and Collation	Data that have been input into the analyses are listed below: <ul style="list-style-type: none"> • Timelines for each phase of construction and operation (provided by MPC); • Anticipated location for each traffic generating component of the project (provided by MPC); • Expected employee and visitor requirements during each phase of construction and operation (provided by MPC); • Assumed employee shift times (provided by MPC); • Expected number of heavy vehicle movements to and from the site by times of day and vehicle type (provided by MPC); • Likely origins and destinations for construction materials (provided by MPC); • Likely modes of transport used during the construction and operational phases (provided by MPC); • Existing road network details such as network geometry, existing road hierarchy and posted speed limits (provided by DTMR & IRC);

	<ul style="list-style-type: none"> • Future road network provision (provided by DTMR & IRC); • Tube count data, along with associated historical growth rates (provided by DTMR & IRC); and • Existing pavement condition data (provided by DTMR).
Traffic Generation and Assignment	<p>Determination of anticipated vehicle movements was undertaken through the following:</p> <ul style="list-style-type: none"> • Consultation with Peabody regarding project specific details as outlined above (see data collection and collation); • Conversion of these development details into peak hour flows for the intersection impact assessment; • Conversion of these development details into daily flows for the link assessment; • Conversion of these development details into yearly traffic flows for the pavement impact assessment; and • Rather than using standard trip generation rates from DTMR's RPDM or any other reference resource, trip generation was calculated through first principles and the knowledge of employee/heavy vehicle movements for different periods of the day. <p>Traffic was distributed onto the road network based on engineering judgement and information provided by Peabody.</p>
Traffic Impact Assessment	<p>The impact analysis presented in this report is based upon the principles defined within GARID. In particular, the following reference holds the general directive as to how assessment of impacts is considered:</p> <p><i>"In general, Main Roads considers a development's road impacts to be insignificant if the development generates an increase in traffic on State-controlled roads (SCR) of no more than 5% of existing levels... Traffic operation impacts need to be considered for any section of a SCR where the construction or operational traffic generated by the development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements"</i></p> <p>'With' and 'without development' traffic conditions were assessed, and the percentage increase attributable to the proposed development was observed to determine whether the triggers of GARID were met. Percentage increases were also considered in conjunction with absolute volumes to determine the likely level of impact.</p>
Pavement Impact Assessment	<p>The pavement impact assessment was conducted in accordance with the procedures identified within GARID supplemented by information provided in the <i>Pavement Design Manual</i> (DTMR, 2005).</p>
Impact Management and Mitigation	<p>Based on the outcomes of the intersection and link impact analysis, alternative intersection/link forms and associated traffic management strategies were recommended for each phase of the</p>

EEP.

These have been based on Local and State Government requirements with due consideration of both operational and safety characteristics. Any proposed treatments also consider future infrastructure provision within the region.

1.4 *Scope of this Report*

The traffic assessment is presented in this report through the following chapters:

Chapter 2 – describes the development proposal in terms of its site location, proposed access locations, proposed haul routes and expected traffic generation.

Chapter 3 – describes the existing conditions in the vicinity of the EEP.

Chapter 4 – assesses the potential traffic and pavement impacts of the proposed development and describes the requirements of the external road network where development generated traffic has resulted in ‘significant’ impacts.

Chapter 5 – discusses other impacts to the transport network.

Chapter 6 – presents the study conclusions.

2 Development Proposal

2.1 *Site Description*

The Eaglefield Coal Mine is an existing open-cut coal mine which is operated by Peabody on mining lease (ML) No. 6949. It is located within the Isaac Regional Council (formerly Belyando Shire) and is located adjacent to the Goonyella Riverside Coal Mine which is owned and operated by BMA.

The EEP is a proposal to extend the open cut mining operation within the existing project ML 6949. The proposed expansion will be wholly contained within this site.

2.2 *Project Timing*

Construction of the EEP is anticipated to start in 2011 and will take approximately 3 years to complete. The project will be opened in stages, with the first year of operations beginning in 2012. The project timing considered in this assessment is as follows:

- 2011 – Year 1 of construction;
- 2012 – Year 2 of construction and first year of operations (5.5 Mtpa);
- 2013 – Final year of construction and second year of operations (6.5 Mtpa);
- 2014 – Ultimate EEP operations (12 Mtpa); and
- 2024 – 10 year design horizon.

2.3 *Site Access*

Primary access to the subject site is via the Eaglefield mine access road, which connects to the external road network at the Suttor Development Road. The subject site is also accessible via Goonyella Road to the south, which is the most direct route to Moranbah township. These roads are indicated in Figure 1.

2.4 *Proposed Haulage Activity*

The proposed haulage activity for construction and operational phases are indicated in Table 2 and Table 3, respectively.

The haulage of coal to the Coal Handling and Preparation Plant (CHPP) will be via an internal network of haul roads and conveyors, and will therefore not impact any SCR. Once coal has passed through the CHPP it will be conveyed and stockpiled for off-site transport via the existing rail network. A second CHPP may be constructed to cater for the increase in production.

A number of hazardous and oversized loads will be transported to site during construction and operational phases. The likelihood and nature of any spills during transport and the proposed incident management plan is discussed in the Hazard and Risk section of the EIS.

2.5 Proposed Haul Routes

From the information presented in Table 2 and Table 3, the expected origin of all construction and operational inputs will be Mackay. There are two potential haul routes to site, as follows:

- Primary Haul Route (95% of trips): Peak Downs Highway → Suttor Development Road → Eaglefield mine access road.
- Secondary Haul Route (5% of trips): Peak Downs Highway → Moranbah Access Road → Goonyella Road.

Although the secondary haul route has a greater distance than the primary route, existing operations occasionally 'piggy-back' off Millennium Mine, which is also owned and operated by Peabody. Transport to the Millennium Mine is via the Moranbah Access Road and the Peak Downs Highway until the turn off at the Mine Access Road, approximately 15km north of Moranbah Access Road. MPC has advised that approximately 5% of total trips to the EEP would be via the secondary haul route.

Table 2 Heavy Vehicle Movement Description – Construction EEP

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6	Movement 7	Movement 8
Haulage Description	Delivery of fuel & other general supplies	Delivery of CHPP plant & components	Delivery of conveyor stacker/in-pit crusher components	Delivery of 4 Electric Shovels	Delivery of 2 hydraulic excavators	Delivery of 18 haul trucks (797/793/789)	Delivery 5 D11 Dozers	Delivery of additional tyre requirements
Austroroads Vehicle Class	Class 10	Class 10	Class 10	Class 10	Class 10	Class 10	Class10	Class 10
Description of goods & material to be transported	Fuel, chemicals, general supplies	CHPP components	Conveyor, stacker, crusher & in pit components	4 x new electric shovel components	2 x complete excavator components	Haul trucks	D11 Dozers	Haul truck tyres
Quantity of goods to be transported	TBA	200 truck deliveries of components	200 truck deliveries of components	20 truck deliveries per shovel	2 truck deliveries per excavator	2 truck loads per haul truck delivery	5 dozers	54 tyres every 6 months
Origin & Destination of goods	Mackay – Site	Mackay – Site	Mackay - Site	Mackay – Site	Mackay – Site	Mackay – Site	Mackay – Site	Mackay – Site
Is the product hazardous or oversized?	Hazardous	Approx. 50% oversized	Approx. 50% oversized	Approx. 50% oversized	Oversized	Oversized	Oversized	Oversized
Duration of haul movement	10 per week until end of 2013	8 per week for the first 6 months of 2012	8 per week for the first 6 months of 2012	20 per week for first 2 weeks of 2011; 20 per week for first 2 weeks of 2012	4 trucks for the first year of construction (2011)	18 trucks in the first year of construction; 18 trucks in the 3 rd year of construction	3 in first year of construction; 2 in third year of construction	9 trucks each 6 months until end of construction

Table 3 Heavy Vehicle Movement Description – Operation EEP

	Movement 1	Movement 2
Haulage Description	Delivery of fuel & other general supplies	Delivery of additional tyre requirements
Vehicle Class	Class 10	Class 10
Description of goods & material to be transported	Fuel, chemicals, general supplies	Haul truck tyres
Quantity of goods to be transported	TBA	108 tyres every 6 months
Origin & Destination of goods	Mackay – Site	Mackay – Site
Is the product hazardous or oversized?	Hazardous	No
Duration of haul movement	15 per week for the life of mine	18 trucks each 6 months for the life of mine

2.6 *Traffic Generation*

2.6.1 *Journey to Work Trips*

The traffic generation of workforce related journey to work trips is dependant on a number of factors, these being:

- Number of staff required for each shift;
- Number of shifts per day;
- Mode of travel to work (i.e. shuttle bus or private car trips); and
- Bus in/Bus out rotation.

For the purposes of this assessment, the following assumed workforce requirements and typical shift times have been considered. Workforce requirements and shift schedules would be the subject of further detailed project planning.

Information supplied by MPC is supplied in Table 4 below.

Table 4 Employee Requirements

	Construction Period	Combined Construction & Operations*	Operational Period
Total Employee Requirements	300 personnel	500 personnel	300 personnel
Number of Employees per Shift			
• At peak	180 personnel	180 personnel (construct) 65 personnel (op)	100 personnel
• On average	160 personnel	160 personnel (construct) 65 personnel (op)	100 personnel
Number of Shifts per Day	1	1 (construct) 2 (op)	2
Anticipated Shift Times	6:00 - 18:00	6:00 - 18:00	6:00 - 18:00
Residence of Employees			
• North Goonyella Village	95%	95%	95%
• Moranbah	5%	5%	5%
Mode of Travel to Work			
• North Goonyella Village	Shuttle Bus	Shuttle Bus	Shuttle Bus
• Moranbah	Private Vehicle	Private Vehicle	Private Vehicle

*Combined Construction and Operational phases occur in 2012 and 2013

Traffic generation for peak periods can be calculated by dividing the personnel requirements for each shift by the vehicle occupancy. For urban areas, vehicle occupancy of 1.2 persons per vehicle is usually considered appropriate. This rate was applied to trips originating and destined for Moranbah. Employees residing within North Goonyella Village will be transported to and from work via shuttle bus. The shuttle has been assumed to be of coach size capacity, which can accommodate 55 seated persons. The location plan in Appendix A shows that North Goonyella Village is located approximately 17 km along the private access road to the north east of the EEP. Trips between North Goonyella Village and the EEP will not impact on the local or SCR network.

When considering trip generation for each of the construction and operational phases, the following movements should be taken into account:

- Construction Period – One shift per day, therefore:
 - Morning Peak Period – Employee IN movement
 - Afternoon Peak Period – Employee OUT movement
 - Daily – Sum of morning and afternoon peak movements
- Operational Period – Two shifts per day (24 hour continuous operation), therefore:
 - Morning Peak Period – Employee OUT movement for night shift + employee IN movement for day shift
 - Afternoon Peak Period – Employee OUT movement for day shift + employee IN movement for night shift
 - Daily – Sum of morning and afternoon peak movements

In addition to the daily trip generation for each employee shift change, there would be a proportion of employees that would be transported to and from Mackay under a Bus-in/Bus-out (BIBO) or Drive in/Drive out (DIDO) arrangement. MPC has indicated that 70% of personnel would travel via BIBO, whilst the remaining 30% would travel via DIDO. The BIBO would operate on Mondays and Fridays and at the change of roster. All trips would return each day, resulting in a maximum of three return trips per week. The trip generating methodology for BIBO/DIDO trips is presented in Table 5. Details of employee trip generation are shown in Table 6.

To be conservative, link and intersection impact calculations are based on the days when the BIBO is running.

Table 5 BIBO/DIDO Trip Generation

	Construction (2011)	Construction & Operation (2012, 2013)	Operation (2014)
Total employee requirements (1)	300	500	300
Average employee requirements per shift	160	160 (construct) 65 (op)	100
Number of shifts per day	1	1 (construct) 2 (op)	2
Number of employees required each day (2)	160	290	200
Employees on a day off (1) - (2)	140	210	100
Personnel not at work and residing in North Goonyella Village (i.e. Eligible for BIBO/DIDO)	133	200	95
Days of operation - BIBO	3	3	3
- DIDO	7	7	7
Personnel travelling via BIBO per week (i.e. 70%)	93	140	67
Number of passengers travelling via BIBO per day of BIBO operation	31	47	22
Vehicle occupancy (i.e. No. of seats)	55	55	55
Number of buses required to transport BIBO personnel	1	1	1
Daily bus generation on days of BIBO operation (i.e. Sum IN:OUT movements)	2	2	2
Personnel travelling via DIDO per week (i.e. 30%)	40	60	29
Average personnel travelling via DIDO per day	6	9	4
Vehicle occupancy	1.2	1.2	1.2
Number of cars generated by DIDO	5	7	4
Daily private vehicle generation (i.e. Sum IN:OUT movements)	10	4	8

Table 6 Employee Trip Generation (Total trip ends)

Route	Construction Period (vte ³)	Combined Construction & Operations (vte ³)	Operational Period (vte ³)
Peak Period Generation ¹			
• To/from North Goonyella Village	8 (bus)	10 (bus)	4 (bus)
• To/from Moranbah	8 (light veh)	13 (light veh)	8 (light veh)
• To/from Mackay (BIBO) ²	1 (bus)	1 (bus)	1 (bus)
• To/from Mackay (DIDO)	5 (light veh)	7 (light veh)	4 (light veh)
Daily Generation ¹			
• To/from North Goonyella Village	16 (bus)	20 (bus)	8 (bus)
• To/from Moranbah	16 (light veh)	26 (light veh)	16 (light veh)
• To/from Mackay (BIBO) ²	2 (bus)	2 (bus)	2 (bus)
• To/from Mackay (DIDO)	10 (light veh)	14 (light veh)	8 (light veh)

¹ To be conservative, employee requirements during peak construction have been used for the assessment

² Three days per week

³ Vehicle Trip Ends (vte)

2.6.2 Heavy Vehicle Movements

Based on the information provided in Section 2.4 (see Table 2 and Table 3), the number of expected annual truck deliveries required for each phase of construction and operation can be calculated. Table 7 details the anticipated heavy vehicle generation for use in the pavement impact assessment.

Table 7 Annual Heavy Vehicle Generation

Movement description	Annual No. Deliveries				
	2011	2012	2013	2014	2024
Construction					
Delivery of fuel and other supplies	520	520	520	-	-
Delivery of CHPP plant and components	-	200	-	-	-
Delivery of conveyor stacker/in-pit crusher and components	-	200	-	-	-
Delivery of 4 electric shovels	40	40	-	-	-
Delivery of 2 hydraulic excavators	4	-	-	-	-

Movement description	Annual No. Deliveries				
	2011	2012	2013	2014	2024
Delivery of 18 haul trucks	18	-	18	-	-
Delivery of 5 D11 Dozers	3	-	2	-	-
Delivery of additional tyre requirements	18	18	18	-	-
Operation					
Delivery of fuel and other supplies	-	780	780	780	780
Delivery of additional tyre requirements	-	36	36	36	36
Total Annual Truck Deliveries	603	1,794	1,374	816	816
Total Annual Truck Trip Ends (i.e. Sum of IN:OUT movements)	1,206	3,588	2,748	1,632	1,632

Link and intersection analyses are conducted using peak and daily trip generation. Table 8 details the process that was used to convert the information provided by MPC in Section 2.4 (see Table 2 and Table 3) into peak and daily breakdowns. Note that the number of deliveries quoted for each weekly segment will not necessarily coincide (as indicated in the calculation) and would most likely be spread at different times over the year. However, to be conservative, it has been assumed that all deliveries would occur simultaneously. Therefore the traffic generation is not representative of a typical peak/day, but rather the hypothetical maximum possible generation that could be expected at any time.

Table 8 Heavy Vehicle Generation - Peak and Daily Movements

	Trip Generation				
	2011	2012	2013	2014	2024
Construction					
Delivery of fuel and other supplies	10/ week	10/ week	10/ week	-	-
Delivery of CHPP plant and components	-	8/week	-	-	-
Delivery of conveyor stacker/in-pit crusher and components	-	8/week	-	-	-
Delivery of 4 electric shovels	20/week	20/week	-	-	-
Delivery of 2 hydraulic excavators	4/week	-	-	-	-
Delivery of 18 haul trucks	18/week	-	18/week	-	-

	Trip Generation				
	2011	2012	2013	2014	2024
Delivery of 5 D11 Dozers	3/week	-	2/week	-	-
Delivery of additional tyre requirements	9/week	9/week	9/week	-	-
Operation					
Delivery of fuel and other supplies	-	15/week	15/week	15/week	15/week
Delivery of additional tyre requirements	-	18/week	18/week	18/week	18/week
Total weekly Truck Deliveries	64	88	72	33	33
Average No. Truck Deliveries per day (Assumes 7 day working week)	10	13	11	5	5
Peak Period Generation (To be conservative, assumes that each trip end coincides with the commuter peak)	10	13	11	5	5
Daily Generation (i.e. Sum of IN:OUT movements)	20	26	22	10	10

2.7 *Equivalent Standard Axles Generation*

The equivalent standard axles (ESA) generation for the EEP is detailed in Table 9 below. The annual ESAs generated by the proposal is calculated by multiplying the annual truck trip ends (see Table 7 and Table 6) with the appropriate ESA conversion factor, detailed as follows:

- Vehicle Class 10 (B-Double)
 - Loaded – 6.3
 - Unloaded – 0.53
- Vehicle Class 3 (Shuttle Bus; Coach with approx. 55 seating capacity)
 - Loaded – 2.98
 - Unloaded – 0.54

These factors have been supplied by DTMR and associated axle loading calculations are included in Appendix E.

Table 9 Equivalent Standard Axles Generation

Movement description	Annual ESAs Generated by EEP				
	2011	2012	2013	2014	2024
<i>Construction</i>					
Delivery of fuel and other supplies	3550	3550	3550	-	-
Delivery of CHPP plant and components	-	1370	-	-	-
Delivery of conveyor stacker/in-pit crusher and components	-	1370	-	-	-
Delivery of 4 electric shovels	270	270	-	-	-
Delivery of 2 hydraulic excavators	30	-	-	-	-
Delivery of 18 haul trucks	120	-	120	-	-
Delivery of 5 D11 Dozers	20	-	10	-	-
Delivery of additional tyre requirements	120	120	120	-	-
Shuttle bus to Mackay ¹	930	-	-	-	-
<i>Operation</i>					
Delivery of fuel and other supplies	-	5330	5330	5330	5330
Delivery of additional tyre requirements	-	250	250	250	250
Shuttle bus to Mackay ¹	-	-	-	930	930
<i>Combined Construction and Operation</i>					
Shuttle bus to Mackay ¹	-	930	930	-	-
Total Annual ESAs	5,040	13,190	10,310	6,510	6,510

¹ Shuttle bus is always assumed to be loaded.

3 Existing Conditions

3.1 *Road Network*

Current access to Eaglefield from the north is via the Peak Downs Highway (33B) and Suttor Development Road (82A) (refer to Figure 1). From the south it is via the Peak Downs Highway (33B & 33A) and Moranbah Access Road/Goonyella Road.

3.1.1 *Peak Downs Highway*

The Peak Downs Highway is a state controlled road (SCR) connecting Mackay, Nebo, Moranbah and Clermont. It is a sealed, 3.5m wide lane, single carriageway with occasional passing lanes. The maximum speed limit is 100km/hr.

The Peak Downs Highway recently underwent an upgrade to widen an 8.1km section at Myall Creek. A bypass around Walkerston has also been proposed to improve safety for the main street of Walkerston, improve efficiency for the Peak Downs Highway and provide a direct connection with Paget industrial area. Main Roads is currently completing detailed designs.

3.1.2 *Suttor Development Road*

Suttor Development Road is a state controlled road connecting Nebo and Mt Coolon. The road is sealed for approximately 67km from the turnoff from Peak Downs Highway with the remainder of the road to Mt Coolon a spray seal and granular surface. Lane width ranges from 2.7m to 5.5m with a maximum speed limit of 100km/hr.

No future works to the Suttor Development Road have been identified in the *Roads Implementation Program – Mackay/Whitsunday Region*.

3.1.3 *Goonyella Road/Moranbah Access Road*

The southern portion of Goonyella Road/Moranbah Access Road is owned by IRC. The remaining portion to the north of the Blair Athol rail level crossing (approx 6 km north of Mills Avenue) is owned by Goonyella Riverside Mine.

Aside from pavement rehabilitation works, no other major upgrade improvements are proposed for Goonyella Road or Moranbah Access Road. A minor intersection upgrade is proposed at the industrial estate at O'Neil Street, where an 800m passing lane will be constructed from the level crossing southbound towards Moranbah.

3.1.4 *Eaglefield Mine Access Road*

The Eaglefield Mine Access Road is a privately owned road which ultimately connects with the Suttor Development Road. The access road adjoins with other private access roads that service nearby mine sites, identified within the following table.

Table 10 Eaglefield Mine Access Road – Adjoining Mine Sites

Mine	Owner	Employee Requirements
Existing Eaglefield	Peabody	220 personnel (2007)
North Goonyella	Peabody	450 personnel (2007)
Goonyella/Riverside	BHP Billiton and Mitsubishi Alliance (BMA)	960 personnel (2005)
Burton	Peabody	560 personnel (2007)

Sources: <http://www.peabodyenergy.com/Media/publications-factsheets.asp>;
https://www.epa.qld.gov.au/publications/p01677aa.pdf/Initial_advice_statement_Goonyella_Riverside_Coal_Mine_Expansion_Project_prepared_for_BM_Alliance_Operations_Pty_Ltd.pdf

3.2 *Existing Load Limits and Heavy Vehicle Restrictions*

3.2.1 *Peak Downs Highway*

Peak Downs Highway (33B) is a Type 1 Road Train route to the top of Eton Range. From Eton Range to Mackay, it is B Doubles only. Detailed heavy vehicle restrictions for the Peak Downs Highway are provided in Appendix B of this report.

The design class and condition rating of all bridges located on the Peak Downs Highway is included in Appendix C of this report. Note that typically, timber bridges are vulnerable structures. There are 5 timber bridges.

3.2.2 *Suttor Development Road*

Suttor Development Road is a Type 2 Road Train route.

The design class and condition rating of all bridges located on the Suttor Development Road are included in Appendix C of this report. Note that typically, timber bridges are vulnerable structures.

3.2.3 *Goonyella Road/Moranbah Access Road*

Advice from IRC has indicated that there are no heavy vehicle restrictions or vulnerable structures for the section of Goonyella Road or Moranbah Access Road owned by Council.

However, some heavy restrictions do exist for the section of Goonyella Road which is operated by Goonyella Riverside Mine. Typically, these restrictions coincide with employee shift changeovers.

3.3 *Existing Traffic Flows*

The existing traffic volumes for the Peak Downs Highway and Suttor Development Road for 2008 have been provided by DTMR. A summary of the Average Annual Daily Traffic Volumes (AADT) and the percentage of heavy vehicles are provided in Table 11.

Detailed Traffic Analysis and Reporting System (TARS) data is provided in Appendix B.

Table 11 Background 2008 Traffic Volumes (State Controlled Roads)

Road	Site No*	Description	AADT	% Heavy Vehicles
Peak Downs Highway (Road 33B)	80009	Retreat Hotel	3,550	16
	80020	West of Walkerston Township	5,710	11
	80146	East of Coppabella	2,590	16
	80147	West of Coppabella	2,810	16
	80197	East of Bee Creek	3,340	18
Peak Downs Highway (Road 33A)	82884	North of Braeside Road	3,330	19
	150012	Peak Downs Highway 150m west of Isaac River	2,310	22
	159613	Between Dysart turnoff and Moranbah Access Road	2,340	15

Road	Site No*	Description	AADT	% Heavy Vehicles
Peak Downs Highway (Road 33B)	82777	East of Walkerston Cemetery	8,910	9
	82778	East of BSES	14,170	9
	82838	West of Bernborough Ave.	10,360	12
	83159	Weigh in Motion Site, Eton	4,100	16
	82839	Bernborough Ave – City Gates	11,150	13
Suttor Development Road (Road 82A)	80183	West of Isaac River bridge	350	17
	82701	East of Cattle Creek	860	22
	82801	Floodway West of North Goonyella	15	31
	90064	300m South of Bowen Developmental Road	40	23

*Site number is as per TARS data provided in Appendix D.

Traffic count data was sourced from IRC and is summarised below in Table 12. The zero chainage and starting point for each of the listed roads are as follows:

- Moranbah Access Road – Intersection with Peak Downs Highway;
- Goonyella Road – Intersection with Mills Avenue; and
- Mills Avenue – Intersection with Goonyella Road.

Table 12 Background Traffic Volumes (Local Controlled Roads)

Road	Latest Year of Count	Chainage	AADT	% Heavy Vehicles
Moranbah Access Road	2007	11.58	3,640	17
	2003	10.29	2,350	13
Goonyella Road	2007	0.43	3,115	17
	2006	0.36	3,010	20
	2003	0.71	1,700	7
	2006	2.91	3,680	20
	2006	21.3	1,650	12

Road	Latest Year of Count	Chainage	AADT	% Heavy Vehicles
Mills Avenue	2006	21.4	1,160	10
	2006	0.22 LHS	3,230	9
	2006	0.22 RHS	2,990	10
	2004	0.71 LHS	3,380	6
	2004	0.73 RHS	2,470	6
	2004	0.9 LHS	3,550	9
	2004	0.88 RHS	3,810	2

3.4 Existing Pavement Loads

The existing ESA for the Peak Downs Highway and Suttor Development Road have been calculated and are presented in Table 13. An example of the calculation is presented below. The ESA conversion factor of 3.2 is in accordance with advice provided by DTMR.

2008 AADT	3,550
Total number of vehicles per year	1,295,750
Percentage heavy vehicles	16 %
Total number of heavy vehicles per year	207,320
ESA conversion factor	3.2
ESA per year	663,420

Table 13 Existing 2008 Equivalent Standard Axles

Road	Site No*	Description	Annual ESA
Peak Downs Highway (Road 33B)	80009	Retreat Hotel	663,420
	80020	West of Walkerston Township	733,620
Peak Downs Highway (Road 33A)	80146	East of Coppabella	484,020
	80147	West of Coppabella	525,130
	80197	East of Bee Creek	702,200
	82884	North of Braeside Road	738,990
	150012	Peak Downs Highway 150m west of Isaac River	593,580

Road	Site No*	Description	Annual ESA
	159613	Between Dysart turnoff and Moranbah Access Road	409,970
	82777	East of Walkerston Cemetery	936,620
	82778	East of BSES	1,489,550
Peak Downs Highway (Road 33B)	82838	West of Bernborough Ave.	1,452,060
	83159	Weigh in Motion Site, Eton	766,210
	82839	Bernborough Ave – City Gates	1,693,020
Suttor Development Road (Road 82A)	80183	West of Isaac River bridge	69,500
	82701	East of Cattle Creek	220,990
	82801	Floodway West of North Goonyella	5,430

*Site number is as per TARS data provided in Appendix A.

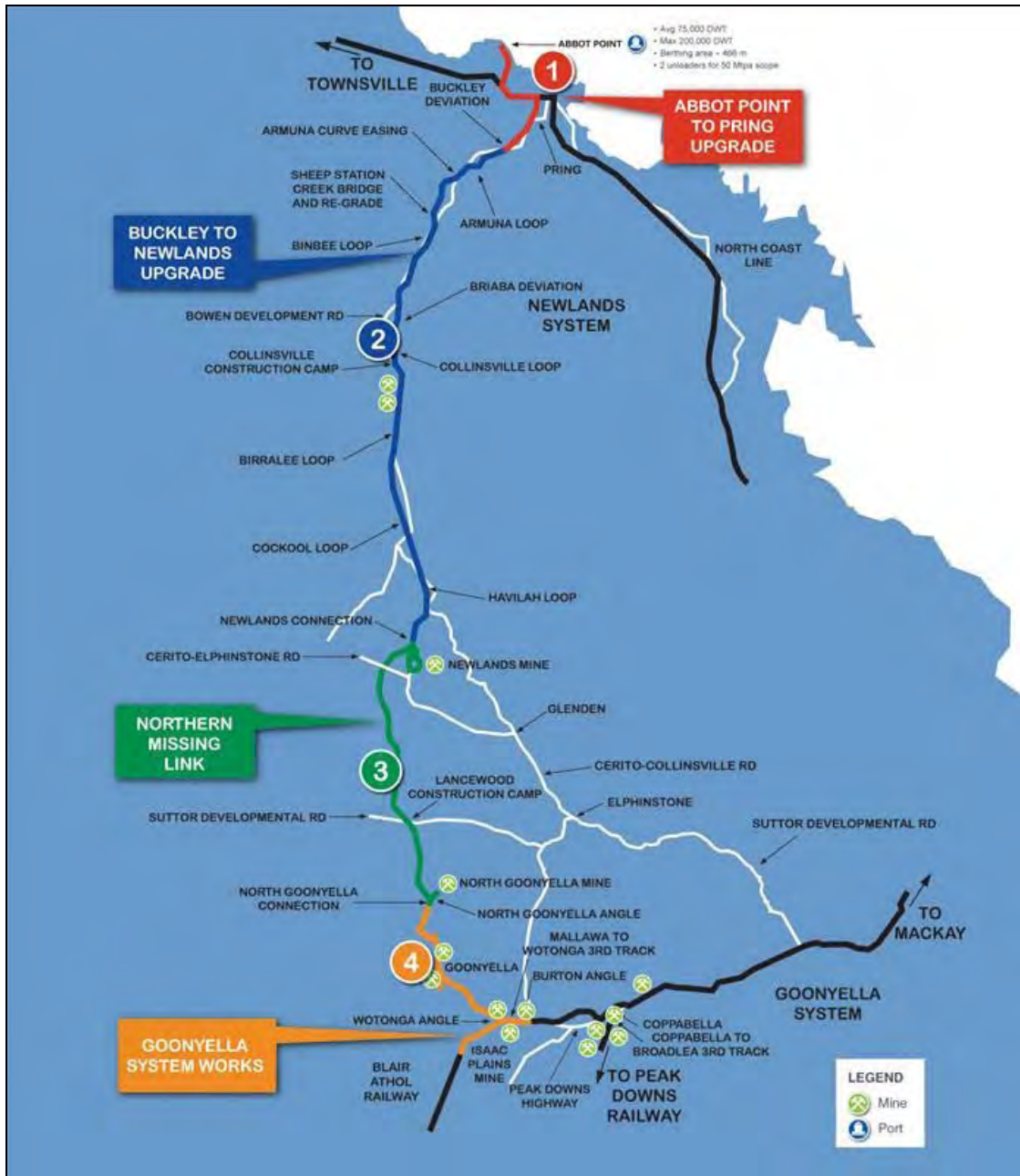
3.5 Rail Network

3.5.1 Passenger Rail

There are no passenger trains servicing the Moranbah area.

3.5.2 Commercial Rail

The rail spur servicing the existing mine is connected to the existing Riverside Mine balloon loop on the Goonyella System, shown in Figure 2.



Source: <http://coalrail.qrnetwork.com.au/COALRAIL-Projects/Newlands-System/Goonyella-to-Abbot-Point-Expansion-Early-Works.aspx>

Figure 3 Goonyella to Abbot Point Expansion Project

3.6 Air

3.6.1 Commercial Airports

A number of commercial airports exist in the vicinity of the EEP as follows:

- **Mackay Airport** is serviced by QANTAS, Jetstar and Virgin Blue. Direct flights are available from Brisbane, Townsville and Rockhampton, with flights operating daily;
- **Emerald Airport** is serviced by QANTAS. Direct flights are available from Brisbane and Blackwater. Flights between Brisbane and Emerald operate daily whilst flights between Blackwater and Emerald typically operate 4 days a week, and only 2 days a week for the return journey; and
- **Moranbah Airport** is serviced by private and charter services. In addition to these, QANTAS Link began servicing this airport from September 2009.

3.6.2 *Local Airstrips*

Many properties in the area maintain small private airstrips for agricultural or personal use. These airstrips are privately owned and operated. They have no bearing or impact on the Project and will not be considered further in this study.

3.7 **Water**

3.7.1 *Ports*

The Goonyella Rail System is currently connected to the world's largest coal export port, which is comprised of two separate coal export terminals:

- **Dalrymple Bay Coal Terminal (DBCT)** – DBCT is leased from the Queensland Government by Babcock and Brown Infrastructure (BBI). Initially designed for a throughput capacity of 12.55Mtpa in 1983, the terminal now has a throughput capacity of 85Mtpa. DBCT handles product for 16 mines in the Northern Bowen Basin.
- **Hay Point Services Coal Terminal (HPST)** – HPST is owned and operated by BHP Billiton and Mitsubishi Alliance (BMA). The terminal has a throughput capacity of 44 Mtpa, although there are expansion plans to increase the throughput to 75 Mtpa in a staged approach. HPST largely services its 7 BMA operated mines in the Bowen Basin.

On completion of the proposed Northern Missing Link, a rail linkage will be provided to the Port of Abbott Point. The Abbott Point Coal terminal has a current throughput of 25Mtpa although expansion plans are underway to increase capacity to 50 Mtpa.

Further information on these ports can be found in the Project Description section of the EIS.

4 Road Impact Analysis and Mitigation Measures

4.1 *Traffic Impact*

4.1.1 *Link Impacts*

The link impact assessment is provided in Appendix F.

The impact analysis indicates that an increase in daily traffic of more than 5% would occur for the following road section:

- Suttor Development Road (between Cattle Creek and Goonyella Mine Access Road) – between 7% and 10% increase in background volumes during construction and operational phases at year 2011, 2012 and 2013.

All other assessed roads at all other years are expected to experience insignificant impacts, as per DTMR's Guidelines for Assessment of Road Impacts of Development.

The section of Suttor Development Road between Cattle Creek and the Goonyella Mine Access Road is expected to service 390 vehicles per day at 2012, without the proposed EEP. The proposed EEP is expected to increase the daily volume by 40 vehicles per day, which in absolute terms, is a very minor traffic increase. Anticipated traffic volumes on the Suttor Development Road at 2012 would therefore be approximately 430 vehicles per day with the EEP.

The capacity of a two lane two way rural road can be calculated using the procedures prescribed in the AUSTROADS *Guide to Traffic Engineering Practice Part 2 - Roadway Capacity*. The following assumptions were used in calculating the daily link capacity. The adopted assumptions are considered to be highly conservative:

- A minimum Level of Service (LOS) A is retained for the whole link;
- The section operates under rolling terrain with approximately 20% of the total length having sight distances of less than 450m;
- Direction distribution is 50/50 over the whole day;
- Lanes are narrow with no usable shoulder width;

- The traffic stream consists of approximately 20% heavy vehicles; and
- The peak hour to daily conversion rate is 6.67 (i.e. peak hour traffic is approximately 15% of total daily traffic as per DTMR advice published in GARID).

Based on these highly conservative assumptions, the daily capacity is calculated to be 635 vehicles per day when a LOS A is retained for the whole link. Given that the 2012 daily volume is anticipated to be 430 vehicles per day with the EEP, expected volumes can be accommodated within the already provided capacity and therefore, mitigation works are not required as part of this development proposal.

4.1.2 *Intersection Impacts*

Intersection impacts are identified when development generated traffic results in increases of greater than 5% of background traffic volumes for any movement. Under these circumstances more detailed intersection analysis is warranted.

Eaglefield Mine Access Road/Suttor Development Road Intersection

The existing layout for the Eaglefield Mine Access Road/Suttor Development Road intersection is indicated in Figure 4.



Figure 4 Eaglefield Mine Access Rd/Suttor Development Rd - Existing Intersection Layout

The impact identification is provided in Appendix G.

The results indicate that the EEP is expected to increase background traffic volumes by more than 5% for each of the assessed cases. This is due to the very light traffic volumes passing through the intersection in the base year.

The background traffic volumes at this intersection are currently very light and this is expected to continue well into the future, even with the presence of the proposed EEP. Chapter 13 of the *Road Planning and Design Manual* (RPDM) (DTMR, 2006) details warrants for identifying priority controlled intersections that operate under un-interrupted flow. Intersections which carry light crossing volumes and operate under un-interrupted flow do not require any flaring on the approaches. Based on the warrants provided in Table 13.4 of the RPDM, the Eaglefield Mine Access Road/Suttor Development Road intersection is expected to operate under uninterrupted flow conditions for all future years, up to and including the 10 year design horizon at 2024.

Given that the intersection is anticipated to carry very light crossing volumes 'with' and 'without' the proposed EEP for all design horizons, no remedial works are required at this intersection.

Moranbah Access Road/Peak Downs Highway Intersection

The existing layout at the Moranbah Access Road/Peak Downs Highway intersection is shown in Figure 5 below.



Figure 5 Moranbah Access Road/Peak Downs Highway – Existing Intersection Layout

The impact identification is provided in Appendix G.

The analysis of ‘with’ and ‘without’ development traffic volumes indicate that an increase in traffic of greater than 5% does not occur for any of the assessed design horizons. Traffic impacts of the EEP are therefore considered insignificant at this location and remedial works would not be required.

Goonyella Road/Mills Avenue Intersection

The existing intersection layout at Goonyella Road/Mills Avenue is shown in Figure 6.



Figure 6 Goonyella Road/Mills Avenue – Existing Intersection Layout

The impact identification presented in Appendix G shows that development generated traffic increases of greater than 5% occur for the following years:

- 2012 – AM Peak (left turn from Goonyella Road North into Mills Avenue);
- 2014 – AM Peak (left turn from Goonyella Road North into Mills Avenue); and
- 2024 – AM Peak (left turn from Goonyella Road North into Mills Avenue).

Given the magnitude of crossing volumes at this intersection, performance analysis was undertaken using the SIDRA Intersection (SIDRA) software platform. SIDRA is an industry recognised analysis tool which can be applied to most intersection forms including priority controlled, roundabout and signalised layouts.

SIDRA analysis was undertaken for cases where the 5% increase in traffic volumes was triggered. A performance summary is provided in Table 14 whilst SIDRA movement summaries are provided in Appendix G.

Table 14 Goonyella Road/Mills Avenue – Performance Summary

	Degree of Saturation	Level of Service*	95% Back of Queue (m)	Performance Adequate?
2012 Without Development Existing Layout	0.728	LOS C	90	YES
2012 With Development Existing Layout	0.747	LOS C	97	YES
2014 With Development Existing Layout	0.786	LOS C	113	YES
2024 Without Development Existing Layout	1.028	LOS F	379	NO
2024 Without Development Upgrade to Seagull#	1.028	LOS F	379	NO
2024 Without Development Upgrade to Roundabout	0.534	LOS B	41	YES
2024 With Development Upgrade to Roundabout	0.535	LOS B	41	YES

*Level of service is taken to be the critical level of service reported for any movement

Seagull refers to a type of an intersection design describe in the Road planning and design manual by department of Main Roads

The results indicate that the existing intersection form is able to adequately cater for anticipated future volumes, including those generated by the EEP, up until the third year of operations (i.e. 2014). However, results for the 10 year design horizon show that the intersection would need to be upgraded, even without the presence of the EEP. To provide acceptable service in 2024 for the ‘without development’ scenario, a roundabout would need to be constructed. Given that the upgrade requirement is due to background traffic growth, the work would need to be undertaken by IRC. The proposed EEP does not bring forward any additional requirement to upgrade the intersection beyond what would be needed for the ‘without development’ condition.

4.2 Pavement Impact

4.2.1 Maintenance Contribution

Operational maintenance is an ongoing annual cost to DTMR and developer payable maintenance contributions are typically triggered when an increase in background ESAs exceed 5% for any road section at each design year. For the purpose of calculating an increase in maintenance costs, it is assumed that the impacts are directly proportional to the increase in loading (ESAs) generated by development traffic. For example, if a development generates a 10% increase in the ESA loading, the annual increase in maintenance costs would be 10% of the annual maintenance costs.

The 5% trigger should be used with discretion as low volume roads may misleadingly report large 'impacts' from small increases in heavy vehicle activity. In these cases, consideration needs to be given to the construction design standard of the subject road section, and maintenance contributions need to be negotiated on a case by case basis between the development proponent and the relevant DTMR district.

The pavement impact assessment is provided in Appendix E of this report.

The impact analysis indicates that an increase in ESA loadings of more than 5% occurs for the following road sections:

- Suttor Development Road towards the EEP (between Peak Downs Highway and Cattle Creek) – 9.0% and 6.8% increase in ESA loadings at 2012 and 2013, respectively; and
- Suttor Development Road towards the EEP (between Cattle Creek and Goonyella Mine Access) – ESAs increases range from 10.7% to 28.6% for the first five year period.

Whilst the percentage increases appear to be significant, it is important to note that these road sections currently carry a small amount of traffic (i.e. less than 1000 vehicles per day). The maintenance contribution that would be payable is therefore to be negotiated between Peabody and DTMR Mackay District.

As per previous advice provided by DTMR, the time frame for contribution calculations has been limited to the first five years. This allows for more accurate and realistic estimations of background and development generated traffic loadings for each five year interval. Another pavement impact assessment would be required for 2016-2021.

4.2.2 *Rehabilitation Contribution*

The 5% trigger used for maintenance contributions is also applicable to road rehabilitation contributions. The trigger is converted to time by assuming that the design life of a pavement section is 20 years. The trigger then becomes 1 year (i.e. 5% of 20 years = 1 year). Impacts are therefore considered insignificant when the reduced life of the pavement as a result of additional development generated traffic is calculated to be less than 1 year.

The pavement impact assessment provided in Appendix E shows that the proposed EEP does not bring forward the date of rehabilitation by more than 1 year for any of the assessed road sections. Therefore, rehabilitation contributions are not required as part of the development proposal.

As per previous advice provided by DTMR, the time frame for contribution calculations has been limited to the first five years. This allows for more accurate and realistic estimations of background and development generated traffic loadings for each five year interval. Another pavement impact assessment would be required for 2016-2021.

4.3 *Summary of Required Mitigation Works*

Based on the findings presented in Section 4.1 and 4.2, the following works will be required in order to mitigate anticipated impacts resulting from the proposed EEP:

Link Impacts

- No mitigation works are required as part of the proposed EEP.

Intersection Impacts

- No mitigation works are required at the Eaglefield Mine Access Road/Suttor Development Road intersection.

- No mitigation works are required at the Moranbah Access Road/Peak Downs Highway intersection.
- Upgrade works are required at the Goonyella Road/Mills Avenue intersection by 2024, regardless of whether the development proposal proceeds. In order to accommodate background traffic growth, the intersection will need to be upgraded to a roundabout as shown in Appendix G. Because these works are not triggered by the proposed EEP, IRC would be responsible for providing the upgrade.
- The proposed EEP does not bring forward any additional requirement to upgrade the Goonyella Road/Mills Avenue intersection beyond what would be required for the 'without development' condition.

Pavement Impacts

- The maintenance contribution for the Suttor Development Road between the Peak Downs Highway and the Goonyella Mine Access will need to be negotiated between DTMR and Peabody;
- Once agreed upon, the payment can be made by a single up-front payment based on the 'present value of costs' or annual payments, which would be subject to DTMR agreement;
- Maintenance contributions are not required on any Council controlled roads; and
- Rehabilitation contributions are not required for any SCR or council controlled roads.

5 Other Impacts

5.1 *Rail Network Impacts*

From Hay Point to North Goonyella there are currently 99 occupation crossings and 9 public crossings. These are largely the responsibility of Mackay and Isaac Regional Councils, although the crossing located at Moranbah Access Road is the responsibility of DTMR. Minor impacts may be expected at these crossings as a result of increased rail activity.

The only road/rail interface that exists along the proposed haul routes is along the North Goonyella Branch. Its details are as follows:

Hay Point/Dalrymple Bay to North Goonyella Branch

- Moranbah Access Road (Chainage 195.250)
 - o Vehicular protection: Flashing lights
 - o Responsible Authority: DTMR

The anticipated increase in vehicle demand at this crossing is 25 vehicles per hour during peak construction/operation (i.e. 2012/2013). Given the light crossing volume, impacts are expected to be minor.

Environmental values which could be affected by increase in rail activity (e.g. dust, noise and vibration) are discussed in the Air Quality and Noise sections of the overarching EIS.

5.2 *Port Related Impacts*

Port related impacts are discussed in Project Description section of the EIS.

5.3 *Impacts to Air Transport*

From the employee trip generation calculations discussed in Section 2.6.1, the maximum number of passengers that may need to be transported in and out of Mackay daily is:

- 2011 Construction Period – 37 personnel;
- 2012/2013 Combined Construction and Operational Period – 56 personnel; and
- 2014 Operational Period – 26 personnel.

Given the minor additional passenger demand resulting from the proposed EEP, it is not anticipated that impacts to air transport would be significant.

5.4 Pedestrian and Cycle Network Impacts

There are no anticipated impacts to the pedestrian and cycle network.

5.5 Public Transport Impacts

There are no anticipated impacts to public transport.

5.6 Environmental Impacts

Impacts of transport associated with the EEP on amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental impacts are discussed in the Air Quality, Noise and Vibration sections of the EIS.

Impacts on watercourses and overland flows and their interaction with the current and future transport network are discussed in the Surface Water section of the EIS.

6 Summary and Conclusions

The Road Impact Assessment for the construction and operation of the proposed Eaglefield Expansion Project has been completed in accordance with the Guidelines for Assessment of Road Impacts of Development (DTMR, 2006). This has included the assessment of traffic and pavement impacts. Key findings and conclusions from this assessment are summarised below.

Road Link Impact

- Of the identified haul routes, the only section which experiences increases in link volume greater than 5% is the Suttor Development Road between Cattle Creek and the Goonyella Mine Access Road;
- Development generated traffic results in a 7% to 10% increase in background volumes during construction and operational phases at year 2011, 2012 and 2013;
- The link capacity for this section has been estimated and it is expected that development generated traffic volumes can be accommodated whilst still providing a high standard of service (i.e. Level of Service A); and
- The EEP is not expected to have an adverse impact on the future year daily operations of the Suttor Development Road, Peak Downs Highway or the Goonyella/Moranbah Access Road.

Intersection Impact

- The Eaglefield Mine Access Road/Suttor Development Road intersection is able to accommodate anticipated traffic volumes generated by the development, and as such does not require any upgrade works;
- Development generated traffic volumes passing through the Moranbah Access Road/Peak Downs Highway are expected to be very light and anticipated impacts are deemed to be insignificant (i.e. all movements experience increases of less than 5%). No upgrade works are required as a result of the EEP;
- The impact identification for the Goonyella Road/Mills Road intersection has shown that individual movement increases of greater than 5% occur for the left turn

from Goonyella Road North into Mills Avenue in the 2012, 2014 and 2024 morning peaks;

- The existing intersection form is able to adequately cater for anticipated future volumes, including those generated by the EEP, up until the third year of operations (i.e. 2014);
- Upgrade works would be required at the Goonyella Road/Mills Avenue intersection by 2024, regardless of whether the development proposal proceeds. In order to accommodate background traffic growth, the intersection will need to be upgraded to a roundabout as shown in Appendix G. Because these works are not triggered by the proposed EEP, IRC would be responsible for providing the upgrade; and
- The proposed EEP does not bring forward any additional requirement to upgrade the Goonyella Road/Mills Avenue intersection beyond what would be required for the 'without development' condition. No upgrade works are required as a result of the EEP.

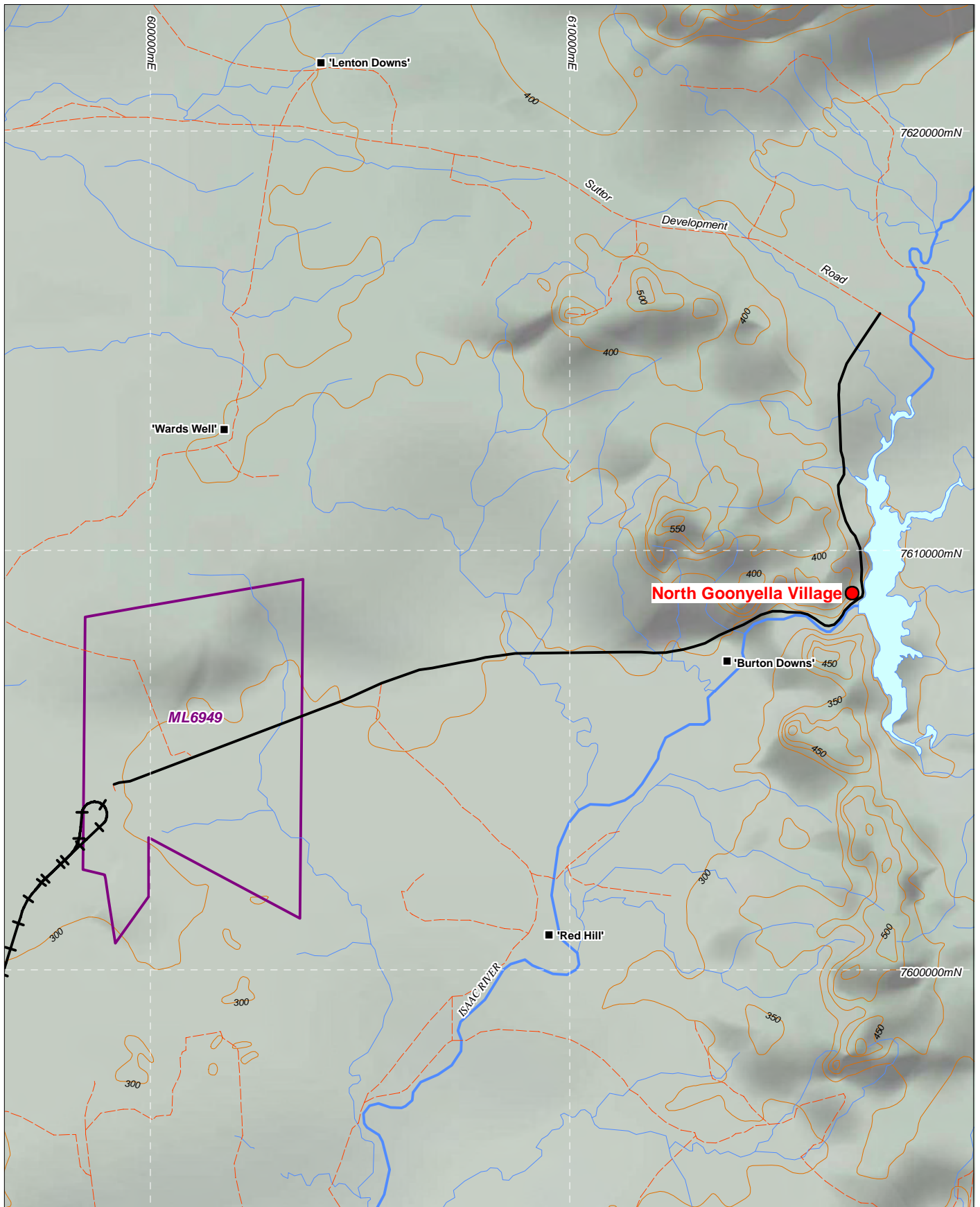
Pavement Impacts














- Of the identified haul routes, the only section which experiences increases in ESAs greater than 5% is the Suttor Development Road between the Peak Downs Highway and the Goonyella Mine Access Road;
- The maintenance contribution for this section would need to be negotiated between DTMR and Peabody as the background ESAs are very light;
- Once agreed upon, the payment can be made by a single up-front payment based on the 'present value of costs' or annual payments, which would be subject to DTMR agreement;
- Maintenance contributions are not required any council controlled roads; and
- Rehabilitation contributions are not required for any SCR or council controlled roads.

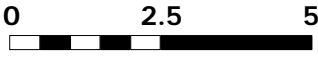

Other Impacts

- Impacts from additional traffic at the rail/road interfaces are expected to be minor;
- Additional passenger demand for air transport as a result of the EEP is not anticipated to be significant; and
- There are no expected impacts to the pedestrian/cycle network or the public transport network.

Appendix A North Goonyella Village Location Plan



 	LEGEND	
	<ul style="list-style-type: none">  Project Tenement  Road  Track  Railway  River  Watercourse  50m Contour 	<ul style="list-style-type: none">  Mine Access Road  Mine Rail Loop  Homestead  Village Location
28/08/2009 Data Source: Topography (250k) - Geoscience Australia. Tenement - Peabody.		

Peabody Energy Australia Pty Ltd Eaglefield Expansion Project	
North Goonyella Village Location Plan	
 Kilometres	
Scale: 1:125,000 (A4)	
 Datum: GDA94 Projection: MGA55	
FIGURE 1-1	

Appendix B Condition Report – Peak Downs Hwy

Conditions current at 26/06/2009.

Disclaimer: The conditions and restrictions outlined in this Conditions of Operation report have been compiled from the most recent information practically available. Conditions are liable to change quickly, particularly due to weather. All care has been taken in providing this information. However, due care still needs to be taken when operating vehicles, particularly those in excess of regulation mass and/or dimension.

Additional search criteria used

Condition type: All

View mass conditions: Yes

Selected route: 33A - Peak Downs Highway (Clermont - Nebo)
33B - Peak Downs Highway (Nebo - Mackay)

CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
00/01	ALL				Height	1.00m	Bridge clearance heights are listed in the conditions below. Any vehicles/loads in excess of these clearances must use alternative routes.
00/03	ALL				Mass	Period Permit	When a blade, bucket or ripper attachment is removed for safety reasons, the attachment may be carried on the same vehicle as the balance of the load, provided that period permit (B class bridge) excess mass limits are not exceeded.

Conditions current at 26/06/2009.

Disclaimer: The conditions and restrictions outlined in this Conditions of Operation report have been compiled from the most recent information practically available. Conditions are liable to change quickly, particularly due to weather. All care has been taken in providing this information. However, due care still needs to be taken when operating vehicles, particularly those in excess of regulation mass and/or dimension.

CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
00/08	ALL				Mass	Regulation	<p>This permit shall be automatically suspended in the event of heavy or prolonged rain affecting the route permitted hereby and the movements of the vehicle and the load shall be deferred until such day and time as may be determined by a representative of the Director-General. See note below regarding Temporary Road Closures affecting excess mass vehicles.</p> <p>TEMPORARY ROAD CLOSURES (Less than 14 days duration) AFFECTING EXCESS MASS VEHICLES</p> <p>Current Conditions of Operation may be obtained from the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Heavy Vehicle Access and Permits, Excess mass and dimension conditions.</p> <p>IT IS THE OPERATORS RESPONSIBILITY TO BE AWARE OF THESE CONDITIONS AT ALL TIMES.</p> <p>For advice on road closures affecting all road users (e.g. flooding) please contact RACQ Road Conditions on Phone 1300 130 595 or via the internet www.racq.com.au select Road Conditions Report</p>
00/14	ALL				Mass	Regulation	<p>If traffic islands or kerbs are to be crossed by the prime mover or the trailer, suitable heavy timber ramps and running planks are to be placed to prevent damage.</p>

Conditions current at 26/06/2009.

Disclaimer: The conditions and restrictions outlined in this Conditions of Operation report have been compiled from the most recent information practically available. Conditions are liable to change quickly, particularly due to weather. All care has been taken in providing this information. However, due care still needs to be taken when operating vehicles, particularly those in excess of regulation mass and/or dimension.

CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
00/15	ALL				Width	2.50m	<p>This permit shall be automatically suspended in the event of heavy or prolonged rain affecting the route permitted hereby and the movements of the vehicle and the load shall be deferred until such day and time as may be determined by a representative of the Director-General. See note below regarding Temporary Road Closures affecting excess dimension vehicles.</p> <p>TEMPORARY ROAD CLOSURES (Less than 14 days duration) AFFECTING EXCESS DIMENSION VEHICLES</p> <p>Current Conditions of Operation may be obtained from the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Heavy Vehicle Access and Permits, Excess mass and dimension conditions.</p> <p>IT IS THE OPERATORS RESPONSIBILITY TO BE AWARE OF THESE CONDITIONS AT ALL TIMES.</p> <p>For advice on road closures affecting all road users (e.g. flooding) please contact RACQ Road Conditions on Phone 1300 130 595 or via the internet www.racq.com.au select Road Conditions Report</p>
00/16	ALL				Mass	Regulation	<p>Conditions of Operation may be obtained from the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Heavy Vehicle Access and Permits, Excess mass and dimension conditions.</p> <p>IT IS THE OPERATORS RESPONSIBILITY TO BE AWARE OF THESE CONDITIONS AT ALL TIMES.</p>

Conditions current at 26/06/2009.

Disclaimer: The conditions and restrictions outlined in this Conditions of Operation report have been compiled from the most recent information practically available. Conditions are liable to change quickly, particularly due to weather. All care has been taken in providing this information. However, due care still needs to be taken when operating vehicles, particularly those in excess of regulation mass and/or dimension.

CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
00/17	ALL				Height Width	4.30m 2.50m	<p>Conditions of Operation may be obtained from the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Heavy Vehicle Access and Permits, Excess mass and dimension conditions.</p> <p>IT IS THE OPERATORS RESPONSIBILITY TO BE AWARE OF THESE CONDITIONS AT ALL TIMES.</p>
00/18	ALL				Mass	Regulation	<p>IT IS THE OPERATORS RESPONSIBILITY TO ASSESS WHETHER ROUTE IS SUITABLE FOR MOVEMENT BEFORE MOVEMENT IS UNDERTAKEN</p> <p>To assist route assessment by operator information on Current Road Closures and Current Roadworks is available on the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Traffic and Roads, select Roadworks, construction and road closures</p>
00/19	ALL				Height Width	4.30m 2.50m	<p>IT IS THE OPERATORS RESPONSIBILITY TO ASSESS WHETHER ROUTE IS SUITABLE FOR MOVEMENT BEFORE MOVEMENT IS UNDERTAKEN</p> <p>To assist route assessment by operator information on Current Road Closures and Current Roadworks is available on the Main Roads Web Site (www.mainroads.qld.gov.au) under Public & Road Users, Traffic and Roads, select Roadworks, construction and road closures</p>
00/27	ALL				Mass	Regulation	<p>All vehicles including trailers must have current registration appropriate for the vehicles use.</p>

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
00/28	ALL				Width	0.10m	All vehicles including trailers must have current registration appropriate for the vehicles use.
00/33	ALL				Mass	Period Permit	<p>A vehicle combination carrying a special purpose vehicle or agricultural vehicle may also carry up to one (1) tonne of additional equipment to be used in conjunction with the vehicle being carried (e.g. blades, buckets, rippers) PROVIDED period permit masses are not exceeded.</p> <p>Additional equipment does not cover the carriage of fuel other than the fuel contained in the fuel tank of the vehicle being carried or substances which will be spread by the vehicle being carried.</p>
08/00	8	ALL			Width	8.00m	<p>Load movements between Mackay and Bowen Basin Mines of 8 metres width or greater must comply with the "Traffic Management Plan - For Wide Loads Operating Between Mackay and Bowen Basin Mining Area".</p> <p>This document is available in electronic format from the Permit Management Centres.</p>
08/00	8	ALL			Width	7.00m	<p>Loads greater than 7m in width will not be permitted in the Mackay Urban Area between the hours of 7am and 9am, and between the hours of 4pm and 6pm. See conditions for individual roads for the extents of the Mackay Urban Area.</p> <p>At the discretion of the department, for any transport, a Traffic Management Plan may be required to be developed and lodged with the Permit Issuing Officer at least 5 working days prior to the intended transport date. Refer to conditions 00/08 for Traffic Management Plan requirements.</p>

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/00	8	ALL			Width	9.00m	<p>Loads up to 9.0m are generally permitted on roads between the coast and the ranges in Mackay District. As nominated by the department, the transport may be requested to be accompanied by a Main Roads Officer, at the cost of the Transport Company.</p> <p>Loads wider than 9.0m requesting to be moved on these roads, referred to in the first paragraph, are to be moved no more than 20km along a State Controlled Road.</p> <p>The maximum width of a load that will be allowed to travel on these roads, referred to in the first paragraph, shall not exceed 10.0m wide. At the total discretion of the Department of Main Roads, loads in excess of 10.0m in width may be approved only in special circumstances.</p> <p>Such wide loads will not be permitted to travel during peak traffic flow times. The exclusion times are between 9:00pm - 6:00am, or as nominated by the department.</p> <p>The transport company may be required to prepare and lodge a Traffic Management Plan at least five working days prior to the intended movement.</p>
08/00	8	ALL			Height	5.20m	<p>Any vehicle with a loaded height in excess of 5.2m which requires to pass under the Queensland Rail Electrified Traction System between the Port of Hay Point and all coal lines to Gregory, Blair Athol and North Goonyella must advise Queensland Rail at least 48 hours prior to movement</p>

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/00	8	ALL			Width	7.00m	<p>Traffic Management Plans</p> <p>When requested or as required, Traffic Management Plans must be prepared and lodged with the Permit Issuing Officer at least five working days prior to the intended movement.</p> <p>A Traffic Management Plan shall address the following:</p> <ul style="list-style-type: none"> (i). Movement details (name, load description / mass / dimension / date and times of movement). (ii). Route details (road and street names, hour by hour milestones (if speed significantly slower than posted speed limit), particular note should be made where it is intended to travel diagonally across an intersection or to travel against the normal traffic flow. (iii). Clearances (roadside facility widths and overhead structure heights - particular attention should be paid to the swept path of a load during turning movements at intersections). (iv). Traffic management details (consider both following and opposing traffic flows in relation to and any special requirements at intersections or roadside and overhead structures).

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Cut Creek to The Retreat	Width	3.50m	Effective From 15/06/2009 to 28/08/2009 Due to roadworks, all excess dimension vehicles over 3.5m in width must comply with the following conditions: - Transport Company to contact the Site Supervisor with details of transportation 24 hours prior to site visit. The Site Supervisor can be contacted on 0419 186297. - Excess dimension convoy to follow signed directions on site and pull over in designated areas until contact with site Traffic Control is made on UHF Channel 21.
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	From Mackay to Eton	Width	7.00m	Loads greater than 7 metres in width are not permitted to travel on this section of highway between the hours of 7am and 9am and between the hours of 4pm and 6pm, as it is part of the Mackay Urban Area.
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Kirkup Bridge (Bakers Creek)	Mass	Period Permit	Kirkup bridge is closed to all excess mass vehicle combinations EXCEPT those vehicles operating under excess mass guidelines or period (B Class Bridge) excess mass permits.
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Walkerston Township	Width	3.60m	West Bound The Peak Downs Highway through Walkerston township is closed to all vehicles operating under excess dimension guidelines or permits EXCEPT those with widths less than 3.6m.

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Walkerston Township	Width	3.60m	East Bound The Peak Downs Highway through Walkerston township is closed to all vehicles operating under excess dimension guidelines or permits EXCEPT those with widths less than 3.6m.
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Kirkup Bridge - Bridge. Over Bakers Creek in Walkerston Through Distance: 78.183	Mass	0.1t Total Mass	Effective From 29/06/2009 to 17/07/2009 Kirkup Bridge over Bakers Creek on the Peak Downs Highway (Nebo - Mackay)(Road 33B) in Walkerston shall be closed to all traffic, 24 hours a day, each day, to enable the completion of maintenance works between the following dates; - Monday 29 June 2009 to Friday 17 July 2009, inclusive. Alternative Route: Heavy vehicles over 15 tonnes total mass (GCM) shall detour around Walkerston via Mackay - Eungella Road & Marian - Eton Road, or via Eton - Homebush Road & Homebush Road. Vehicles not heavier than 15 tonnes total mass (GCM) shall detour around Kirkup Bridge locally within Walkerston via Bold Street, McColl Street and Pugsley Street.

Conditions current at 26/06/2009.

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CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Kirkup Bridge - Bridge, Over Bakers Creek in Walkerston Through Distance: 78.183	Width	0.10m	<p>Effective From 29/06/2009 to 17/07/2009 Kirkup Bridge over Bakers Creek on the Peak Downs Highway (Nebo - Mackay)(Road 33B) in Walkerston shall be closed to all traffic, 24 hours a day, each day, to enable the completion of maintenance works between the following dates;</p> <p>- Monday 29 June 2009 to Friday 17 July 2009, inclusive.</p> <p>Alternative Route: Heavy vehicles over 15 tonnes total mass (GCM) shall detour around Walkerston via Mackay - Eungella Road & Marian - Eton Road, or via Eton - Homebush Road & Homebush Road.</p> <p>Vehicles not heavier than 15 tonne total mass (GCM) shall detour around Kirkup Bridge in Walkerston locally via Bold Street, McColl Street and Pugsley Street.</p>

Conditions current at 26/06/2009.

Disclaimer: The conditions and restrictions outlined in this Conditions of Operation report have been compiled from the most recent information practically available. Conditions are liable to change quickly, particularly due to weather. All care has been taken in providing this information. However, due care still needs to be taken when operating vehicles, particularly those in excess of regulation mass and/or dimension.

CODE	DISTRICT NUMBER	ROAD NUMBER	ROAD NAME	STRUCTURE/ LOCATION	RESTRICTION TYPE	SIZE/ MASS	RESTRICTION
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Kirkup Bridge - Bridge. Over Bakers Creek in Walkerston Through Distance: 78.183	Width	0.10m	Effective From 29/06/2009 to 17/07/2009 Kirkup Bridge over Bakers Creek on the Peak Downs Highway (Nebo - Mackay)(Road 33B) in Walkerston shall be closed to all traffic, 24 hours a day, each day, to enable the completion of maintenance works between the following dates; - Monday 29 June 2009 to Friday 17 July 2009, inclusive. Alternative Route: Heavy vehicles over 15 tonnes total mass (GCM) shall detour around Walkerston via Mackay - Eungella Road & Marian - Eton Road, or via Eton - Homebush Road & Homebush Road. Vehicles not heavier than 15 tonne total mass (GCM) shall detour around Kirkup Bridge in Walkerston locally via Bold Street, McColl Street and Pugsley Street.
08/33B	8	33B	Peak Downs Highway (Nebo - Mackay)	Conveyor Belt. Through Distance: 85.777	Height	5.55m	Racecourse Mill Conveyor belt.

Appendix C Bridge Information Structure Listing

Bridge Information System Structure Listing

Structure Id

Name

Deficiency

Overview

Structure Type

Bridge
 Culvert
 Obstruction
 Minor
 Tunnel
 Retaining Wall

Construction Type

Construction Material

Owner

District

LGA

Status

Location

Code	Id	Road Section			Start		End		Tdist		Length		
		Description	S	Cway	S	RPC	Dist	RPC	Dist	Start	End	From	To
ON	33A	Clermont - Nebo											
ON	33B	Nebo - Mackay											
ON	82A	Nebo - Mt. Coolon											

Pictures

All
 Description
 Date

Order By

Structure Id
 Name
 Road Section and TDist

Bridge Information System Structure Listing

Id	Name	Type	----- Current -----		Construction Type	Construction Material	Dist	Road Sect	S	Cway	S	Tdist	Start	
			Undersize Component	Design Class										Condition Rating
37472	Carborough Downs H	Bridge		S M 1600 + H	1	Deck Unit	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	111.192
7370	North Creek	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	119.366
7375	Railway At Peak Dow	Bridge		H20s16	2	Slab	Concrete	8	33A	Clermont - Nebo	C	1	C	125.712
7376	Thirty Mile Creek	Bridge		A Class	2	Slab	Concrete	8	33A	Clermont - Nebo	C	1	C	136.001
7371	Humbug Gully	Bridge		H20s16	1	Deck Unit	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	143.818
7373	Bee Creek	Bridge		H20s16	3	Girder/Beam	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	150.762
7374	Nebo Creek	Bridge		T44	3	Girder/Beam	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	163.087
7372	Railway At Goonyella	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	33A	Clermont - Nebo	C	1	C	164.021
7384	Fiery Creek	Bridge	✓	A Modified	2	Girder/Beam	Timber	8	33B	Nebo - Mackay	C	1	C	9.962
7385	Lonely Creek	Bridge	✓	A Modified	3	Girder/Beam	Timber	8	33B	Nebo - Mackay	C	1	C	13.421
7386	Boundary Creek	Bridge	✓	A Modified	2	Girder/Beam	Timber	8	33B	Nebo - Mackay	C	1	C	16.681
7387	Cut Creek	Bridge	✓	A Modified	3	Girder/Beam	Timber	8	33B	Nebo - Mackay	C	1	C	24.212
7380	Denison Creek	Bridge		T44	1	Girder/Beam	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	28.130
7377	Stockyard Creek	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	36.881
37984	Black Waterhole Cree	Bridge		S M 1600 + H	1	Deck Unit	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	46.730
7381	Cut Creek	Bridge		H20s16	2	Girder/Beam	Steel	8	33B	Nebo - Mackay	C	1	C	54.236
7382	Cut Creek	Bridge		H20s16	2	Girder/Beam	Steel	8	33B	Nebo - Mackay	C	1	C	56.976
7378	Sandy Creek	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	63.274
35818	Perry Creek	Bridge		S M 1600 + H	1	Deck Unit	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	65.614
7379	Sawn Creek	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	33B	Nebo - Mackay	C	1	C	66.603
7390	Kirkup Bridge	Bridge		B Class	4	Girder/Beam	Timber	8	33B	Nebo - Mackay	C	1	C	78.183
9742	Nebo Creek	Bridge		T44 + H L P	1	Deck Unit	Pre-Stressed	8	82A	Nebo - Mt. Coolon	C	1	C	1.903
7392	Cattle Creek	Bridge		H20s16	2	Deck Unit	Pre-Stressed	8	82A	Nebo - Mt. Coolon	C	1	C	7.277
7393	Cooper Creek	Bridge		H20s16	1	Deck Unit	Pre-Stressed	8	82A	Nebo - Mt. Coolon	C	1	C	11.470
7394	Bee Creek	Bridge		T44	2	Deck Unit	Pre-Stressed	8	82A	Nebo - Mt. Coolon	C	1	C	28.500

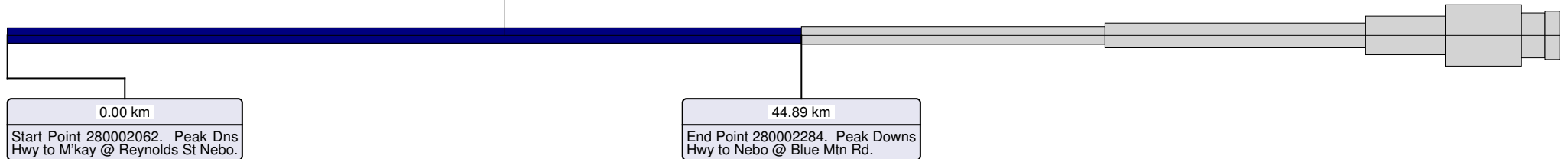
Bridge Information System Structure Listing

Id	Name	Type	----- Current -----		Construction Type	Construction Material	Dist	Road Sect		S	Cway	S	Tdist	Start
			Undersize Component	Design Class										
32694	Hail Creek Rail Overp	Bridge		T44 + H L P	1	Deck Unit	Pre-Stressed	8	82A	Nebo - Mt. Coolon	C	1	C	38.702
7395	Isaacs River	Bridge		Ms18	2	Girder/Beam	Steel	8	82A	Nebo - Mt. Coolon	C	1	C	68.915
7396	Suttor River	Bridge		H20s16	2	Girder/Beam	Steel	8	82A	Nebo - Mt. Coolon	C	1	C	121.825

Appendix D TARS Data

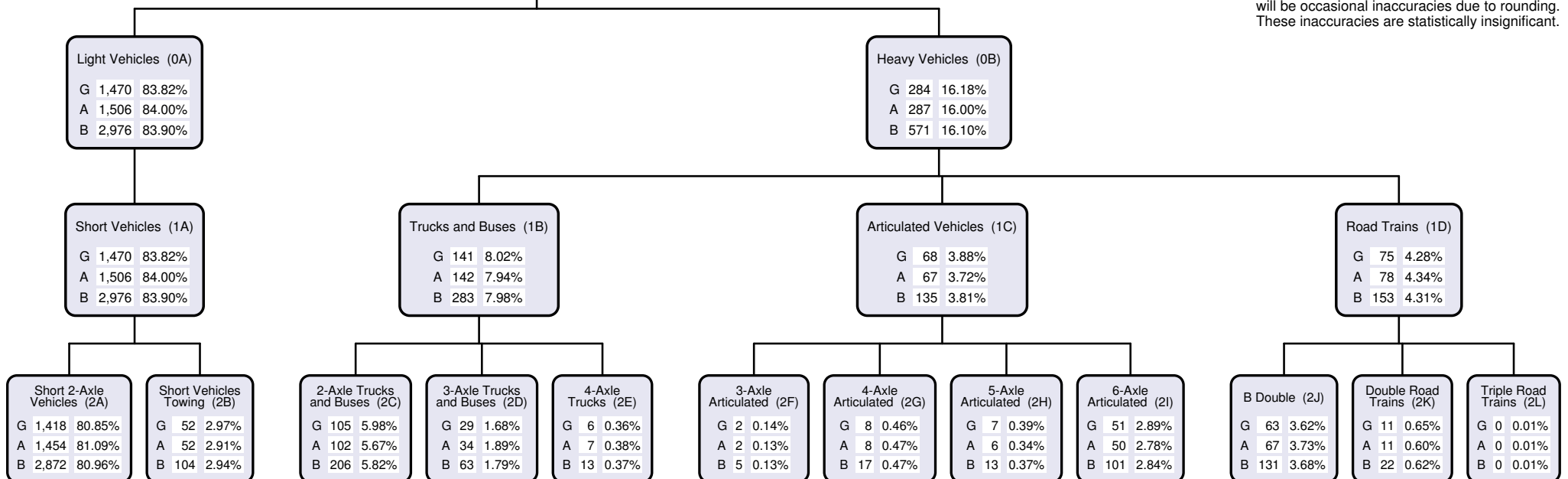
Site 80009. Point 280002061.
Retreat Hotel Permanent Counter.
28.12 km

The width of each Road Segment is proportional to its AADT.



All Vehicles (00)
G 1,754 100%
A 1,793 100%
B 3,547 100%

This report shows Annualised Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



TARS Growth Rate Calculation Sheet

Road No.	33B
Chainages	0.000 - 52.867
Description	Retreat Permanent Counter
Site No.	80009
Assoc. Permanent Site No.	80009

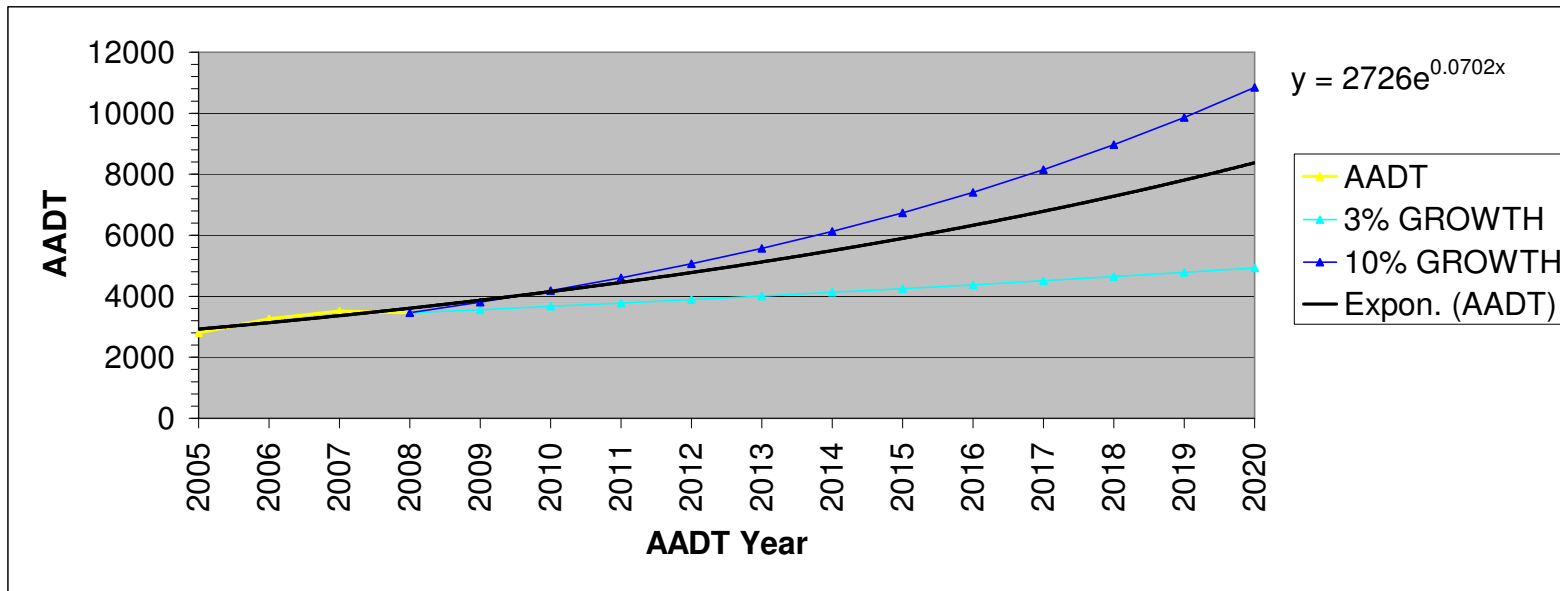
YEAR	AADT	% COMM.	COMMERCIAL VEHICLES	3% GROWTH	10% GROWTH
2005	2805	16.15	453		
2006	3265	16.05	524		
2007	3518	16.78	590		
2008	3457	16.10	557	3457	3457
2009				3561	3803
2010				3668	4183
2011				3778	4601
2012				3891	5061
2013				4008	5568
2014				4128	6124
2015				4252	6737
2016				4379	7410
2017				4511	8151
2018				4646	8967
2019				4785	9863
2020				4929	10850

EXPONENTIAL GROWTH RATE

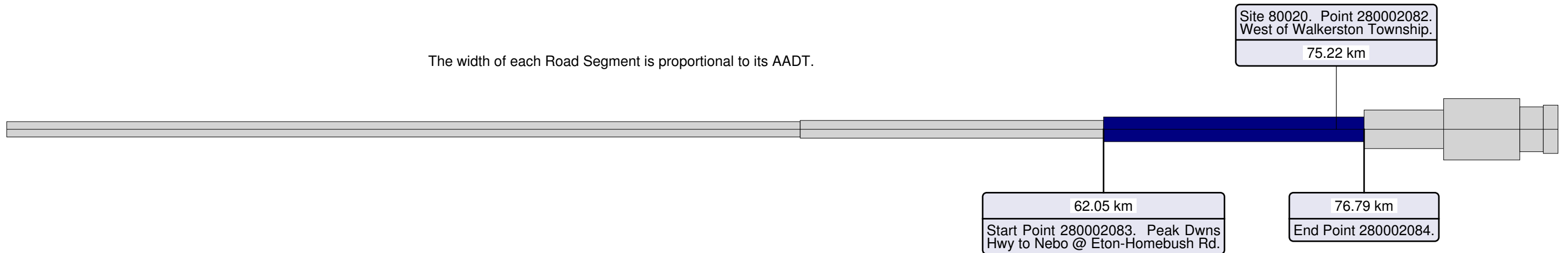
AADT Year	Growth Year	AADT	Growth Rate
2009	5	3872	
2014	10	5500	
2019	15	7813	7.27

EXPONENTIAL GROWTH RATE (Commercial Vehicles)

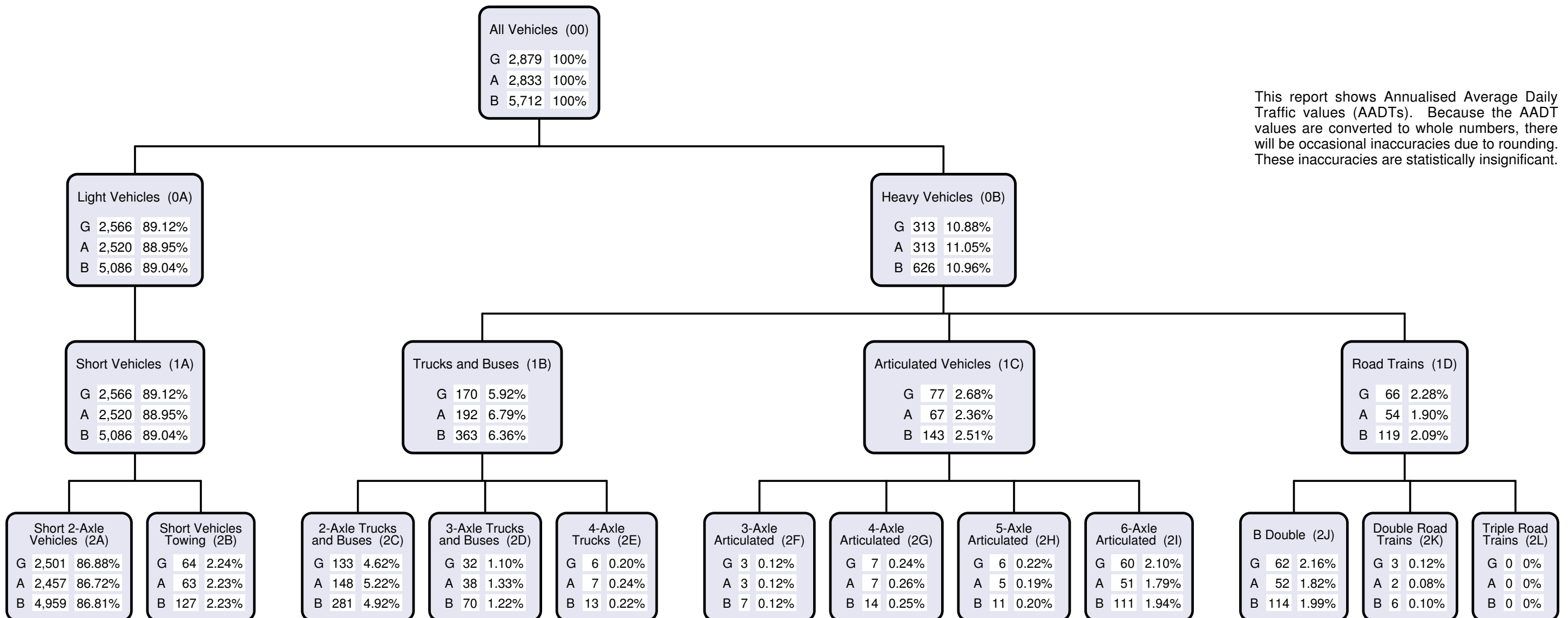
Year	Growth Year	COMM VEH	Growth Rate
2009	5	635	
2014	10	919	
2019	15	1328	7.65



The width of each Road Segment is proportional to its AADT.



This report shows Annualised Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



TARS Growth Rate Calculation Sheet

Road No.	33B
Chainages	62.052 - 76.792
Description	West of Walkerston Township
Site No.	80020
Assoc. Permanent Site No.	80017

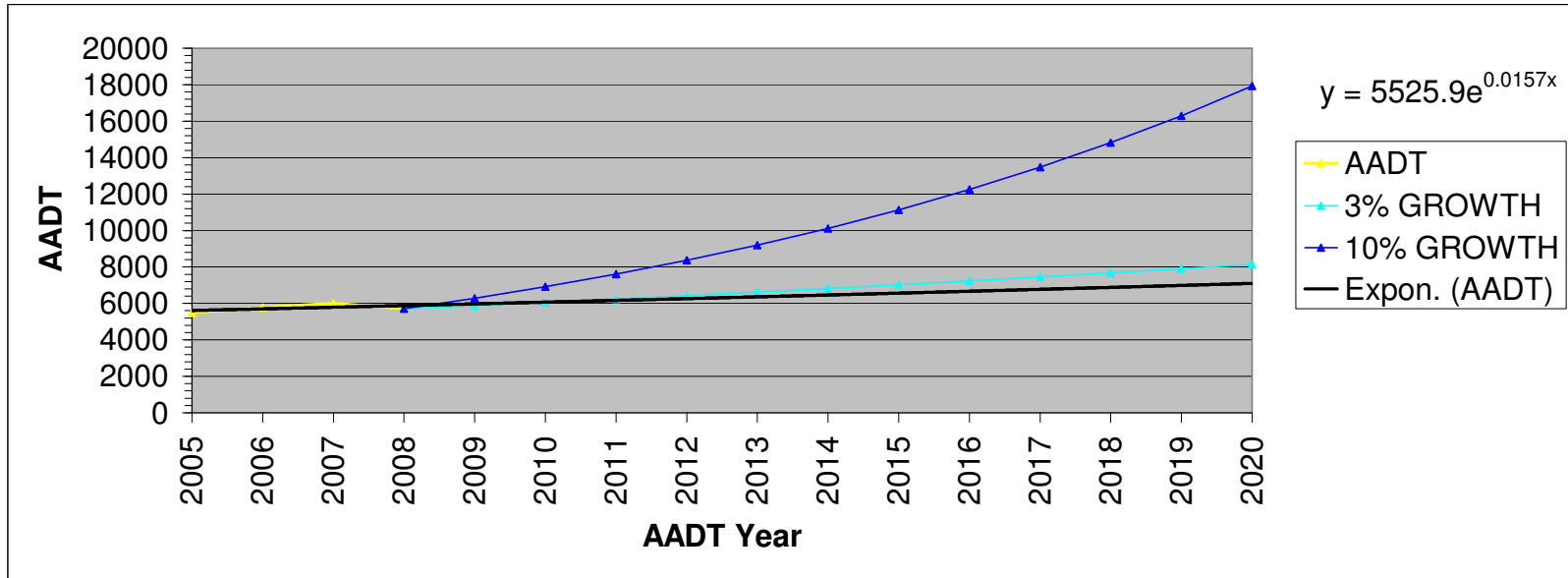
YEAR	AADT	% COMM.	COMMERCIAL VEHICLES	3% GROWTH	10% GROWTH
2005	5490	10.69	587		
2006	5787	10.42	603		
2007	6009	11.30	679		
2008	5712	10.96	626	5712	5712
2009				5883	6283
2010				6060	6912
2011				6242	7603
2012				6429	8363
2013				6622	9199
2014				6820	10119
2015				7025	11131
2016				7236	12244
2017				7453	13469
2018				7676	14815
2019				7907	16297
2020				8144	17927

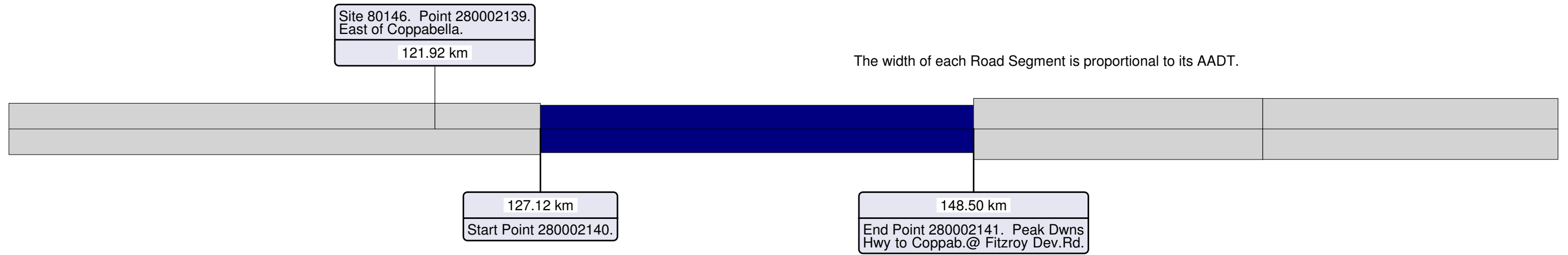
EXPONENTIAL GROWTH RATE

AADT Year	Growth Year	AADT	Growth Rate
2009	5	5977	
2014	10	6465	
2019	15	6993	1.58

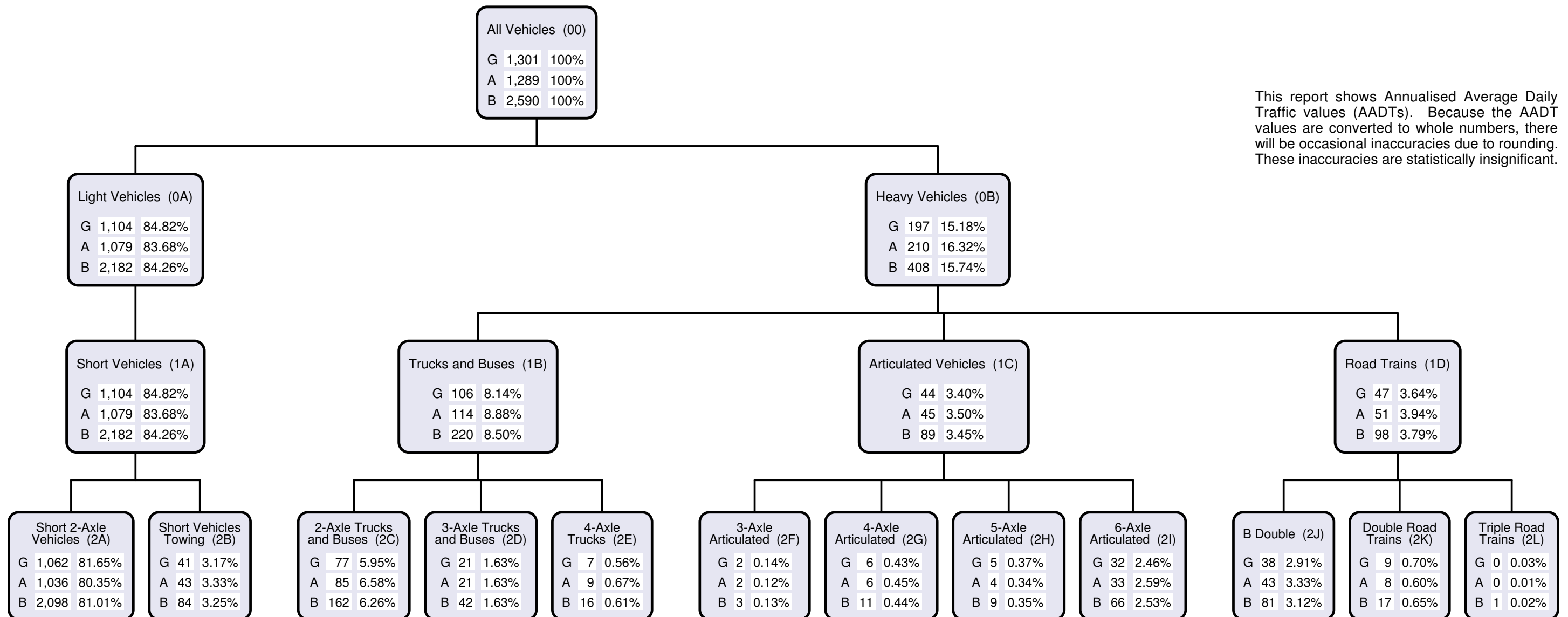
EXPONENTIAL GROWTH RATE (Commercial Vehicles)

Year	Growth Year	COMM VEH	Growth Rate
2009	5	673	
2014	10	787	
2019	15	920	3.17





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TARS Growth Rate Calculation Sheet

Road No.	33A
Chainages	127.122 - 148.490
Description	East of Coppabella
Site No.	80146
Assoc. Permanent Site No.	80009

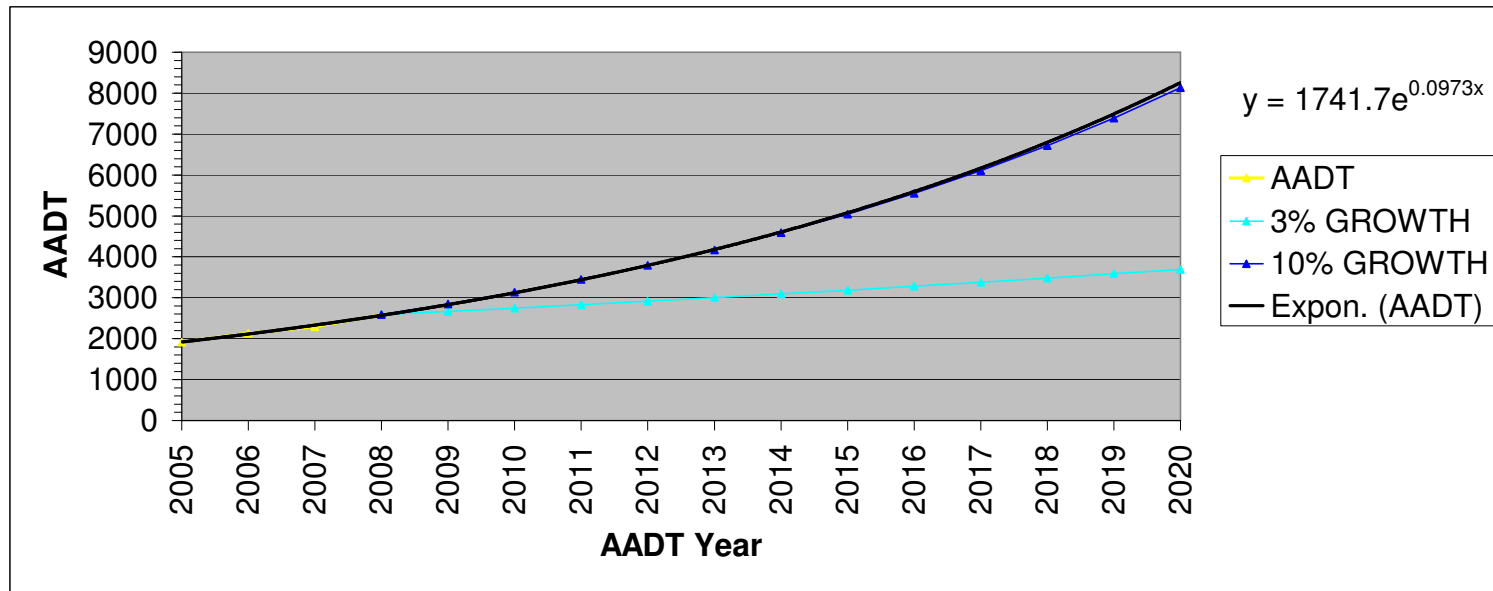
YEAR	AADT	% COMM.	COMMERCIAL VEHICLES	3% GROWTH	10% GROWTH
2005	1917	17.61	338		
2006	2138	18.12	387		
2007	2293	14.91	342		
2008	2590	15.74	408	2590	2590
2009				2668	2849
2010				2748	3134
2011				2830	3447
2012				2915	3792
2013				3003	4171
2014				3093	4588
2015				3185	5047
2016				3281	5552
2017				3379	6107
2018				3481	6718
2019				3585	7390
2020				3693	8129

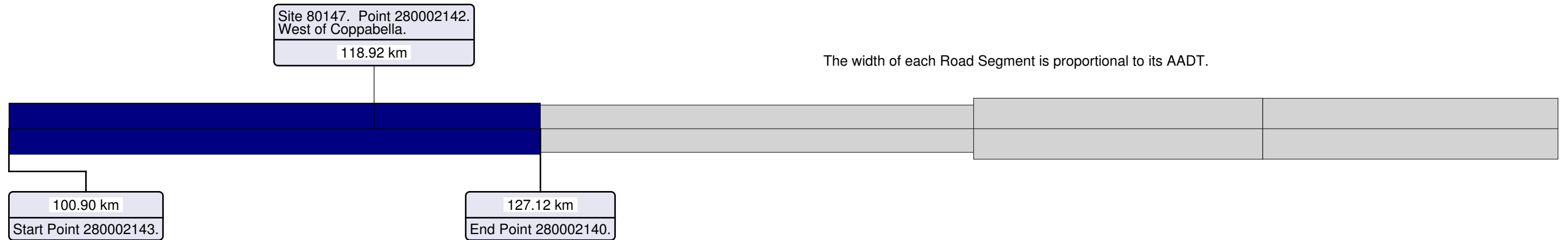
EXPONENTIAL GROWTH RATE

AADT Year	Growth Year	AADT	Growth Rate
2009	5	2833	
2014	10	4608	
2019	15	7496	10.22

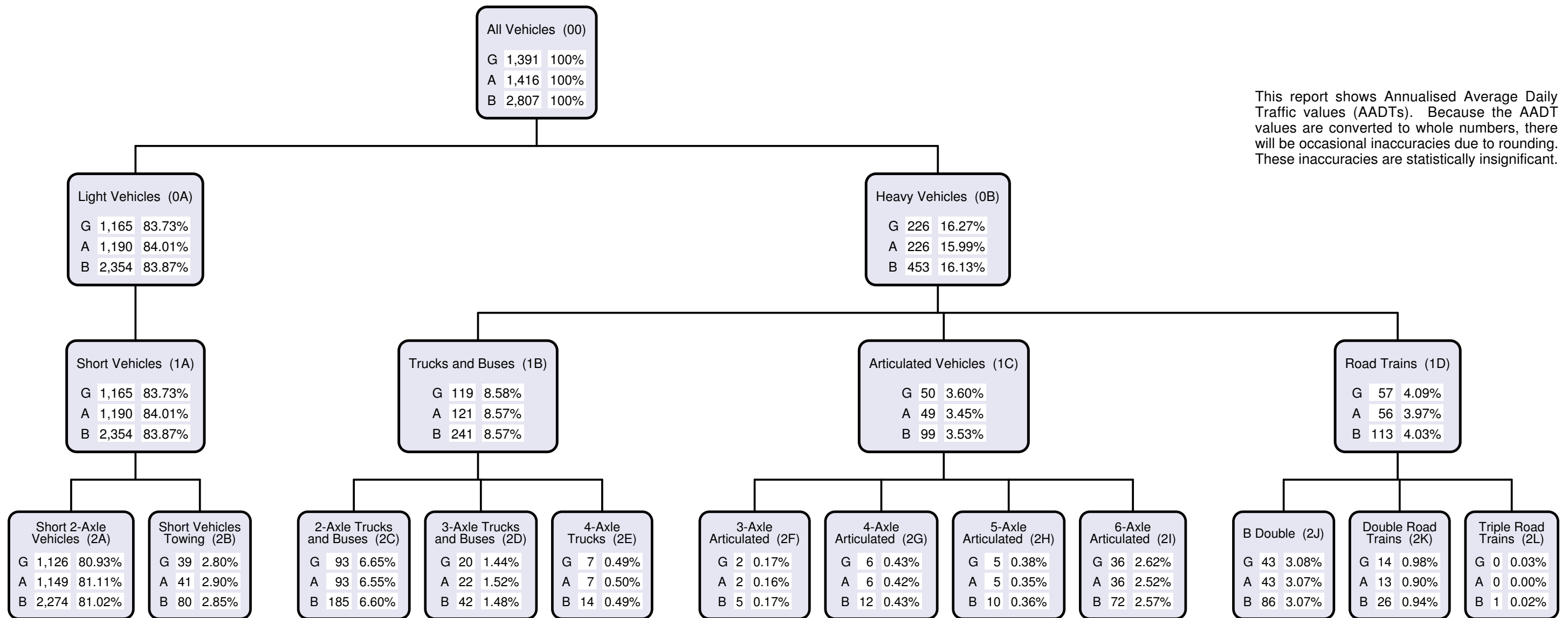
EXPONENTIAL GROWTH RATE (Commercial Vehicles)

Year	Growth Year	COMM VEH	Growth Rate
2009	5	410	
2014	10	511	
2019	15	638	4.51





This report shows Annualised Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



TARS Growth Rate Calculation Sheet

Road No.	33A
Chainages	100.900 - 127.122
Description	West of Coppabella
Site No.	80147
Assoc. Permanent Site No.	80009

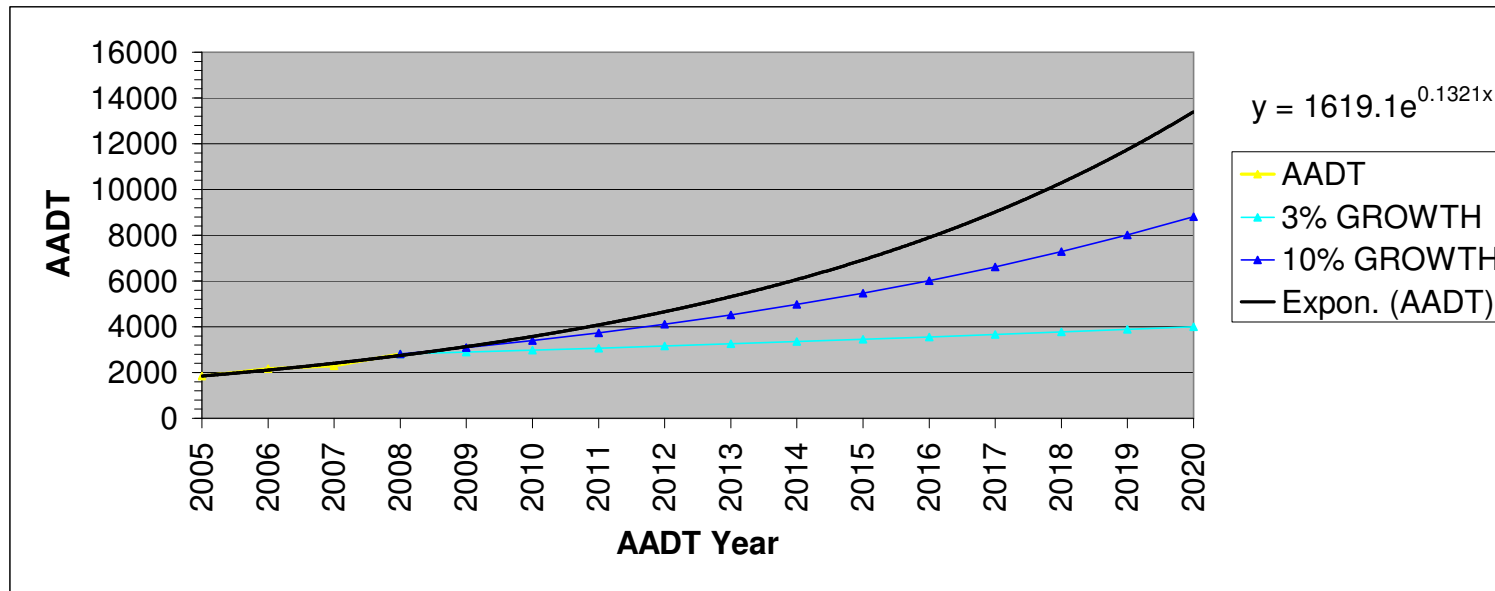
YEAR	AADT	% COMM.	COMMERCIAL VEHICLES	3% GROWTH	10% GROWTH
2005	1844	18.08	333		
2006	2164	18.86	408		
2007	2299	19.57	450		
2008	2807	16.13	453	2807	2807
2009				2891	3088
2010				2978	3396
2011				3067	3736
2012				3159	4110
2013				3254	4521
2014				3352	4973
2015				3452	5470
2016				3556	6017
2017				3662	6619
2018				3772	7281
2019				3886	8009
2020				4002	8810

EXPONENTIAL GROWTH RATE

AADT Year	Growth Year	AADT	Growth Rate
2009	5	3134	
2014	10	6067	
2019	15	11744	14.12

EXPONENTIAL GROWTH RATE (Commercial Vehicles)

Year	Growth Year	COMM VEH	Growth Rate
2009	5	526	
2014	10	874	
2019	15	1453	10.69



Peabody