Section 3

Consultation, Issue Identification and Prioritisation

PREAMBLE

This section describes how the environmental issues assessed in the Environmental Impact Statement were identified and prioritised. In summary:

- *a comprehensive list of all relevant environmental issues was assembled through consultation with the local community and local and State government agencies, completion of preliminary environmental studies and a review of relevant legislation, planning documents and environmental guidelines;*
- *a review of the Proposal design and local environment was undertaken to identify risk sources and potential environmental impacts for each environmental issue;*
- *an analysis of unmitigated risk for each potential environmental impact was then completed with a risk rating assigned to each impact based on likelihood and consequence of occurrence; and*
- *through a review of the allocated risk ratings, the relative priority of each issue was determined, with this priority used to provide an order of assessment and breadth of coverage within Section 4.*

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3.1 INTRODUCTION

In order to undertake a comprehensive assessment of the Proposal, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. To ensure this has occurred, a program of community and government consultation and a review of environmental planning documentation was undertaken to identify relevant environmental issues and potential impacts. This was followed by an analysis of the risk posed by each potential impact in order to prioritise the assessment of the identified environmental issues within the *Environmental Impact Statement*.

3.2 CONSULTATION

3.2.1 Community Consultation

3.2.1.1 Introduction

The Applicant has been actively consulting with community groups from initial inception of the development application process in 2001. An initial community consultation meeting at inception and subsequent face to face meetings, telephone conversations, and emails have allowed the Applicant to identify and engage local land holders and other potential stakeholders. The Applicant has committed to maintaining open lines of communication with these stakeholders through individual discussions, group meetings or community newsletters. The Applicant is publicly listed on the Australian Stock Exchange and has regularly been featured in the Dubbo Daily Liberal newspaper (owned by Rural Press Limited). It is probable that there are very few people in Dubbo who would not have heard about the Proposal over the past ten years.

The Applicant's General Manager NSW has given numerous presentations since 2001 to Rotary Clubs in Dubbo, Probus, Independent Retirees, local schools, Western Institute of TAFE, Orana Valuers, Little River Landcare, Dubbo Field Naturalist & Conservation Society and Dubbo City Council staff. In addition, the Applicant's Managing Director and General Manager NSW have presented information on the Proposal at mining conferences nationally and internationally. Most presentations are contained on the Applicant's website.

In addition to the initial community information session in 2001, community consultation associated with the development application has included the following components described in the following subsections.

- A second community information session held in November 2011 (Section 3.2.1.2).
- A local land holder consultation session, coordinated by the Mrs Diana Gibbs of Diana Gibbs & Partners (author of the Socio-economic Impact Assessment), held in May 2012 (Section 3.2.1.3).
- A third community information session held in July 2012 (Section 3.2.1.4).
- Regular community newsletters (Section 3.2.1.5).
- Targeted community consultation (Section 3.2.1.6).
- Aboriginal community consultation (Section 3.2.1.7).

3.2.1.2 Community Information Session – November 2011

The 2011 information session was held on 28 November at Toongi Hall, with a flyer prepared and distributed to local landowners and other known stakeholders inviting attendance. Between 80 and 100 people attended the information session during which the Applicant's managing director presented information on the proposed operations, outlined the environmental studies to be commissioned to assess impact and explained the opportunities a project of this magnitude and longevity could have. AZL representatives then answered questions raised by those attending. A variety of questions were raised by attendees. **Table 3.1** provides a summary of the key issues raised by the stakeholders present and highlights where these have been addressed in this document.

Table 3.1
November 2011 Community Information Session – Key Issues Raised

Issue Raised	EIS Section(s)
Radioactivity of the ore, products and waste.	4.4
Noise impacts of the hours of operations and rail activity.	4.2.7.6
Potential sterilisation of agricultural land through implementation of a 'buffer zone'.	AIS (**Appendix 9**)
Management of waste materials.	2.5, 2.9 & 2.11
Volume of water required and likely source of this water.	2.8
Employment opportunities and other potential benefits for the local and wider community.	2.15, 4.15

3.2.1.3 Community Information Session – May 2012

The May 2012 session was held with local agricultural property owners in Toongi to gauge the issues of critical concern for this community. This session was held as part of the socio-economic analysis of the Proposal that is discussed further in Section 4.15 of the EIS. A variety of issues were raised by this group and these have been summarised in **Table 3.2** together with where each issue has been addressed in this document.

Table 3.2
Toongi Agricultural Property Owners Consultation – Issues Raised

Issue Raised	EIS Section (s)
Noise	4.2
Dust	4.3.7.2 – 4.3.7.4
Odour	4.3.7.8
Visual Impact (including site lighting)	4.13.4
Road traffic	4.12.5
Amenity	4.2.7, 4.13.4, 4.15
Social impacts	4.15
Water contamination	4.5.5, 4.6.4.3 & 4.6.5
Access across rail lines	4.12.2.4, 4.12.5.7
Future expansion	1.1, 1.5.3
Presence of construction village/camp	2.15, 4.15

3.2.1.4 Community Information Session – July 2012

An additional community information session was held in Dubbo on the evening of 10 July 2012 at the Dubbo RSL Club theatrette to present an overview of the Proposal, outline updated plans, discuss the reactivation of the Toongi to Dubbo Rail Line, present information on naturally occurring radioactive material and discuss the on-going preparation of the EIS and specialist environmental studies.

Attended by an estimated 150 to 180 people, a variety of questions and comments were received during a question and answer session to conclude the meeting. **Table 3.3** provides a summary of the issues raised during this question and answer session and where each issue has been addressed in this document.

Table 3.3
July 2012 Community Information Session – Issues Raised

Issue Raised	EIS Section (s)
Timing of Trains	2.14.1
Alternative rail lines to Toongi-Dubbo	2.18
Noise and Vibration impacts on Dundullimal Homestead	4.2.7.6
Arrangement of fencing along rail easement adjoining Margaret Crescent (opposed to fencing)	2.16.2
Water requirements, supply and security / access to groundwater	2.8
Water consumption	2.8
Rail versus Road Transport	2.12, 4.12.5
Truck numbers on Obley Road	2.12, 4.12.5
Route for the proposed power line	2.1.2.2, 2.2.7
Night-time activities, e.g. train loading and unloading	2.14.1, 4.2.7.3
Potential for a construction village/mining camp (opposition)	2.15, 4.15
Impacts on other industries through reduction in available skilled workforce	4.15.4.5
Nature of residues and potential risks	2.9
Noise impacts at night	4.2.7.3

3.2.1.5 Community Newsletters

The Applicant has maintained consistent contact with the local communities of Toongi and Dubbo through community newsletters. These newsletters were provided via email to registered parties, thereby including not only the residents of Toongi and surrounds in the dissemination of information but also other parties interested in the progress of the Proposal. Names and details were collated through community information sessions and a database maintained to ensure the newsletters remained as inclusive as possible. Each of the newsletters can be viewed on the Applicant's website (http://www.alkane.com.au/index.php/community/community-newsletters).

In general, the newsletters included project development updates, information on the progress and findings of environmental assessments undertaken and details on recent and planned community consultation events. The newsletters have sought to engage the local community

with the Proposal and facilitate contact between readers and the Applicant. Contact details for those seeking further information or questions were also provided and the Applicant has fielded many such questions since the November 2011 Community Information Session and issue of the fourth newsletter in January 2012.

In total, eight newsletters have been circulated, three issued prior to August 2002, and four since January 2012. The most recent newsletter was distributed in July 2013, however, the Applicant intends to issue an eighth newsletter to coincide with the exhibition of the EIS.

3.2.1.6 Targeted Community Consultation

The Applicant has also undertaken a range of consultative initiatives to engage specific stakeholder groups and ensure that consultation has been comprehensive and inclusive. These initiatives are described below.

Little River Landcare Committee

The Applicant's General Manager NSW responded to a series of questions on the Proposal raised by the Little River Landcare Group (LRLG). A representative of the ecological consultant commissioned by the Applicant also attended the meeting of the LRLG to answer questions regarding the potential impacts of the Proposal. **Table 3.4** provides a selection of the issues raised during the meeting and where each issue is addressed in this document.

Table 3.4
Issues Raised by the Little River Landcare Group

Issues Raised	**EIS Section(s)**
Electricity supply to the Site and associated infrastructure requirements	2.2.7
The management of endangered ecological communities	4.7.5
Offsetting areas lost to mine infrastructure	2.17.8, 4.7.6.2
Groundwater management	4.6.4
Hours of operation	2.14.1
Benefits to the catchment economy	4.15.5, AIS (**Appendix 9**)
Surface water management and water pollution	4.5.4
Plans to regenerate local habitat and vegetation	2.17.6, 4.7.5
General benefits to the local communities of Toongi and Wambangalang	4.15
Traffic impacts and site access	4.12.5
Blasting impacts especially at night	4.2.7.7
General environmental management including:	
– dust:	4.3.6
– water;	4.5.4, 4.6.4
– radiation impacts;	4.4.7
– site monitoring; and	Various
– site design.	**Figures 2.1** & **2.9**
Visual impacts	4.13.4
Potential decrease in property values	4.15

Dubbo Naturalist & Conservation Society

The Applicant's General Manager NSW invited the Dubbo Field Naturalists (DFN) to participate in flora and fauna field surveys conducted by OzArk Environment and Heritage Management (OzArk) over the DZP Site. In particular, the DFN was involved in several field surveys for the Pink-tailed Worm-lizard (*Aprasia parapulchella*) a native reptile listed as vulnerable in the EPBC. The reptile is easily identifiable but difficult to locate as it remains primarily underground. The presence of more field assistants therefore aided in the overall effectiveness of the survey. The Applicant took the opportunity to present the group with the mitigation and offset measures that would be taken to ensure the protection of flora and fauna found and provided the group with a forum to ask questions and raise issues.

Rail Line Inspection Invitation

An invitation was advertised in the Daily Liberal by CR Rail, engineering consultants commissioned by the Applicant to assess the rail line upgrade requirements, for escorted inspections of the rail line. It is understood no one chose to take up this invitation

Dubbo Chamber of Commerce and other Business Stakeholders

Mrs Diana Gibbs, of Diana Gibbs and Partners (DGP), commissioned by the Applicant to complete a Socio-economic Assessment of the Proposal, met with representatives of the Dubbo Chamber of Commerce and other local commercial / business stakeholders. These meetings were held at various times between July 2012 and April 2013 to obtain an understanding of the general economic setting, key drivers and issues of concern or interest to these stakeholders. Those consulted, who they represent and the dates and times of these meetings are documented in Part 12 of the *Specialist Consultant Studies Compendium* (DGP, 2013).

Dubbo Mayoral Developers Forum

The Dubbo Mayoral Developers Forum is made up of property developers, builders, engineering consultants, real estate agents, Council Directors with the aim of providing an informal opportunity for issues related to local development to be identified and discussed. At the July 2013 forum, held on Wednesday 17 July 2013 and attended by 30 people, in response to a discussion on significant contraction in business activity within the Dubbo City LGA, the Applicant's General Manager NSW discussed the type of development and employment opportunities the DZP would provide to the Dubbo Mayoral Developers Forum. The briefing was generally well received.

Dubbo Residential Forum

On 2 July 2013, the Applicant's General Manager NSW participated in a Dubbo Residential Forum (hosted by Dubbo City Council and facilitated by Hill PDA). As part of this forum, opportunities and constraints for residential development within the Dubbo City LGA were discussed. The potential impacts of the Proposal on residential development and housing generally was discussed and both constraints and opportunities were identified.

Charles Sturt University

Recognising the potential opportunities for application of skills training within the region, the Applicant's General Manager NSW provided a briefing on the skills requirement and development timetable for the Proposal to the Orana & Western Regional Consultative Committee for Charles Sturt University.

3.2.1.7 Aboriginal Community Consultation

Consultation with the registered Aboriginal stakeholders and other relevant members of the Aboriginal community was undertaken primarily by OzArk Environment & Heritage Management Pty Limited and in accordance with the Aboriginal Cultural Heritage Consultation Requirements (ACHCRs). A complete summary of consultation is provided in Part 8 of the Specialist Consultant Studies Compendium (OzArk, 2013b) (*Section 2.2* and *Appendix 1*). In summary, the following organisations and individuals were confirmed as Registered Aboriginal Parties (RAPs) and consulted throughout the preparation of the Aboriginal Heritage Assessment, EIS and associated documentation.

- Wirrimbah Direct Descendants.
- Binjang Wellington Wiradjuri Heritage Surveys.
- Dubbo Local Aboriginal Land Council.
- Dianne Stewart (individual).

Prior to, and throughout the field survey period, consultation with the above RAPs involved advertisements in local newspapers, personally addressed letters providing information on the Proposal and requests for input, various mailed and emailed correspondence, phone calls, meetings in the Applicant's offices and on site with representatives from each group and informal meetings to provide information regarding the proposal to interested parties that were late in registering their interest in participation. Following the completion of field survey, the results and proposed management recommendations of OzArk (2013b) were presented to the RAPs and two Aboriginal Focus Group Meetings (AFGMs) were held (in May and August 2013) to discuss the heritage values of the sites identified. The proposed management of Aboriginal heritage presented in the EIS reflects the results of this consultation.

3.2.2 Government Agency Consultation

3.2.2.1 Introduction

The Applicant has undertaken a range of consultation with government agencies in relation to the Proposal, including the following.

- A Conceptual Proposal Development Plan Meeting and other agencies briefing.
- A Planning Focus Meeting.
- Referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities.
- Targeted consultation and negotiation.

3.2.2.2 Conceptual Project Development Plan Meeting and Other Agencies Briefing

In late 2012, a *Conceptual Project Development Plan* (CPDP) was presented to representatives of the Division of Resources & Energy (DRE) by Mr Ian Chalmers (Managing Director of the Applicant). The CPDP provides information on the geological resource to be mined, initial plans for the mining and processing of the resource and an outline of potential environmental or other constraints on the development of the resource.

An additional briefing on the CPDP was also presented by Mr Chalmers to the following government agency representatives.

- Chris Wilson (Executive Director, Major Projects), Department of Planning and Infrastructure.
- Howard Reed (Director, Mining Projects), Department of Planning and Infrastructure.
- Robert O'Neill (Director, Water Policy and Planning), Office of Water.
- Gary Davey (Director, North Branch), Environment Protection Authority.
- Monica Collins (Director, Conservation Regulation Division, Heritage), Office of Environment and Heritage.

The DRE subsequently notified the Department of Planning & Infrastructure of their support for the proposed development, allowing for the Applicant to request Director-General's Requirements for the Proposal.

3.2.2.3 Planning Focus Meeting

A Planning Focus Meeting (PFM) was held for the Proposal on 28 March 2012 at the Toongi Hall. The PFM was timed to coincide with an application, to the Department of Planning & Infrastructure (DP&I), for Director-General's Requirements (DGRs). This timing was chosen such that on request by the DP&I of these agencies for specific assessment requirements (to accompany the DGRs), an understanding of the Proposal, potential impacts and local conditions would have been obtained.

The PFM was attended by representatives of the following government agencies and public authorities.

- NSW Department of Planning & Infrastructure (DP&I) (local government office – Dubbo).
- NSW Department of Premier and Cabinet.
- NSW Department of Trade and Investment, Regional Infrastructure and Services - Resources (DTIRIS).
- NSW Office of Environment and Heritage (OEH).
- NSW Office of Water (NOW).
- NSW Environment Protection Authority (EPA).
- NSW Department of Primary Industries (NSW Fisheries and NSW Agriculture).

- NSW Department of Roads and Maritime Services (RMS).
- Dubbo City Council.
- Wellington Shire Council.
- Australian Rail Track Corporation.
- Essential Energy.
- John Holland Rail.
- Transport for NSW (as the then Country Rail Infrastructure Authority).
- Central West Catchment Management Authority.

Representatives of the Mining Projects division within the Department of Planning & Infrastructure and Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) were invited but provided apologies.

During the meeting, Mr Chalmers provided an overview of the Proposal, followed by a description of the local environment, potential environmental impacts and overview of ongoing environmental investigations provided by Mr Alex Irwin of RW Corkery & Co Pty Limited. An inspection of the DZP Site was then undertaken focussing on the proposed locations of the rail line and siding, processing plant and open cut.

Following the site inspection, each government agency was invited to provide an initial indication of their likely assessment requirements which would be provided to DP&I following the PFM. The verbal advice provided by these agencies is reflected in the assessment requirements which accompanied the DGRs (see **Appendix 3**). Consequently, a detailed summary is not provided here. The DGRs were provided by DP&I to the Applicant on 4 May 2012. Supplementary DGRs were issued by the DP&I following the issue of assessment requirements by DSEWPaC for a Controlled Activity Approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (refer to Section 3.2.2.4).

3.2.2.4 Commonwealth Department of Sustainability, Environment, Water, Population and Communities

Following the identification of the Pink-tailed Worm-lizard (*Aprasia parapulchella*), listed as vulnerable under the EPBC Act, the Applicant consulted with DSEWPaC and confirmed that the Proposal should be referred to the Minister for determination as to whether it represents a Controlled Action. The Proposal was referred in accordance with DSEWPaC requirements on 8 November 2012. Following the provision of additional information requested by DSEWPaC with respect to potential impacts related to 'nuclear actions' and 'wetlands of international significance', the Applicant was notified that the Proposal was considered a controlled action on 4 January 2013.

Environmental assessment requirements were supplied by DSEWPaC to the DP&I for inclusion with the DGRs on 14 February 2013, with supplementary DGRs issued by the DP&I on 1 March 2013.

3.2.2.5 Other Government Consultation

Additional consultation with the following government agencies and organisations has also been undertaken.

NSW Parliamentary Member for Dubbo

The Applicant's Managing Director and General Manager NSW have met the Honourable Troy Grant on several occasions to discuss progress and plans for the Proposal.

Department of Premier & Cabinet

The Applicant's General Manager NSW gave a presentation to the Mining Taskforce of the Department of Premier & Cabinet on 14 August 2013. The presentation and discussion focused on the development of suitable community infrastructure to service the growth occurring as a result of the mining industry in western NSW.

NSW Treasury

Mr Chalmers met with Mr Adam Achterstraat, Senior Policy Advisor with the Office of the Treasurer, in December 2012 to provide an overview of the Proposal.

NSW Department of Trade and Industry – Division of Resources & Energy

On 11 December 2012 Mr Chalmers met with the Honourable Chris Hartcher (Minister for Energy and Resources), Mr Charlie Dowsett (Director, Industry Investment, Division of Resources and Energy) and Mr Andrew Humpherson (Chief of Staff for the Minister for Energy and Resources) to provide an overview of the Proposal.

The Applicant has met with departmental personnel on many other occasions over the preceding two years to discuss resource development, progress with assessments and tenement issues.

Transport NSW

On 21 August 2012, the Managing Director and General Manager NSW met with The Hon Duncan Gay MLC, Minister for Roads and Ports and Mr Troy Grant MP, Member for Dubbo Electorate at Parliament House in the Company of Steve Fieldus (owner of Transforce Bulk Haulage). The meeting outlined the Proposal's freight task and highlighted the potential for new local jobs in the transport industry and the opportunity to operate a "green fleet" of trucks to support the Proposal.

On 11 September 2012, the Applicant met with Mr Christopher O'Brien, General Manager Freight Strategy, Policy and Industry Relations Freight and Regional Development Division Transport for NSW, Ms Rachel Johnson, Deputy Director General Freight & Regional Development and Mr Justin McGuire, Principal Manager for Freight Regulation Management to discuss the transport tasks for the proposal.

The three scenarios involving road and rail transport of reagents and finished products were discussed in the context of potential government support.

NSW Department of Primary Industries

Ms Liz Rodgers of the Department of Primary Industries was consulted via letter in February 2012 regarding minimum sampling requirements for Agricultural Land Capability Assessment by specialist soil consultant Dr Patrick Hulme of Sustainable Soils Management. The sampling methods and density presented in the Soils and Land Capability Assessment for the Proposal (Part 10 of the *Specialist Consultant Studies Compendium*) reflect this consultation.

Discussions were held with departmental economist, Mr Graham Carter on 7 August 2013 to discuss the requirements of DPI for the completion of an Agricultural Impact Statement (AIS). The information contained within the AIS (**Appendix 9**) addresses the requirements as nominated by Mr Carter.

Dubbo City Council

The Applicant has maintained regular contact with Dubbo City Council, providing updates on the Proposal and preparation of the EIS. This consultation included but has not been limited to the following.

- A meeting convened by the Applicant, and attended by the Applicant's traffic consultant, was held with Council personnel on 7 August 2012. During this meeting, the proposed requirement for truck movements on Obley Road was raised, the general condition of the road discussed and approach to the collection of additional road condition data discussed.
- In November 2012, the author of the EIS liaised with Council personnel in relation to an upgrade to an intersection opposite Dundullimal Homestead to provide access to Taronga Western Plains Zoo's Zoofari Lodge. This consultation was undertaken to ensure that any road upgrade proposed by the Applicant accounted for approved intersection plans at this point on Obley Road. Plans were supplied to RWC on 26 November 2012 and again on 12 March 2013.
- A meeting was convened on 1 March 2013 between Messrs Mike Sutherland and Tony Wright (of the Applicant) and Ms Melissa Watkins and Messrs Mark Riley, Ken Rogers, Craig Giffin, and Steve Clayton (Dubbo City Council). Discussions covered the ongoing progress of environmental assessments, the potential for a Voluntary Planning Agreement, annual rate levels and potential sale of Council-owned lots in Toongi Village.
- A meeting between the Applicant's traffic consultant and Council personnel was convened on 19 March 2013. At this meeting, the detail of road condition and traffic impact assessment was discussed, along with the proposed addition of an additional heavy vehicle transport route between Yarrandale Road and Newell Highway. The Traffic Impact Assessment (Part 11 of the *Specialist Consultant Studies Compendium*) reflects the agreed outcomes of this meeting.
- The proposed road and infrastructure upgrades associated with the Proposal as well as further discussion on the development of a Voluntary Planning Agreement and annual rate levels was held in August 2013. Dubbo City Council reaffirmed the position to await the final EIS before addressing the development of a Voluntary Planning Agreement.

NSW Office of Environment and Heritage

Recognising the relatively large scale of impact associated with the Proposal, and the likelihood of disturbance to native vegetation, the Applicant has requested their ecological consultants (OzArk) liaise with the OEH in relation to the application of the BioBanking Assessment Methodology (BBAM) to quantify impacts and proposed offsets. Mr Phillip Cameron and Ms Heidi Kolkert of OzArk have met with representatives of OEH on three separate occasions.

The discussions, and subsequent modifications to OzArk's application of the BBAM, have enabled the accuracy of the Applicant's assessment of impact to be increased and relative value of offsets improved.

Department of Primary Industries – Crown Lands

The Applicant has met with representatives on several occasions in 2013 to discuss the acquisition of various Crown Land lots which form part of the DZP Site. At the last meeting of 24 June 2013, the Applicant was provided with instruction that it would be the preference that the Applicant acquire Lot 7300, DP1149010, Lots 41 & 61, DP753220 and an unformed paper road (19927-1603R).

NSW Roads & Maritime Service

The Applicant's traffic consultant, contacted the RMS requesting guidance on assessment requirements. A letter dated 24 April 2012 from Mr Tony Hendry, who is the Road Safety and Traffic Manager for Western Region, RMS, outlined these requirements for the traffic assessment.

Department Education & Communities

During 2012 and 2013 the Applicant has engaged with Region 21 Governing Committee which facilitates partnerships between schools, business and community so that communities are empowered and have access to quality education, training and employment opportunities. The Applicant has also consulted with the Central West Mining Steering Committee, coordinated by Tony Fuller (Regional Coordinator Aboriginal Affairs – DEC).

The Applicant's General Manager NSW met with Regional Vocational Education Consultant, Mr Wade Greenwood on 30 July 2013 to discuss methods to ensure information on future job opportunities to be provided by the Proposal and skills requirements could be best disseminated to both prospective employees and training providers.

Essential Energy

The Applicant, through Mr Kevin Rugg of Energy Serve (Jemtom Pty Ltd), has consulted with the electricity supply authority (Essential Energy) regarding the proposed construction of a new 132kV ETL between Geurie and the DZP Site and an 11kV line between the DZP Site and the proposed Macquarie River pumping station. On the basis of this consultation, the Applicant has commenced the preparation of an Environmental Scoping Study for two proposed routes. This will be followed by the preparation of a Review of Environmental Factors (REF) to accompany an application for approval under approval to be obtained in accordance with Part 5 of the EP&A Act (as noted in Section 2.2.7).

The Applicant, and its nominated representatives, will continue to consult with Essential Energy.

A high voltage connection preliminary enquiry for the Dubbo Zirconia Project was sent to the Manager Network Connections Essential Energy on 28 May 2012.

Taronga Conservation Society Australia

The Applicant's General Manager NSW consulted with Mr Mathew Fuller, General Manager, Taronga Western Plains Zoo regarding the potential impact of increased traffic on the zoo specifically along Obley Road. Mr Fuller submitted his concerns relating to potential traffic changes and impacts to zoo staff and visitors. These concerns have been addressed in further detail in Section 4.12.5.

Concerns over the impact of increased traffic, and associated noise, on the breeding programs undertaken at Taronga Western Plains Zoo have also been raised. The EIS addresses this issue in Section 4.2.7.8.

3.3 REVIEW OF PLANNING LEGISLATION AND ENVIRONMENTAL GUIDELINES

3.3.1 Introduction

A number of planning instruments apply to the Proposal. These planning instruments were reviewed to identify any environmental aspects requiring consideration in the EIS. In addition, the DGRs identified a number of guideline documents to be referenced / reviewed during the preparation of the *Environmental Impact Statement* (**Appendix 2**).

A brief summary of each relevant planning instrument is provided in Sections 3.3.2 to 3.3.4. The application and relevance of planning instruments related to specific environmental issues have been assessed in the relevant specialist consultant assessments. Section 3.3.5 briefly outlines the approach taken to referencing and reviewing environmental guideline documents.

3.3.2 State Planning Instruments

3.3.2.1 State Environmental Planning Policy (State and Regional Development) 2011

This *State Environmental Planning Policy* (SEPP) was gazetted on 28 September 2011 and applies to all projects satisfying nominated criteria made following that date. One of the purposes of this SEPP is to define those developments of State significance and therefore requiring Ministerial approval under the provisions of the EP&A Act. This SEPP, and Part 4 – Division 4.1 of the EP&A Act, is a system introduced to specifically deal with major projects.

As the capital investment value of the Proposal would be in excess of the identified threshold of $30 million, the Proposal is identified under Schedule 1 of the SEPP and hence is designated as State Significant Development to which Part 4, Division 4.1 of the EP&A Act applies.

3.3.2.2 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

This SEPP was gazetted on 17 February 2007 in recognition of the importance to NSW of mining, petroleum production and extractive industries.

The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development as defined in NSW legislation. **Table 3.5** presents a summary of the matters that the Minister or his/her delegate needs to consider when assessing a new or modified Proposal (Part 3 – Clauses 12 to 17 of the SEPP) and a reference to the section(s) in this *Environmental Impact Statement* where each relevant element of the SEPP is addressed.

3.3.2.3 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP identifies, amongst other things, the matters to be considered in the assessment of development adjacent to particular types of infrastructure, including:

- Electricity Infrastructure (Clause 45).
- Pipeline Infrastructure (Clause 55).
- Road Infrastructure (Clause 101).
- Telecommunication Infrastructure (Clause 115).
- Railway Infrastructure (Clause 79).

A review of how each of these clauses is relevant to the Proposal is provided as follows.

Electricity Infrastructure

Clause 45 of the Infrastructure SEPP identifies that where development would be carried out within or immediately adjacent to an easement for electricity purposes, the determining authority must give written notice to the electricity supply authority, inviting comments about potential safety risks and take into consideration any response received.

The DZP Site is traversed by various easements for electricity purposes (see **Figure 3.1**). The ETL supplying Toongi village follows the rail corridor from the south and this will be between the DZP Site Administration Area and Processing Plant Area. This ETL is likely to be retained, however, it may require raising or placement underground where it crosses the access road between the two noted areas. Several ETLs to existing homesteads or sheds may require relocation or disconnection, although it is considered likely that supply availability is maintained to Lot 312, DP 595631 whilst this remains privately owned. As noted in Sections 2.1.2.1 and 2.2.7, the construction of a 132kV ETL from Geurie and 11kV extension to the pumping station on the Macquarie River are proposed (see **Figure 2.5**).

Initial discussions have been held with Essential Energy, and an environmental scoping study considering the two route options is in preparation (see Section 3.2.2.5). Consultation with Essential Energy remains ongoing with a REF to be prepared as part of formal application for the proposed ETL construction under Part 5 of the EP&A Act.

Table 3.5
Application of SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Relevant SEPP Clause	Description	EIS Section
12: Compatibility with other land uses	Consideration is given to: • the existing uses and approved uses of land in the vicinity of the development;	4.1.5, 4.15 & AIS (**Appendix 9**)
	• the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	Various Section 4 subsections
	• any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	1.6, 4.15 and 6.4
	Measures proposed to avoid or minimise any incompatibility are considered.	5
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	2.4
	Measures taken by the Applicant to avoid or minimise any incompatibility are considered.	2.4
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	NA
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure: • impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4.5.5 and 4.6.5
	• impacts on threatened species and biodiversity are avoided or minimised; and	4.7 and 4.8
	• greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	4.3
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.4, 2.9
16: Transportation	The following transport-related issues are considered. • The transport of some or all of the materials from the Project Site by means other than public road.	2.12
	• Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	2.12
	• The preparation of a code of conduct for the transportation of materials on public roads.	4.12.4
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including: • the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	2.17.5, **Figures 2.16** to **2.18**
	• the appropriate management of development generated waste;	2.5, 2.9 and 2.11
	• remediation of any soil contaminated by the development; and	4.11.3
	• the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.16 and 2.17.4

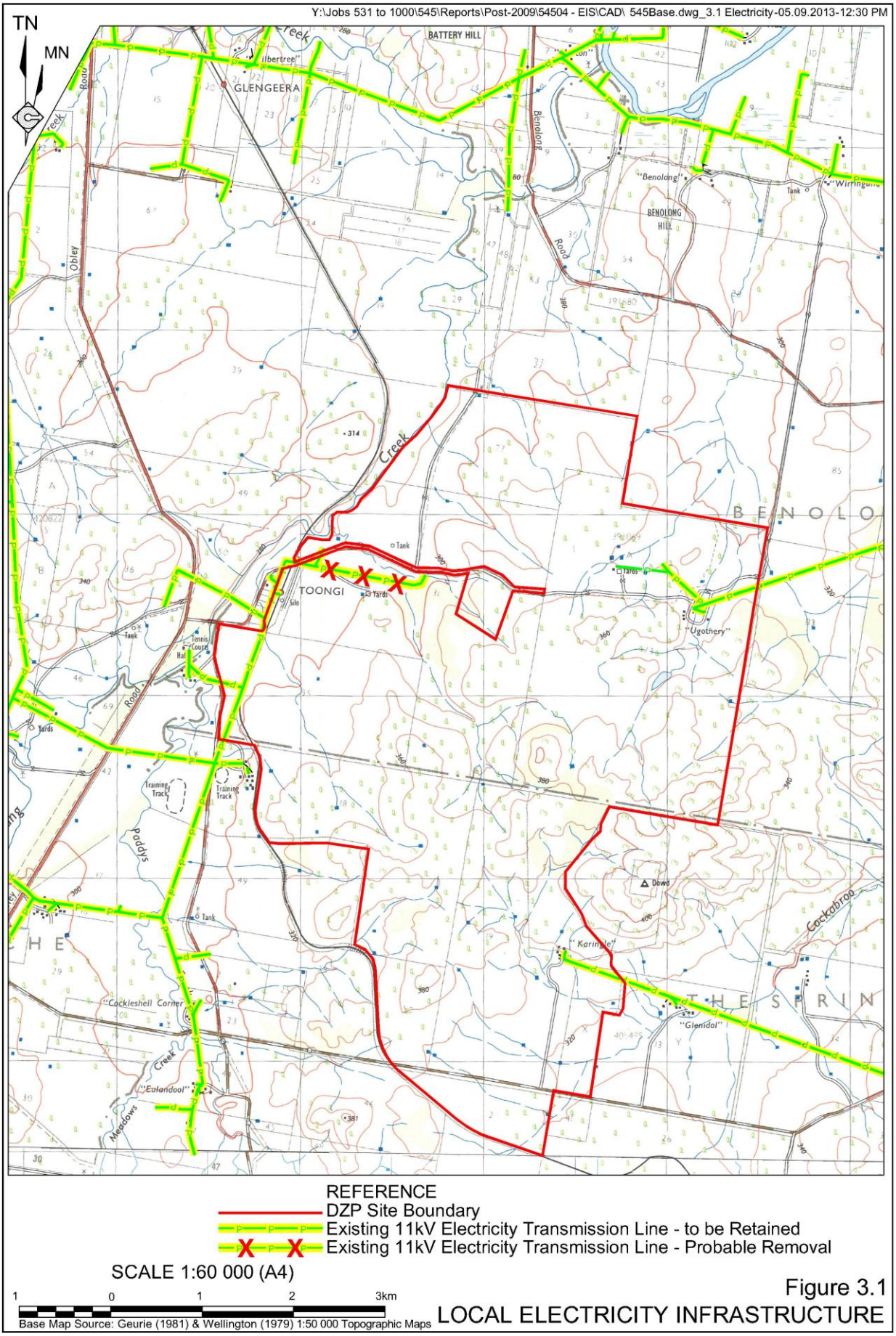

Figure 3.1
LOCAL ELECTRICITY INFRASTRUCTURE

The Applicant submitted a Connection Inquiry to Essential Energy on 28 May 2012. Essential Energy responded on 3 September 2012 identifying the information required to progress the enquiry to an application. This information was supplied by the Applicant and a Connection Investigation Services Agreement with Essential Energy was signed on 3 May 2013.

Pipeline Infrastructure

Clause 53 of the Infrastructure SEPP states "Development for the purpose of a pipeline may be carried out by any person without consent on any land if the pipeline is subject to a licence under the *Pipelines Act 1967* or a licence or authorisation under the *Gas Supply Act 1996*". The Applicant proposes to make application for a licence under Part 3 of the *Pipelines Act 1967* and it is noted that Section 89K of the EP&A Act states that the granting of such a licence cannot be refused if it is necessary for carrying out State Significant Development that is authorised by a development consent and is to be substantially consistent with the consent. The level of detail provided in this EIS (Section 2.2.3) would allow for the authority to assess a subsequent application for licence as substantially consistent with any development consent issued for the Proposal.

Clause 55 of the Infrastructure SEPP identifies that where development would be carried out within or immediately adjacent to a licensed gas pipeline, the consent authority must:

a) be satisfied that the potential safety risks or risks to the integrity of the pipeline that are associated with the development or modification to which the application relates have been identified; and

b) take those risks into consideration.

As noted in Section 2.2.3, the Applicant proposes to construct a spur line from the Central West Compressed Natural Gas Pipeline operated by East Australia Pipeline Limited (a wholly owned subsidiary of the Australian Pipeline Trust [APA Group]) at Purvis Lane, Dubbo.

The Applicant has made enquiries of the APA Group (Mr Bob Paton, Head of Commercial: Resources & Industrials) regarding the proposed works. The APA Group noted no specific objections and the Applicant has subsequently continued negotiations with possible operators / suppliers of the spur line on this basis. Based on previous correspondence with the APA Group, the Applicant notes that inspection of the detailed construction design and methodology by APA Group personnel would be required. In addition, supervision of the construction works in the vicinity of the pipeline by APA Group personnel would also be a requirement.

Road Infrastructure

Clause 101 of the Infrastructure SEPP identifies that where a development has a frontage to a classified road, development consent must not be granted unless the consent authority is satisfied that:

- vehicular access to the land is provided by a road other than the classified road;
- the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the design of the vehicular access to the land, the emission of smoke or dust from the development or the nature, volume or frequency of vehicles using the classified road to gain access to the land; and

- the development is of a type that is not sensitive to adverse impacts from the classified road.

While the Newell Highway, which is defined as a classified road, would be used by the Applicant for the transportation of reagents and other materials, the DZP Site does not front this road.

Telecommunication Infrastructure

Clause 115 of the Infrastructure SEPP identifies that development for the purposes of telecommunications facilities, may be carried out by any person with consent on any land. The Applicant would arrange for the necessary telecommunications for the entire operation with a reputable communications provider.

Railway Infrastructure

Clause 79 of the Infrastructure SEPP identifies that development for the purpose of a railway or rail infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land.

3.3.2.4 State Environmental Planning Policy (Rural Lands) 2008

The aims of this SEPP, which applies to the local government area of Dubbo City, as considered relevant to the Proposal, are to:

- *facilitate the orderly and economic use and development of rural lands for rural and related purposes; ……..*
- *implement measures designed to reduce land use conflicts;*
- *identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations; ……..*

Specifically, and as described in Clause 12, the objectives of this SEPP are to provide for the protection of agricultural land:

- *that is of State or regional agricultural significance; and*
- *that may be subject to demand for uses that are not compatible with agriculture; and*
- *if the protection will result in a public benefit.*

The Proposal is considered as follows with respect to these aims.

- The land that would be affected by the Proposal (including the Macquarie River Water Pipeline) has not been identified as State or regional significant agricultural land by *Schedule 2* of the Rural Lands SEPP.
- The Proposal would require a relatively small proportion of the agricultural land in the locality (refer to the *Agricultural Impact Statement* prepared for the Proposal – **Appendix 9**) and, as demonstrated at numerous other mine sites where

agricultural activities are undertaken concurrently within mining, would not be incompatible with continued agricultural land use on and surrounding the DZP Site.

- The protection of the land that is the subject of the Proposal would not provide any public benefit. In fact, the employment and local economic stimulus that would be generated by the Proposal is considered to be of wider public benefit than the current agricultural activities.

As a result, the Rural Lands SEPP is not considered further in this document.

3.3.2.5 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

The hazardous substances and dangerous goods to be held or used on the DZP Site are required to be identified and classified in accordance with the risk screening method contained within the document entitled *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DP&I, 2011). Hazardous materials are defined within that document as substances falling within the classification of the *Australian Code for Transportation of Dangerous Goods by Road and Rail* (Dangerous Goods Code), (DITRDLG, 2011).

Section 2.7 identifies the various reagents and processing materials to be transported to, stored and used within the DZP Site. The Applicant has commissioned Sherpa Consulting Pty Ltd to complete a SEPP 33 Risk Screening and Preliminary Hazard Analysis (PHA) based on these reagents and other materials (see **Appendix 4**). The following substances would be stored or transported in sufficient quantities to require a risk screening under SEPP 33.

- Hydrochloric acid (33%).
- Sulphuric acid (98%).
- Sodium sulphide.
- Sodium hydroxide.
- Anhydrous ammonia.
- Chlorine (potable water treatment chemicals).
- Solvent Extraction organic.
- Diesel fuel.
- Aluminium powder.
- Tributyl phosphate

Appendix 4 presents the results of the PHA for the Proposal. A summary of the methodology, criteria and conclusions are provided in Section 4.14.2.

3.3.2.6 State Environmental Planning Policy No. 44 – Koala Habitat Protection

Dubbo City (LGA) is not identified in Schedule 1 of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) as an LGA that could provide habitat for Koalas. It is noted, however, that neighbouring LGAs of the Narromine and Parkes are identified in

Schedule 1 of SEPP 44 and that Koala feed tree species (as listed under Schedule 2 of SEPP 44) are present on the DPZ Site.

While not strictly required under SEPP 44, an investigation has been carried out to determine if core or potential Koala habitat is present on the areas of the DZP Site likely to be disturbed. Core Koala habitat comprises land with a resident population of Koalas whereas potential Koala habitat comprises land with native vegetation with known Koala feed trees constituting at least 15% of the total number of trees present on a site. A review of previous recordings of Koala occurrence and local vegetation completed by OzArk (OzArk, 2013a) has confirmed that the DZP Site represents potential Koala habitat for dispersing or transient individuals. Section 4.7.4.2.1 reviews the classification and potential impacts in greater detail.

3.3.2.7 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires that consent for any development cannot be granted unless the consent authority has considered whether the land is contaminated. If the land is contaminated, the consent authority must be satisfied that:

(a) the land is suitable in its contaminated state (or would be suitable, after remediation) for the purpose for which the development is proposed to be carried out; and/or

(b) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, the land would be remediated before the land is used for that purpose.

The prior land use history of the DZP Site is one primarily of agricultural operations and mineral exploration, neither of which is likely to result in contamination of the land. As a result, the Applicant is satisfied that no contaminated land occurs on the DZP Site. SEPP 55 is therefore not considered further in this document.

It has been noted, however, that Lot 1 DP 818802 located to the immediate west of the DZP Site was the site of grain silo operated by GrainCorp Limited. Considering the possible use of pesticides and other chemicals for vermin control likely to have been used on this property, the Applicant commissioned a contaminated lands assessment by Ground Doctor Pty Ltd. The results of this assessment, which is provided in full as **Appendix 10**, indicate the likelihood of contamination as unlikely and that the site is suitable for ongoing commercial and/or industrial use (see Section 4.14.5).

3.3.3 Regional Planning Instruments and Strategies

3.3.3.1 Strategic Regional Land Use Policy

The Strategic Regional Land Use Policy (SRLUPo) sets out a range of initiatives to better balance growth in the mining and coal seam gas (CSG) industries with the need to protect important agricultural land and water resources.

The goal of the SRLUPo is to protect valuable agricultural land from any encroachment, and to support the sustainable management of natural resources. The NSW Government is currently

completing mapping of Strategic Agricultural Land (SAL) across NSW which when complete will be incorporated into a series of *Strategic Regional Land Use Plans* (SRLUPl). The mapped land will provide a trigger for the Gateway process, a scientific assessment of the impacts of SSD mining (and CSG) proposals on Strategic Agricultural Land by an independent, expert panel. If the panel considers that a proposal does not meet the Gateway criteria relating to agricultural and water impacts, it will issue a certificate with conditions which must be fully addressed as part of the development application, including amending the proposal, if necessary.

Figure 3.2, taken from a fact sheet issued by the NSW Department of Planning & Infrastructure (DP&I) on the SRLUPo, provides an overview of the protective measures which cover the entire process from land access and exploration through to planning application and mining.

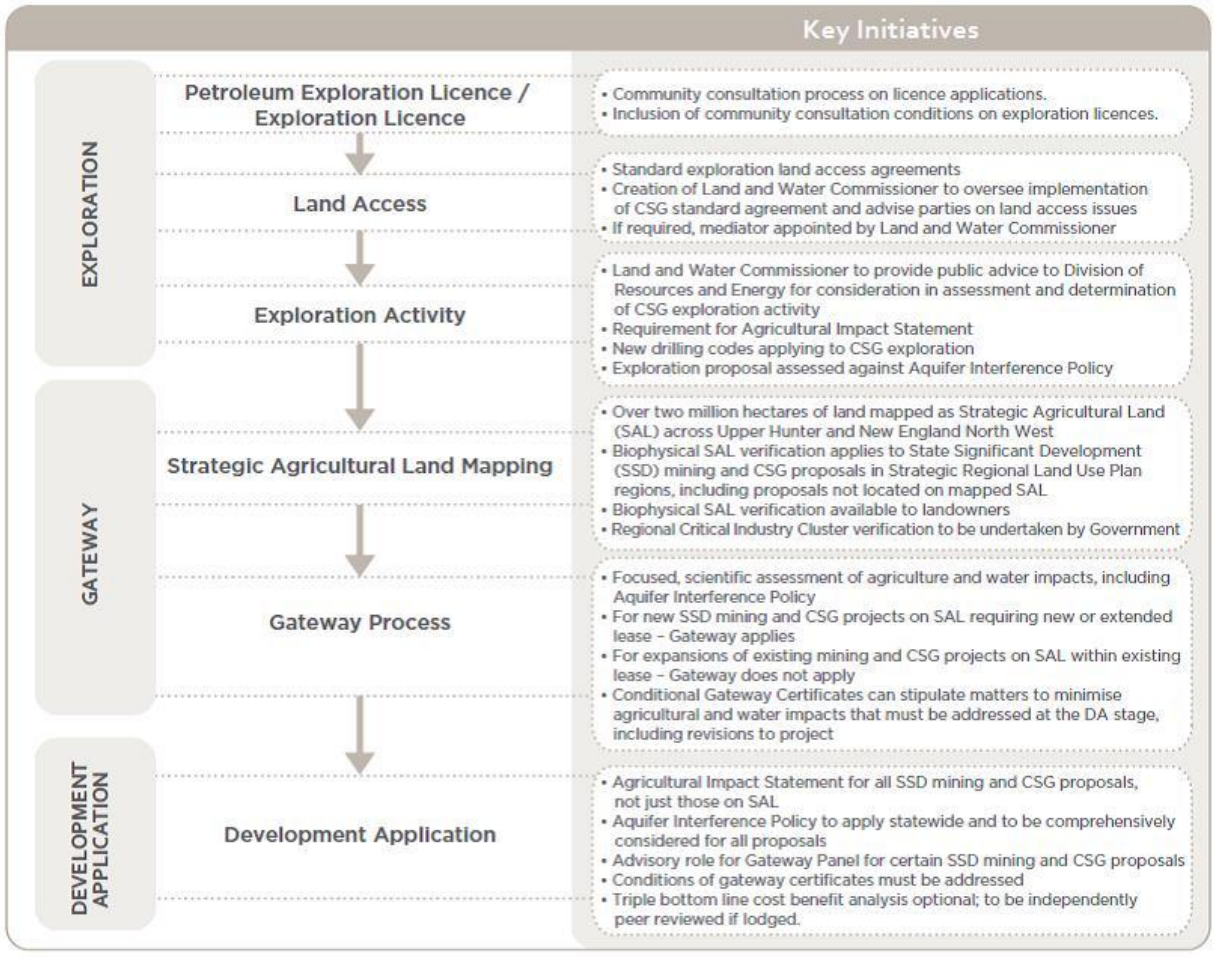

Figure 3.2
STRATEGIC AGRICULTURAL LAND FLOWCHART PROCESS

3.3.3.2 Central West Catchment Management Authority – Catchment Action Plan 2006 – 2016

The Central West Catchment Management Authority (CW-CMA) – *Catchment Action Plan 2006 – 2016* (Central West CAP) represents a regional strategy document which needs to be considered in the planning and assessment of any development within the area managed by the Central West CMA. The Central West CAP outlines the direction for actions within the

catchment over the 10 year period 2006 to 2016. It sets the framework for this by specifying catchment and management targets that address key natural resource management issues in the catchment, namely:

- salinity;
- vegetation;
- soil; and
- water;
- biodiversity;
- people and community.

3.3.3.3 Draft NSW Freight and Ports Strategy

Transport for NSW released a draft NSW Freight and Ports Strategy document for comment in November 2012. This Strategy has been reviewed in line with the forecast DZP freight tasks and predicted freight volumes and the following is concluded.

- The importation of bulk reagents for the Proposal would be via the Port of Newcastle by either road or rail to the DZP Site, which is not part of the freight corridors focused upon in the Strategy.
- The predicted export volumes of 75 000t would utilise established export routes and integrate with the NSW regional export volumes to Port Botany.
- Should bulk reagents be transported to the DZP Site by rail from Newcastle, the required access to the Hunter Valley freight corridor 6 times per week (3 into Newcastle and 3 from Newcastle) would have little impact on the major coal export corridors.
- DZP notes a line connected direct between Dubbo and Dunedoo upgraded to 92 tonne wagon weight would improve the efficiency of the rail freight corridor between Dubbo and Newcastle.
- Should bulk reagents be transported by road to the DZP Site from Newcastle, it is noted that there is no provision for any major upgrade to this route. There are also no route upgrades proposed for the roads on which other reagents for the Proposal would be transported, e.g. Newell Highway, Mitchell Highway.

Overall, the freight task of the Proposal is unique and has limited application to the Strategy. The freight volumes proposed would be of little influence to the major export routes.

3.3.4 Local Planning Instruments and Strategies

3.3.4.1 Local Environment Plan

The Site is located within the Dubbo City Local Government Area for which the *Dubbo Local Environmental Plan* (LEP) *2011* is relevant. **Figure 3.3** displays the section of the Dubbo LEP 2011 relevant to the Application Area and its surrounds. A summary of local zoning relevant to the Application Area is as follows.

- With the exception of the Dubbo – Molong Rail Line and a small area of land to the east of the rail line adjacent to the village of Toongi which is zoned SP2 Infrastructure (Railway), the land over which the DZP Site is located is zoned RU1 Primary Production.

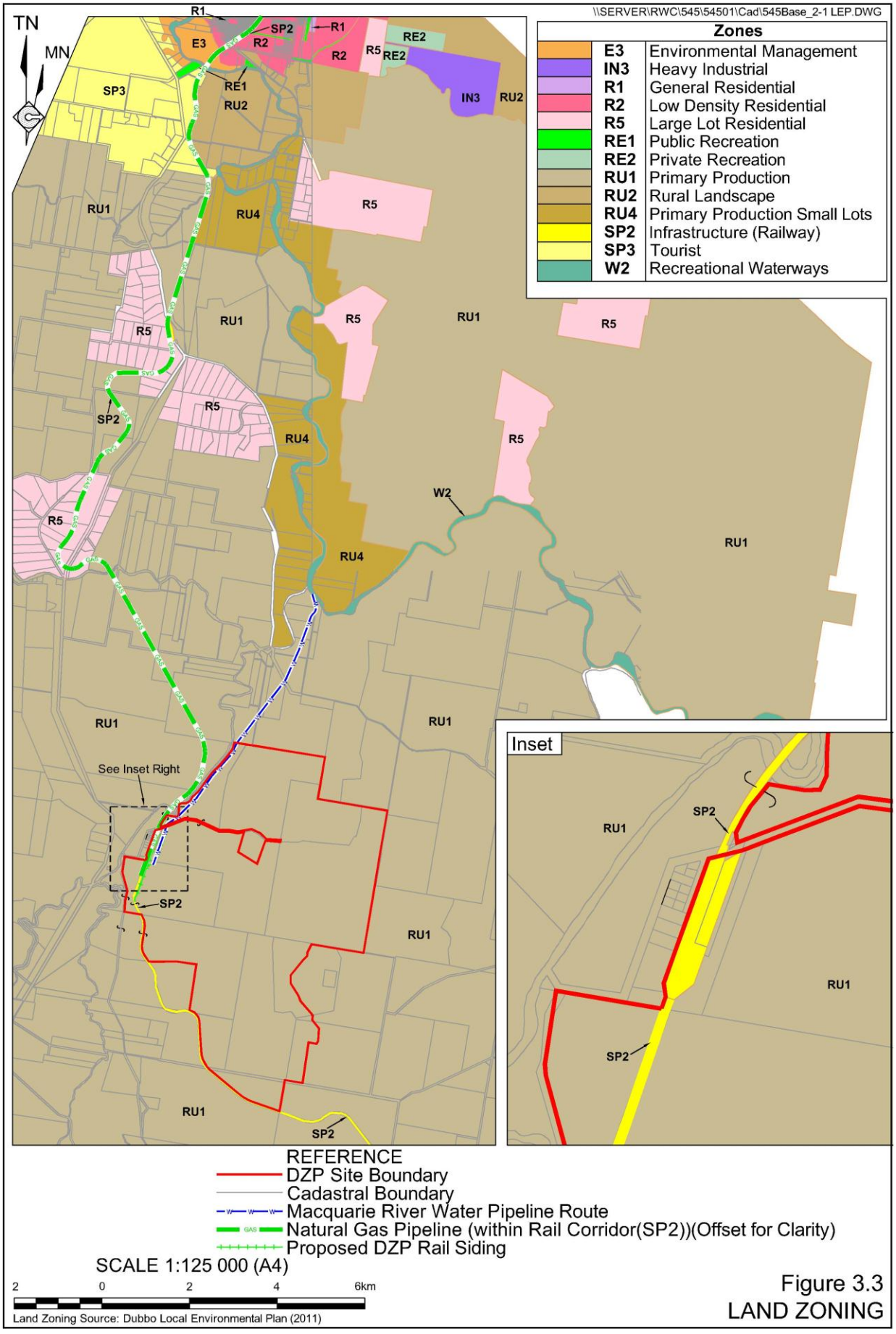

Figure 3.3
LAND ZONING

- The Macquarie Water Pipeline is located on land zoned RU1 Primary Production. The pumping infrastructure would occur within Zone W2 Recreational Waterways of the Macquarie River.
- The Natural Gas Pipeline and Dubbo-Molong Rail Line are located within the SP2 Infrastructure (Railway) easement of the Dubbo – Molong Rail Line.

The planning objectives of the relevant zones are as follows.

Zone RU1 – Primary Production

The six objectives of the RU1 Zone are as follows.

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To enable uses of an appropriate scale to facilitate the economic sustainability of primary production.
- To enable function centres, restaurants and appropriate forms of tourist and visitor accommodation to be developed in conjunction with agricultural uses.

Open cut mining is permissible within this zone with consent.

Zone SP2 – Infrastructure (Railway)

The two objectives of the SP2 Zone are as follows.

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.

Development within this zone for the purpose nominated on the LEP map (Railway) is permitted with consent.

The Applicant sought clarification from Dubbo City Council in relation to the permissibility of the proposed gas pipeline within this zone. Advice received from Dubbo City Council on 9 January 2013 confirmed this activity would be permitted with consent.

Zone W2 – Recreational Waterways

The three objectives of the W2 Zone are:

- to protect the ecological, scenic and recreation values of recreational waterways;
- to allow for water-based recreation and related uses; and
- to provide for sustainable fishing industries and recreational fishing.

A review of the activities permitted with consent includes water reticulation systems, which is considered the activity best describing the proposed construction and operation of the water pumping infrastructure. The installation and operation of this infrastructure, if managed appropriately, would not be detrimental to the objectives of the W2 Zone.

3.3.4.2 Dubbo Economic Development Strategy 2011

In conjunction with the business community, Dubbo City Council has developed the *Dubbo Economic Development Strategy 2011* ("the Strategy") (DCC, 2011) to inform future economic development activities to promote a sustainable, forward-moving economy. The Strategy has a clear ambition, i.e. to:

> *Produce a stronger economy through business investment, increased population and employment growth.*

The Strategy recognises the strengths and opportunities within the LGA and has identified sub-strategies that will be the 10 Steps to Dubbo's economic success.

1. Infrastructure development.
2. Mining and mining services.
3. Tourism destination development.
4. Transport and distribution.
5. Agricultural sustainability and diversification.
6. The region's service centre.
7. Workforce and skills development.
8. Advocacy and leadership.
9. Marketing and investment attraction.
10. Business and industry expansion.

The relevance of the Proposal to these sub-strategies and overall ambition of the Strategy is considered in further detail in Sections 4.15.

3.3.5 Environmental Guidelines

The DGRs require that in assessing the identified key assessment requirements, reference be made to one or more guideline documents. In addition, a number of the government agencies consulted in relation to the Proposal required reference to other environment guideline documents. **Appendix 3** identifies each of the relevant guidelines referenced in the preparation of the EIS and/or relevant part of the *Specialist Consultant Studies Compendium* where they are considered and/or addressed.

3.4 IDENTIFICATION OF ENVIRONMENTAL ISSUES

Based on the results of the consultation undertaken and a review of relevant planning instruments and environmental guidelines with the preliminary results of the specialist consultant studies, the following issues of relevance to the Proposal have been identified.

- Air Quality.
- Aboriginal Heritage.
- Non-Aboriginal Heritage.
- Noise and vibration.
- Radiation.
- Terrestrial Ecology.
- Aquatic Ecology.
- Soil and Land Capability.
- Groundwater.
- Surface Water/Erosion and Sedimentation.
- Traffic and Transport.
- Visibility.
- Hazards (including Land Contamination, Waste Management and Bush fire).
- Socio-economic climate.

3.5 ANALYSIS OF ENVIRONMENTAL RISK AND ISSUE PRIORITISATION

3.5.1 Introduction

Following the identification of the environmental issues requiring assessment, a review of the Proposal design, the local environment and other factors was undertaken to identify the sources of environmental risk and their corresponding impacts associated within each issue. This subsection prioritises the identified environmental issues, with respect to the potential for environmental impact, by the completion of an analysis of risk associated with each environmental issue. The analysis of risk has been completed in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004 and through consideration of the likelihood and potential consequence(s) of the environmental impacts.

On 11 January 2012, a preliminary risk assessment workshop was held by the Applicant to identify and quantify the risks associated with the Proposal to the environment. Attending the preliminary risk assessment workshop were the following.

- Mr Michael Sutherland, Alkane General Manager, NSW.
- Mr Tony Wright, Alkane Commercial Manager.
- Mr Peter Broadbent, TZMI Engineering Manager.
- Mr Gavin Diener, TZMI Managing Consultant.
- Mr Dereck Becker, TZMI Consulting Engineer.
- Mr Alex Irwin, RWC Senior Environmental Consultant.

3.5.2 Analysis of Environmental Risk

Risk is the chance of something happening that will have an impact upon the objectives of a task, which in this case is the development and operation of the Proposal in an environmental responsible manner. Risk is measured in terms of consequence (severity) and likelihood (probability) of the event happening.

As part of the preliminary risk assessment workshop, and in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004, environmental parameters that could be affected by the Proposal were identified. Risk sources, potentially affected receptors or environments and potential consequences were then discussed and determined. For each risk source, receptor and potential consequence, a specific potential impact was identified.

On identification of each potential environmental impact associated with the Proposal, a review of the Proposal design, the local environment and other factors was undertaken to identify the likely consequence and likelihood.

The allocation of a consequence rating was based on the definitions contained in **Table 3.6**. It is noted that the assigned consequence rating represents the highest level applicable, i.e. if a potential impact is assigned a level of 4 - Major based on impact to the environment and 2 - Minor based on area of impact, the consequence level assigned would be 4 - Major.

Table 3.6
Qualitative Consequence Rating

Level	Severity Level	Consequence Types						
		Financial	Health and Safety	Natural Environment	Social /Cultural Heritage	Community /govt. /reputation /media	Legal	Variance from Business Performance
5	Severe	>$5.0M	Fatality	Long-term impairment of ecosystem	On-going serious social issues, major permanent impact to cultural and heritage sites	Serious public or media outcry (national coverage) /major reputation impact	Significant prosecution and fines, litigation including class action	>30% variance from business plan with complete loss of productivity
4	Major	$1M-$5M	Hospitalisation required leading to permanent injury	Medium term impairment of an ecosystem	Significant social issues, significant damage to structures / items of cultural significance	Major public embarrassment / adverse media coverage	Serious breach of regulation leading to litigation	15% - 30% variance from business plan leading to major loss of productivity
3	Moderate	$250 000 - $1M	Medical treatment leading to lost time or restricted duties	Short term impairment of ecosystem affecting function	On-going social issues, damage to items of cultural significance	Adverse media /public /NGO attention	Significant level of complaints / incidents with a high threat of legal action	5% - 15% variance from business plan leading to; disruption to productivity
2	Minor	$20 000 - $250 000	First aid treatment required but no lost time or restricted duties	Short-term impact not affecting ecosystem functions	Minor medium-term social impacts on local population. Mostly repairable	Attention from media and/or heightened concern by local community	Isolated complaint /incident with a threat of legal action	2% - 5% variance from business plan, minimal loss of productivity
1	Insignificant	<$200 000	No injury or review required	Minor impact on biological or physical environment	Minor social issues, repairable damage	Minor adverse local public or media attention or complaints	Minor complaint /incident	<2% variance from business plan. Nil or negligible loss of productivity

Source: Alkane Policy & Procedures Organisational Risk Management Framework June 2012 – Table 3

The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table 3.7**.

Table 3.7
Qualitative Likelihood Rating

Level	Descriptor	Description
A	Almost Certain	The event will occur on an annual basis.
B	Likely	The event has occurred several times or more in your career.
C	Possible	The event might occur once in your career.
D	Unlikely	The event does occur somewhere from time to time.
E	Rare	Hear of something like the event occurring elsewhere.
Source: Alkane Policy & Procedures Organisational Risk Management Framework June 2012 – Table 2		

The risk associated with each environmental impact was assessed without the inclusion of any operational controls or safeguards in place and is based on the qualitative assessment of consequence and likelihood, a risk ranking of: low, medium, high or very high was assigned to each potential impact based on the matrix presented in **Table 3.8**.

Table 3.8
Risk Rating Matrix

Likelihood		Consequences				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A	Almost Certain	M	H	H	VH	VH
B	Likely	M	M	H	H	VH
C	Possible	L	M	H	H	H
D	Unlikely	L	L	M	M	H
E	Rare	L	L	M	M	H
Source: Alkane Policy & Procedures Organisational Risk Management Framework June 2012 – Diagram 4						

The four risk rankings are defined as follows.

Low (L): manage by routine procedures, unlikely to need specific application of resources.

Medium (M): manage by specific monitoring or response procedures, with management responsibility specified.

High (H): senior executive management attention needed, action plans and management responsibility specified.

Very High (VH): board attention needed, action plans and management responsibility specified.

Table 3.9 identifies each of the risk sources, receptors, potential consequences and potential impacts for each environmental parameter. **Table 3.10** then provides the assessment of the unmitigated risk, namely the risk level in the absence of management and mitigation measures, identified for each potential environmental impact during the preliminary environmental risk analysis workshop. **Table 6.1** in Section 6.2.1 provides an analysis of risk following the implementation of the proposed management and mitigation measures.

Table 3.9
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Radiation	Low level radiation emitted by ore	Mining workforce	Exposure to radiation during mining.	Adverse health outcomes for workforce
		Processing plant workforce	Exposure to radiation during processing.	Adverse health outcomes for workforce
	Low level radiation emitted by process residues and by-products	Surrounding landowners and residents	Exposure to radiation in solid residues during the life of the mine.	Adverse health outcomes for surrounding landowners / residents during the period of mine operation
			Exposure to radiation in solid residues beyond the life of the mine.	Long-term adverse health outcomes for surrounding landowners / residents following the completion of the Proposal
		Local flora and fauna	Exposure to radiation in solid residues during the life of the mine.	Degradation of local vegetation and/or reduced survival rates of local fauna during the life of the Proposal
			Exposure to radiation in solid residues beyond the life of the mine.	Long-term degradation of local vegetation and/or reduced survival rates of local fauna following the completion of the Proposal
	Low level radiation emitted by product	Vessels and equipment / Destination of used equipment and scrap	Exposure to radiation from equipment / scrap.	Adverse health outcomes for those exposed to the equipment or scrap
		Product / Destination of the product	Exposure to radiation in product.	Adverse health outcomes for the customer or end user
Groundwater	Leachate from the SRSF	Local aquifer(s)	Elevated concentration of metalliferous or other contaminants in the groundwater.	Reduction in groundwater quality
		Surrounding landholders utilising bores or pumps	Elevated concentration of metalliferous or other contaminants in the groundwater accessed by surrounding landholders.	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users.
		Dubbo City Council bores downstream of DZP Site	Elevated concentration of metalliferous or other contaminants in the groundwater accessed for Dubbo City water supply.	Contamination of Dubbo City water supply
				Health related impacts (people) due to consumption of contaminated water
				Health related impacts (stock) due to consumption of contaminated water
		Groundwater dependent ecosystems	Contamination of accessible water.	Degradation of groundwater dependent ecosystems

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Groundwater (Cont'd)	Leachate from LRSF	Local aquifer(s)	Elevated concentration of metalliferous or other contaminants in the groundwater.	Reduction in groundwater quality
		Surrounding landholders utilising bores or pumps	Elevated salinity of the groundwater accessed by surrounding landholders.	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users
		Dubbo City Council bores downstream of DZP Site	Elevated salinity of the groundwater accessed for Dubbo City water supply.	Contamination of Dubbo City water supply
		Groundwater dependent ecosystems	Contamination of accessible water.	Degradation of groundwater dependent ecosystems
	Hydrocarbon spills	Local aquifer(s)	Elevated concentration of hydrocarbon contaminants in the groundwater.	Reduction in groundwater quality
		Surrounding landholders utilising bores or pumps	Elevated concentration of hydrocarbon contaminants in the groundwater accessed by surrounding landholders.	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users
		Dubbo City Council bores downstream of DZP Site	Elevated concentration of hydrocarbon contaminants in the groundwater accessed for Dubbo City water supply.	Contamination of Dubbo City water supply
				Health related impacts (people) due to consumption of contaminated water
				Health related impacts (stock) due to consumption of contaminated water

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Groundwater (Cont'd)	Process chemical / reagent spills	Local aquifer(s)	Elevated concentration of chemical contaminants in the groundwater.	Reduction in groundwater quality
		Surrounding landholders utilising bores or pumps	Elevated concentration of chemical contaminants in the groundwater accessed by surrounding landholders.	Health related impacts (people) due to consumption of contaminated water
				Health related impacts (stock) due to consumption of contaminated water
		Dubbo City Council bores downstream of DZP Site	Elevated concentration of chemical contaminants in the groundwater accessed for Dubbo City water supply.	Contamination of Dubbo City water supply
				Health related impacts (people) due to consumption of contaminated water
				Health related impacts (stock) due to consumption of contaminated water
		Groundwater dependent ecosystems.	Contamination of accessible water.	Degradation of groundwater dependent ecosystems
	Groundwater drawdown	Local aquifer(s)	Reduced groundwater level.	Reduction in the volume of water contained within the affected groundwater aquifer
		Surrounding landholders utilising bores or pumps	Decrease in availability of groundwater to adjoining landowners.	Reduced yields of local groundwater bores
		Groundwater dependent ecosystems	Reduced availability of water.	Degradation of groundwater dependent ecosystems
	Reduction in contribution to surface water flows	Local streams, and springs	Changes to local hydrological regime and surface flows.	Reduced surface flows to Wambangalang and other creek catchments of the Macquarie River
				Degradation of riparian or aquatic vegetation / ecosystems
		Groundwater dependent ecosystems	Reduced availability of water.	Degradation of groundwater dependent ecosystems

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Surface Water / Flooding / Erosion and Sediment Control	Reduction in environmental flows through on-site capture of water	Local streams, creeks and tributaries	Reduced natural surface water flows.	Reduced flows to Wambangalang Creek and other tributaries of the Macquarie River
		Downstream water users	Reduced natural surface water flows.	Reduced availability of water to downstream users
		Local flora, terrestrial and aquatic fauna	Reduced volume of water available to local flora and fauna.	Stress and possible reduction in viability of native vegetation
				Degradation of aquatic habitats
	Discharge of dirty, saline or contaminated water	Local creeks and tributaries	Decreased water quality.	Pollution of downstream waters
				Pollution of local waterways resulting in detrimental affects to flora and fauna
		DZP Site soils and vegetation.	Contamination of soil resources.	Contamination of soil resources and indirect impacts on future land use
		Local and regional catchment ecosystem	Introduction of a toxic compound to the environment.	Health related impacts (people) due to consumption of contaminated water
			Contamination of soil and water resources.	Health related impacts (stock) due to consumption of contaminated water
	Wall failure or overtopping of LRSF	Surrounding land and surface water	Uncontrolled flows of contaminated water.	Contamination of local surface water
				Contamination of local soil resources
				Contamination of drinking water supply
	Changes to hydrology of creeks and drainage lines	Local creeks and drainage lines	Reduced flows.	Reduced surface flows within the affected waterway and the Macquarie River catchment more generally
			Changed alignment of hydrological flow.	Increased erosion potential resultant from changed alignment of flow
		Local flora, terrestrial and aquatic fauna	Reduced volume of water available to local flora and fauna.	Reduction in the quality of aquatic habitat

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Surface Water / Flooding / Erosion and Sediment Control	Changes to the flood regimes of Wambangalang and Paddys Creek	Wambangalang and Paddys Creek and associated communities and ecosystems.	Changes to frequency or intensity of local flooding.	Increased erosion potential within Wambangalang and Paddys Creek catchments
				Detrimental impacts on surrounding properties as a result of changes to flooding regime
				Changes to vegetation community structure and habitat values
	Erosive actions of water	DZP Site soils	Loss of topsoil.	Soil erosion and loss of agriculturally productive capacity
				Decreased availability of soil for rehabilitation
	Sedimentation of water on and discharged from the DZP Site	Local creeks and drainage features	Increased sedimentation within downstream creeks.	Increased sediment load in drains and/or waterways
				Increased siltation
	Increase in dryland salinity	DZP Site Lands	Rise of groundwater table due to removal of vegetation.	Occurrence of dryland salinity on the DZP Site
Biodiversity (Flora and Fauna)	Removal of native vegetation due to clearing activities	Vegetation and habitat within the impact footprint	Reduced biodiversity.	Loss of biodiversity and alteration to existing habitat
		Threatened species, populations and endangered ecological communities	Removal of threatened species, populations and endangered ecological communities from the DZP Site.	Direct adverse impact on threatened species, populations and communities.
				Local or regional reduction in distribution of threatened species, populations and endangered ecological communities
	Detrimental affects of indirect Proposal impacts, e.g. noise, dust, lighting	Locally occurring species, populations and communities	Dispersal of locally occurring species, populations and communities from the site.	Reduced biodiversity value of the site.
			Reduced potential for use of the site by threatened species, populations and endangered ecological communities.	Reduced local distribution of threatened species, populations and endangered ecological communities
	Pooling of contaminated (including hypersaline) water on the SRSF and LRSF	Local fauna	Ingestion of water by local fauna.	Detrimental health impacts on native fauna
		Local fauna	Hit by vehicle.	Injury or death of fauna

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Aboriginal Heritage	Removal or destruction of known Aboriginal sites and/or artefacts	Local archaeological setting	Damage or destruction of Aboriginal artefacts or sites.	Destruction of identified site
				Cumulative reduction of the in-situ archaeological record
	Removal or destruction of currently unidentified Aboriginal sites and/or artefacts	Local archaeological setting	Damage or destruction of Aboriginal artefacts or sites.	Destruction of identified site
				Cumulative reduction of the in-situ archaeological record
European Heritage	Removal or destruction of sites of heritage significance due to Proposal activities	Local archaeological setting	Loss or damage to heritage sites.	Loss or destruction of items of heritage significance
Noise	Increased noise resultant from construction on the DZP Site (18 month to 24 months)	Surrounding residents and landowners	Increased noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
			Impacts on the health and well-being of local residents.	Noise levels associated with the Proposal causing adverse affects on physical or mental health.
		Native fauna	Detrimental effects on local fauna.	Adverse effects on the local fauna assemblage
	Increased noise levels resulting from mining and haulage	Surrounding residents and landowners.	Increased noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions.
			Impacts on the health and well-being of local residents.	Noise levels associated with the Proposal causing adverse affects on physical or mental health.
		Native fauna	Detrimental effects on local fauna	Adverse effects on the local fauna assemblage.

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Noise (Cont'd)	Increased noise levels from processing plant	Surrounding residents and landowners	Increased average noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
			Occurrence of occasional very loud noises.	Sleep disturbance as a result of maximum noise levels
			Impacts on the health and well-being of local residents.	Noise levels associated with the Proposal causing adverse affects on physical or mental health
		Native fauna	Detrimental effects on local fauna.	Adverse effects on the local fauna assemblage
	Noise associated with the construction of the rail line	Residences adjacent to rail line	Increased average noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
	Increased noise levels from rail loading	Surrounding residents and landowners	Increased average noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
			Occurrence of occasional very loud noises.	Sleep disturbance as a result of maximum noise levels
			Impacts on the health and well-being of local residents.	Noise levels associated with the Proposal causing adverse affects on physical or mental health
		Native fauna	Detrimental effects on local fauna.	Adverse effects on the local fauna assemblage.
	Increased rail traffic noise levels	Residences adjacent to rail line	Increased average noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
			Occurrence of occasional very loud noises.	Sleep disturbance as a result of maximum noise levels
	Noise associated with road upgrades			Increased noise levels associated with DZP activities causing annoyance, distractions, i.e. amenity impacts
	Increased road traffic noise levels	Residents of properties adjoining Obley Road	Increased average noise levels.	Noise levels associated with the Proposal causing annoyance and/or distractions
			Occurrence of occasional very loud noises.	Sleep disturbance as a result of maximum noise levels

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Vibration	Vibration from mine blasting	Surrounding residences, buildings and other structures	Structural damage to buildings and structures.	Structural damage to buildings and structures
			Nuisance/amenity impacts on surrounding landowners / residents.	Reduced local amenity
		Native fauna	Dispersal of locally occurring species, populations and communities from the site.	Reduced biodiversity value of the site.
		Local livestock	Reduced production from livestock.	Reduced productivity
	Vibration from rail traffic	Surrounding residences, buildings and other structures to the rail line (including within Dubbo)	Nuisance/amenity impacts on surrounding landowners / residents.	Reduced local amenity
Air Pollution – Dust, Odour, other	Dust generation resulting from blasting, vehicle movements on unsealed haul roads	Surrounding residents and buildings	Increased deposited dust and suspended particulates.	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.
			Health-related complaints.	Adverse health impacts (if PM_{10} levels are excessive)
		Surrounding pastures	Reduced palatability of pastures	Decreased productivity of pastures
	Wind action on disturbed areas, waste rock emplacements, SRSF and other stockpiles	Surrounding residents and buildings.	Health-related complaints.	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.
				Adverse health impacts (if PM_{10} levels are excessive)
	Blasting fugitive emissions	Local airshed	Increase in greenhouse gas and other emissions	Increase in the greenhouse gas effect
	Crushing and grinding emissions	Surrounding residents and buildings	Health-related complaints.	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.
				Adverse health impacts (if PM_{10} levels are excessive)
		Surrounding grazing land	Ingestion of radionuclides.	Health related impacts (stock) due to consumption of contaminated pasture

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Air Pollution – Dust, Odour, other (Cont'd)	Material handling (train unloading bulk products limestone and sulphur)	Workforce	Health-related complaints.	Adverse health impacts (if PM_{10} levels are excessive)
	Processing plant stack emissions	Local airshed	SO_2, CO_2, water vapour (H_2O) emissions.	Increase in the greenhouse gas effect
	Emissions resultant from plant malfunction	Local airshed	Elevated levels of process chemical emissions, e.g. SOx, Ammonia (NH_3), HCl etc., VOCs.	Temporary reduction in local amenity due to odour and visible plume
		Surrounding land and community		Acute health impacts associated NH_3, SO_2, SO_3 emissions
	Vehicle emissions	Local and global air-shed	Increased greenhouse and other gas emissions.	Increased contribution to greenhouse effect.
Traffic and Transport	Obley Road and Toongi Road upgrade and site access road construction	Local landforms, vegetation and neighbouring land holdings	Impacts associated with road construction (noise, dust, vegetation clearing, ground disturbance, etc.).	See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above.
		Local road network		
		Existing road users	Temporary closure of Toongi Road to upgrade Wambangalang Creek crossing.	Temporary inconvenience to commuters if stopped for road works
			Vehicle traffic disruptions – temporary delays during road works.	
			Increased traffic hazards during construction.	Increased risks of accident
	Re-establishment of railway Toongi-Dubbo	Local landforms, vegetation and neighbouring land holdings	Impacts associated with road construction (noise, dust, vegetation clearing, ground disturbance, etc.).	See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above.
		Road traffic	Vehicle traffic disruptions – temporary delays during road works.	Temporary inconvenience to commuters if stopped for road works
		Surrounding residents	Impacts associated with rail traffic (noise, etc.).	See "*air pollution*", "*noise*" and "*vibration*" above.

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Traffic and Transport (Cont'd)	Train derailment causing chemical spill	Local groundwater	Chemical seepage to groundwater.	Broad dispersion of chemicals
		Local streams and drainage features	Chemical runoff into local streams.	Hydrocarbon or other pollutant contamination of surface water
	Road accident causing chemical spill	Local groundwater	Chemical seepage to groundwater.	Broad dispersion of chemicals
		Local streams and drainage features	Chemical runoff into local streams.	Hydrocarbon or other pollutant contamination of surface water
		Local air shed	Dispersion of ammonia / HCl vapour.	See "*air pollution*" above
		Local landforms and vegetation	Initiation and spread of fire.	See "*Bush fire*" below
	Railway crossings	Obley Road (2 crossings)	Vehicle traffic disruption (delays at lights).	Temporary inconvenience to commuters and loss of productivity
			Vehicle - train collision.	Loss of life/property damage through collision with train
		Transport network	Altered transport patterns.	Use of an existing easement/asset
				Lessen road freight task (increased transport safety)
	Workforce commuter traffic	Local road network.	Increased vehicle movements (especially heavy vehicles) on Obley Road.	Increased traffic creating pressure on existing road and infrastructure function
				Accelerated road pavement deterioration
		Existing road users.	Vehicle accident/roll over.	Elevated risk of accident/incident on local roads
	Heavy vehicle movements for reagent delivery	Local road network.	Increased vehicle movements (especially heavy vehicles) on Obley Road.	Increased traffic creating pressure on existing road and infrastructure function
				Accelerated road pavement deterioration
		Local streams & drainages	Hydrocarbon spill following vehicle malfunction or accident.	Hydrocarbon or other pollutant contamination of surface water
			Chemical reagent spill following vehicle malfunction or accident.	Contamination of local water resources by leaking or spilt chemical reagent

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Visual Amenity	Changes in visual characteristics of the site from agriculture to industrial	Surrounding residents and passing traffic on Obley Road.	Clearing of native vegetation and increased visibility of the mine processing activities.	Decreased visual amenity
	Night lighting	Surrounding farms	Increased 'glow' from site.	Reduced amenity of night sky
Rehabilitation and Final Landform	Modifications to the landform of the site	Local landforms and surrounding landowners and/or residents.	Altered local landforms and influence on activities/lifestyle of adjoining landowners.	Reduced amenity of the final landform resultant from altered topography
				Final landform and land use that is different from current activities/lifestyle of local community
Soil Resources	Local soils	Soils of the site	Structural damage to soils through poor soil management practices.	Rehabilitation outcomes not meeting objectives
			Reduced biological activity of soils.	Reduced productivity on final landform
			Increased soil erodibility.	Increased erosion on the final landform
Waste Management	Management of process waste	Site land and water resources	Leak or spill from SRSF, LRSF or waste rock emplacements over downstream lands and into local drainage lines and creeks.	See "*surface water / flooding / erosion and sediment control*" above.
		Local landforms	Changes to local landforms for stockpiling / disposal of process waste.	Reduced visual amenity
	Management of waste rock from mining	Site land and water resources	Acid Mine Drainage.	Generation of acid from waste rock
		Downstream land and water resources	Erosion and sedimentation from stockpiles.	Reduced water quality of downstream catchment
		Local and regional groundwater	Leaching of contaminants to groundwater.	Reduction in groundwater quality
				Reduction in the beneficial uses of the water and therefore availability to existing groundwater users
				Health related impacts (people) due to consumption of contaminated water
				Health related impacts (stock) due to consumption of contaminated water

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Waste Management (Cont'd)	Low level radionuclides contained in SRSF and LRSF	See "*surface water / flooding / erosion and sediment control*" above.		
	Management of Effluent	Site treatment plant and groundwater resources	Spill or leaching of effluent to groundwater.	Organic and nitrate contamination of groundwater
	Disposal of Reagent packaging waste	Site and disposal location	Contaminated packaging waste sent to local landfill.	Contaminate off-site landfill
	Disposal of waste process consumables, e.g. filter cloths	Site and disposal location	Contaminated packaging waste sent to local landfill.	Contaminate off-site landfill
	Disposal of non-processing waste, e.g. engineering scrap, office waste, domestic waste	Site and disposal location	Increased volume of waste sent to landfill.	Reduced life of landfill
Bush fire	Initiation of fire in the processing plant	Proposal personnel, equipment and adjoining properties	Endangerment of Proposal workforce.	Health and safety impacts to Proposal personnel
			Damage to site infrastructure.	Damage to DZP Site equipment
				Property damage and impacts on process
		Adjoining land vegetation, property and landforms	Damage to adjoining property infrastructure and land.	Damage to adjoining properties and/or native vegetation
	Bush fire in pasture, cropping and offset woodlands	See above		
	Ignition of sulphur stockpile	Site and surrounds	Generation of SO_2 / SO_3 gas.	Acute health impact from ingestion of SO_2
				Death of vegetation
	Fire within Solvent Extraction Plant (large volumes of kerosene)	Site and surrounds and local air shed	Toxic products of incomplete combustion emissions.	Air contamination

Table 3.9 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Socio-Economic Impacts	Alteration of social activities or employment	Local community and businesses.	Transfer of workers from other industry to the Proposal.	Strain/drain on local skilled workforce
				Reduced unemployment and increased local spending
				Additional population for schools and community services
		Local government (mainly DCC)	Influx of additional workforce to Dubbo and surrounds.	Strain on local (Dubbo) housing and other community infrastructure and services
	Perceived or real impacts on local amenity of neighbouring properties	Surrounding property owners	Reduced desirability of properties.	Reduced property values
				Reduced amenity value of landholdings.
	Resuming railway land	Current lessees of railway land	Removal of stock from corridor.	Loss of associated income
			Removal of amenity tree plantings.	Loss of biodiversity

Table 3.10
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Radiation				
Low level radiation emitted by ore	Adverse health outcomes for mining workforce	D	1	L
	Adverse health outcomes for processing workforce	D	1	L
Low level radiation emitted by process residues and by-products	Adverse health outcomes for surrounding landowners / residents during the period of mine operation	E	1	L
	Long-term adverse health outcomes for surrounding landowners / residents following the completion of the Proposal	E	2	L
	Degradation of local vegetation and/or reduced survival rates of local fauna during the life of the Proposal	E	1	L
	Long-term degradation of local vegetation and/or reduced survival rates of local fauna following the completion of the Proposal	E	1	L
Low level radiation emitted by product	Adverse health outcomes for those exposed to the equipment or scrap	D	1	L
	Adverse health outcomes for the customer or end user	D	1	L
Groundwater				
Leachate from the SRSF	Reduction in groundwater quality	C	2	M
	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users.	C	3	H
	Contamination of Dubbo City water supply	D	3	M
	Health related impacts (people) due to consumption of contaminated water	E	3	M
	Health related impacts (stock) due to consumption of contaminated water	C	3	H
	Degradation of groundwater dependent ecosystems	E	2	L
Leachate from the LRSF	Reduction in groundwater quality	C	3	H
	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users	C	3	H
	Contamination of Dubbo City water supply	D	3	M
	Degradation of groundwater dependent ecosystems	E	2	L
Hydrocarbon spills	Reduction in groundwater quality	B	1	M
	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users	B	1	M
	Contamination of Dubbo City water supply	D	3	M
	Health related impacts (people) due to consumption of contaminated water	E	3	M
	Health related impacts (stock) due to consumption of contaminated water	E	3	M

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Groundwater (Cont'd)				
Process chemical / reagent spills	Reduction in groundwater quality	D	3	M
	Health related impacts (people) due to consumption of contaminated water (surrounding land user water bores)	E	3	M
	Health related impacts (stock) due to consumption of contaminated water (surrounding land user water bores)	C	3	H
	Contamination of Dubbo City water supply	D	3	M
	Health related impacts (people) due to consumption of contaminated water (Dubbo City Council water bores)	E	3	M
	Health related impacts (stock) due to consumption of contaminated water (Dubbo City Council water bores)	E	3	M
	Degradation of groundwater dependent ecosystems	E	2	L
Groundwater drawdown	Reduction in the volume of water contained within the affected groundwater aquifer	E	1	L
	Reduced yields of local groundwater bores	E	3	M
	Degradation of groundwater dependent ecosystems	E	2	L
Reduction in contribution to surface water flows	Reduced surface flows to Wambangalang and other creek catchments of the Macquarie River	E	2	L
	Degradation of riparian or aquatic vegetation / ecosystems	E	2	L
	Degradation of groundwater dependent ecosystems	D	2	L
Surface Water / Flooding / Erosion and Sediment Control				
Reduction in environmental flows through on-site capture of water	Reduced flows to Wambangalang Creek and other tributaries of the Macquarie River	B	2	M
	Reduced availability of water to downstream users	B	1	M
	Stress and possible reduction in viability of native vegetation	D	1	L
	Degradation of aquatic habitats	D	1	L
Discharge of dirty, saline or contaminated water	Pollution of downstream waters	D	2	L
	Pollution of local waterways resulting in detrimental affects to flora and fauna	D	2	L
	Contamination of soil resources and indirect impacts on future land use	D	3	M
	Health related impacts (people) due to consumption of contaminated water	E	3	M
	Health related impacts (stock) due to consumption of contaminated water	C	3	H

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Surface Water / Flooding / Erosion and Sediment Control (Cont'd)				
Wall failure or overtopping of LRSF	Contamination of local surface water	D	4	M
	Contamination of local soil resources	D	4	M
	Contamination of drinking water supply	D	3	M
Changes to hydrology of creeks and drainage lines	Reduced surface flows within the affected waterway and the Macquarie River catchment more generally	B	2	M
	Increased erosion potential resultant from changed alignment of flow	D	2	L
	Reduction in the quality of aquatic habitat	D	2	L
Changes to the flood regimes of Wambangalang and Paddys Creek	Increased erosion potential within Wambangalang and Paddys Creek catchments	D	2	L
	Detrimental impacts on surrounding properties as a result of changes to flooding regime	E	2	L
	Changes to vegetation community structure and habitat values	E	2	L
Erosive actions of water	Soil erosion and loss of agriculturally productive capacity	C	2	M
	Decreased availability of soil for rehabilitation	C	3	H
Sedimentation of water on and discharged from the DZP Site	Increased sediment load in drains and/or waterways	C	2	M
	Increased siltation	C	2	M
Increase in dryland salinity	Occurrence of dryland salinity on the DZP Site	C	3	H
Biodiversity (Flora and Fauna)				
Removal of native vegetation due to clearing activities	Loss of biodiversity and alteration to existing habitat	A	3	H
	Direct adverse impact on threatened species, populations and communities.	B	3	H
	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities	A	3	H
Detrimental affects of indirect Proposal impacts, e.g. noise, dust, lighting	Reduced biodiversity value of the site.	B	2	M
	Reduced local distribution of threatened species, populations and endangered ecological communities	D	3	M
Pooling of contaminated (including hypersaline) water on the SRSF and LRSF	Detrimental health impacts on native fauna	A	2	H
	Injury or death of fauna	A	2	H
Aboriginal Heritage				
Removal or destruction of known Aboriginal sites and/or artefacts	Destruction of identified site	E	4	M
	Cumulative reduction of the in-situ archaeological record	E	4	M

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Aboriginal Heritage (Cont'd)				
Removal or destruction of currently unidentified Aboriginal sites and/or artefacts	Destruction of identified site	C	4	H
	Cumulative reduction of the in-situ archaeological record	C	4	H
Non-Aboriginal Heritage				
Removal or destruction of sites of heritage significance due to Proposal activities	Loss or destruction of items of heritage significance	D	3	M
Noise				
Increased noise resultant from construction on the DZP Site (18 month to 24 months)	Noise levels associated with the Proposal causing annoyance and/or distractions	A	3	H
	Noise levels associated with the Proposal causing adverse affects on physical or mental health.	E	3	M
	Adverse effects on the local fauna assemblage	D	1	L
Increased noise levels resulting from mining and haulage	Noise levels associated with the Proposal causing annoyance and/or distractions.	A	3	H
	Noise levels associated with the Proposal causing adverse affects on physical or mental health.	C	4	H
	Adverse effects on the local fauna assemblage.	D	1	L
Increased noise levels from processing plant	Noise levels associated with the Proposal causing annoyance and/or distractions	A	3	H
	Sleep disturbance as a result of maximum noise levels	E	3	M
	Noise levels associated with the Proposal causing adverse affects on physical or mental health	C	4	H
	Adverse effects on the local fauna assemblage	D	1	L
Noise associated with the construction of the rail line	Noise levels associated with the Proposal causing annoyance and/or distractions	A	2	H
Increased noise levels from rail loading	Noise levels associated with the Proposal causing annoyance and/or distractions	A	3	H
	Sleep disturbance as a result of maximum noise levels	B	3	H
	Noise levels associated with the Proposal causing adverse affects on physical or mental health	C	4	H
	Adverse effects on the local fauna assemblage.	E	1	L
Increased rail traffic noise levels	Noise levels associated with the Proposal causing annoyance and/or distractions	A	2	H
	Sleep disturbance as a result of maximum noise levels	C	3	H

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Noise (Cont'd)				
Noise associated with road upgrades	Increased noise levels associated with DZP activities causing annoyance, distractions, i.e. amenity impacts	A	2	H
Increased road traffic noise levels	Noise levels associated with the Proposal causing annoyance and/or distractions	A	2	H
	Sleep disturbance as a result of maximum noise levels	C	3	H
Vibration				
Vibration from mine blasting	Structural damage to buildings and structures	E	2	L
	Reduced local amenity	D	2	L
	Reduced biodiversity value of the site.	D	2	L
	Reduced productivity	C	2	M
Vibration from rail traffic	Reduced local amenity	C	2	M
Air Pollution – Dust, Odour, Other				
Dust generation resulting from blasting, vehicle movements on unsealed haul roads	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.	C	2	M
	Adverse health impacts (if PM_{10} levels are excessive)	C	3	H
	Decreased productivity of pastures	D	2	L
Wind action on disturbed areas, waste rock emplacements, SRSF and other stockpiles	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.	D	2	L
	Adverse health impacts (if PM_{10} levels are excessive)	D	3	M
Blasting fugitive emissions	Increase in the greenhouse gas effect	A	1	M
Crushing and grinding emissions	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.	D	2	L
	Adverse health impacts (if PM_{10} levels are excessive)	D	3	M
	Health related impacts (stock) due to consumption of contaminated pasture	C	3	H
Material handling (train unloading bulk products limestone and sulphur)	Adverse health impacts (if PM_{10} levels are excessive)	C	3	H
Processing plant stack emissions	Increase in the greenhouse gas effect	A	1	M
Emissions resultant from plant malfunction	Temporary reduction in local amenity due to odour and visible plume	D	3	M
	Acute health impacts associated NH_3, SO_2, SO_3 emissions	E	5	H
Vehicle emissions	Increased contribution to greenhouse effect.	A	1	M

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Traffic and Transport				
Obley Road and Toongi Road upgrade and site access road construction	See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above.			
	Temporary inconvenience to commuters if stopped for road works	A	2	H
	Increased risks of accident	C	4	H
Re-establishment of railway Toongi-Dubbo	See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above.			
	Temporary inconvenience to commuters if stopped for road works	A	2	H
	See "*air pollution*", "*noise*" and "*vibration*" above.			
Train derailment causing chemical spill	Broad dispersion of chemicals	D	3	M
	Hydrocarbon or other pollutant contamination of surface water	D	3	M
Road accident causing chemical spill	Broad dispersion of chemicals	C	4	H
	Hydrocarbon or other pollutant contamination of surface water	C	3	H
	See "*air pollution*" above			
	See "*Bush fire*" below			
Railway crossings	Temporary inconvenience to commuters and loss of productivity	A	1	M
	Loss of life/property damage through collision with train	C	5	H
	Use of an existing easement/asset	Positive impact (no risk rating)		
	Lessen road freight task (increased transport safety)	Positive impact (no risk rating)		
Workforce commuter traffic	Increased traffic creating pressure on existing road and infrastructure function	A	2	H
	Accelerated road pavement deterioration	A	3	H
	Elevated risk of accident/incident on local roads	C	4	H
Heavy vehicle movements for reagent delivery	Increased traffic creating pressure on existing road and infrastructure function	A	2	H
	Accelerated road pavement deterioration	A	4	VH
	Hydrocarbon or other pollutant contamination of surface water	D	3	M
	Contamination of local water resources by leaking or spilt chemical reagent	D	4	M
Visual Amenity				
Changes in visual characteristics of the site from agriculture to industrial	Decreased visual amenity	A	3	H
Night lighting	Reduced amenity of night sky	C	2	M

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Rehabilitation and Final Landform				
Modifications to the landform of the site	Reduced amenity of the final landform resultant from altered topography	A	2	H
	Final landform and land use that is different from current activities/lifestyle of local community	A	3	H
Soil Resources				
Local soils	Rehabilitation outcomes not meeting objectives	C	3	H
	Reduced productivity on final landform	B	3	H
	Increased erosion on the final landform	C	3	H
Waste Management				
Management of process waste	See "*surface water / flooding / erosion and sediment control*" above.			
	Reduced visual amenity	B	2	M
Management of waste rock from mining	Generation of acid from waste rock	No potential for AMD		
	Reduced water quality of downstream catchment	D	2	L
	Reduction in groundwater quality	C	2	M
	Reduction in the beneficial uses of the water and therefore availability to existing groundwater users	C	3	H
	Health related impacts (people) due to consumption of contaminated water	E	3	M
	Health related impacts (stock) due to consumption of contaminated water	C	3	H
Low level radionuclides contained in SRSF and LRSF	See "*surface water / flooding / erosion and sediment control*" above.			
Management of Effluent	Organic and nitrate contamination of groundwater	D	3	M
Disposal of Reagent packaging waste	Contaminate off-site landfill	C	3	H
Disposal of waste process consumables, e.g. filter cloths	Contaminate off-site landfill	C	3	H
Disposal of non-processing waste, e.g. engineering scrap, office waste, domestic waste	Reduced life of landfill	A	1	M
Bush fire				
Initiation of fire in the processing plant	Health and safety impacts to Proposal personnel	E	5	H
	Damage to DZP Site equipment	E	5	H
	Property damage and impacts on process	E	3	M
	Damage to adjoining properties and/or native vegetation	E	5	H
Bush fire in pasture, cropping and offset woodlands	See above			

Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.

Table 3.10 (Cont'd)
Risk Sources and Potential Environmental Impacts

Risk Source (s)	Potential Environmental Impacts	Likelihood of Occurrence if not Mitigated	Consequence of Occurrence if not Mitigated	Unmitigated Risk Rating*
Bush fire (Cont'd)				
Ignition of sulphur stockpile	Acute health impact from ingestion of SO_2	E	5	H
	Death of vegetation	E	3	M
Fire within Solvent Extraction Plant (large volumes of kerosene)	Air contamination	E	3	M
Socio-Economic Impacts				
Alteration of social activities or employment	Strain/drain on local skilled workforce	C	3	H
	Reduced unemployment and increased local spending	Positive impact (no risk rating)		
	Additional population for schools and community services	Positive impact (no risk rating)		
	Strain on local (Dubbo) housing and other community infrastructure and services	D	3	M
Perceived or real impacts on local amenity of neighbouring properties	Reduced property values	D	3	M
	Reduced amenity value of landholdings.	D	3	M
Resuming railway land	Loss of associated income	B	2	M
	Loss of biodiversity	B	2	M
Note: The mitigated or residual risk rating for all sources is presented in Section 6.2.				

The sources of potential environmental impacts nominated as having an associated high or very high risk are discussed within relevant subsections within Section 4. All other issues generally allocated a "medium" or "low" level of priority, have been addressed to the level considered appropriate throughout the *Environmental Impact Statement*.

3.5.3 Issue Prioritisation

Based on the issues identified and the risk ratings allocated to the potential environmental impacts of these, and a review of the issues considered 'key assessment requirements' of the DGRs, the following order of priority of environmental issues has been determined. This order of priority provides for the order of assessment in Section 4.

1. Noise.
2. Air Quality.
3. Radiation.
4. Surface Water/Erosion and Sedimentation.
5. Groundwater.
6. Biodiversity.
7. Aboriginal Heritage.
8. Non-Aboriginal Heritage
9. Visual Amenity.

10. Blasting.
11. Traffic.
12. Soil and Land Capability.
13. Hazards (including Waste Management, Land Contamination and Bush fire).
14. Socio-economic Climate (including Land Use).

It is noted that the inclusion of "Socio-economic Setting" at N^{o} 14 is not a direct consequence of the environmental risk analysis. Rather, it is included at N^{o} 14 to enable all other issues to be considered prior to the consideration of the socio-economic setting as this issue invariably is inter-related with many of the preceding issues. It is also noted that the issues associated with "Land Use" and "Land Contamination and Waste Management" are considered as part of the assessment of other issues such as water resources, soils, hazards and socio-economic setting.

The sources of potential environmental impacts nominated as having an associated high or extreme risk are discussed within relevant subsections within Section 4. All other issues generally allocated a "moderate" or "low" level of priority, have been addressed to the level considered appropriate throughout the EIS.

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