AUSTRALIAN ZIRCONIA LTD

(A wholly owned subsidiary of Alkane Resources Ltd)

ACN: 091 489 511

Dubbo Zirconia Project

Response to Submissions

State Significant Development Application SSD_5251

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

December 2013

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Dubbo Zirconia Project

Response to Submissions

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Appendix 1b Heritage Letter Report - Pipeline Realignment, Dubbo Zirconia Project, Toongi NSW (OzArk, 18 December 2013) A1b-1

Appendix 1c Dubbo City Council Feedback re Obley Road Improvement Impacts to Native Vegetation for the Dubbo Zirconia Project, Toongi NSW (OzArk, 19 December 2013) A1c-1

Appendix 2 Dubbo Zirconia Project Obley Road Alignment Investigation and Intersection Treatment Concept Design (Constructive Solutions, 19 December 2013) A2-1

Appendix 3 Response to Submissions – Dubbo Zirconia Project (EMGA Mitchell McLennan, 19 December 2013) A3-1

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LIST OF ABBREVIATIONS

ACHCRs	Aboriginal Cultural Heritage Consultation Requirements
ADG 7	Australian Dangerous Goods Code 7th Edition
AHD	Australian Height Datum
AQGIA	Air Quality and Greenhouse Gas Impact Assessment
ALARP	As Low As Reasonably Possible
AZL	Australian Zirconia Ltd
BASL	Biophysical Strategic Agricultural Land
BBAM	BioBanking Assessment Methodology
CAA	Controlled Activity Approval
CBA	Cost Benefit Analysis
CEP	Community Engagement Protocol (Tomingley Gold Mine)
CMA	Catchment Management Authority
CSPL	Constructive Solutions Pty Limited
DCC	Dubbo City Council
DEMC	District Emergency Management Committee
DGP	Diana Gibbs & Partners
DoE	Department of the Environment
DPI	Department of Primary Industries
DPI-CL	Department of Primary Industries – Crown Lands
DPI-Fisheries	Department of Primary Industries – NSW Fisheries
DPI-NOW	Department of Primary Industries – NSW Office of Water
DPI-OASFS	Department of Primary Industries – Office of Agricultural Sustainability & Food Security
DP&I	Department of Planning & Infrastructure

DRE	Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy
DZP	Dubbo Zirconia Project
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EES	Environmental Earth Sciences Pty Ltd
EIS	Environmental Impact Statement
EMM	EMGA Mitchell McLennan
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning & Assessment Act 1979*
ESD	Ecologically Sustainable Development
HDPE	High Density Poly Ethylene
ICNG	Interim Construction Noise Guideline
INP	Industrial Noise Policy
JRHC	JRHC Enterprises Pty Limited
LGA	Local Government Area
LRSF	Liquid Residue Storage Facility
MRWP	Macquarie River Water Pipeline
MSDS	Material Safety Data Sheet
Nb	Niobium
OzArk	OzArk Environment & Heritage Management Pty Limited
PAD	Potential Archaeological Deposit
PEL	Pacific Environment Limited
POEO Act	*Protection of the Environment Operations Act 1999*
RAP	Registered Aboriginal Party
RFS	Rural Fire Service
RING	Rail Infrastructure Noise Guideline
RMS	Roads and Maritime Services

RNP	Road Noise Policy
SEC	Salt Encapsulation Cell
SEEC	Strategic Environmental and Engineering Consultants
Sherpa	Sherpa Consulting Pty Ltd
SRSF	Solid Residue Storage Facility
TfNSW	Transport for NSW
TSCA	Taronga Conservation Society Australia
TSC Act	*Threatened Species Conservation Act 1995*
TZMI	TZ Minerals International Pty Ltd
VPA	Voluntary Planning Agreement
Zr	Zirconium

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1. INTRODUCTION

Following the public exhibition of an *Environmental Impact Statement* supporting an application made by Australian Zirconia Ltd (AZL) under Part 4, Division 4.1 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to develop and operate the Dubbo Zirconia Project (DZP), submissions were received from 13 local, NSW and commonwealth government agencies or authorities along with public submissions from 48 individuals and nine special interest groups. All submissions can be reviewed on the Major Project Register of the Department of Planning & Infrastructure (DP&I) at:

http://majorprojects.planning.nsw.gov.au/page/development-categories/mining--petroleum---extractive-industries/mining/?action=view_job&job_id=5251.

This document presents the requested "Response to Submissions" prepared by RWC on behalf of the Proponent. RWC has been assisted in preparing responses to issues raised by the following specialist consultants.

- Pacific Environment Limited (PEL) has provided assistance in addressing issues raised relating to the Air Emissions.
- EMGA Mitchell McLennan (EMM) has provided assistance in addressing issues raised relating to the Noise.
- Strategic Engineering & Environmental Consulting (SEEC) has provided assistance in addressing issues raised relating to the Surface Water Assessment.
- OzArk Environmental & Heritage Management Pty Ltd (OzArk) provided assistance in addressing issues raised relating to the Biodiversity and Cultural Heritage Assessments.
- Constructive Solutions Pty Limited (CSPL) has provided assistance in addressing issues related to the proposed design of the Obley Road and Toongi Road upgrades.
- Sherpa Consulting Pty Ltd (Sherpa) has provided assistance in addressing issues raised in relation to hazardous material management.
- Diana Gibbs & Partners (DGP) has provided assistance in addressing issues raised in relation to the socio-economic impact of the DZP.

Where a response has been prepared by one of these specialist consultants, it is either included as an appendix (with a summary provided in the main text) or prefaced as having been prepared by or prepared with the assistance of the relevant consultancy.

This document is structured as follows.

Section 1 Provides an introduction to the document and identifies the contributing authors.

Section 2 Provides information clarifying AZL's commitment to a comprehensive assessment of the rail transport option and provides further information on assessments currently underway, those proposed, a timetable for these and further information supporting the 'preferred' status of the rail transport option.

Section 3 Provides a summary of additional assessment completed to assess a minor realignment of the Macquarie River Water Pipeline, details of additional commitments towards the upgrade of Obley Road, additional noise monitoring and modelling results, and a transport hazard analysis.

Section 4 Provides a response to those government agency submissions received.

Section 5 Provides a response to the issues raised in the 48 individual and nine special interest group submissions.

Section 6 Provides an updated and final version of the Statement of Commitments originally included as Section 5 in the *Environmental Impact Statement*. Where the commitments have been amended, the amended text has been tracked and is underlined and in red.

Appendices provide the supplementary assessments, responses and additional information provided by the specialist consultants listed above.

This document was reviewed by a range of employees of the Proponent, namely, Messrs David Ian Chalmers (Alkane's Managing Director), Nicholas Earner (Alkane's Chief Operations Officer), Michael Sutherland (Alkane's General Manager NSW), Terry Ransted (Alkane's Chief Geologist), Tony Wright (Alkane's Commercial Manager) and Alex Ryan (Senior Consultant of TZ Minerals International Pty Ltd).

2. ASSESSMENT OF RAIL TRANSPORT FEASIBILITY

Throughout the EIS, it is noted that the preferred transport option of the Applicant would be a combination of rail (for the bulk reagents of Sulphur, Hydrochloric Acid, Caustic Soda and Soda Ash, as well as the DZP products) and road (for other reagents, materials and goods). However, acknowledging the operational, logistical and economic complexity of implementing the preferred rail/road transport option (summarised in *Section 2.12.1* of the EIS), and the fact that many of these issues cannot be fully resolved until certainty over project approval and operations is obtained, AZL has provided for initial operation utilising road transportation only. As stated in Section 2.12.1 of the EIS, AZL has committed to:

> "… *within five years of receiving development consent, complete a thorough and comprehensive review of the transport task to assess the feasibility of the rail option. This report would be provided to DP&I and other relevant stakeholders and a final decision made as to the incorporation of the rail option into the transport task provided at this time. In recognition of this, the EIS considers the impacts of the Proposal with and without operating Toongi-Dubbo Rail Line.*"

A number of submissions received raised scepticism, or requested clarification of the intent of the Applicant to follow-through on this commitment to reviewing and implementing the preferred rail transport option.

The following has been provided to clarify that AZL is fully committed to the review of the transport task and provide further detail as to the approach to this being taken.

Current Studies (Rail Transport Logistics Assessment)

AZL has commissioned Mr Sami Lambe of Sami Lambe & Associates to complete a detailed study of the reagent and product transport task. One of the main focus points will be the identification of logistical solutions to the rail transport of the bulk reagents from a single port of entry to Australia. This study will also involve liaison with the multiple stakeholders involved in sourcing, importing, storing, transferring to road/rail and the transporting of these reagents and products to and from the Toongi site. Consideration will also be given to the interaction with other stakeholders of the rail line and port. Mr Lambe has provided services to some of Australia's leading port operators (Patrick Container Ports and Patrick General Stevedoring and Bulk Ports), global mining and metals companies (Rio Tinto), Australia's largest publicly listed rail operator (Aurizon) and largest carrier of interstate rail freight (Pacific National Rail). The scope of services covered the introduction of automation technology, developing activity based pit-to-port cost models, due diligence studies and turnaround strategies.

Future Assessment

Assessment of Economic Considerations (Business Case Review)

Should the study currently being undertaken by Sami Lambe & Associates demonstrate that logistical solutions to the rail transport task can be achieved (and evidence to date is positive), AZL will then undertake a more detailed assessment of the economic factors likely to influence the feasibility of the rail transport option.

This assessment would consider the costs associated with the rail transport option, both capital (currently estimated at $20M) and operational, comparing these to the costs associated with the road transport option. Detailed design work would also be undertaken during this stage to ensure that cost calculations are accurate.

Assessment of Operational Considerations

The final assessment will consider the operational issues associated with the rail transport option. This will require consideration as to the final volumes of reagents required once a stable production rate is achieved. Consideration will be given as to whether the trains can be fully utilised based on operational requirements, or whether there are other operational considerations which may preclude the use of rail for one or more of the bulk reagents or products proposed for the rail transport task.

The above information will lead to a recalculation of operating costs, which will then be re-assessed versus to option of using road transport.

Timetable

1. The transport task logistics study is likely to be completed within the first quarter of 2014.
2. Under the assumption that solutions to the various logistical issues facing the rail transport task are available, the assessment of economic considerations (Business Case Review) would follow (immediately on receipt of development consent).
3. The final analyses to be completed would be a review of operating conditions once stable production is achieved. As illustrated by the mining schedule of ***Table 2.4*** (of *Section 2.4.4* of the EIS), mining of 800 00tpa is proposed in Year 2 and 900 000tpa in Year 3 (following a site establishment phase of 18 months to 2 years). On the basis of this production rate, by the completion of Year 3 (Year 5 following the issue of development consent) AZL will be in a position to consider the logistical, economic and operational issues associated with the rail and determine whether to proceed.

Advantages of Rail

While the capital investment in the rail transport option will be significant, with final costs to be confirmed through an assessment of capital costs and business case review noted above, AZL has identified several advantages to the use of rail which provide evidence to support the identification of rail as the 'preferred option'.

- Operating Cost. The annual cost of transporting the bulk reagents by rail would be lower and less subject to fluctuation in cost associated with changes in the diesel price. As a project for which a 20 year life has been applied for, but with significant mining reserves that allow potential extensions to the project life, reductions in annual operational costs provide great incentive to implementing the rail option.
- Operational Efficiency. The use of rail would allow for far greater quantities to be delivered at once and therefore allow for increased efficiency in the loading and

unloading of containers or materials. Rail deliveries would invariably be at the same times each week, providing the ability of the operator to plan personnel levels and other activities around these arrivals. Where increased efficiency in operations can be made, cost savings and improvements in safety standards and outcomes generally follow.

- Environmental Benefits. The use of rail wold have the obvious benefit of reducing the number of heavy vehicles using local roads and the State Highway network, thereby reducing noise emissions, air emissions, fauna fatalities. AZL wishes to be identified as a Company which aims to minimise impacts on the environment, an objective which is emphasised in the EIS by the considerable effort which has been applied to identifying, managing, mitigating and offsetting the impacts associated with the DZP.
- Social Investment. AZL acknowledges that it would be one of many stakeholders in the local and regional setting. AZL also acknowledges an intention to operate the DZP for at least 20 years and potentially many more. Establishing good will within the local and wider community, who generally speaking favour the reopening of the rail line over additional road transport, is therefore identified as a good investment.

3. ADDITIONAL INVESTIGATIONS

3.1 MINOR WATER PIPELINE REALIGNMENT

3.1.1 Proposed Modification

Following further discussion with the land owner of the "Mia Mia" property which fronts the Macquarie River, the proposed location of the pump site has been moved slightly south. A small deviation in the alignment of the pipeline has subsequently been proposed. **Figure 1** presents the proposed minor adjustment as a modified version of EIS ***Figure 2.3***.

3.1.2 Additional Investigations

On Thursday 12 December 2013, OzArk completed an inspection of the revised pump site location and minor deviation to the pipeline alignment to:

- survey for the occurrence of Aboriginal sites or artefacts; and
- document the vegetation which would be disturbed and compare to that considered in the Terrestrial Ecology Assessment which formed Part 6 of the Specialist consultant Studies Compendium accompanying the EIS.

Also completed on 12 December 2013, and in response to a request from the NSW Office of Environment and Heritage, additional field survey was conducted to meet the requirements of the BioBanking Assessment Methodology (BBAM) (DECC, 2008). Additional detail on the field survey completed is provided in the letter reports prepared by OzArk (OzArk, 2013c, d - see **Appendices 1a** and **1b**).

3.1.3 Results (Assessment of Impact)

3.1.3.1 Terrestrial Ecology

The field survey and additional investigations completed by OzArk confirm that the revised location of the pump site would not require any additional disturbance to that assessed in the EIS. OzArk also confirm that no areas within the Macquarie River Water Pipeline represent native vegetation community types or derived native grasslands. The pipeline is 100% located in cleared agricultural ploughed land dominated by an understory greater than 50% weeds (see **Appendix 1a**).

3.1.3.2 Aboriginal Heritage

No additional Aboriginal Sites or Potential Archaeological Deposits (PADs) were identified within the modified pipeline corridor of pump site (see **Appendix 1b**). It is noted that one additional artefact was identified adjacent to the previously recorded extent of Site MM-AS-01 and the extent of this site has therefore been extended. Notably, the proposed realignment of the pipeline avoids both the new artefact and Site MM-AS-01.

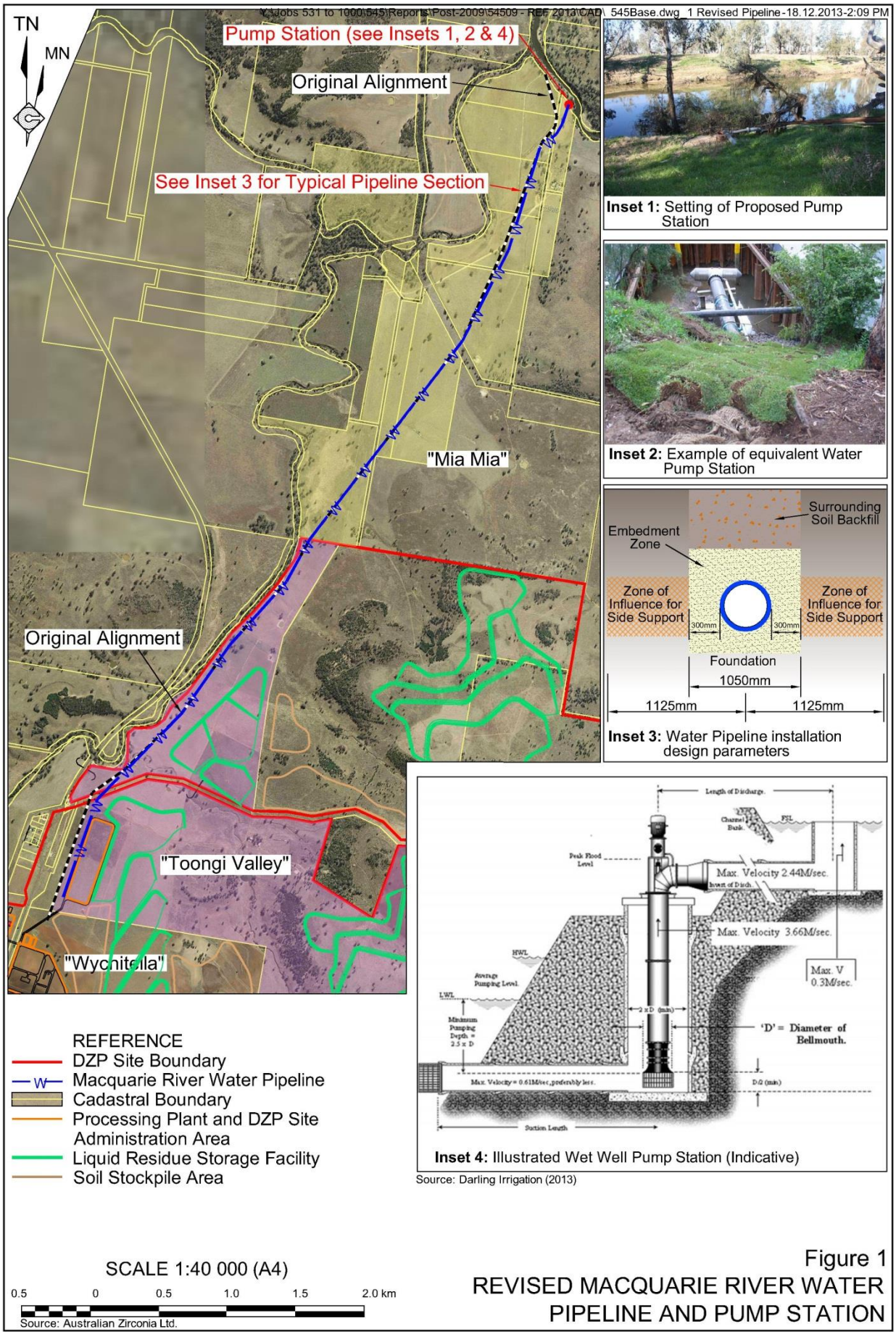

Figure 1
REVISED MACQUARIE RIVER WATER PIPELINE AND PUMP STATION

As no new sites were identified within the modified pipeline route alignment, this minor modification to the Macquarie River Water Pipeline alignment would not impact on Aboriginal heritage values.

3.2 OBLEY ROAD UPGRADE

The submissions of Dubbo City Council, Taronga Conservation Society Australia (TCSA) and a number of the public submissions either expressed concern over the suitability of Obley Road for the transport of reagents and products, or requested additional commitments from AZL with respect to the upgrade of the road. In response to these submissions, AZL commissioned Constructive Solutions (CSPL) to review several additional road upgrade options over and above those presented in the EIS.

CSPL generated a revised set of drawings identifying the modified treatments (see **Appendix 2**), as well as an analysis of the likely cost associated with each option. On the basis of the benefits likely from the implementation of these additional road upgrades (which also consider benefits associated with noise mitigation – refer to Section 3.3), AZL has incorporated the following additional commitments with respect to local road upgrades.

Commitment 14.4 Upgrade Obley Road to provide a 10m pavement seal (two 3.5m lanes + two 1.5m shoulders) over a 12m formation between the Newell Highway and Toongi Road.

Commitment 14.5 Provide for a 7.5m clear zone on all straight sections, and at least a 9m clear zone on the outside of all curves, of Obley Road between the Newell Highway and Toongi Road. Where the establishment of such a clear zone cannot be attained without impacting on important fauna habitat, e.g. breeding hollows, existing infrastructure, e.g. walkway / cycleway, or encroaching on freehold land, wire rope safety barriers would be installed 500mm from the outer edge of the pavement.

Commitment 14.6 Upgrade the intersection between Obley Road and the main visitor entrance to the Taronga Western Plains Zoo to provide an extended channelized right turn into the zoo.

Commitment 14.7 Upgrade the intersection between Obley Road and Toongi Road to provide channelized left turn deceleration lane, an auxiliary right turn acceleration lane on to Obley Road and channelized right turn from Obley Road into Toongi Road.

Commitment 14.8 Upgrade the crossings of Hyandra Creek, Twelve Mile Creek and Wambangalang Creek.

Commitment 14.9 Apply an asphaltic concrete seal to 2.4km section of Obley Road from the Newell Highway (200m beyond Zoofari Lodge / Dundullimal Homestead intersections) and 950m section of Obley Road from the Toongi Road intersection.

Commitment 14.10 Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible modification to pedestrian / cyclist access to Taronga Western Plains Zoo and implement if identified as reasonable, feasible and without creating subsequent drainage, amenity of other traffic hazard.

Commitment 14.11 Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible installation of lighting at entrances to the Taronga Western Plains Zoo subject to confirmation as to compliance with relevant standards and agreement of payment of operating costs.

Commitment 14.12 Upgrade Toongi Road to provide an 8.5m sealed pavement over a 10m formation.

The final statement of commitments (Section 6) incorporates these commitments, which are discussed further with respect to relevant submissions throughout the remainder of the document.

3.3 TRUCK PASSBY NOISE REVIEW

3.3.1 Introduction

While the Noise and Vibration Impact Assessment completed for the DZP by EMGA Mitchell McLennan (EMM, 2013) and included as Part 1 of the *Specialist Consultant Studies Compendium* was comprehensive and demonstrated compliance with various Industrial Noise Policy (INP) (EPA, 2000), Interim Construction Noise Guideline (ICNG) (DECCW, 2009), Road Noise Policy (RNP) (DECCW, 2011) and Rail Infrastructure Noise Guideline (RING) (EPA & DP&I, 2007), submissions from TCSA and Mr K. Riley (Submission No. 83192) requested further information of truck noise.

- TSCA raised some concerns over the impact of truck passby noise on sensitive areas of the zoo during night time periods, namely, the various breeding enclosures (approximately 65m from Obley Road) and the various accommodation facilities, headlined by the Zoofari Lodge (approximately 1.85km from Obley Road).
- Mr K Riley raised concern as to the potential noise impacts associated with trucks turning, stopping and accelerating at the intersection of Toongi and Obley Roads.

In order to provide assess these concerns, and identify possible additional mitigation measures, EMM was commissioned to completed additional noise monitoring, modelling and assessment. The following provides a summary of the letter report prepared by EMM (EMM, 2013b), which can be reviewed in full as **Appendix 3**.

3.3.2 Noise Monitoring

Operator-attended monitoring was completed on 29 November 2013 on the access road adjacent to the rhinoceros pens and Zoofari Lodge (refer to *Figure 1* of EMM, 2013b) to determine the maximum noise level (L_{max}) associated with truck passbys.

EMM (2013b) note that during the day, road traffic noise from Obley Road was inaudible, and during the night, the noise contribution from heavy vehicles on Obley Road was insignificant compared to that of the Newell Highway. The L_{max} associated with a truck passby was quantified during the day period at the Rhinoceros breeding pens (R1) as 73dB(A) (at 65m) and was associated with the trailer banging over an uneven section of road.

3.3.3 Assessment of Impact

Assessment Locations

The results of the noise monitoring were used by EMM (2013b) to conduct predictive modelling of road traffic noise, based on proposed heavy vehicle traffic associated with the DZP, on the following receivers.

- R1: Rhinoceros breeding pens – 65m.
- R2: Zoofari Lodge – 1 200m
- R3: Residence of Mr K. Riley (Receiver R22 of EIS *Figure 4.6*) – 160m.

Road Traffic Noise (L_{eq})

EMM (2013b) confirms that the $L_{eq(1\text{-}hr)}$ noise level that would be received at R3 complies with both the daytime (60dB) and night time (55dB) road traffic noise criteria for freeway/arterial/sub-arterial road type nominated by the RNP.

Road traffic noise is not expected to be a contributing factor to the noise environment at the Zoofari Lodge (R2) as traffic noise on Obley Road was inaudible (Newell Highway traffic was just discernable).

Truck Passby Noise Levels (L_{max})

Considering the maximum truck passby noise level recorded at R1 (73dB)[1], and the relative distances of the receivers to Obley Road, EMM (2013b) predicted the following L_{max} noise levels.

- R1 (TWPZ): 70dB(A).
- Zoofari Lodge (TWPZ): <55dB(A) (inaudible).
- R3: 65dB(A).

[1] It is noted that the predicted noise levels assume no road improvements which would almost certainly reduce the frequency and scale of the impact noise generating the L_{max} noise event.

The *RTA Environmental Noise Management Manual* (RTA, 2001) provides guidance on the assessment of maximum noise levels on sleep disturbance from road traffic noise. The Manual notes that the maximum noise assessment should be "*used as a tool to help priories and rank mitigation strategies, but should not be applied as a decisive criterion in itself*". Additional guidance on maximum noise levels and sleep disturbance is listed in the RNP (EPA, 2011) which states:

- *maximum internal noise levels below 50 to 55 dB(A) are unlikely to wake sleeping occupants; and*
- *one or two noise events per night, with maximum internal noise levels of 65-70 dB(A), are not likely to affect the health and well being of occupant's significantly.*

EMM (2013b) also note that it is commonly accepted by acoustic practitioners and regulatory bodies that a partially open window would reduce external noise levels by 10dB(A). Therefore, external noise levels in the order of 60 to 65dB(A), calculated at the facade of a residence, are unlikely to cause sleep disturbance affects, i.e. with windows open.

The modelled noise levels identify that the rhinoceros pens would experience L_{max} noise levels above 65dB(A). It is noted, however, this criteria is designed for humans and has only been adopted as a guide for the breeding pens in the absence of alternative criteria. It is also acknowledged that the rhinoceros are not situated within a building and therefore any correction for facade transmission does not apply.

Based on the criteria noted above, the Zoofari Lodge and the residence of Mr Riley are expected to be at or below 65dB(A) (L_{max}). This notwithstanding, AZL has made various additional noise mitigating commitments that would further reduce the L_{max} noise levels received.

3.3.4 Noise Mitigation

The following noise mitigation, and associated reduction in L_{max} noise levels would be implemented by AZL.

Road Surface Upgrade

In addition to standard road pavement treatments to provide for a 20 year life for the entire Obley Road, AZL would apply an asphaltic concrete seal ('hot seal') to:

- a 2.4km section of Obley Road between the Newell Highway and approximately 200m south of the Zoofari Lodge entrance; and
- 950m section of Obley Road from the Toongi Road intersection.

RTA (2001) notes that this treatment of the road surface would likely reduce truck passby noise by at least 5dB(A).

Vehicle Selection and Testing

AZL would ensure, through contractual arrangements with transport operators, that the trucks used achieve sound power levels specified in Australian Design Rule (ADR) 28/01 External Noise of Motor Vehicles.

Building Construction

Installation of an air conditioning system at residential receivers would be effective in facilitating further noise reductions for the interior of the residence (as this would allow for windows to be kept closed).

Other Mitigation Options

Speed Limits

Reference to RTA (2001) indicates that a reduction in the speed of travel from 100km/hr to 80km/hr would further reduce truck passby noise by 4dB. AZL will continue to liaise with Dubbo City Council, TCSA and other relevant stakeholders regarding the possible reduction in the speed limit along this stretch of road.

Noise Barrier

EMM (2013b) calculate that the construction of a noise barrier (up to 3m high) adjacent to the breeding pens would reduce the L_{max} noise level by up to 11dB. If further noise level reduction is demonstrated as a requirement by TCSA, AZL would provide for the construction of such a barrier.

3.3.5 Conclusion

Considering the existing noise environment and the additional mitigation measures proposed by AZL aimed at reducing the L_{max} of truck passbys, the maximum noise levels received at the sensitive receivers nominated would be as follows.

- Breeding Pens: 65dB(A). The L_{max} noise received could be reduced further (<55dB(A)) if a 3m noise barrier is constructed.
- Zoofari Lodge (TWPZ): not audible.
- Residence of K. Riley: 60dB(A). The L_{max} noise received could be reduced further (45dB(A)) if features such as air conditioning is provided allowing for windows to be closed at night.

These noise levels are below internal noise levels likely to cause sleep disturbance (60 to 65dB(A)).

3.4 TRANSPORT HAZARD ANALYSIS

3.4.1 Introduction and Scope

Following the completion of risk screening in accordance with State Environmental Planning Policy 33 – Hazardous and Offensive Development (SEPP 33), the DZP was found to be 'potentially hazardous' and a Preliminary Hazard Analysis (PHA) was therefore prepared and included in the EIS (Sherpa, 2013). As supply arrangements for the reagents to be transported to the DZP Site remained to be confirmed, a transport route selection study in accordance with the Hazardous Industry Planning Advisory Paper (HIPAP) 11 – Route Selection (DoP, 2011) was not included.

While the supply arrangements remain to be confirmed, AZL has now indicated that transport of reagents by road to the DZP Site would be undertaken for the initial few years of operations (see Section 2). Given all reagents are to be transported via Obley and Toongi Roads, and in response to submissions from Dubbo City Council and Taronga Conservation Society Australia (TCSA) requesting further information on potential hazards and management, AZL commissioned Sherpa to review the transport risk screening of SEPP 33 and prepare a transport hazard analysis in order to:

- summarise the hazards and the potential hazardous incidents during transport and the safeguards associated with preventing incidents during transport;
- identify whether there are any factors that are likely to preclude the proposed transport route taking into account the following factors from HIPAP 11; and
- provide recommendations as required.

It is noted that the transport hazard analysis completed by Sherpa (2013b) (see **Appendix 4**) has been completed to demonstrate that the relevant risks have been identified and that there are reasonable management measures available to enable the transport of the dangerous goods. It is noted that prior to the transport of any dangerous good, the transporter must prepare a detailed route specific transport risk assessment for each reagent to meet licensing requirements under the Australian Dangerous Goods Code (ADG) (NTC, 2011). This will be undertaken by the transporter for each reagent once supplier agreements are in place.

3.4.2 SEPP 33 Risk Screening

Table 1 summarises the updated SEPP 33 screening assessment. Both ammonia and Class 8 (corrosive) materials exceed the SEPP 33 transport screening thresholds hence need to be considered in the transport hazard analysis.

Table 1
SEPP 33 Risk Screening

Reagent	Traffic Generation		Annual Delivery (t)	DG Class	Threshold (vehicle movements)		Threshold Exceeded?
	Annual	Peak Weekly			Annual	Peak Weekly	
All Class 8 (HCl & NaOH)	3795	79	91 000	8 PG II	500	30	Yes
Anhydrous Ammonia	326	7	9 796	2.3	100	6	Yes
Source: Modified after Sherpa (2013b) – Table 2.1							

3.4.3 Hazard Identification and Management

Sherpa (2013b) provides a review of the hazards associated with anhydrous ammonia, caustic solution (NaOH) and hydrochloric acid (HCl). The event of most concern during transport would be the spillage or leakage as a result of:

- spontaneous failures due to mechanical faults, corrosion;
- loss of control of vehicle and impact on roadside obstacle; or
- impact events such as a vehicle accident.

Table 2 presents the primary hazard types, potential consequences and preventative / protection measures available to manage these.

3.4.4 Route Selection Factors

Sherpa (2013b) consider the factors of HIPAP 11 that influence routing decisions for dangerous goods as a method of confirming that the routes from major supply sources, e.g. Newcastle or Sydney, and between the Newell Highway and the DZP Site, Obley and Toongi Roads, do not preclude the transport of the nominated reagents. In all cases, and subject to the mandatory completion of transport route risk analyses for each reagent and route (by transporter) and preparation of Emergency Response Systems, Sherpa (2013b) confirm that there are no factors that would preclude the use of the proposed route (see **Appendix 4**).

3.4.5 Further Assessment (Transporter Route Risk Analysis)

As noted previously, on identification of reagent source and selection of each transport contractor, a Route Risk Analysis would be completed in accordance with the following documents;

- AS/NZS 4360:2004 Risk Management Standard (now superseded by AS31000); and
- Australian Code for the Transport of Dangerous Goods by Road and Rail.

Table 2
Hazard Identification and Management

Transport Activity	Hazard Type	Consequences	Prevention / Protection Measures
Road tanker transport (DG Class 8) - HCl (33 wt%) - NaOH (50%)	Corrosive irritant fumes	• Spillage and pooling of HCl and evolution of irritant fumes (in immediate area of spill). • Pollution of waterways due to low pH acid or high pH caustic (no persistent pollutant effect).	• Tanker/vehicle design standards as per the ADG (AS 2809). Thin walled tanker, puncture may occur in a vehicle accident. • Excess flow valves on tanker Driver training and ADG licensing. • Route specific risk assessment as part of transporter compliance with the ADG. • Driver emergency response procedures
Road tanker transport Anhydrous ammonia (DG Class 2.3)	Toxic gas	• Evolution of toxic fumes (effect area many hundreds of metres).	• Tanker/vehicle design standards as per the ADG (AS2809). Ammonia tankers have thick walls as they are pressure vessel – difficult to puncture, very unlikely unless a high energy impact (such a train impact or tanker rollover). • Excess flow valves on tanker Driver training and ADG licensing. • Route specific risk assessment as part of transporter compliance with the ADG. • Driver emergency response procedures.
Source: Modified after Sherpa (2013b) – Table 3.2			

Following from recommendations provided by Sherpa (2013b), AZL would require that each transporter, in completing the Route Risk Analysis, provides for:

1. the identification of specific environmentally sensitive locations;
2. consultation regarding emergency response in vicinity of sensitive location occurs between operator, transporter and the district emergency management committee and Taronga Western Plains Zoo (TWPZ); and
3. emergency response requirements for TWPZ specific to an ammonia leak including the identification of a safe emergency assembly area.

3.4.6 Conclusion

Following an updated SEPP 33 Risk Screening, identification of potential hazards and management, and consideration of the ADG and HIPAP 11, Sherpa (2013b) conclude that there are no factors associated with the goods to be transported, or routes to be used, that would preclude the transport as proposed for the DZP.

4. GOVERNMENT AGENCY SUBMISSIONS

4.1 INTRODUCTION

The following subsections present a summary of the issues raised by each of the 13 government agencies and authorities (including Taronga Conservation Society Australia) which provided a submission on the DZP.

In each case, the relevant issues have be categorised to reflect the subject area on which additional information is requested, with the specific request(s) for information paraphrased and provide in *italics*. A response to each issue raised is presented (in normal text). Where one of the specialist consultants identified in Section 1 has provided the relevant response, reference to this consultancy is made. Where text has been drawn directly from the *Environmental Impact Statement*, it is identified in *underlined italics*.

A separate subsection (Section 4.12) considers the consent conditions recommended by the government agencies separately.

4.2 DUBBO CITY COUNCIL

4.2.1 Introduction

Dubbo City Council (DCC) provided a submission to the DP&I (dated 15 November 2013) confirming the DCC is "very supportive of this project". Dubbo City Council does, however, identify specific issues related to the following subject areas where further information or clarification is requested so as to "minimise any potential impacts on the Dubbo community".

- Infrastructure (see Section 2.2.2).
- Open Space and Recreation (see Section 2.2.3).
- Flora and Fauna (Biodiversity Offsets) (see Section 2.2.4).
- Bushfire Management (see Section 2.2.5).
- Voluntary Planning Agreement (see Section 2.2.6)

4.2.2 Infrastructure

4.2.2.1 Toongi-Dubbo Rail Line

Dubbo City Council Wrote:

1. *Council is overwhelmingly supportive of the proposal by Australian Zirconia Ltd (AZL) to reopen the Dubbo-Molong railway line between Dubbo and Toongi for the transport of the estimated 400,000 tonnes per annum of reagents and product. The re-opening of the line should be a priority and be conditioned to include/address the following:*

a) Vehicular level crossings at Wingewarra Street, Cobra Street (Mitchell Highway), Boundary Road and Macquarie Street to be controlled by flashing lights, bells and boom gates.

b) Vehicular level crossings on the Obley Road at Cumboogle and Hyandra Creek to be controlled by flashing lights and bells (as a minimum). The road pavement at each crossing to be reconstructed to a suitable horizontal and vertical alignment as part of any reopening of same.

c) A suitable level crossing to be provided at the Dundullimal Historic Homestead tourist attraction (private crossing) just outside of Dubbo on the southern side of the Macquarie River bridge crossing.

d) A suitable Stop Sign controlled crossing to be provided at the Bellevue Road (public road) level crossing.

e) Whilst the majority of former level crossings can generally be reinstated at a similar vertical elevation to their original, the rail crossing at Macquarie Street in Dubbo will need to match current, developed road levels approximately one metre lower than what existed in 1980 when nearby lands were still rural in nature.

Council has two trial longitudinal sections available demonstrating how the track can be regraded on both sides of the level crossing and will expect the track to be reconstructed accordingly. Option 1 has maximum track grades of 1%, no vertical curves and requires approximately 1,400 metres of track to be lowered; Option 2 has some grades in excess of 1%, vertical curves and requires 1,100 metres of track to be lowered.

f) The proponent will be expected to consult effectively with residents in the vicinity of the railway line who have not experienced a train using the track for nearly 30 years. This will be most important in the Margaret Crescent area of South Dubbo.

g) Fencing of the railway permanently will be an emotive issue for some community members, especially in the Margaret Crescent area where walking tracks have been established through regular usage by local residents. These walking tracks have been formalised by Council within the last 12 months as shared use pedestrian/cycling paths. The proponent and the Rail Infrastructure Corporation should be required to consult effectively with the local community on this issue.

h) Council is aware that major signalling upgrades with an estimated cost in the millions of dollars will be required in and around the 'Railway Triangle' in East Dubbo. Council expects these deficiencies to be addressed and overcome as part of the rail line recommissioning process.

Unacceptable delays are already experienced by motorists in Dubbo because of the non-automation of the existing system where trains transit from west to north via the Triangle, and this will be complicated further by trains having to transit from north to south and vice versa through the Triangle to access Toongi.

The level crossing at Cobra Street is less than one train length south of the Triangle and if trains are forced to stop there by inadequate signalling equipment, then the Mitchell Highway will be cut on a regular basis which is unacceptable to Council and presumably Roads and Maritime Services (RMS).

Response

Section 2.2.4 of the EIS provides the proposed minimum design standards which would be applied with respect to the rail line, rail bridges, level crossings and signalling interface. While noting that further design work would be undertaken concurrently with further assessment of economic considerations (refer to Section 2), the following reference to the recommendations and comments of DCC (a. to h.) are as follows.

a) AZL has nominated this standard for these crossings in *Section 2.2.4.4* of the EIS.

b) AZL has nominated this standard for these crossings in *Section 2.2.4.4* of the EIS. Road pavement reconstruction has been confirmed in *Section 2.2.5.2* of the EIS.

c) AZL agrees to the DCC request for a suitable level crossing to be provided at the Dundullimal Historic Homestead tourist attraction. A level crossing which provides guard rails and running rails secured within concrete along with flashing lights and warning bells is considered appropriate.

d) AZL agrees to the request for a Stop Sign controlled crossing to be provided at the Bellevue Road (public road) level crossing.

e) AZL agrees to the request of DCC regarding the regrading of the rail line at the Macquarie Street crossing. The proposed design of the track on approach to the level crossing would be designed and discussed in consultation with DCC following the issue of development consent as part of the proposed assessment of economic considerations nominated in Section 2.

f) AZL has engaged with the local community, including the residents of Margaret Crescent, through newsletters, community meetings and a general open door policy to enquiries. This notwithstanding, AZL confirms that effective consultation with the residents of Margaret Crescent is important.

g) AZL has identified in the EIS (Section 4.15.3) that it would consult with residents as to achieving reasonable expectations with respect to local amenity, e.g. fencing or no fencing of the rail easement along Margaret Crescent.

h) *Section 2.2.4.5* of the EIS illustrates the intent of AZL to upgrade the signalling and interface connecting the Toongi-Dubbo Rail Line ('the branch line') to the Main Western Rail Line ('the main line') at Dubbo East Junction. This will ensure that the closure of the Cobra Street level crossing is limited to 4 minutes, an assessment of which is provided in *Section 4.12.5.7* of the EIS. It is noted that Transport for NSW (TfNSW) has suggested the worst-case queue length associated with this may be acceptable (refer to Section 4.8 for a response).

4.2.2.2 Local Roads

Dubbo City Council Wrote:

2. *Unfortunately, various comments within the Environmental Impact Statement (EIS) do not give Council confidence that the Rail line will be re-opened (and/or vigorously pursued by the proponent) which would then place all transport to be 'on-road' (in particular from Council's perspective onto the Obley Road - a Council-owned and maintained road).*

   In the absence of specific confirmation from the proponent regarding Option A - (Rail to Toongi), it is considered that likely condition(s) will need to be formulated around Obley Road being required to carryall of the transportation requirements for the DZP.

   a) *The EIS is unclear with regard to the total daily truck numbers (and truck movements) associated with Options B and C - Transportation to the site by road.*

      Throughout the reports, a Table of 'Daily Truck Movements/Numbers' is shown…However, it is not known how this figure of 158 was arrived at. This issue requires further clarification and justification….

   b) *Option B - Rail (to Dubbo)/Road. It is distinctly likely that B-doubles will be utilised in transportation of reagents to the DZP Site. The issue (number/consequence) of B doubles being utilised needs to be addressed further in the EIS.*

   c) *Whilst it would appear on face-value that substantial work (by the consultants) has been undertaken on the required Obley Road upgrades…it would appear that more 'fine detail' of these works will be required. This was acknowledged by the proponent at a community meeting on 23 October 2013.*

   d) *Clarification/details of the content to be contained within the proposed Voluntary Planning Agreement (VPA) - (in particular, the likely dollar contribution amount towards the ongoing maintenance of Obley Road over and above the physical upgrade of this road) is required before Council can give further consideration to this matter.*

   e) *"Implementation of a Construction Traffic Management Plan", would need to be fully endorsed (and approved) by Council….*

   f) *Additional details (numbers and impact(s)) are also required regarding the transportation of reagent and other products to the DZP via roads currently not listed in the EIS (plus supporting consultancy studies), for example, transportation of reagents etc. from Newcastle (via the Golden Highway) or from Sydney (via the Mitchell Highway) or from the west via the Mitchell Highway. Impacts of these additional heavy vehicles (number, size and movement of hazardous goods through town etc.) must be considered.*

   g) *It is highly unlikely that neither Council nor Roads and Maritime Services will support recommendations 4.2.1 and 4.2.2 contained within Part 11: Traffic Impact Assessment (Specialist Consultant Studies) for the 60km/hr*

speed zone along the Newell Highway to be relocated south of the Obley Road intersection and south of the Dundullimal Homestead access roadway.

h) Part 11: Traffic Impact Assessment (Specialist Consultant Studies),… highlighted/recommended that a 'Code of Conduct' be developed for the DZP. This issue is endorsed by Council however, should also extend to all staff (ie all employees) not just the 'contractors/drivers of heavy vehicles'.

Response

Section 2 of this document provides further discussion on the intent of AZL to 'vigorously pursue' the rail option.

Responses to each of the recommendations or requests for further information (a) to (h) are provided as follows.

a) The daily truck numbers used for both Options B and C were compiled following a detailed review of the volumes of the various reagents, fuels and other materials required, container type required to deliver these, and appropriate vehicle arrangement, i.e. B-Double or B-Single.

   The truck numbers presented in ***Table 2.16*** of the EIS, on which the various assessments of traffic, noise and air emissions are based, represent daily averages and there is likely to be some fluctuation from day to day. It is worthy of note, however, that should AZL adopt higher mass limit[2] vehicles, the number of vehicle movements required would be reduced as each truck movement would be capable of carrying up to an additional 3t for 19m B-Doubles and 5.5t for 25/26m B-Doubles. AZL understands that adoption of HML vehicles requires approval of a HML route and various other requirements.

b) B-Doubles would be used for the bulk and other reagents transported from source to the DZP Site by road only. Due to restrictions on loading of B-Doubles at the Fletcher International Exports Rail Terminal, B-Singles would have to be utilised resulting in the higher average daily truck numbers for Option B.

c) DCC's assessment of the level of detail completed on Obley Road upgrade requirements is accurate. The level of detail included in the EIS reflects that required to identify upgrade requirements and concepts for road upgrades. This is considered more than sufficient to enable assessment of the potential impact of the DZP on the roads, traffic conditions and associated environmental factors. Detailed design work, including further geotechnical pavement assessment, water course crossing design and pavement design will be completed following receipt of development consent.

[2] Since July 2006 Higher Mass Limits (HML) have been available in New South Wales on certain roads for certain vehicles. HML allows those vehicles eligible to operate at increased mass limits compared to statutory limits (RMS, 2010).

d) AZL considers that a VPA and/or mining rates would be structured around the likely maintenance costs associated with the additional traffic on Obley Road. A more detailed discussion on this issue is provided in Section 4.2.6.

e) AZL accepts that a Construction Traffic Management Plan will need to be endorsed (and approved) by DCC.

f) On review of the likely sources of the bulk reagents (noting that there could be some variation to this following finalisation of the transport task) the following average daily truck movements are expected on the Golden Highway (ex-Newcastle), Mitchell Highway (ex-Geurie, Sydney), Newell Highway (from Mitchell & Golden Highways) and Newell Highway (ex-Victoria).

- Golden Highway: 76.
- Mitchell Highway: 46.
- Newell Highway (via Golden & Mitchell Highways): 122.
- Newell Highway (ex-Victoria): 16.

Noting that each of the three highways are gazetted Restricted Access Vehicle (RAV) routes for B-Doubles, the proportional increase that the DZP heavy vehicle traffic would make to each of these highways (see **Table 3**) is considered minor.

Table 3
Traffic on State Highways (Dubbo)

Location	Baseline Traffic	DZP Heavy Vehicle Movements	%
Golden Hwy - Talbragar Bridge	1,367	76	5.6%
Newell Hwy - 1.5km south of Mitchell Hwy	6,070	122	2.0%
Newell Hwy - south of Mitchell Hwy	21,631	122	0.6%
Mitchell Hwy - Apex Oval	21,088	42	0.2%
Mitchell Hwy - West of Sheraton Rd	10,532	42	0.4%

It is also worthy of note that at AZL's 11 September 2012 meeting with TfNSW, Mr Christopher O'Brien, General Manager Freight Strategy, Policy and Industry Relations Freight and Regional Development Division, was commented that the volume of freight to be transported on the State Highway network was very small and impact on the network would be insignificant.

Given the potential for high traffic density over the LH Ford Bridge on the Mitchell Highway, and through Dubbo on the Mitchell Highway (Cobra Street) more generally, heavy vehicles travelling from Geurie and Sydney may use Wheelers Lane (a gazetted B-Double and Road Train Route) to travel to the east of Dubbo, joining the Golden Highway crossing the Macquarie River (of the Newell Highway) over the Emile Serisier Bridge. This would reduce the pressure on traffic flows at this bottleneck within Dubbo.

The reagents and other materials to be transported to the DZP Site would all be undertaken using road registered vehicles licensed appropriately under the *Australian Code for the Transport of Dangerous Goods by Road And Rail 7th Edition* (ADG 7) (NTC, 2011). Transport would be restricted to the gazetted RAV routes through Dubbo on which vehicles carrying dangerous goods already travel. In accordance with ADG 7, DCC would be informed of the transport routes, volumes and materials to be transported prior to utilisation of these routes. Furthermore, AZL has already engaged with the District Emergency Management Committee (DEMC) regarding the transport of dangerous goods on roads with the Dubbo City LGA. Once the routes, volumes and materials of the transport task are confirmed, discussions with the DEMC will be undertaken again with the possibility of specific contingency and incident management training being developed.

Further to the above, a Transport Route Selection Study would be completed following confirmation of the specific details of the transport task, either by AZL or more likely the company responsible for transporting the reagent. This notwithstanding, a Transport Hazard Analysis has now been completed by Sherpa Consulting Pty Ltd (Sherpa, 2013b) (see **Appendix 4**) illustrating that any risks associated with the transport of materials are known and can be appropriately managed.

g) CSPL, AZL and Taronga Conservation Society Australia all believe the recommendation to reduce the speed limit between the Newell Highway and Camp Road south of the Dundullimal Homestead has merit, however, acknowledges that the road authority has control over such decisions. This notwithstanding, and in order to reduce the risk of traffic incident along this section of road as well as minimise truck pass-by noise, AZL commits to enforcing a reduced speed limit on heavy vehicles travelling to and from the DZP Site for this section of road. It is noted that through appropriate road design, road maintenance and driver behaviour the risk of traffic incident along this section of road would be minimised.

h) AZL agrees to enforce a driver code of conduct on all DZP personnel travelling to and from the DZP Site (see **Commitment 14.2**).

4.2.2.3 Other Matters

Dubbo City Council Wrote:

3. Other matters to be included/noted are provided in bold below:

a) Page ES-3. …

- *A Section 138 Permit, issued by the Dubbo City Council under the Roads Act 1993, for all works affecting classified roads, namely Obley Road, Toongi Road* ***and Benolong Road (plus any other public roads)****…*

b) *Level Crossings at Boundary Road (Dubbo) and Macquarie Street (Dubbo). One lane each way, single track* ***with a formed pedestrian path crossing.***

c) *Page 2-22 and 2-23 …, as per previous advice…****Macquarie Street is not to be 'raised in elevation'****. Also, central islands and light posts plus pedestrian crib fencing, formed pedestrian paths with 'Red Man' warning lights and sirens etc to be installed at all four Dubbo crossings (this includes Boundary Road and Macquarie Street).*

d) *Cumboogle Road/****Belmont Road****.*

e) *Page 2-26 (plus other pages within the EIS). First dot point*

- *The pavement seal (Obley Road) would be increased to* ***10 metres*** *for the entire length of the road (except where* ***existing*** *bridge crossings prevent this).*

  Council's letter to the NSW Department of Planning and Infrastructure,… requested Obley Road to be reconstructed as a 10 metre seal, on a 12 metre formation … Council maintains its request for a 10 metre seal on a 12 metre formation … Having regards to the aspect that Obley Road is extensively utilised by cyclists, is a school bus route and also acts as a scenic/tourist drive route (Molong-Cumnock-Yeoval Dubbo), it is considered that a 10 metre seal (on a 12 metre formation) is required.

f) *Page 2-26. Fifth dot point.*

- *Five 2,400mm x 1,500mm box culverts would replace the 450mm reinforced* ***concrete*** *pipe at the Twelve Mile Creek crossing.*

g) *Page 2-27 … In accordance with the recommended minimum road standard recommended by RMS, Toongi Road would be widened between Obley Road and the DZP site entrance to provide for two sealed lanes at least* ***four (4) metres wide (total of eight (8) metres sealed width) including the Wambangalang Creek crossing.*** *This would eliminate the need for traffic to move onto the unsealed shoulder to accommodate oncoming traffic.*

In relation to this issue, it is stressed that Toongi Road is to be upgraded by and at full cost to the Applicant/Developer.

h) *Page 2-88 (Contingency Option B - Rail (to Dubbo)/Road (to Toongi)…*

- *Left on Boothenba Road before crossing the* ***Coonamble*** *Rail Line at a signalled level crossing…*

i) *Obley Road Daily Truck Movements. Limestone from Geurie/Parkes. Are they shown in Table 2.16.*

j) *Section 2.12.3.1… The description of rail transportation therefore focuses on* ***Option A*** *using the upgraded Toongi-Dubbo Rail Line.*

k) Section 2.16.2 Public Safety. The Molong Branch Line from Dubbo East Junction is currently unfenced and used by local residents for recreational pursuits such as dog walking, jogging ***and cycling****.*

l) Section 4.10.3

- *The Obley Road Alignment: approximately 22 kilometre long* ***and 27 metre wide*** *corridor for the proposed realignment of portions of Obley Road between the DZP site and Dubbo. (The 27 metre corridor would refer to inclusion of the 'clear zone.')*

m) There are three major creek crossings on Obley Road.

- *Hyandra Creek:…****steel*** *and concrete bridge…*
- *Cumboogle Creek: a* ***steel*** *and concrete bridge structure…*

n) Obley Road forms part of the Western Plains Tourist Circuit, is currently used by cyclists (including for annual events) and there is a shared pedestrian/cycleway from the Newell Highway to the ***Dundullimal Historic Homestead tourist attraction.***

o) Consultation with the Local Emergency Management Committee (LEMC) in relation to Traffic Incident/Potential Incident(s) etc. will need to be undertaken as part of the required 'Transport Route Selection Study' and should be identified as such.

The 'Transport Hazard' (Transport Route Selection Study) should be addressed as part of this EIS.

p) It is considered that an education program for Staff on 'Fatigue Management' should be addressed as part of the 'Achieve safe and efficient transport operations'….

q) Trained Fire Fighter(s) (staff) including Fire Fighting Equipment should be addressed.

r) Closure of the unformed section of Toongi Road prior to commencement of operations of the Extractive Industry is required.

s) … Part 11 Traffic Impact Assessment … both the Wingewarra Street Rail Crossing and Boundary Road Rail Crossing. The crossings are located within a ***50km/hr*** *speed zone.*

Response

Responses to each of the recommendations or requests for further information (a) to (s) are provided as follows.

a) Noted – no further comment.

b) Noted – no further comment.

c) The error in the EIS is noted. AZL agrees to the request of DCC regarding the regrading of the rail line at the Macquarie Street crossing. The proposed design of the track on approach to the level crossing would be designed and discussed in consultation with DCC following the issue of development consent as part of the proposed assessment of economic considerations nominated in Section 2.

d) Noted – no further comment.

e) AZL agrees to the request from DCC and commits to upgrading Obley Road to provide a 10m pavement over a 12m formation (see **Commitment 14.4**). **Appendix 2** provides the revised concept plans for Obley Road identifying the road alignment and nominated clear zones (refer to (l) below).

f) Noted – no further comment.

g) Noted and agreed.

h) Noted – no further comment.

i) Yes, the truck movements required to transport limestone to the DZP Site are accounted for in ***Table 2.16*** of the EIS.

j) Noted – no further comment.

k) Noted – no further comment.

l) AZL does not agree with DCC's reference to the Obley Road alignment having a width of 27m (pavement shoulder and clear zone) over the entire length between Toongi Road and the Newell Highway. This provides for a 10m clear zone either side of the road edge line for the entire length.

While DCC reference *Part 6* of the *Guide to Road Design* (Austroads, 2010) as the standard for road construction, further review of the relevant section of Austroads (2010) indicates that the blanket application of a 10m vegetation clear zone is not the intent of the guideline.

With reference to *Table 4.1* of Austroads (2010) (reproduced on the following page), the recommended clear zone reflects the speed zone, average traffic volume and slope of the fill or cut batter on either side of the road.

While a clear zone of 10m (or more) between the Taronga Western Plains Zoo where average traffic volumes exceed 3 000vpd is considered reasonable, the average daily traffic volume on the remainder of Obley Road is less than 1 500vpd. Noting that the road would be constructed almost certainly with fill batters with a slope of '6:1 to flat', *Table 4.1* of Austroads (2009) suggests a clear zone of 7.5m along straight sections of road.

Table 4.1 (of Austroads, 2010)
Clear zone distances from edge of through travelled way

Design speed (km/h)	Design ADT	Clear zone width (m)					
		Fill batter			Cut batter		
		6:1 to flat	4:1 to 5:1	3:1 and steeper[2]	6:1 to flat	4:1 to 5:1	3:1 and steeper[2]
≤ 60	< 750	3.0	3.0	[2]	3.0	3.0	3.0
	750 – 1500	3.5	4.5	[2]	3.5	3.5	3.5
	1501 – 6000	4.5	5.0	[2]	4.5	4.5	4.5
	> 6000	5.0	5.5	[2]	5.0	5.0	5.0
70 – 80	< 750	3.5	4.5	[2]	3.5	3.0	3.0
	750 – 1500	5.0	6.0	[2]	5.0	4.5	3.5
	1501 – 6000	5.5	8.0	[2]	5.5	5.0	4.5
	> 6000	6.5	8.5	[2]	6.5	6.0	5.0
90	< 750	4.5	5.5	[2]	3.5	3.5	3.0
	750 – 1500	5.5	7.5	[2]	5.5	5.0	3.5
	1501 – 6000	6.5	9.0	[2]	6.5	5.5	5.0
	> 6000	7.5	10.0[1]	[2]	7.5	6.5	5.5
100	< 750	5.5	7.5	[2]	5.0	4.5	3.5
	750 – 1500	7.5	10.0[1]	[2]	6.5	5.5	4.5
	1501 – 6000	9.0	12.0[1]	[2]	8.0	6.5	5.5
	> 6000	10.0[1]	13.5[1]	[2]	8.5	8.0	6.5
110	< 750	6.0	8.0	[2]	5.0	5.0	3.5
	750 – 1500	8.0	11.0[1]	[2]	6.5	6.0	5.0
	1501 – 6000	10.0[1]	13.0[1]	[2]	8.5	7.5	6.0
	> 6000	10.5[1]	14.0[1]	[2]	9.0	9.0	7.5

1. Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear zone distances greater than the clear zone shown in Table 4.1. A jurisdiction may limit clear zones to 9 m for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

2. Since recovery is less likely on the unshielded, traversable 3:1 slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of the slope. Determination of the recovery area at the toe of the slope should take into consideration available road reservation, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the travelled lane and the beginning of the 3:1 slope should influence the recovery area provided at the toe of the slope. While the application may be limited by several factors, the fill slope parameters which may enter into determining a maximum desirable recovery area are illustrated in Figure 4.4.

Notes:

The design ADT in the table is the average daily traffic volume in both directions and in all lanes, other than for divided roads where it is the total traffic in all lanes in one direction.

Where the road is curved the values in Table 4.1 should be adjusted by the curve correction factors in Table 4.2.

The RTA New South Wales uses a similar approach based on a hazard corridor and with curve adjustments included rather than ADT (Appendix C). For the same situation the RTA method results in greater clear zones than those shown in Table 4.1.

Source: Adapted from AASHTO (2006).

Where the road curves, in particular after extended straight sections, an increased clear zone is accepted to minimise the risk involved in incidents where vehicles leave the road surface. Adopting the 1.5m curve correction factor of *Table 4.2* of Austroads (2010) (reproduced on the following page) for roads with a curve radius of 400m or greater, AZL would therefore adopt at least a 9m clear zone on the outside of curves.

Table 4.2 (of Austroads, 2010)
Curve correction factors

	Design speed (km/h)					
Radius (m)	***60***	***70***	***80***	***90***	***100***	***110***
900	*1.1*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*
700	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.3*
600	*1.1*	*1.2*	*1.2*	*1.2*	*1.3*	*1.4*
500	*1.1*	*1.2*	*1.2*	*1.3*	*1.3*	*1.4*
450	*1.2*	*1.2*	*1.3*	*1.3*	*1.4*	*1.5*
400	*1.2*	*1.2*	*1.3*	*1.3*	*1.4*	*-*
350	*1.2*	*1.2*	*1.3*	*1.4*	*1.5*	*-*
300	*1.2*	*1.3*	*1.4*	*1.5*	*1.5*	*-*
250	*1.3*	*1.3*	*1.4*	*1.5*	*-*	*-*
200	*1.3*	*1.4*	*1.5*	*-*	*-*	*-*
150	*1.4*	*1.5*	*-*	*-*	*-*	*-*
100	*1.5*	*-*	*-*	*-*	*-*	*-*

Source AASHTO (2006)

In summary AZL commits to (see **Commitment 14.5**):

- a 7.5m clear zone on all other straight sections of Obley Road;
- at least a 9m clear zone on the outside of curves (except where impacting on important fauna habitat, existing infrastructure or freehold land title).

Where the establishment of such a clear zone cannot be attained without impacting on important fauna habitat, e.g. breeding hollows, existing infrastructure, e.g. walkway / cycleway, or encroaching on freehold land, wire rope safety barriers would be installed 500mm from the outer edge of the pavement. The clear zone, as it potentially impacts on the vegetation of the Obley Road easement is discussed in more detail in Section 4.2.4.

Appendix 2 provides for the revised Obley Road upgrade concept plans, featuring the nominated clear zones.

m) Noted – no further comment.

n) Noted – no further comment.

o) The reagents and other materials to be transported to the DZP Site would all be undertaken using road registered vehicles meeting the relevant standard for the specific transport task. It is noted that a Transport Route Risk Analysis would be completed following confirmation of transport option and source of reagents, either by the operator responsible for transporting the reagent. This notwithstanding, a Transport Hazard Analysis has now been completed by Sherpa Consulting Pty Ltd (Sherpa, 2013b) (see **Appendix 4**) illustrating that any risks associated with the transport of materials are known and can be appropriately managed.

p) **Commitment 14.17** (Advise personnel on 'Fatigue Management' as part of Staff induction) has been included in the Final Statement of Commitments.

q) AZL believe **Commitment 16.8** addresses this issue satisfactorily.

r) Noted – no further comment.

s) Noted – no further comment.

4.2.3 Open Space and Recreation

Dubbo City Council Wrote:

a) The Dubbo - Molong rail corridor has become an important link in the open space network in the urban area of Dubbo. The role of the Dubbo - Molong rail corridor is reflected in the Open Space Master Plan adopted by Council in 2009.

... Council requires on the western side of the rail line the minimum distance possible for safety from the rail track. This will allow the installation of a shared pathway between the road reserve and the fenced portion of the rail reserve. It is Council's preference that the main maintenance track for vehicles be located on the eastern side of the rail line in order for a minimum amount of the rail reserve to remain inaccessible.

... Council requires provision of a pedestrian/bicycle crossing. This will allow integration of all pathways within the network and reduce the motivation by the public to damage a fence and access/cross the railway at a number of informal points.

b) There are two other crossings that exist for pedestrians and bikes. These will need to be formalised (see Figure 2 below) and could potentially be consolidated into one crossing utilising more of the rail corridor for north-south travel after crossing the actual line.

c) Any fencing of the rail corridor as well as minimising the amount of space taken up to the west of the line should minimise the intrusiveness of the fence line ... A preliminary risk assessment undertaken by the Director Parks and Landcare Services has found that the main risk is small children crossing the rail line without supervision.

d) Substantial two metre fences are not required to keep small children out. The experience of Council is that substantial fences designed to prevent any access are easily accessed by children as young as eight years old up to 14 years of age. A preference would be for a 1.5 metre fence to be placed along the rail line on the western side that adjoins the above identified crossings. In relation to the colour of the fence, Council's preference would be for a black fence which would minimise the visual intrusiveness of a new fenceline.

e) Pedestrian crossings would require lighting, preferably of an LED low energy use variety.

f) Council has a new pathway corridor that runs alongside the rail line from Macquarie Street to the Macquarie River … Council cannot move the pathway easement and would prefer any works to be restricted to the current extent of the fenced rail corridor in this precinct.

g) In the block between Cobra Street and Birch Avenue, there are similar issues with trees and shared pathway crossings. The minimising of enclosure to the west of the rail line should continue from Margaret Crescent up to and including this block. This will minimise tree loss and will allow the installation of a shared pathway along the Chelmsford Avenue side of the railway corridor… The railway crossings will have to be fenced appropriately as other existing crossings are in the urban area. Apex Oval East Dubbo football complex is a major node in the Open Space network.

Response

AZL has no objection to achieving the outcomes nominated by DCC with respect to open space and recreation.

4.2.4 Flora and Fauna (Biodiversity Offsets)

Dubbo City Council Wrote:

- *Fauna species impact, particularly Pink Tailed Worm Lizard, are offset well however, this should not justify a failure to offset vegetation impact to at least Tier 2 "no net loss" of the bio banking protocol…*

Response

The BioBanking Assessment Methodology (BBAM) was adopted by AZL to identify an appropriate Biodiversity Offset for the DZP in accordance with the NSW OEH *Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, State Significant Development (SSD) and State Significant Infrastructure (SSI) Projects* (OEH, 2011).

This policy has been applied appropriately and notably, OEH does not raise any objections or other concerns over the adequacy of the proposed Biodiversity Offset Area. Compliance with OEH (2011) notwithstanding, it is considered that the conservation and improvement of over 1 000ha of land, much of which has been and continues to be grazed and or cropped, represents

an exceptional biodiversity outcome. We believe the submission of OEH supports this and request DP&I defer to OEH as the NSW authority on matters related to biodiversity and threatened biota.

Dubbo City Council Wrote:

- *There is significant variation between stated areas and impacts in numerous places throughout the document which makes assessment difficult. The EIS is not consistent and in some areas not consistent with the final consultant's reports. The EIS should be redrafted to ensure internal consistency which may impact on calculations.*

Response

The EIS and OzArk (2013a) have been reviewed and, with the exception of one typographical error in OzArk (2013a), all references in the EIS and this report (including BBAM calculations) reference the correct area. Again reference is made to the OEH submission which appears satisfied with the information provided and assessment completed.

Dubbo City Council Wrote:

- *It is clearly stated that the impact offset does not meet either Tier 1 or Tier 2, instead relying on Tier 3 "Approval through negotiation". Council is of the opinion that Tier 2 "no net loss" should be the target offset. This would require either additional lands being placed into the biodiversity offset area, or additional offset areas to be protected.*

Response

Reference is made to the above response which notes the application of OEH (2011) in the development and assessment of the Biodiversity Offset Area.

Dubbo City Council Wrote:

- *Mapping does not appear to match calculated areas ie Map 4.33 compared to Table 2.22 in the EIS document. Examination of Map 4.33 shows an underestimation of CW212 in Table 2.22 of some seven hectares, or 26%. It is considered that this would increase the discrepancy between the proposed offset and that required to reach Tier 2 significantly. Vegetation CW212 is of high conservation significance requiring between six and 16 hectares to be offset for each impacted hectare (see dot point six below).*

Response

The areas in question have been recalculated using AUTOCAD and confirmed to be accurate.

Dubbo City Council Wrote:

- *All derived grasslands are defined as the less valuable CW213 rather than CW212. This has been explained by the consultant as a direction from OEH but it would be reducing the offset requirements significantly …*

  Calculations used to define impact and offset values are inconsistent. A formula has been used to calculate vegetation impact while detailed assessment has been used to calculate offset and this provides dramatically different results for the same ecosystems or vegetation communities in the same landscape …

Response

OzArk applied the BBAM in accordance with the reference manual (DECC, 2008). It is noted that the metric used in BioBanking does not show any significant difference for offsetting CW231 or CW212, hence there is no advantage to use either in preference. Furthermore, OzArk liaised regularly with OEH personnel prior to finalisation of the EIS with the application of BBAM refined under the instruction of OEH. Again reference is made to the submission of OEH which, with a single exception related to species based credit calculations, doe not raise any concerns over the application of the BBAM.

Dubbo City Council Wrote:

- *Environmental impact of widening or straightening 14 kilometres of Obley Road has not been adequately considered. Council's standard for road construction is the Austroads guidelines which would require a 10 metre clear zone (i.e. timber free) from the outside edge of each traffic lane (ie 13.5 metres from the centreline on each side)… An additional offset area is likely to be required to manage this significant unconsidered impact.*

Response

The establishment of a variable clear zone along the alignment of Obley Road was justified with respect to Austroads (2010) in Section 4.2.2.3 and is formalised as **Commitment 14.5**).

An additional contributing factor to the establishment of a clear zone is the conservation significance of the vegetation contained. The RMS acknowledge this and have previously adopted a clear zone of 6.0m along on straight sections and 10.0m on corners along the Newell Highway (see **Appendix 1c**). Obley Road represents an important contiguous habitat corridor within a largely cleared environment and OzArk (2013a) report that the vegetation within the easement of Obley Road is almost entirely EEC. It is therefore considered that the vegetation of the Obley Road easement represents vegetation of high conservation significance and avoiding disturbance to this where possible should be a priority.

CSPL have generated a series of plans reflecting the clear zones nominated above, i.e. 7.5m on straight sections, 9m on the outside of curves (see **Appendix 2**). With reference to these plans, a qualified ecologist of OzArk undertook an additional field survey of the Obley Road easement on Friday 13 December. The survey involved reinspection of the entire length of Obley Road

between Toongi Road and the Newell Highway with specific attention was paid to sections where road realignment has been proposed, as well as sections where the plans generated by CSPL (see **Appendix 2**) suggest encroachment of trees close to the current pavement. In these locations a tape measure was used to measure the distance from the road edge (or best estimate of the realigned road edge) to trees >100mm at their base. Where the trees encroached within the proposed clear zone, the area within the clear zone was calculated. Important habitat trees or features were also noted, whether within or beyond the proposed clear zone.

A summary letter report of the field survey and results has been produced by OzArk and is provide as **Appendix 1c**. The area of impact identified by OzArk following the December 2013 survey is 2.05ha of vegetation community CW213[3]. It is noted that this is larger than the 1.08ha quoted by OzArk (2013a) and reference in the EIS, however, this is still less than the area (2.43ha) used in the BioBanking Credit Calculator[4] (see **Appendix 1c**).

Given the above, while there is a slight discrepancy between the nominated area and likely area of impact, the impact of the likely area has been considered in the development and assessment of the Biodiversity Offset Area included in the EIS. The proposed Biodiversity Offset Area therefore remains appropriate, when considering the adoption of 'Variation of the Offset Rules' in accordance with OEH (2011), on the basis that:

1. the proposed BOA generates significant surplus credits for locally and regionally important species; and
2. the proposed management of the local population of *Aprasia parapulchella (*Pink-tailed Worm-lizard) within the proposed BOA is consistent with the National Recovery Plan and Threat Abatement and Recovery criterion and the NSW OEH Priority Actions and Listed Activities to assist the Pink-tailed Worm-lizard.

Furthermore, reference is made to Principle 7 of the recently released (17 July 2013) *NSW offset principles for major projects (state significant development and state significant infrastructure)* (http://www.environment.nsw.gov.au/biocertification/offsets.htm) (OEH, 2013) which states:

> ***7. Offsets can be discounted where significant social and economic benefits accrue to NSW as a consequence of the proposal.***
>
> *While an outcome in which biodiversity values are improved or maintained is preferred, it is acknowledged that in some circumstances flexibility may be required, especially in the context of a project providing significant social or economic benefits to NSW.*

[3] CW213 best represents the vegetation of the Obley Road easement where impact is proposed (finer scales of mapping could be used to split this community in the White Box dominated areas, Inland Grey Box dominated areas, or area co-dominated by Fuzzy Box EECs).

[4] OzArk (2013a) applied the precautionary principle when using the credit calculator with a minimum value of 0.25ha (the minimum value the calculator accepts) used at each point along the road easement where clearing was considered likely.

The Socio-economic Assessment of the DZP demonstrates significant economic benefit to the local region, state of NSW and Australia. Furthermore, the DZP will establish Australia as an important global supplier of products critical to the application of green and other '21st Century' technologies.

While the Biodiversity Offset Strategy presented in the EIS satisfactorily offsets the proposed disturbance of the Obley Road clear zone, the December 2013 survey of OzArk identified several important habitat trees within and immediately adjacent to the nominated clear zone (see **Appendix 1c** for further detail on the species, location and features of these trees). It is proposed that rather than undertake the clearing required to provide the clear zone, a wire rope safety barrier be installed approximately 500mm from the edge of the pavement (see **Commitment 14.5**). The use of wire rope safety barriers are a feature of many roads, particularly where conservation of vegetation is identified as a priority, e.g. where an EEC is identified. These barriers prevent, or at least slow significantly, any vehicle leaving the road.

Dubbo City Council Wrote:

- *The proposed offset area will be closed to the public for management purposes…*

Response

The NSW Government has developed seven principles to be used in assessing impacts to biodiversity and determining acceptable offsets for state significant development and state significant infrastructure projects (OEH, 2013). None of these require the offset to provide for public access or benefit.

Dubbo City Council Wrote:

- *Local extensions to the currently proposed Biodiversity Offset Area (BOA) are available in contiguous areas of vegetation adjoining the proposed BOA, adding these areas might bring the project up to Tier 2 status (no net loss of habitat being the goal).*

Response

Extension to the proposed Biodiversity Offset Area, which delivers an exceptional biodiversity outcome, is not necessary. It is the position of AZL that the proposed Biodiversity Offset Area addresses both OEH (2011) and OEH (2013) and note that the submission of OEH supports this by not requesting any significant modification. It is requested that DP&I defer to OEH as the NSW authority on matters related to biodiversity and threatened biota.

Dubbo City Council Wrote:

- *Mapping shows an area within the BOA which is Crown Land ... Is this area calculated in the BOA area? ...*

  The proposed final, rehabilitated landscape sees very sparse vegetation (ie 200 metre spacings)… Either the language within the EIS or the reposed Rehabilitation Plan needs to be modified to provide clarity or a better environmental outcome.

Response

The Crown Land has been excluded from the BOA for the purposes of credit calculation, however, it will undoubtedly form a component of the overall biodiversity conservation of the area.

The 'sparse' vegetation reflects the objective or returning the landscape to a traditional grassy woodland which is represented by occasional trees over a native grass understorey. Additional tree establishment would then occur naturally in line with natural ecosystem development.

4.2.5 Bushfire Prone Land

Dubbo City Council Wrote:

The subject land is designated as being Bushfire Prone Land. As a consequence, the provisions of 79BA of the Environmental Planning and Assessment Act 1979 are invoked. This necessitates assessment of the development under the Planning for Bushfire Protection (2006) publication.

The assessment provided in the EIS (clause 4.14.3.3) appears to be incorrect as it makes references and determinations based on superseded provisions of the 'Planning for Bushfire Protection' publication. Specifically, the EIS makes a bushfire hazard assessment under superseded Appendix 3 of that document which was replaced in 2012. Accordingly, the EIS has failed to establish the Bushfire Attack Level (BAL) applicable to the development.

Response

Section 79BA (1B) of the *Environmental Planning and Assessment Act 1979* states that this section does not apply to State Significant Development, which the Dubbo Zirconia Project is classified under the *State Environmental Planning Policy (State and Regional Development) 2011*.

An assessment against the updated version of *Appendix 3* of the Planning for Bushfire Protection is contained in **Table 4**.

With reference to the assessment contained in the EIS, the Bushfire Attack Level (BAL) increases from low to 12.5 where activities are to occur upslope and within 100m of vegetation. *Table 3.1* of AS3959 indicates a BAL of 12.5 describes an exposure level as ember attack.

Table 4
Bush Fire Hazard Assessment

Vegetation Classification	Slope	Distance to Activities	Bushfire Attack Level
Dry Sclerophyll Forest (Open Forest)	>15 ° to 18°	>100m	Low
	>5 ° to 10°	43 – 100m	12.5
Heathlands (shrublands)	>15 ° to 18°	>100m	Low
Grasslands	0 ° to <5°	<22m	12.5
Sourced: Based on Appendix 3.3 of RFS (2012) and AS3959:2009			

Subsequent to the exhibition of the EIS, and with respect to the potential for ember attack on portions of the DZP Site, AZL requested Patrick Westwood, Inspector - Community Safety Officer Orana Team of the NSW Rural Fire Service review the proposed objectives, safeguards and controls in relation to bushfire management of the DZP. The following reflects the modifications to these (as presented in the EIS) following the review of Mr Westwood (underlined text in red represents additions to the information contained with the EIS).

Bush Fire Management Objectives

The objectives of RFS (2006), considered in this assessment of bush fire management of the Proposal, are to:

- afford occupants of any building adequate protection from exposure to a bush fire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- ensure that safe operational access and egress for emergency service personnel and residents is available;
- provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the Asset Protection Zone (APZ); and
- ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bush fire fighting).
- Mitigate risk of fire leaving Alkane land holdings and impacting neighbouring properties and asset. (Section 63 of the *Rural Fires Act 1997*)
- Undertake all practical steps to prevent fire escaping from the property.

Safeguards and Controls

The Applicant would implement the following management and mitigation measures to minimise risks associated with starting of bush fires within the DZP Site (see **Commitments 16.4 to 16.24**).

- Ensure refuelling is undertaken within designated fuel bays or within a cleared area of the DZP Site.
- Ensure vehicles are turned off during refuelling.
- Ensure no smoking policy is enforced in designated areas of the DZP Site.
- Ensure fire extinguishers are maintained within site vehicles and refuelling areas.
- Ensure a focus on housekeeping by mine management.
- Ensure that a water cart is available to assist in extinguishing any fire ignited.
- Establish appropriate maintenance of mechanical equipment that is being used in the natural landscape i.e. slashers, mowers, belt driven machinery etc.
- Establish hot work protocols for welding, grinding, oxy work on tenure, including availability of portable water and a lookout for potential ignitions.
- Monitoring of any equipment with exhaust stacks capable of throwing embers.
- Monitoring for lightning strikes on tenure after dry electrical storms.
- Minimisation of using petrol/diesel vehicles in long grass during hot and dry periods.
- Regular maintenance of rail line holdings from site to Dubbo need to be considered if the rail line is owned/leased. This will include slashing of verges and maintaining a low grass fuel load.
- Train movements have a high potential for multiple ignitions and will need regular maintenance if owned/leased by Alkane.

Bushfire Mitigation Plan

In addition to the above, and following the advice of the NSW RFS, AZL would prepare and implement a Bushfire Mitigation Plan (refer also to **Commitments 16.4** to **16.6** and **19.2**)

This would include the establishment of hazard reduction and land management activities in order to manage fuel loads within the DZP Site. Consideration of appropriate areas for burns, grazing or mechanical hazard reduction would be focused on protecting AZL infrastructure and neighbouring properties. Formation of first response and patrol strategies would be included to enable appropriate land management for mitigating the spread of fire.

Boundary management would be discussed with the RFS and appropriate methods included to reduce the potential for a fire to leave the DZP Site. Appropriate fire management of the proposed Biodiversity Offset Area would also be discussed with the NSW RFS and appropriate management measures incorporated into the plan.

The plan wold provide for a 'specific to site' fire management strategy which is encouraged by RFS Orana and seen as essential in providing adequate land management outcomes for fire management and mitigation to neighbouring holdings.

4.2.6 Voluntary Planning Agreement

Dubbo City Council Wrote:

> *... Council is yet to view any such VPA which should form part of the current application, nor has it been provided with any details as to what the terms of the VPA are proposed to be ... Council would urge the Department to request that the proponent commence these negotiations with Council as a priority and provide Council with the draft VPA for its consideration prior to development consent being issued.*

Response

In responding, it is noted that AZL made contact with DCC on at least two occasions prior to the lodgement of the EIS with the intention of discussing the possible structure and value of a VPA. On each occasion, AZL was informed that DCC would prefer to view the EIS before undertaking such discussions.

This notwithstanding, AZL has reviewed the potential impact of the DZP would have on DCC managed and maintained services and infrastructure. Given the predicted low impact on local services (DGP, 2013) and isolated nature of the DZP Site, the maintenance of Obley Road and Toongi Road is considered the only such service/infrastructure which could be affected by the development and operation of the DZP. AZL note that the proposed upgrade works would defer and reduce the maintenance and capital works costs associated with these roads for several and perhaps many years. The proposed creek crossing upgrades would improve flood immunity and therefore reduce future flood damage to the road, also a likely saving for DCC. It is also worthy of note that AZL expect to be required to pay higher rates, associated with mining activities on the relevant properties it will own, assumedly to account for increased maintenance costs of infrastructure such as roads affected by mining related traffic.

In fact, rather than impose additional costs on DCC, the DZP would almost certainly generate economic benefits for the LGA which would flow onto DCC through increased business activity, rate collection, residential construction and other less easily quantified measures. Tacit acknowledgement of this likely benefit is provided by the recent "adjustment funding" provided to DCC and the three adjoining LGA's in lieu of the economic stimulus that the Cobbora Coal Project, which has been placed on hold indefinitely, was expected to have provide. The provision of $20 million, to be split between the four LGA's, indicates that each was expected to have benefitted from the mining development.

In light of the above, AZL will complete a more thorough analysis of the potential cost burden to be borne by DCC in relation to maintenance costs on Obley and Toongi Roads. Liaison with DCC will continue in order that a fair and reasonable contribution, to account for these costs, is provided (in the form of a VPA or equivalent arrangement).

4.3 WELLINGTON COUNCIL

4.3.1 Introduction

In its submission to the EIS, Wellington Council contends that as the DZP is within 10km of the Wellington Local Government Area and 30km northwest of the Wellington township, it should be considered a 'mine affected community' (as defined by the NSW Government report *Economic Assessment of Mining Affected Communities* of February 2013), as the Wellington LGA:

- will neighbour the mining area; and
- could provide a dormitory service or transport thoroughfare for the mine workforce.

The issues raised by Wellington Council are each considered under separate subsections.

4.3.2 Workforce Domicile

Wellington Council Wrote:

Construction Phase

... Based on research for other mining projects, Council believes it is reasonable to assume that 70% of the construction workforce, or 280 people (400 x 70%), will be sourced locally ... The most defining description of what 'local' means can be found on page 12-41 where it states 'local' residents are those that live 'within 70 kilometres' of the Project site.

It is also reasonable to assume, based on evidence from other mining projects, that some 40% of this locally sourced workforce (numbering 112 persons, ie 280 x 40%) will reside outside the Dubbo LGA and, in this case, most likely reside in the Wellington LGA as it is the next closest.

Operational Phase

... there will be a maximum of 250 jobs generated by the Project ... 40% (ie 100 persons) is likely to reside in the next closest LGA, namely Wellington.

Impacts

Based on the predicted numbers outlined above, the Project will draw on the following number of persons residing in the Wellington LGA:

- *112 persons during the two years of construction; and*
- *100 persons during the 20 years of operation.*

Response

Mrs Diana Gibbs of Diana Gibbs & Partners (author of the Socio-economic Assessment and co-author of the Agricultural Impact Statement for the DZP) has reviewed the assumptions and claims of Wellington Council and responds as follows.

It appears that Council is basing their claims on the likely impact of the DZP in the Wellington LGA on the assumption that the DZP is directly comparable to the recently exhibited Cobbora

Coal Project. On the basis of this assumption, it is claimed that 40% of both the construction and operational workforce required for the DZP could be expected to reside within the Wellington LGA. It is therefore assumed that some 212 employees will be resident within the LGA.

The comparison to the Cobbora Coal Project is unrealistic and does not accurately reflect the likely demand for accommodation within the Wellington LGA. The DZP is a completely different type of operation to the Cobbora Coal Project, and (more importantly) the DZP is located in close proximity to the major regional centre of Dubbo. The Cobbora Coal Project was planned in a more remote location, within or adjoining four LGA's. As such, the assumption that employees for Cobbora Coal Project would be drawn from and/or reside within the surrounding towns and LGA's based on a proportional model is potentially reasonable. The DZP Site, however, is located approximately 25km from the primary regional centre of the Orana Region, Dubbo, on what will be an upgraded and high quality road. By comparison, the main residential centre of the Wellington LGA, Wellington, is located approximately 70km from the DZP Site on rural roads, some of which are unsealed. As a consequence, Dubbo is expected to provide virtually all the required labour force and accommodation requirements.

There is therefore no evidence to substantiate the claim that around 20% of the anticipated workforce of the DZP might be located in Wellington. In fact, the evidence strongly supports the assessment that those employed at the DZP will reside within Dubbo.

Wellington Council Wrote:

> *The advent of this significant new project will cause a drain on the local, skilled workforce (p 3-42). It is also highly likely that Council itself will lose staff, thus incurring staff replacement and training costs.*

Response

An analysis of the labour force characteristics of Dubbo and Wellington (see **Table 5**) indicates that Dubbo is far more likely to be the source of employees and therefore the DZP is unlikely to create the drain on local, skilled workforce claimed by Wellington Council.

Table 5
Comparative Labour Force Data

Characteristic	Dubbo	Wellington
Size of labour force	19,338	3,308
Pop aged 15+ (share total population)	22,833 (62.7%)	4,827 (60.1%)
Participation rate	64.3%	49.0%
Unemployment rate	4.9%	8.3%
Relevant sectors[1]	3,667	439
Relevant occupation[2]	3,221	323
Population	38,805	8,493
Av rent as % weekly wage[3]	34.7%	31.6%
Source: ABS Census data 2011		
Note 1: Total of employment in mining, manufacturing, construction, and transport sectors Note 2: Total of employment in "technicians and trade workers", and "machinery operators and drivers" occupations Note 3: Average weekly rent as proportion of average weekly individual income		

The data presented in **Table 5** illustrates many characteristics of the Dubbo labour force (and population) that tend to favour this major centre over Wellington, as a base for DZP employment:

- Dubbo has a much larger labour force (6x) than Wellington, in both absolute (total number) terms, and also relative (as share of the total population) terms.
- More importantly, more of the "working" age cohort is part of the labour force, as demonstrated by the much higher participation rate in Dubbo (64.3% as compared to just 49% for Wellington).
- When industry sectors and occupation groups that are most directly relevant to the employment needs of the DZP are considered (see Notes 1 and 2 in **Table 5**), it is clear that the workforce of Wellington can only offer around 10% of the level of appropriate skills that could be provided from Dubbo.
- While it is true that average rents are lower in Wellington, so too are average wages, with the result that the "affordability" of living in Dubbo is very comparable to levels available in Wellington. This does not support the claim of Wellington Council that employees will choose to reside in Wellington due to a lower cost of living.

The comparative labour force analysis therefore casts significant doubt on the assumptions made by Wellington Shire in their submission. AZL remain of the opinion that Dubbo would be the dominant residential location for the workforce, with around 80% of the operational workforce already resident within the Dubbo LGA.

The submission made by Wellington Shire has been carefully considered and it is accepted that there may be a small number of tradespeople currently resident with Wellington who take up employment at the DZP. However, the available evidence suggests that this number is likely to be very small given the comparative sizes of the total and relevant labour forces of Dubbo and Wellington.

4.3.3 Workplace Planning and Training

Wellington Council Wrote:

> *It is important from Council's perspective that there is an employment benefit to the local community from the Project. See Table 1 below (not presented) for details on the required workforce numbers ... Council wishes to see the Proponent commit to a minimum number of annual apprenticeships or traineeships over the life of the mine.*
>
> *Council recommends that an apprenticeship and traineeship employment program be established by the Proponent that provides:*
>
> *a) a minimum of five apprenticeships or traineeships for local personnel at anyone time during the life of the Project; and*

b) a specific Indigenous training and employment program with a minimum of three Indigenous staff members actively participating in the program at anyone time during the life of the Project.

Response

AZL recognises the importance of obtaining and training a high quality workforce and, as documented in the EIS (Sections 3.2.1.6, 3.2.2.5 and 4.15.5.4), has engaged with Regional Training Organisations and local educational institutions (e.g. Charles Sturt University, NSW TAFE), and relevant government agencies and committees (e.g. Department of Education & Communities, Region 21 Governing Committee, Central West Mining Steering Committee) over several years with the aim of preparing Dubbo to supply a locally skilled workforce.

It is worthy of note that following liaison with Alkane Resources Ltd (of which AZL is a subsidiary company), NSW TAFE (Dubbo Campus) currently provides targeted training to satisfy the requirements for the Applicant's workforce at the Tomingley Gold Mine and the technical training requirements specific to the industrial processing operations of the DZP have been discussed on several occasions.

As noted in the EIS, AZL has a target for 80% of start-up operational workforce to be local residents. AZL recognises that in order to achieve this, community engagement is required to illustrate the pathways to employment at the DZP, many of which involve attainment of specific educational outcomes and skills. AZL has been pro-active in providing information on these pathways, as is illustrated by the focus placed on the advertisement of career development on the Alkane website (http://www.alkane.com.au/index.php/careers/dzpcareers).

With respect to employment of Aboriginal people, AZL refers to the Peak Hill Gold Mine for which 20 of the total 156 people to be employed over the life of the mine identified as Indigenous (13%). Reference is also made to the Tomingley Gold Mine where a Community Engagement Protocol (CEP) has been developed and signed by six registered Aboriginal organisations. The CEP provides the framework within which the operator of the mine works cooperatively with the local Aboriginal community with the intent of mutual benefit from mining and exploration activity in the Peak Hill/Tomingley district. The CEP effectively captures the mining company's objectives, Aboriginal people's aspirations and principles for negotiations.

The above demonstrates the commitment of AZL to maximising employment and other opportunities for the local Aboriginal community. With specific reference to the DZP, AZL has also consulted with the Central West Mining Steering Committee, coordinated by Tony Fuller (Regional Coordinator Aboriginal Affairs – DEC), in relation to the most effective ways of provided such training and employment through the DZP.

Considering the record of Alkane in employing locally, e.g. Peak Hill Gold Mine, Tomingley Gold Mine, and emphasis being placed on developing the vocational pathways to employment at the DZP, it is considered unnecessary to require specific targets for apprenticeships.

Wellington Council Wrote:

> *Council would also like to draw attention to the significant number of major projects that are in the planning stages in the local region ... This demand clearly has implications for the provision of hard and soft infrastructure by local councils, including Wellington.*

Response

The DZP is unlikely to have any significant impact on these for the reasons documented in Section 4.3.2. This notwithstanding, it is suggested that the numbers presented in Wellington Council's *Table 1* are not truly representative of the future workforce requirements of the Wellington LGA for the following reasons.

- The Cobbora Coal Project, which is identified as the dominant contributor, is now not expected to proceed. The more realistic figures for additional workforce numbers should therefore be 965 (construction) and 95 (operational).
- The numbers presented represent total workforce requirements for the region, and not just for Wellington.

It is also not clearly documented how the total demand is scheduled over the indicated "next five or so years", and therefore the extent of overlap with the construction and operations stages of the DZP is undefined.

With respect to employment opportunities and costs more generally, Wellington Council appear to view the potential for additional employment as both a cost *("... advent of this significant new project will cause a drain on the local skilled workforce*") as well as a benefit ("*… employment benefit to the local community ...*"). While the potential draw of employees from the Wellington LGA is likely to be low for the reasons previously stated, it is suggested that new employment opportunities, particularly in areas with a relatively high unemployment rate (see **Table 5**), would generally represent an economic benefit for the local area. Implicit in this conclusion is the assumption that the benefit of a new source of wage income, and thus spending, within the local area more than compensates for any additional costs imposed via demand for services. Considering this further, it is noted that Wellington Council has recently been compensated to the value of $1 million, with further compensation being negotiated, as part of an "adjustment" package to replace the economic stimulus that the Cobbora Coal Project was expected to have provided. The provision indicates that Wellington was expected to have benefitted from the development of the Cobbora Coal Project. Based on the logic presumed to underlie the provision of this "adjustment funding", there is no reason to assume that the DZP would not deliver some benefit to the Wellington LGA in the event that a (small proportion) of the workforce do reside in the Shire.

4.3.4 Road Repair and Maintenance

Wellington Council Wrote:

> *The Traffic Impact Assessment in the EIS is considered to be incomplete because it does not address the likely traffic flows generated by mine-related personnel living in places other than Dubbo, such as to the east, south-east and north-east of the Project site…It is clearly likely that a substantial number of workers will travel to/from the east to/from such places as Geurie and Wellington, and Council seeks assessment of the local roads and traffic impacts attributable to the Project.*
>
> *Based on the calculation…that approximately 112 persons will reside in the LGA during the two years of construction and approximately 100 persons during the 20 years of operation, there will be a substantial impact on the local rural roads as workers commute to and from the mine site…leading to road pavement deterioration, increased repair and maintenance costs and an elevated risk of accidents.*
>
> *…The increased repair and maintenance costs generated by the Project's workforce commuter traffic on local rural roads needs to be offset via financial contributions associated with a VPA.*

Response

As discussed in Section 4.3.2, AZL is confident that the vast majority of the workforce would reside in Dubbo and access the DZP Site via Obley Road from the north. Given it is unlikely Wellington LGA will provide the domicile for the DZP workforce claimed by Wellington Council, the predicted impacts on roads and other infrastructure will not eventuate. As such, no financial contribution to Wellington Council, either by VPA or other means is considered warranted.

4.3.5 Population and Housing

Wellington Council Wrote:

> *During the two year construction phase the technical specialists who are not locals are likely to reside in hotels, motels, caravan parks or rental accommodation, including those found in the Wellington LGA. This demand is likely to place pressure on temporary housing, thus increasing rents … Workers new to the region will be attracted to the Wellington LGA due to cheaper real estate and rents compared with Dubbo. Furthermore, the availability of housing (both short-term and long-term) is in short supply in Dubbo, thereby increasing the attractiveness of the Wellington LGA as a place to live.*

Response

AZL is confident that Dubbo would be the principal domicile for any temporary workforce required for the construction phase for the following reasons.

- Dubbo represents a much larger centre with significantly larger number of motels, caravans and other temporary housing available.

- Dubbo is significantly closer and more accessible to the DZP Site (25km vs 70km).
- Dubbo is serviced by a major regional airport.

The lower rents in Wellington is acknowledged, however, as noted in **Table 5**, the proportion of wage spent on rent within the two LGA's in comparable. With respect to the 'short supply' of housing in Dubbo, reference is made to *Section 4.15.5.3.1* of the EIS which, based on data available from the Real Estate Institute of NSW, indicates that although there have been public expressions of concern over rising rents in Dubbo, trends in rents, sales, and bonds indicate a broad decline in all housing sectors. As noted in DGP (2013), the DZP could, in fact, provide a stimulus for future land releases which would provide for the residential housing choices currently lacking or restricted in the current market and potentially result in reduced rental prices as more accommodation becomes available.

4.3.6 Environmental Impacts on Local Rural Properties

Wellington Council Wrote:

> *Council urges the State Government to ensure that the safeguards to be included … are sufficiently comprehensive and robust to protect nearby rural residents and downstream properties from adverse environmental, social and economic impacts including radiation, noise, dust, surface and ground water impacts and visual impacts…*

Response

The Final Statement of Commitments for the DZP (see Section 6) has been prepared following comprehensive assessment of the possible impacts of the DZP on the local environment, residents and other stakeholders. These commitments, which summarise the safeguards, controls, management measures and offset strategies are considered extremely comprehensive and robust.

4.3.7 Power Line

Wellington Council Wrote:

> *… Given the Proponent has commenced the preparation of a Review of Environmental Factors for the two proposed routes, Council suggests this should now be incorporated into the overarching Project assessment, namely the Dubbo Zirconia Project.*

Response

As the power line would be owned and operated by Essential Energy, it represents an 'Activity' as defined by the EP&A Act. As such, the appropriate pathway for application is under Part 5 of the EP&A Act.

4.3.8 Geurie Limestone Quarry

Wellington Council Wrote:

> *... Council seeks greater transparency as to the plans for the Geurie site and ideally, for its impact assessment to be integrated into the current DZP EIS ...*

Response

AZL has kept Wellington Council informed as to the development of the Geurie Limestone Quarry and plans to submit a development application during 2014. While the Geurie Limestone Quarry would supply limestone to the DZP, it would operate separately and therefore needs to be assessed and approved separate to the DZP.

4.3.9 Economic Appraisal

Wellington Council Wrote:

> *Council wishes to see various adjustments and clarifications made to the social and economic assessment methodologies, namely:*
>
> *a) Assessment that better considers inter-generational and intra-generational equity consistent with the need to address ESD principles;*
> *b) Internalising into the valuation of the Project all environmental costs (e.g. noise, dust, amenity and ecosystem services, etc.);*
> *c) A more effective weighting and balancing given to environmental and social factors, in addition to economic ones;*
> *d) More robustness in the modelling regarding the availability of skilled labour in the local community for absorption by the Project; and*
> *e) More robustness in the modelling regarding the number of indirect jobs created by the Project.*

Response

The following provides a response to the statements (a to e) made with respect to the Socio-economic Assessment.

a) Section 6.2.2.3 of the EIS provides a detailed assessment of the Social Equity Principle of ESD which considers inter-generational and intra-generational equity.

b) As recognised in the EIS, the DZP would result in some environmental costs, related to noise and air emissions, increased traffic and changes to the local setting, being imposed on certain sectors of the community. Attributing a 'value' to these residual impacts is difficult and largely qualitative in nature as what one person places high value on may be of low value to another and vice versa. This notwithstanding, where such costs have been considered very high, AZL has agreed to purchase the affected landholding at prices exceeding current market value. AZL is also prepared to purchase other properties as required should significant unforeseen environmental costs become apparent. In this way,

environmental costs imposed by the project on the local community will be minimal.

c) AZL considers the Socio-economic Assessment of DGP (2013) appropriately considered the social and relevant environmental impacts that could be incurred as a result of the DZP.

d) AZL recognises that a proportion of the workforce required for the DZP would be technical specialists to be drawn from other sites and locations outside the local area. This is acknowledged in the EIS.

e) The remaining positions available at the DZP would require skills largely transferrable from industries currently operating within Dubbo. Table 5 identifies there are over 3 000 such employees within the Dubbo LGA. Furthermore, AZL is being proactive in advertising vocational pathways (see career opportunities page of the Alkane Resources website - http://www.alkane.com.au/index.php/careers/dzpcareers) to encourage local residents to obtain the relevant skills, training or educational building blocks to allow for easy transition to the DZP workforce on commencement of operations (targeting 2016). AZL considers that Dubbo can easily accommodate the supply of the necessary skilled workforce without a requirement for any further modelling of community demographics.

Estimating the number of indirect jobs generated by a new development such as the DZP is difficult and subject to numerous variables related to the type of industry, ancillary industry already present, population of the effected centre(s), size of the existing workforce, and other factors. Davidson & De Silva (2011) suggest an employment multiplier of between 4 and 5 for mining developments, however, it is not so simple as to infer that with the creation of 250 DZP jobs, 1 000 new indirect jobs within the Dubbo LGA will eventuate. This is primarily because 85% of the future workforce for the DZP is expected to be already resident in Dubbo, and so any flow-on stimulus (i.e. indirect jobs) would already have been experienced within the local economy.

The EIS presents estimates of potential new residents which could be attracted to Dubbo, to take up any jobs that might be vacated by existing local residents choosing to take up employment with the DZP. This approach has been used in the EIS to make an assessment of potential future demand for social infrastructure and services in Dubbo, and has been found to be broadly consistent with the approach used by DCC in their own assessments of potential future demand for such services.

4.3.10 Financial Contributions

Wellington Council Wrote:

Council looks forward to securing a VPA whereby financial contributions are agreed for:

a) The repair and maintenance of various rural roads and intersections for the life of the mine;

b) General community enhancement to address social amenity and community infrastructure requirements arising from the Project; and

c) Compensation for Project-related administration and management costs.

Response

Previous responses have demonstrated that the claimed financial impost on Wellington Council will almost certainly not occur. As such, financial contributions or other compensation (by way of a VPA or other means) are not considered appropriate in this case.

4.4 ENVIRONMENT PROTECTION AUTHORITY

4.4.1 Introduction

The Environment Protection Authority (EPA) provided a submission to the DP&I (dated 18 November 2013) stating its determination to support the proposal subject to the Applicant addressing issues related to air, water, hazardous materials, waste, and miscellaneous matters.

A review of the conditions of consent nominated by the EPA is provided in Section 4.12.1.

4.4.2 Air

The EPA Wrote:

The air quality assessment predicts exceedances of the EPA's impact assessment criteria for S02, 10 minute and 1-hour averages. The exceedances are predicted at a single mine owned residence (receptor 1). The assessment does not provide details on the frequency of the predicted exceedances.

Recommendation:

1. ***The proponent review and benchmark the proposed operations against best practice process design and emission control.***
2. ***The proponent identify additional controls that can be implemented to ensure that there are no predicted exceedances at sensitive receptors surrounding the project site.***

3. Following the assessment under point 2) the air quality assessment be revised to demonstrate that proposed emissions will not result in exceedances of EPA's impact assessment criteria.

4. The air quality assessment be revised to include a comparison of proposed emission concentrations, for all pollutants and emission points, against the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2010.

Response

As design of the various components of the processing plant is ongoing, it is noted that the stack emission concentrations used to model and predict SO_2 and other gaseous emissions from the DZP processing plant were conservative.

The above notwithstanding, a commitment to restrict the in-stack concentration of SO_2 to 800mg/m^3, 20% less than the 1 000mg/m^3 criteria of the *Protection of the Environment Operations (Clean Air) Regulation 2010* for SO_2 (Group 6[5]), was made. Furthermore, following the completion of initial modelling results, the design of the Sulphuric Acid Plant was modified to increase the height of the stack from 80m to 90m to further reduce the concentration of SO_2 and other gases received at locations surrounding the DZP Site. It is recognised that modelling of the stack emissions presented in the Air Quality Impact Assessment identify an exceedance of 10-minute and 1-hour concentration criteria at a single receiver (mine-contracted). This exceedance was considered acceptable, given the receiver in question would be owned by AZL following approval of the DZP.

Further analysis of the predicted frequency of exceedance at this receiver has been completed by PEL (2013b) (see **Appendix 5**) who confirm that the exceedance occurs only during only once over the modelled (1 year) period. The next highest predictions of 1-hour and 10-minute concentration are as follows.

- 1-hour: 211µg/m^3 (cumulative - 238µg/m^3)
- 10-minute: 302µg/m^3 (cumulative - 336 µg/m^3).

Both predictions are well below the relevant averaging period assessment criteria. **Table 6** provides the predicted maximum and next highest prediction against the SO_2 concentration criteria.

Table 6
Modelled SO2 Emissions (Frequency of Exceedance)

	1 hour		10 minute	
Receiver R1	**Incremental**	**Cumulative**	**Incremental**	**Cumulative**
Criterion	**570**	**570**	**712**	**712**
Maximum	679	706	971	1 005
Next Highest	210	237	302	336
Source: PEL (2013b) (refer to **Appendix 5**)				

[5] Group 6 refers to those activities commenced on or after 1 September 2005.

Figure 2 provides a cumulative frequency plot for the incremental and cumulative results for the 1 hour and 10 minute averaging periods at Receiver R1. Similar to *Figure 36* in the Air Quality and Greenhouse Gas Impact Assessment of PEL (2013), the plots indicate the percentage of time that the SO_2 concentrations were experienced at Receiver R1.

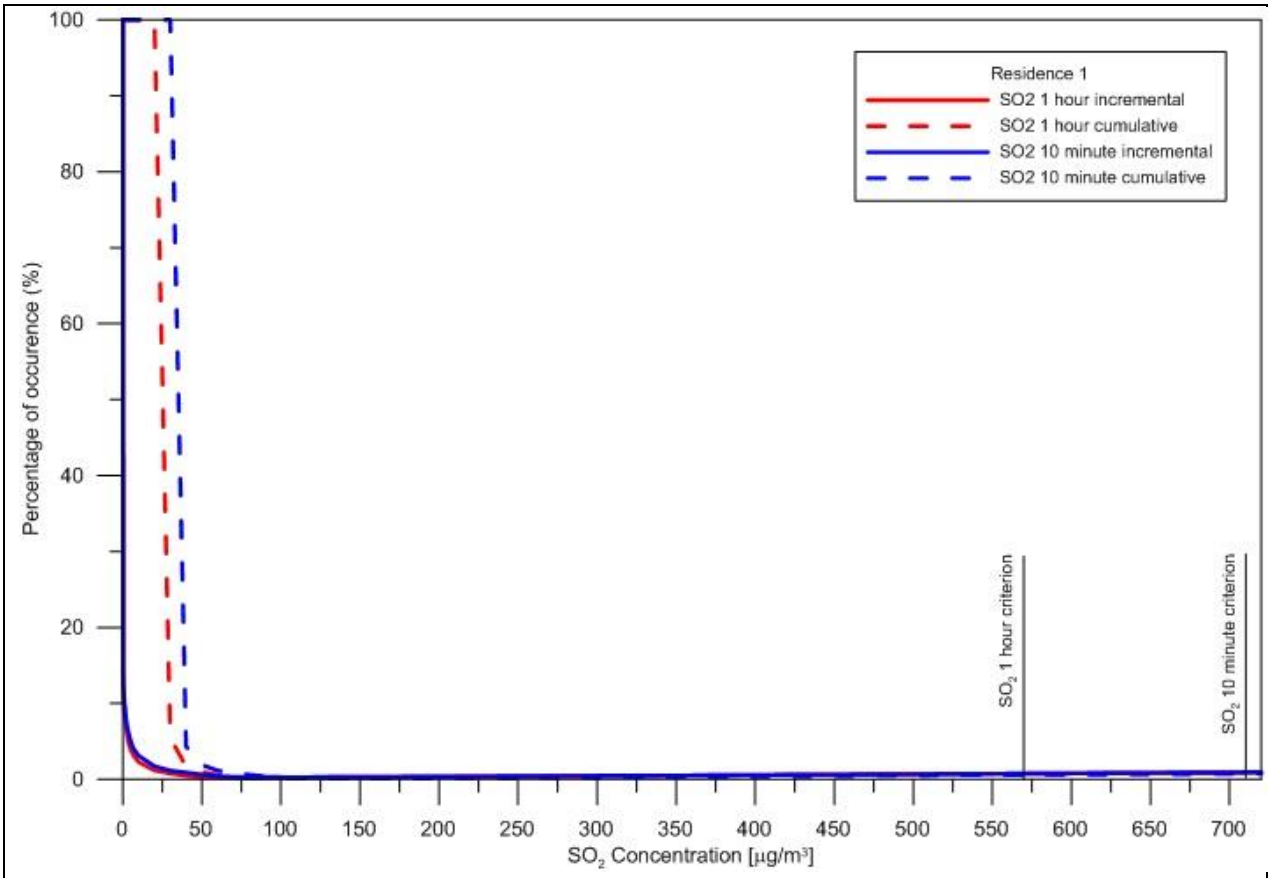

Figure 2

Frequency Plot (1 hour and 10 minute) at Receiver R1

In summary the plot indicates:

- 87% of the time the incremental 1 hour average SO_2 concentrations are below 0.2µg/m^3
- 95% of the time the cumulative 1 hour average SO_2 concentrations are below 30µg/m^3.
- 86% of the time the incremental 10 min average SO_2 concentrations are below 0.2µg/m^3.
- 96% of the time the cumulative 10 min average SO_2 concentrations are below 40µg/m^3.

While the additional analysis illustrates that the potential for elevated SO_2 concentration at Receiver R1 would be very low and manageable through restriction on use, in order to allow for ongoing tenancy or mine use of this residence, AZL requested PEL identify what further reductions to in-stack emissions would be required to comply with all SO_2 criteria at all receivers. PEL (2013b) re-ran the model and identified that by reducing the SO_2 concentration of the acid plant stack to 190ppm (545mg/m^3), compliance at all receivers was predicted under all conditions (see **Appendix 5**). **Table 7** provides the revised results at Receiver R1 and other

receivers on, or in close proximity to the DZP Site. All results show compliance with the NSW air quality impact assessment criteria.

Table 7
Modelled SO2 Emissions (Revised In-Stack SO2 Emission Concentration)

		Incremental prediction				Cumulative prediction			
Averaging period		**10 min**	**1 hour**	**24 hour**	**Annual**	**10 min**	**1 hour**	**24 hour**	**Annual**
EPA Criterion		***712***	***570***	***220***	***60***	***712***	***570***	***220***	***60***
Adopted background		***-***	***-***	***-***	***-***	***34***	***27***	***11***	***3***
Receiver ID	1[a]	675	472	20	1	709	499	31	4
	2	186	130	8	1	220	157	19	4
	10	424	296	12	1	458	323	23	4
	23	124	87	6	1	158	114	17	4
	24	200	140	6	1	234	167	17	4
	25	176	123	9	1	210	150	20	4
	26	216	151	11	0	250	178	22	3
	48[a]	63	44	5	0	97	71	16	3
	49A[a]	37	26	4	0	71	53	15	3
	49B[a]	32	22	4	0	66	49	15	3
	51[b]	148	103	6	1	182	130	17	4
	54[a]	178	125	8	1	212	152	19	4
	55[c]	174	122	7	1	208	149	18	4
	56[a]	212	148	8	1	246	175	19	4
	58[c]	400	280	13	1	434	307	24	4
	50[d]	56	39	6	0	90	66	17	3

[a] Mine owned residence; [b] Agreed contract (call option); [c] Agreed contact (put option); [d] Potential future residence.

AZL subsequently commissioned a review of emissions reduction technology which could be applied to the DZP Processing Plant. Through this review, AZL has identified that the addition of a Caesium catalyst to the plant design would reduce in-stack concentration of SO_2 by a further 35% to 45%, below the 190 ppm PEL (2013b) have indicated will remove the exceedance (see **Appendix 5**).

On the basis that there is technology available to reduce in-stack emissions such that compliance can be achieved at all receivers, AZL commits to the inclusion of emission reduction technology that will reduce SO_2 emissions such that all SO_2 criteria are achieved at receivers surrounding the DZP Site (refer to **Commitment 5.7**).

It is noted that three additional air emission sources have been added within the Processing Plant Area since the Air Quality and Greenhouse Gas Impact Assessment of PEL (2013) was completed. These additional sources include:

- Zr Calciner and Coolers.
- Nb Concentrate Refining – Roaster.
- Nb Concentrate Refining – Calciner.

Notably, these emissions sources are not expected to include SO_2, however, may have minor in-stack concentrations of other gases such as SO_3, HCl and NO_2 and will contribute to the overall load of air emissions released during the operation of the DZP processing plant. Final plant design specifications are required before the overall emissions can be remodeled and noting this, AZL makes the following additional commitment (**Commitment 5.12**).

5.12: Complete modelling of gaseous emissions on completion of final plant design and provide results, along with discussion on application of all reasonable and feasible emissions reduction technology, to the Environment Protection Authority prior to, or as part of an application for an Environment Protection Licence.

4.4.3 Water

The EPA notes that remaining issues associated with impacts on water can be addressed through the recommended conditions of consent (refer to Section 4.12.1.3).

4.4.4 Hazardous Materials

The EPA Wrote:

Appendix 11 of the EIS provides Material Safety Data Sheets (MSDS) for the substances to be produced by the mine. None of the substances are classified as dangerous goods. The MSDS for Zirconium Dioxide indicates the product is of minimum flammability however it also indicates it liberates extremely flammable gas and is spontaneously flammable. In addition, values for toxicity and ecological information all show data not available. Similarly, values for ecological information for Ferroniobium, Heavy Rare Earth Chloride Solution and Light Rare Earth Chloride Solution all show data not available.

Clarification is required as to whether the product has been the subject of appropriate testing against the criteria in the Australian Dangerous Goods Code for classification as class 4 or class 9 Dangerous Goods. This may have bearing on how Dangerous Goods are handled, managed and transported to ensure compliance with the Australian Dangerous Goods Code.

Additional information should also be provided to identify if any products meet the classification of UN 3077 of an Environmentally Hazardous Substance.

Response

AZL requested Chemwatch, who produced the MSDS' for the various DZP products, to review the MSDS issued for ZrO_2 and ZOH. On review, it has been confirmed that these incorrectly referred to the products as liberating extremely flammable gas and being spontaneously flammable. The revised and accurate MSDS' for ZrO_2 and ZOH are provided as **Appendix 6**. On the basis of the revised MSDS', neither product would be classified as a Class 4 or Class 9 Dangerous Good.

AZL is in the process of completing additional literature review, and possibly laboratory testing, to provide the ecological data currently absent from the MSDS' which will enable the determination as to whether the products meet the classification of UN 3077 or UN 3082 (Environmentally Hazardous Substance [solid or liquid respectively]).

The above notwithstanding, AZL confirms that all products will be transported within Intermediate Bulk Containers (IBC's), in compliance with Chapter 6.5 of the Australian Dangerous Goods Code (ADG Code) (NTC, 2011). As such, transport of these products is not subject to the ADG Code under Special Provision AU01 which states:

> *"Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to this Code when transported by road or rail in;*
>
> *a) packagings that do not incorporate a receptacle exceeding 500 kg(L); or*
>
> *b) IBCs."*

It is recognised that no such exemption applies to Marine Transport for these products, however, as noted above, AZL is currently obtaining the relevant information to enable classification under UN 3077 and/or UN 3082 for the purposes of export.

4.4.5 Miscellaneous

The EPA Wrote:

> *Environment Protection Licensing*
>
> *…The proponent should be advised that Scheduled Activities (such as mining and processing) cannot lawfully be undertaken unless an Environment Protection License permitting Scheduled Activities has been issued by the EPA.*

Response

AZL understands the obligations under the *Protection of the Environment Operations Act 2000* and confirms no Scheduled Activities would be undertaken until an Environment Protection License permitting these is issued by the EPA.

The EPA Wrote:

> *Scale of Mining*
>
> *Table 2.4 p. 2-44 indicates that the project will have an annual extraction of up to 1.6 million tonne p.a. (year 11); generating 75,000 tonne of product for a 20 year period. This is contradictory to information provided on page ES-4 which specified a maximum rate of extraction of 1 Mt p.a.*
>
> ***Clarification is required as to the maximum rate of extraction and that impacts have been assessed accordingly**.*

Response

AZL can confirm that the impacts associated with the DZP have been assessed on the basis of the mining and production schedule provided by **Table 2.4** of the EIS (reproduced below).

Table 2.4
Indicative Mining Rate

Mining Year	*Ore (t)*	*Waste Rock (t)*	*Total (t)*	*Strip Ratio (ore : waste rock)*
Site Establishment	*74 598*	*1 869*	*76 466*	*1 : 0.025*
1	*753 362*	*41 016*	*794 378*	*1 : 0.054*
2	*813 254*	*67 398*	*880 652*	*1 : 0.083*
3	*905 797*	*88 888*	*994 685*	*1 : 0.098*
4	*1 000 444*	*118 254*	*1 118 697*	*1 : 0.118*
5	*1 008 330*	*116 829*	*1 125 159*	*1 : 0.116*
6	*989 570*	*113 171*	*1 102 742*	*1 : 0.114*
7	*1 005 179*	*82 212*	*1 087 391*	*1 : 0.082*
8	*991 605*	*77 541*	*1 069 147*	*1 : 0.078*
9	*1 002 201*	*78 917*	*1 081 118*	*1 : 0.079*
10	*1 005 807*	*149 356*	*1 155 163*	*1 : 0.148*
11	*1 004 671*	*669 556*	*1 674 227*	*1 : 0.666*
12	*995 891*	*262 944*	*1 258 836*	*1 : 0.264*
13	*1 003 319*	*271 753*	*1 275 072*	*1 : 0.271*
14	*1 001 169*	*285 565*	*1 286 734*	*1 : 0.285*
15	*998 558*	*268 212*	*1 266 771*	*1 : 0.269*
16	*995 185*	*186 425*	*1 181 610*	*1 : 0.187*
17	*1 006 494*	*188 543*	*1 195 037*	*1 : 0.187*
18	*991 207*	*149 643*	*1 140 850*	*1 : 0.151*
19	*1 004 666*	*148 007*	*1 152 673*	*1 :0.147*
20	*904 566*	*92 642*	*997 208*	*1 :0.102*
Total	***19 455 875***	***3 458 740***	***22 914 615***	***1 : 0.178***
Source: Alkane Resources Ltd				

The 1Mtpa refers to an approximation of the annual extraction of ore. The maximum annual total material extraction presented in ***Table 2.4*** is 1 674 227t (in Year 11) and refers to both ore and waste rock.

The EPA Wrote:

> *Appendix 6 – page A6-13 notes that borrow areas will be established on the site to provide soil for the embankment fill. Some soil will have to be taken from an external borrow area. External borrow areas do not appear to have been shown or discussed in the EA.*

Clarification is required as to whether impacts at external borrow area's have been assessed and relevant assessments and management measures documented in the EA.

Response

The external borrow areas referenced by DECA (2013) refer to the 'cut' areas of the LRSF cells. Suitable weathered material below the subsoil would be stockpiled within the footprint of the soil stockpile areas for future use in the construction of the Cell C embankment if sufficient material cannot be excavated from the impact footprint of Cell C itself. If this material is not required, it would be replaced within the footprint of the LRSF during rehabilitation activities. As such, the impact of these external borrow areas have been considered in the assessment of the DZP.

4.5 DEPARTMENT OF PRIMARY INDUSTRIES

4.5.1 Introduction

The Department of Primary Industries (DPI) provided a submission summarising the comments of the NSW Office of Water, Crown Lands and Fisheries NSW which was received by the DP&I on 25 November 2013.

A separate submission was received by the DP&I from the Office of Agricultural Sustainability & Food Security (of the DPI) on 29 November 2013.

The following paraphrases the comments of each of these agencies along with a response to any requests for clarification or additional information.

4.5.2 Crown Lands

The DPI-CL wrote:

i) *The use of any Crown road area will require that road to be closed under the Roads Act 1993 and either purchased or some other access/occupation arrangement authorised. The proponent should make early contact with Crown Lands in relation to the occupation of any Crown road.*

ii) *The project area includes Lot 7300 DP 1149010 (Reserve 753220, ... Licence 454835 for Grazing & Agriculture) and Lots 41 & 61 DP 753220 (Reserve 62545,...Licence 454836 for Grazing). The Crown is in the process of negotiating the sale of these lots to adjoining owners. If the sale does not proceed any use of these lots will need to be authorised by the appropriate mechanism under the Crown Lands Act 1989. The proponent should make early contact with Crown Lands to that end before commencing any use or occupation of these lots.*

Response

As referenced in Section 4.1.4.1 and *Figure 4.6* of the EIS, AZL has identified the various lots and roads of Crown Land on or adjoining the DZP Site. Notably, Lots 41 & 61 DP 753220 (Reserve 62545, Licence 454836) are located beyond the DZP Site limit.

The Applicant's preferred access arrangement to these lots and roads is by acquisition and met with representatives of the DPI-CL on several occasions throughout 2013 to discuss this.

4.5.3 NSW Office of Water

4.5.3.1 Introduction

The DPI-NOW submission provides general commentary and requests clarification on information presented in the EIS with respect to:

1. Water Supply and Sources;
2. Surface Water Impacts; and
3. Groundwater Impacts.

The following subsections consider these comments and provide responses where clarification or additional information is sought.

A review of the conditions of consent nominated by DPI-NOW is provided in Section 2.13.2.

4.5.3.2 Water Supply and Sources

The DPI-NOW wrote:

- *The EIS indicates the project will require approximately 4.05 GL in make up water per year for processing and approximately 39.6 ML/yr for dust suppression activities…. As indicated in Appendix 7 the ability to purchase additional High Security entitlement may be limited. The proponent may therefore be reliant on purchasing additional General Security entitlements which will be more subject to reduced allocations.*
- *…….*
- *The Office of Water considers the fractured rock aquifers of the Lachlan Fold Belt Water Source recommended for investigation in Appendix 8 may not yield the proposed volume of 1 GL/yr. The Upper Macquarie Alluvial Water Source however has characteristically higher yields and it is advised any proposal to extract water from this water source will require the development of a plan to mitigate impacts to existing water users and the environment.*

Response

AZL recognises that the development of, and extraction of water from bores within either the Lachlan Fold Belt or Upper Macquarie Alluvial Water Sources will require assessment and development of specific operational controls and safeguards or compensatory measures to

ensure impacts on existing water users and the environment are identified and appropriately mitigated. As stated in Section 2.8.2 of the EIS:

> "*Appropriate assessment of impacts on surrounding groundwater users and the aquifer itself would be completed as part of application(s) for water supply works and use approval(s) under the Water Management Act 2000, i.e. information on the impact of such extraction on other water users and the aquifers more generally is not provided as part of this EIS.*"

NOW's advice with respect to the availability of water within these two water sources is appreciated, however, AZL will continue to explore extracting water from both given the desktop investigation completed by Environmental Earth Science Pty Ltd (EES) and provided as *Appendix 8* of the EIS suggests that up to 1 000ML of water could be drawn from the Lachlan Fold Belt Water Source below the DZP Site.

4.5.3.3 Surface Water Impacts

The DPI-NOW wrote:

- *Section 4.5.4.3 (main EIS) details the proposed sediment and water supply dams proposed for the project and the applicability of Harvestable Rights. A key issue for the proponent to be aware of is the need for landholdings considered in the Harvestable Rights calculation to be contiguous and the water must be used on the same property.*

Response

AZL notes that on approval of the DZP and purchase of the properties within the DZP Site, the landholding will be contiguous and any water harvested used only on these properties.

The DPI-NOW wrote:

- *Section 4.5.5.2 (main EIS) indicates a total reduction in annual runoff during mine-life of approximately 453 ML… The Office of Water confirms there are no existing water licences on watercourses downstream of the proposed site. There are however properties which have riparian frontage and hence the ability to extract water for stock and domestic requirements. It is recommended further assessment of the impacts to these properties be completed, with particular focus on the undefined Macquarie River Catchment.*

Response

Strategic Environmental and Engineering Consultants (SEEC) assisted in the preparation of this response.

In responding to the NOW's request, a note of clarification is provided with respect to the calculated loss in flow presented in ***Table 4.47*** of the EIS. For the larger and defined

Wambangalang Creek catchment, this calculation was based on the entire catchment given the large number of creeks and tributaries contributing to the total flow. Within the smaller and less well-defined Cockabroo Creek and Macquarie River (undefined) Catchments, the calculation was restricted to that portion of each catchment contained within the DZP Site.

The likely impact of the proposed reduction in flow in each catchment is considered as follows.

Wambangalang Creek Catchment (including Paddys Creek and Meadows Creek)

The reduction in flow to Wambangalang Creek (1.3%) is very small and likely to be imperceptible within the creek. Therefore, any impact on availability of water to properties fronting Wambangalang Creek downstream of the DZ Site would be negligible.

Cockabroo Creek Catchment

A reduction in flow of 20ML/yr is considered very minor and unlikely to have any perceptible impact on the availability of water within this catchment. The following also supports the assessment that this reduction is likely to be insignificant.

- When the larger Cockabroo Creek Catchment (as defined by ***Figure 4.2*** of the EIS) is considered, the effective reduction in catchment is reduced to less than 1%.
- Much of the flow within the Cockabroo Creek Catchment is supplied by groundwater discharge (springs) at the slope-break point in the landform (see ***Figure 4.31*** of the EIS). This would be largely unaffected by the small reduction in effective surface water runoff.

Macquarie River (Undefined) Catchment

The affected section of the Macquarie River (undefined) Catchment (5 820ha) is presented on **Figure 3** and consists (predominantly) of Watercourses A and D. Watercourses A and D are intermittent streams which confluence at approximately -32.4294°, 148.6462°. Beyond this confluence point, the combined watercourse is joined by another second order stream and a first order stream at approximately -32.4274°, 148.6458°. The total catchment to this point is about 1 380ha (**Figure 3**).

The upper reaches of the catchment which drain to Watercourses A and D would be affected by some of the cells of LRSF Areas 4 and 5, an area of approximately 91ha. The effective loss of catchment is therefore 7% (91ha of 1 380ha). The corresponding estimated loss in mean annual flow attributable to surface runoff is 65ML out of 977ML.

This revised mean annual loss of 7% is less than that permissible by Harvestable Right and as such a reduction of this magnitude would be practically imperceptible downstream. The lack of significance is more pronounced when considering that it only relates to that part of the flow attributed to surface runoff (i.e. no sub-surface base flow discharge) and only considers the mean annual flow loss (flows would vary significantly from year to year).

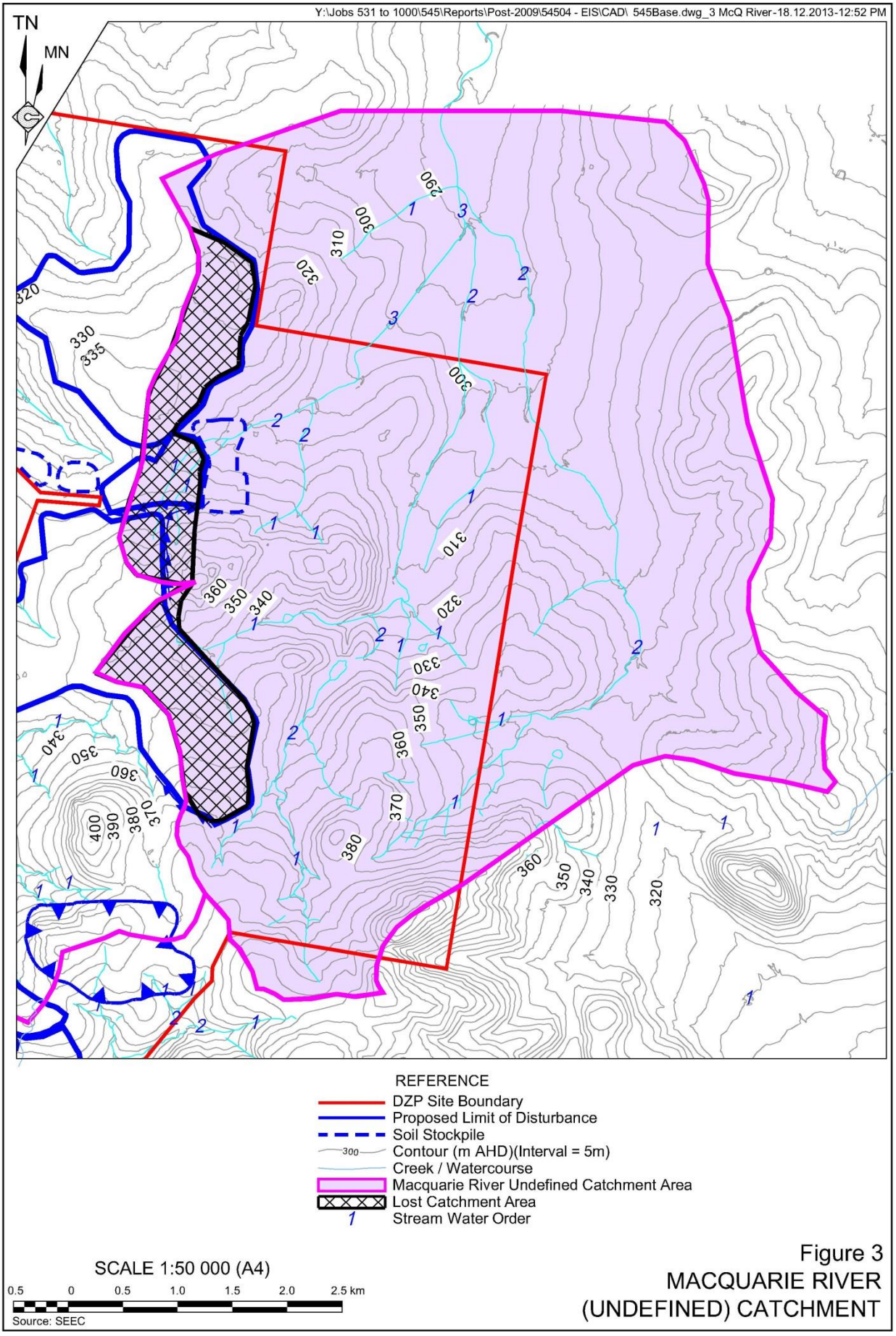

Figure 3
MACQUARIE RIVER
(UNDEFINED) CATCHMENT

It is considered highly unlikely that this minor reduction in mean annual surface flow would impact on the availability of water to downstream landowners for the following reasons.

- The stream beyond the DZP Site becomes a third order watercourse and so, although there are two existing dams, no new harvestable right dams would be permissible on downstream properties.
- The stream becomes somewhat discontinuous downstream before it meets the Macquarie River, draining into a swampy area before it reaches the river. Opportunities to source water from it here would therefore be limited.
- There is no intent of AZL to source water from the existing dams within this catchment. Therefore, this water would flow in and out of these dams during periods of higher rainfall when sourcing of surface flows is most likely.

On the basis of the above, the minor reduction in flow (7%), which is less than the harvestable right for this catchment, would have negligible impact on the availability of surface water within this catchment to downstream landowners.

The DPI-NOW wrote:

- *Based on Figure 4.22 and 4.23 (main EIS) the buffer distances between proposed infrastructure and the banks of Watercourse C are not defined. The NSW Office of Water recommends the "Guidelines for Controlled Activities on Waterfront Land' (CAA guidelines) be addressed when finalising the locations of these structures. A key aspect is that a 20 metre buffer relates to Watercourse C as it is a second order watercourse….*

Response

A 20m buffer will be retained between the DZP Site Administration Area and Watercourse C (see **Commitment 7.11**).

The DPI-NOW wrote:

- *Section 4.1.9 of the Stormwater Assessment refers to approval requirements in relation to structures built within the floodplain…. It is recommended the proponent consult with the NSW Office of Water to confirm the necessary approval requirements prior to commencement of works.*

Response

A Controlled Work for which an approval under Part 8 of the *Water Act 1912* is defined by Section 165A as:

a) an earthwork, embankment or levee that is situated, or proposed to be constructed, on land that:

i. is, or forms part of, the bank of a river or lake, or

ii. is within a floodplain, or

b) any work that is situated, or proposed to be constructed, on land that:

i. is, or forms part of, the bank of a river or lake, or

ii. is within a floodplain,

iii. and that is declared by order of the Ministerial Corporation published in the Gazette to be a controlled work, or

c) an earthwork, embankment or levee, wherever situated or proposed to be constructed, that:

i. affects or is reasonably likely to affect the flow of water to or from a river or lake, and

ii. is used or is to be used for, or has the effect or likely effect of, preventing land from being flooded by water, or

d) any work, wherever situated or proposed to be constructed, that:

i. affects or is reasonably likely to affect the flow of water to or from a river or lake, and

ii. is used or is to be used for, or has the effect or likely effect of, preventing land from being flooded by water, and

iii. is declared by order of the Ministerial Corporation published in the Gazette to be a controlled work.

On the basis of the assessment completed by SEEC (2013), the construction of the DZP Site Administration Area is unlikely to significantly affect the flow of water to Wambangalang Creek. This is therefore not considered a controlled work and an approval under Part 8 of the *Water Act 1912* is not considered necessary.

The above notwithstanding, AZL would consult with NOW prior to construction of the DZP Site Administration Area. Should NOW deem this to represent a controlled work, the assessment completed and presented as *Section 4.1.9* of SEEC (2013) is considered sufficiently detailed to allow for NOW to issue the approval.

The DPI-NOW wrote:

- *Section 8 of the Stormwater Assessment indicates the proposal to modify road bridge structures to improve the flood clearance level. The NSW Office of Water recommends works within 40 metres of waterfront land is carried out in accordance with the CAA guidelines.*
- *The proposed water pipeline and natural gas pipeline will cross several minor drainage lines. In addition, the water extraction point on the Macquarie River will require disturbance to the river bed and banks. The NSW Office of Water recommends works within 40 metres of waterfront land be carried out in accordance with the CAA guidelines.*

- *A number of clean water diversions are proposed to divert water around proposed infrastructure and in some instances infrastructure is proposed over an existing watercourse (eg. SRSF in upper reach of Watercourse C shown in Figure 4.27). It is recommended diversion structures and consideration of offset requirements be developed in accordance with the CAA Guidelines.*

Response

AZL confirms that all works within 40m of waterfront land will be completed in accordance with the CAA Guidelines (see **Commitment 7.14**)

4.5.3.4 Groundwater Impacts

The DPI-NOW wrote:

- *A reduction in recharge due to the SRSF is predicted to result in a 1 to 3 metre reduction in the water table. An increase in recharge from the open cut is predicted to minimise the impacts, however this has not been considered in term of timing of the impacts. The proposed monitoring is supported to verify impacts to enable consideration of contingency requirements as necessary.*

Response

It is noted that the proposed increase in recharge would occur following cessation of mining when open cut dewatering ceases.

The DPI-NOW wrote:

- *The potential for contaminants to enter the groundwater from the Solid Residue Facility, Liquid Residue Storage Facility and Salt Encapsulation Cells is recognised in the EIS…. the Groundwater Assessment recommends further investigations be carried out to confirm the presence of permeable aquifers to enable consideration of adequate mitigation measures, which is also supported.*

Response

As part of the final design phase of the LRSF, additional boreholes along the perimeters of the proposed LRSF would be drilled and hydraulic testing undertaken to evaluate aquifer properties (as per the recommendations of EES, 2013). If high permeability alluvial aquifers are identified below the proposed LRSF, modification to the extent of the LRSF could be required. However, if this is impractical, AZL would either:

- construct the LRSF cells with a double liner system with leakage detection and capability to pump any leakage similar to the SRSF; and/or
- design and/or install a quick response seepage interception system as part of the Groundwater Management and Mitigation Plan.

The DPI-NOW wrote:

- *The significantly high salinity water to be stored in the LRSF represents a risk to local groundwater and surface water systems. The ability to ensure adequate initial investigations and the implementation of mitigating measures and contingency plans is critical.*

Response

AZL has committed to the implementation of a comprehensive suite of controls, safeguards and monitoring measures focussed on the design, construction and operation of the LRSF. These measures would be formalised as part of a Residue Storage Facility Management Plan for the DZP to be prepared in consultation with NOW (see **Commitment 19. 2**).

The DPI-NOW wrote:

- *Section 6.2.3 of the Groundwater Assessment indicates a decision on whether the Salt Encapsulation Cells (SEC) will remain on-site or be removed is yet to be made … The proposal in Section 2.9.4.4 of the main EIS to pump any leakage from the SEC's post closure to the LRSF may not be possible if the liner of the LRSF has been removed. It is therefore recommended this be given further consideration.*

Response

While AZL continues to investigate options for the re-use, sale or off-site disposal of the salt residue, the EIS has considered the disposal, management and rehabilitation of this material on-site.

It is noted that leakage of the liners installed with the SEC's would be unlikely given the design, installation and testing protocols to be followed (refer to *Section 4.6.4.2.5* of the EIS). Prior to the closure of the site, a hydrogeological investigation of the structures would be completed to confirm no breach of the liner. In the unlikely event that saline leakage from the SEC's is identified and requires management, at least one lined LRSF cell would be maintained to collect this saline water until such time as either the leak / breach is remediated or an alternative solution is identified, approved and implemented. This would require AZL to retain ongoing responsibility for the DZP Site until such time as the leak can be remediated.

The DPI-NOW wrote:

- *The Office of Water supports the proposal to develop a Groundwater Management and Mitigation Plan prior to commencement of activities. Monthly groundwater level measurements are recommended to ensure early detection of any potential leakage. The recommendations in Section 7 of the Groundwater Assessment are supported.*

Response

AZL has committed to the preparation of a Groundwater Management Plan and Surface and Groundwater Response Plan (see **Commitment 19.2**).

4.5.4 Fisheries NSW

Fisheries NSW have recommended conditions of consent which are reviewed in Section 4.12.2.2.

4.5.5 Office of Agricultural Sustainability and Food Security

The DPI-OASFS wrote:

> ***Specific Agricultural Impact Assessment Issues***
>
> *Under the current project design, a significant area appears to be potential biophysical strategic agricultural land (BSAL); particularly the area designated Area 5 of the Liquid Residue Storage Facility. Every attempt should be made to avoid this area if it cannot be returned to its former productive potential post mining.*
>
> *Agriculture NSW notes that there has been no identification or mapping of BSAL. From the information supplied, the Wongarbon and part of the Bald Hill soil landscapes may be considered to fit into this category. This land should be restored to its former capability and productive capacity where possible.*
>
> *Agriculture NSW notes that no mention of BSAL has been made throughout the soils assessment. The proposal should clearly identify the extent of BSAL to be disturbed, provide justification for doing so, articulate why any other areas cannot be used if BSAL will be disturbed, and commit to rehabilitating this land back to its former productive capacity.*

Response

Biophysical Strategic Agricultural Land (BSAL) was not mapped nor identified as part of the EIS for the DZP as the amendment to the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) (Mining SEPP) had not been gazetted prior to the EIS being placed on public exhibition[6]. It is also noted that the map identifying BSAL over the DZP Site (Strategic Agricultural Land Map – Sheet STA_022) remains on exhibition for public comment.

While mapping of verification of BSAL on the DZP Site is not required on the basis of the above, **Figure 4** provides an illustration of the BSAL mapped over the DZP Site Layout by Strategic Agricultural Land Map – Sheet STA_022 (DP&I, 2013).

[6] The Mining SEPP amendment 2013 was gazetted on 4 October 2013, which follows the exhibition of the EIS on 18 September 2013.

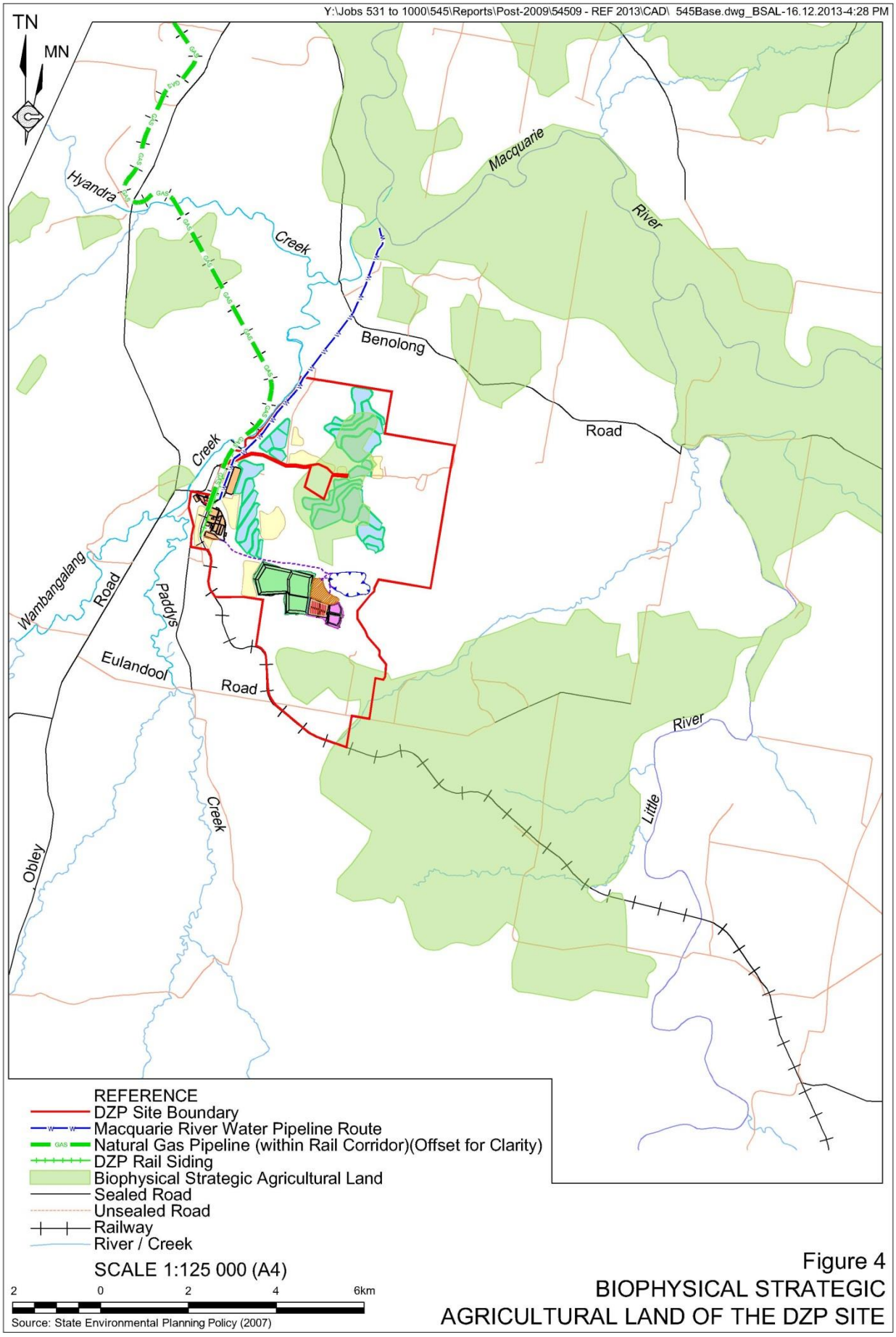

Figure 4
BIOPHYSICAL STRATEGIC AGRICULTURAL LAND OF THE DZP SITE

Figure 4 suggests that 148ha of LRSF Areas 4 and 5 occur on land identified as BSAL by the mapping currently on exhibition. A desktop review of the potential BSAL on the DZP Site undertaken by SSM, and their knowledge gained through on site investigations suggests that this BSAL mapping likely overstates the BSAL of the DZP Site. BSAL is more likely to be confined to the flatter land adjoining Wambangalang Creek.

Justification for use of Areas 4 and 5 for the placement of the LRSF are documented in *Section 2.9.3.2* of the EIS. Essentially, the properties of the soils and subsoils that suggest these areas as BSAL, also present the properties required for the construction and management of the LRSF cells. Reference is also made to *Section 6.1.6* of the EIS which further discusses the alternative locations considered for the LRSF and the reasons for choosing Areas 2, 3, 4 and 5.

The above notwithstanding, AZL has provided for targeted rehabilitation practices to return the disturbed areas of the LRSF back to agriculturally productive land. It is noted that the proposed final Land and Soil Capability Class of 4 is a slight reduction on the Class 3 nominated currently. Considering the current land use over these areas is more akin to that nominated for Class 4 or 5, this is considered appropriate and achieves the DPI-OASFS request for a commitment to "*rehabilitating this land back to its former productive capacity*". This has been formalised as **Commitment 13.24**.

The DPI-OASFS wrote:

Socio-economic Assessment

1. *Impacts on agricultural enterprises, including farm productivity, land values and flow on impacts to regional communities and the environment…*
   a) …
   b) …
   c) Flow on impacts to regional communities

   It is suggested that as a condition of consent, the proponent be required to commit to using rail as the primary mode of transport. For more detailed comments
2. *…*
3. *…*
4. *…*
5. *Mitigation measures for minimising adverse impacts on agricultural resources, including agricultural lands, enterprises and infrastructure at the local and regional level.*
   d) …
   e) …
   f) Agricultural infrastructure

   The proponent does not commit to using rail transport. If the proponent were to rely on road transport, the Project may have significant adverse impacts on regional road infrastructure. As a condition of consent, it is recommended that the proponent be required to commit to using rail as the primary mode of transport.

Response

As documented in the EIS, AZL cannot commit to incorporating rail into the transport task until various logistical, operational and economic factors are reviewed and resolved. Section 2 provides further clarity on AZL's approach to assessing and implementing the rail transport option should it prove feasible.

The above notwithstanding, the EIS provides a detailed assessment of the likely impact of the proposed road transport on road users, local landholders and the regional road infrastructure. This assessment (*Section 4.12* of the EIS) confirms that with the implementation of the various road upgrades, controls and safeguards, the DZP would not impact significantly on local road infrastructure and in fact would result in the construction and maintenance of a local road far superior to that provided by Obley Road currently.

4.6 NSW OFFICE OF ENVIRONMENT AND HERITAGE

4.6.1 Introduction

The OEH has reviewed the EIS and development application against the requirements of the *National Parks & Wildlife Act 1974* (NPW Act), *Threatened Species Conservation Act 1995* (TSC Act) and *Native Vegetation Conservation Act 2003* (NVC Act). These Acts consider the assessment of impacts of developments on matters of Aboriginal cultural heritage, threatened biodiversity, and native flora and fauna management issues more generally. The various issues raised are paraphrased below and responded to, with additional information provided by OzArk where required.

4.6.2 Breadth of Coverage

OEH wrote:

1. *Certain project components are not included in the project scope*

   ...As stated in our adequacy assessment provided to the Department of Planning on 29th July 2013, OEH is of the opinion that, as the ETL is required for the operation of the Zirconia Project, a full assessment of the impacts of the powerline should have been included with this EA…

Recommendations

1.1 That the proponent commits to thorough environmental assessments for both the proposed powerline and the limestone quarry, with these assessments to include detailed flora, fauna and cultural heritage studies as well as considering the cumulative impacts of all components relating to the DZP.

1.2 That the impacts on native flora and fauna for the powerline and limestone quarry are quantified using the Biobanking Assessment Methodology (BBAM) and an adequate offset package formulated.

Response:

AZL can confirm that the appropriate rigour will be applied to the assessment of the 132kV power line (to be assessed and determined under Part 5 of the EP&A Act) and Geurie Limestone Quarry (to be assessed and determined under Part 4 of the EP&A Act) with respect to flora, fauna and cultural heritage.

The BioBanking Assessment Methodology will be used to quantify impacts associated with both assessments.

4.6.3 Threatened Biodiversity Issues

OEH wrote:

2. Avoidance of significant native vegetation

The development includes 0.1 hectares of the EEC Fuzzy Box – Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and Southern BBS Bioregion (CW 318)…

Recommendations

2.1 OEH requests that the remaining 0.1 ha of Fuzzy Box Woodland EEC is either avoided or a strong case be made as to why complete avoidance is not possible.

Response:

The area in question is located towards the upper eastern perimeter of LRSF Area 2. To modify the LRSF to avoid what is effectively a paddock tree over a relatively weedy understorey would reduce the capacity of LRSF Area 2 by 10% to 15% thereby compromising the overall water balance for the DZP Site.

It is considered that impact to this 0.1ha of Fuzzy Box Woodland EEC which is isolated and in low to marginal condition is more than adequately compensated for through the conservation and enhancement of 23.3ha of this EEC within the proposed Biodiversity Offset Area.

While avoidance cannot be achieved this this instance AZL can confirm that land adjoining Wambangalang Creek has been earmarked for rehabilitation and/or habitat enhancement within the Biodiversity Offset Area involving species consistent with Fuzzy Box EEC (CW138 Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion) (see *Table 14* of OzArk (2013a) - "On flats near creeks"). Land the would be the subject of rehabilitation along the creek exceeds 0.1ha.

4.6.4 BioBanking Calculations

OEH wrote:

3. Errors in Biobanking calculations

Species Credits have been incorrectly calculated resulting in errors in the calculation of credits required to offset the development.

Section 8.3.3 provides an introduction to BBAM. The definition of Species Credits provided has been misinterpreted and has led to an error in inputting information into the BioBanking calculator…

Recommendations

3.1 OEH requests that the BioBanking credit calculator be re-run in order to generate a correct credit report.

Response:

OzArk has indicated a willingness to address the species credit issue identified by OEH, however, technical issues are preventing recalculation of the DZP BioBanking work in progress[7]. OzArk has indicated an appointment with OEH (Dubbo) will be made to work directly from the OEH server to address the problem.

4.6.5 Road Traffic

OEH wrote:

4. Impacts on increased road traffic on fauna

… while there is some discussion of other impacts included in the EA, the potential impacts of increases in road traffic on fauna have not been included.

Recommendations

4.1 That the potential impacts of increased road traffic on fauna be assessed, and any practical mitigation measures included in the Statement of Commitments.

Response:

Reference is made to Section 7.3.3 of OzArk (2013a) which provides the following recommendations.

- *An increased risk of vehicle collision exists within the DZP Site within both the construction phase and operation of the Proposal:*
  - *All machinery should be speed limited as directed by AZL (nominally maximum of 20km/h) at night to reduce the risk of collision with arboreal fauna and nocturnal birds (dunnarts, gliders and owls).*
  - *A reporting system should be adopted resulting in disciplinary action for employees breaking the legal speed limit to and from work. Many Kangaroos are observed along Obley Road and as such a higher level of risk to fauna, people and assets are noted. This OH&S requirement not only protects the employer, who is responsible for the employee on their journeys to and from work, it would reduce the risk of harm to wildlife. Implementation of this system is achieved through administrative controls such as inductions, policies and procedures.*

[7] Previous advice and assistance provide by the Hurstville BioBanking team identified the DZP is extremely large (7 assessment circles, data entered for each Bioregion that divides the development area) and can no longer be altered remotely without crashing the system.

Commitments 9.20 and **9.21** have been included to adopt these recommendations.

The use of wire rope safety barriers in preference to clearing of important habitat trees (see **Commitment 14.5**) would also reduce the potential for mortality of arboreal fauna.

4.6.6 Macquarie River Water Pipeline Vegetation

OEH wrote:

5. Identification of vegetation communities along water pipeline

Section 5.2.3 of the Terrestrial Ecology Report describes the Macquarie River Water Pipeline easement as passing through predominantly cropped and grazed paddocks. Section 4.6.2.3 indicates that additional surveys were conducted by OzArk over the Macquarie River Water Pipeline easement.

The description of vegetation communities along the route of the proposed Macquarie River Pipeline (Section 5.2.3 of the Terrestrial Ecology Report) largely relies on results from surveys conducted in 2002, and provides limited detail regarding the vegetation communities along this easement. Indeed, this section states, ...

Recommendations

5.1 That the vegetation communities along the Macquarie River Pipeline easement be clearly identified, mapped and quantified consistent with BBAM

5.2 Any native vegetation to be impacted along the Macquarie River Pipeline easement should be offset as part of the overall Biodiversity Offset Strategy.

Response:

As nominated in Section 3.1, on Thursday 12 December 2013 a qualified ecologist (of OzArk) re-surveyed the Macquarie River Water Pipeline. A brief letter report has been prepared (OzArk, 2013c - see **Appendix 1a**) which confirms no areas within the Macquarie River Pipeline have been identified as possessing native vegetation. The pipeline is 100% located in cleared agricultural ploughed land dominated by an understory greater than 50% weeds. On the basis of the result of the additional survey, no additional BBAM work is required and the existing mapping in the report is sufficient.

4.6.7 Aboriginal Cultural Heritage

OEH wrote:

Point 1: Aboriginal sites and landscapes within the project Area

... OEH has further examined the distribution of Aboriginal sites listed in the OzArk report with landform mapping produced for Brigalow Belt South Bioregion (BBSB) (RACD: 2002). The map scale is 1:50k compared to 1:250k for Mitchell Landscape maps used in the OzArk report. ...

... However the dominate features of the Soil mantled slope negate it being considered an ACH sensitive landform. Virtually all of the sites located among this landform are associated with minor drainage. The potentially more significant landform category in the study area is Alluvium which forms the western boundary of the development proposal. The dominant feature of this landform in the project area is Wambangalang Creek. The Mitchell Landscape mapping presented in the OzArk report was viewed as too coarse to compare effectively with the BBSB landform mapping and evaluate site distribution patterns.

Response (provided by OzArk):

OzArk notes that the BBSB landform mapping is more accurate than the Mitchell Landscape mapping. It is also noted that the results of OzArk (2013b) correlate where the Soil mantled slopes are present. Notably and unfortunately, GIS data for the BBSB is not publically available and therefore OzArk has used Mitchell landscapes, the publically available dataset. Furthermore, the BBSB GIS only covers 50% of the areas assessed, as the remaining 50% occurs within a completely different bioregion. Therefore, in order to provide consistent and accurate representation of data and findings across the entire assessment area, the Mitchell Landscapes is preferred.

Although it may be the case that the Alluvium landform adjacent to Wambangalang Creek has a higher sensitivity under the BBSB mapping system, the factors outlined in response to OEH Points 2 and 3 below illustrate adequate assessment of this area. All areas of impact were surveyed with particular intensity along waterways, and disturbance levels are high where impacts are nearby to the major waterways. Additionally, the vast majority of the impact footprint is over 70m from Wambangalang Creek and the Macquarie River, and a high majority is over 200m distant.

OEH wrote:

Point 2: Toongi-Dubbo Rail Line and Gas Corridor

No Aboriginal sites have been recorded around the creek intersections within the rail easement. In lieu of the limited details of the creek inspections undertaken within the corridor OEH advises caution when excavating trenches for the pipeline and expect that the Aboriginal Heritage Management Plan address this with appropriate strategies.

Point 3: Macquarie River Pipeline Route

The Macquarie River Pipeline route follows, in part, parallel to Wambangalang Creek. It is difficult to ascertain in the report the extent of harm from the proposed pipeline that may affect ACH in this area, particularly survey units MM-8 and MM-7. The report tables only two isolated finds in this area. OEH expects the ACHMP will action particular attention in areas where the development proposal intersects Wambangalang Creek and its confluences with minor creeks.

Response (provided by OzArk):

The Macquarie River Water Pipeline route has recently been altered (see OzArk 2013d), but considerations of proximity to water are similar. Aside from the termination at the Macquarie river, the pipeline is no nearer than 70m to a major waterway (i.e. Wambangalang Creek). The pipeline has been entirely surveyed and is within an area of heavy agricultural use. Test excavations in the northern section of the pipeline revealed that even near major waterways, ploughing is likely to have impacted throughout artefact-bearing soils.

Considering the potential for Aboriginal site associated with Wambangalang Creek other than the pipeline, only the rail/gas easement intersects with the creek. As is noted in the report "*Areas that were more closely examined consist of terraces adjacent to creeks and the creeks themselves* ..." (OzArk 2013b, p.55).

OEH wrote:

> *Point 4: Aboriginal consultation and cultural Significance evaluations*
>
> *The report indicates that Aboriginal people have been involved in the project and have been provided an opportunity to participate and form opinion of the project results. OEH accepts and supports the community summaries (Appendix 1) regarding the significance of ACH discovered in the project area. …OEH records show that the AHIMS site cards report that each site is significant to Aboriginal people.*

Response (provided by OzArk):

OzArk concurs with OEH. Nolan's 2002 report that identified a number of the sites in the DZP footprint are considered by Dubbo LALC as follows:

> *"All Aboriginal sites in the LALC area are considered as being highly significant to members of the Aboriginal community…These sites are valued evidence of Aboriginal occupation in the area and provide a direct physical link with the past.' and 'Many Aboriginal sites in the Dubbo area are valued as an educational resource. This value is dependant on the site's potential for interpretation by a general visitor audience, feasible site access, and management resources." (Nolan, 2002, p.8)*

This is generally compatible with the cultural values offered in the current assessment. However, the statement in the current assessment that "... *all sites have some level of cultural value*" (OzArk, 2013b, p.112) suggests variable value whereas the 2002 assessment indicates that all sites have high value.

OEH wrote:

> *Point 5: Recommendations and Management Plan proposal*
>
> *Overall, OEH accepts the broader elements of the report's recommendations that site contents will be either salvaged or surface artefacts collected. The framework of the*

ACHMP is sound but requires further clarity. OEH wishes to defer further comments until the development of the ACHMP commences post project approval. In the meantime, OEH supports further test excavation of areas selected by OzArk for the purpose of better informing the project proposal of sensitive areas.

Response (provided by OzArk):

As OEH notes, there will need to be further clarification of salvage (surface collection / no sub-surface salvage) strategies in the formation of the ACHMP. OzArk intended this as can be seen in the recommendations. The ACHMP, will detail a salvage methodology and OEH will be given the opportunity to review this document.

A test excavation was conducted at TS-OS-03 and TS-OS-05. There are other PADs, however, these are not within the impact footprint of the DZP. The OEH suggestion that there should be further test excavation implies that they consider some sites within the impact footprint as having PADs, which other than TS-OS-03 and TS-OS-05, OzArk have not assessed in this way.

4.7 DEPARTMENT OF TRADE AND INVESTMENT, REGIONAL INFRASTRUCTURE AND SERVICES – DIVISION OF RESOURCES AND ENERGY

The DRE has commented on the final land use of the DZP Site presented in the EIS. The following sub-sections paraphrase the comments received from the DRE along with a response to these.

The DRE wrote:

The proponent must develop a final land use that is consistent with existing surrounding land uses and zonings.

In Figure 2.1 Indicative Final Land Use, the final land use for the processing and administration areas are shown as potential industrial land uses. Similarly, in Section 2.17.6.2 Decommissioning Activities, proposes to retain the rail line infrastructure, Macquarie River pipeline, natural gas pipeline, electricity transmission lines, transformers and substations and the access road for potential industrial land uses.

DRE prefers the post mining land use to be consistent with existing land use strategies in the region. As a future industrial use has not been approved the proponent must assume these areas will be rehabilitated to a land use consistent with existing surrounding land uses and zonings, which is predominantly grazing agricultural use. Therefore the majority of the retained infrastructure is not compatible with that use.

Response:

AZL notes that the land in question is zoned RU1 Primary Production and SP2 Infrastructure (Railway). Retention of the rail line and associated rail infrastructure within the SP2 zone is considered consistent with the zoning regulations of the Dubbo Local Environment Plan 2011.

It is accepted that future development for purposes other an agricultural, environmental protection or road would require development consent.

On the basis of the above, AZL will modify future final land use and rehabilitation plans to reflect a return of land within the RU1 zone to agriculture until such time as an appropriate approval is obtained for an alternative development.

The DRE has also recommended several conditions of consent relevant to final land use and rehabilitation. These are reviewed along with comments and on the suitability of these in the DZP in Section 4.12.3.

4.8 TRANSPORT FOR NSW / ROADS AND MARITIME SERVICES

The submission of Transport for NSW (TfNSW) focuses on the proposed delay in the assessment and decision on the feasibility and implementation of Transport Option A (incorporation of rail to Toongi).

TfNSW wrote:

> *Of particular concern is the proposal to undertake a full assessment of transport option 'A' five years after the project has commenced. Transport for NSW does not consider this to be acceptable.*

Response

Section 2 provides further clarity on AZL's approach to assessing and implementing the rail transport option should it prove feasible. Importantly, and contrary to the interpretation of TfNSW, this process would be completed within five years, not commenced after five years.

TfNSW also wrote:

> *It is requested that a full and thorough assessment of the transport options identified in the Traffic Impact Assessment, including specific details of the exact transportation arrangements to be implemented throughout the life of the project, be completed prior to the Department of Planning and Infrastructure making its determination.*

Response

It is on the basis that there remain significant logistical, operational and economic variables to be addressed with respect to the feasibility of rail transport that the three transport options were presented and assessed in the EIS (and Traffic Impact Assessment). The information presented in the EIS does, however, provide a level of detail appropriate to the assessment of environmental impacts associated with each option.

Road Transportation

With respect to the proposed road transport options (B and C), the average volume of road traffic considered represents the likely worst case, i.e. the maximum number of movements required to transport reagents to and products from the DZP Site. All movements would access

the DZP Site via Obley Road (from the north) and Toongi Road, distributed relatively evenly over 24 hours. This provides the specific details of the road transportation task on local roads as requested by TfNSW.

It is acknowledged that beyond Obley Road, the exact source of some reagents, and therefore route to Obley Road, remains to be confirmed. However, this only affects the road network beyond Obley Road, i.e. which state highway (Golden, Mitchell or Newell), the trucks would travel on. Given the proportional increase in traffic movements on these roads would be minimal (see **Table 3**), and the designation of these as RAV routes (which recognises these as the preferred roads for the transport of road based freight), specification of the transport arrangements on these roads is not necessary. It is also a reasonable situation that some flexibility be retained by AZL in the sourcing and transport of reagents required by the DZP (subject to this not exceeding the volume of traffic movements assessed in the EIS and compliance with relevant road and transport standards, such as ADG 7).

The Traffic Impact Assessment completed by CSPL (2013) and EIS therefore provides for the specific details requested of the road transportation options, along with a comprehensive assessment of the potential impacts of these worst-case traffic levels on the local roads to be used (Obley Road, Toongi Road and the affected intersections), intersection performance and other road users considering the proposed road upgrades, modifications and other management measures proposed[8].

Rail Transportation

It is not possible to provide the specific detail of future rail transportation on the basis that the detailed review of the logistical, operational and economic factors influencing the feasibility and application of this method of transport remain ongoing. This should not preclude the assessment and determination by DP&I as AZL is committed to completing the review within five years of the granting of development consent, and providing TfNSW with the requested level of detail with respect to rail line construction, operation, management and integration with the rail and road network (see below).

TfNSW also wrote:

> *This ("full and thorough assessment of the transport options identified in the Traffic Impact Assessment"[9]) should include, but not be limited to, the following:*
>
> 1. *A full case for reinstating the Dubbo to Toongi rail line, including a preliminary scoping study, which has been reviewed and confirmed by Transport for NSW, should be submitted ... Accurate assessments of the likelihood of transport option 'A' being implemented with and without Government funding need to be prepared.*

[8] Section 4.2.2 (Response to Dubbo City Council) also references additional commitments with respect to road upgrade and construction which would further safeguard against impact.

[9] Text in " " added by RWC.

Response:

AZL will provide the requested information following the completion of the current review into feasibility and implementation of the rail transport option.

2. *… If the rail line is to be re-opened then Transport for NSW and RMS maintain that all crossings of the Mitchell Highway should be to a grade separated standard and this requirement form a base case for the scoping study …*

Response:

Should the feasibility of rail transportation be confirmed, detailed engineering studies would be completed to review and present the most appropriate level crossing arrangements. TfNSW and RMS would be consulted and liaised with as part of this process.

3. *Traffic volumes for the Mitchell and Newell Highways used in the Traffic Impact Assessment appear to be low. This is particularly relevant for the assessment of impacts at the Obley Road and Newell Highway intersection and the Mitchell Highway rail level crossing. Roads and Maritime questions the projected queue of 96 vehicles (p11-69), it is likely to be greater than this. Notwithstanding the discrepancy, a queue of 96 or more vehicles is considered by Roads and Maritime to be an unacceptable delay to the Highway which will cause further delays and disruptions to the wider road network.*

Response:

With respect to the Newell Highway traffic volumes, CSPL (2013) used available AADT data from the RMS and applied an annual growth factor to predict current and future traffic levels. Based on this, as well as manual traffic counts conducted at the Newell Highway – Obley Road intersection, CSPL (2013) completed an analysis of the performance of this intersection with and without the addition of traffic from the DZP using SIDRA. *Table 16* of CSPL (2013) is presented below.

Table 16 - Modelled Future Traffic Conditions – Peak Operation

Intersection	***Scenarios***	***Peak Flow***	***DoS***	***Delays (Sec)***	***LoS (worst)***	***Queue (m)***
Newell Highway and Obley Road	*Background Traffic (2036)*	*905*	*0.312*	*15.0*	*B*	*10.3*
	Background Traffic (2036) + DZP Traffic	*939*	*0.339*	*15.1*	*B*	*11.8*
Newell Highway and Boothenba Road	*Background Traffic (2036)*	*1,217*	*0.500*	*32.4*	*C*	*20.6*
	Background Traffic (2036) + DZP Traffic	*1,238*	*0.508*	*33.8*	*C*	*20.8*

As discussed in CSPL (2013), the SIDRA analyses confirms that the influence of the proposed DZP traffic on the performance of the intersection in it current form would be insignificant.

The performance of the Mitchell Highway level crossing would be reconsidered should rail be identified as a feasible transport option. This being said, the nominated maximum 96 car queue length is considered conservative based on a crossing closure of 5 minutes (which could be considerably shorter depending on rail timetable, train speed, train length, signalling arrangements and upgrade to the interface of the Toongi-Dubbo Rail Line with the Main Western Rail Line [Dubbo Triangle]).

4. *The Traffic Impact Assessment (p11-25) states that there will be no crossings of classified roads for the gas pipeline, however other parts of the documentation refer to a crossing of the Mitchell Highway for the gas pipeline. If a gas pipeline is proposed to cross the Mitchell Highway, Roads and Maritime requires the proponent to enter into a Pipeline Road Crossing Deed to cover the works, maintenance and liability for the pipeline crossing of the Highway.*

Response:

It is confirmed that the proposed gas pipeline between a Central West Pipeline offtake at Purvis Lane and the DZP Site would require crossing of the Mitchell Highway and Golden Highway within Dubbo.

AZL confirms it would enter into a Pipeline Road Crossing Deed to cover the works, maintenance and liability for the pipeline crossing of the Highway.

5. *Further detail on the likely train make up and frequencies required to service the project's transportation requirements between Port and Dubbo and/or Toongi …*

Response:

As discussed previously, this cannot be provided at this time. The relevant detail will be presented to TfNSW should the feasibility review currently underway confirm that the logistical, operational and economic issues associated with rail to the DZP Site can be addressed.

6. *Further detail on the mining outputs associated with the project, including the transport arrangements to support this, such as daily/week tonnages, mode and configurations, route, time of day travel (if necessary) and destination(s) should be supplied.*

Response:

On an annual basis the DZP would produce approximately 25 600t of rare earth product (in solution), 4 000t of ferroniobium and up to 45 000t of zirconia products.

At this time, the destination of the products cannot be confirmed and will be dictated by customer and port capabilities closer to the date of production. It can be confirmed that all products would be exported from the Toongi site in full container loads, the zirconia and ferroniobium products packaged in bulk bags while the rare earth products in bulky boxes. The product containers would be trucked to the selected port facilities for loading onto the export vessels. The timing of product dispatches from the site would be determined by the individual customer order requirements, however, it is AZL's intention to schedule product despatches in accordance with the times of day selected as being preferable for the receipt of reagent deliveries.

7. *Further detail on rail level crossings situated between Dubbo and Toongi, the infrastructure required supporting the safe operation of these crossings and any mitigation measures necessary should be supplied …*

Response:

Section 2.2.4.4 of the EIS provides an initial description of the likely arrangements at the critical level crossings between the Main Western Rail Line and DZP Site. These arrangements reflect the recommendations provide by UTS Rail Pty Ltd, commissioned to provide a concept proposal for modifications to be submitted to the rail network owners (ARTC) (UTS Rail, 2012). Further and more detailed review and design would be prepared should the rail option be confirmed as logistically, operationally and economically feasible.

8. *Confirmation from the proponent that Fletcher International Exports can accommodate the proponent's requirements within their rail terminal should transport option B be implemented … . Should transport option B be the transport option implemented, It is requested that the conditions of consent include a clause requiring that the proponent ensure a suitable rail terminal is sourced within an acceptable period of time should existing terminal access change for any reason during the project life. Any change in terminal arrangements should involve the preparation of a new traffic assessment.*

Response:

The recommendations of TfNSW are considered reasonable and accepted by AZL.

9. *Further detail on the proposed gas pipeline to be contained within the rail corridor, regarding the design (including its proposed location in relation to the rail track and any proposed structures), construction and operation of the pipeline. The design must comply with all other aspects of CRN CS 540 Service Installations in the Rail Corridor. However, Transport for NSW would prefer that the pipeline is constructed outside the rail corridor. Further comments surrounding the gas pipeline are included in* ***Tab B****.*

Response:

The rail easement represents the most practical alignment for the gas pipeline, although there is potential for the Obley Road easement between the Cumboogle level crossing and the DZP Site (as this provides a more direct alignment).

The detailed design for the pipeline would be provided as part of an application for a pipeline under Part 3 of the *Pipelines Act 1967*. This notwithstanding, AZL would ensure that the design and installation of the pipeline would meet the applicable codes and standards, being *CRN CS 540 Service Installations in the Rail Corridor* and *AS 1799-2000: Installation of Underground Utility Services and Pipelines within Railway Boundaries*. AZL would ensure that the design and installation requirements specified within Tab B of the TfNSW submission are adhered to.

10. *RMS has also provided Indicative requirements for major gas route crossings outlined at* ***Tab C****.*

Response:

AZL would ensure that the information requirements for works undertaken in installing the pipeline within the Mitchell and Golden Highway easements (as provide in Tab C of the TfNSW submission) are provided and approved or confirmed by RMS prior to the commencement of works.

11. *… The potential for soil contamination of the existing rail corridor must be assessed prior to any works commencing on site.*

Response:

This is acknowledged and a contaminated lands assessments would be completed, for those sections of the rail corridor where removal and replacement of ballast is required, should the current review of the rail transport option confirm the feasibility of rail transportation. The contaminated lands assessment would form part of the detailed rail design to be completed should AZL move forward with the rail transportation option (to be confirmed within five years of issue of the development consent).

TfNSW also wrote:

> *... A business case for re-instatement of the line would need to be developed by the proponent to support re-opening the rail line. The following additional matters are to be noted by the proponent when preparing the business case:*
>
> 1. *The interface point between the ARTC Leased Network and the Country Regional Network is on the Dubbo side of where the rail corridor crosses Wingewarra Street. The operational\signalling interface would need to be moved further towards Toongi at a point where a train waiting on acceptance onto the ARTC network would not block any level crossing.*
> 2. *The EIS states that a license agreement between John Holland Rail and the applicant would be required to upgrade the Toongi to Dubbo rail line. This agreement would in fact be between Transport for NSW (CRC) and the applicant.*
> 3. *The proponent should ensure that all assessment and design involving rail infrastructure complies with the Rail Safety National Law, including substantial operational interface and risk management processes…*

Response:

These requirements are acknowledged and accepted.

4.9 NSW HERITAGE COUNCIL

The NSW Heritage Council raises no objection to the DZP on the basis of the recommendations contained within the Historic Heritage Assessment, namely:

- archival recording of rail bridges that are assessed to have local significance (but are not currently listed on the LEP);
- heritage inductions; and
- actions on discovery of historic relics.

A review of the NSW Heritage Council's recommended consent conditions is provided by Section 4.12.4.

4.10 COMMONWEALTH DEPARTMENT OF THE ENVIRONMENT

In correspondence provided to the DP&I on 19 November 2013, the DOE provided support for the assessment of impact on the potentially affected EPBC Act Matters of National Environmental Significance and proposed offset measures. The DOE wrote:

> *The Department considers that the proposed offset for the EPBC listed Pint-tailed Worm Lizard meets the requirements of the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (October 2012) and the Offsets Assessment Guide, including funding for in perpetuity management.*

A review of recommended conditions of consent requested by the DOE is provided in Section 4.12.5.

4.11 TARONGA CONSERVATION SOCIETY AUSTRALIA

4.11.1 Introduction

On Tuesday 22 October 2013, a meeting between the Applicant, represented by Mr Mike Sutherland (General Manager NSW), Mr Nicholas Earner (Chief Operations Officer) and Mr Alex Irwin (Senior Environmental Consultant of RWC and primary author of the EIS), and Taronga Conservation Society Australia (TCSA), represented by Mr Matt Fuller (General Manager Taronga Western Plains Zoo), Mr Alex Haliburton (Asset Management Manager) and Mr Peter Rand (consultant to TSCA) was hosted at Taronga Western Plains Zoo ("the Zoo") to discuss the EIS and potential impacts on the operation of the Zoo.

In opening, Mr Fuller reiterated that he and Zoo management were generally supportive of the Proposal and recognised the potential benefit such a development could have for the city of Dubbo, wider Dubbo LGA and Orana region, with potential flow-on benefits to the Zoo. This notwithstanding, Mr Fuller, supported by Messrs Haliburton and Rand, noted the potential for the Proposal to impact negatively on the operation of the Zoo. The issues raised in the meeting of 22 October, focussing on requests for various commitments and clarifications from AZL to ensure that traffic safety risks are minimised, have been reiterated in the submission of TCSA.

The following subsection paraphrase the TCSA submission with respect to the issues raised in relation to Road Standard, Hazardous Materials Transport and Traffic Noise along with a response in each case.

4.11.2 Road Standard

TCSA wrote:

> *The EIS indicates that there would be various upgrades to Obley Road under the proposal, including alignment adjustments to meet Austroads Guide to Road Design requirements for a 100km/hr speed limited road, pavement improvements, and the establishment of a 9m wide pavement seal. No specific improvements to Obley Road adjacent to the main operational area of the zoo, are indicated in* ***Figure 2.4*** *of the EIS …*
>
> *… contribute to a challenging road safety environment in this area. This is likely to become significantly more challenging with the addition of large numbers of heavy vehicles on Obley Road as a result of the proposal. It will be vital to minimise the risk of conflict between vehicles associated with zoo visitation and those associated with the proposal.*
>
> *… TCSA therefore suggests that the standards to be adopted for Obley Road between the Newell Highway and the zoo entrance, should be higher than those adopted for the remainder of Obley Road. Specific improvements requested by TCSA for this section of Obley Road are:*

- *The establishment of a standard 12m wide road cross section based on Austroads guidelines for roads carrying more than 3000 vehicles per day. This would comprise 2 x 3.5m wide lanes in each direction, 2 x 1.5m wide sealed shoulders, and 2 x 1 m unsealed shoulders on the outside of the sealed shoulders.*
- *Clear road and edge line delineation.*
- *Addressing the presence of clear zone hazards such as trees (potentially through minor adjustments to the road alignment and/or safety barriers)*
- *Upgrading of the cyclist pedestrian crossing on Obley Road near the zoo entrance. The most appropriate solution may be grade-separation (underpass), however TCS acknowledge this would require discussion between the TCSA, Australian Zirconia Ltd, Council and RMS to identify the optimum solution.*

TCSA also requests that pavement upgrades are undertaken along Obley Road between the Newell Highway and Camp Road to create a consistent high quality surface along the entire length of this section of road. We would like consideration to be given to the use of low noise pavement as part of any pavement upgrade.

Response:

It is noted that the areas identified on *Figure 2.4* of the EIS, which do not identify pavement upgrade along the section of Obley Road fronted by the Taronga Western Plains Zoo, reflects those sections not subject to significant upgrade by Dubbo City Council in the last 20 years. This notwithstanding, it has always been the commitment of AZL to ensure that the entire length of Obley Road is upgraded to provide a pavement surface with 20 year (minimum) life standard.

AZL can confirm that Obley Road from Newell Highway to Toongi Road would be upgraded (as required) to provide a 10m sealed pavement (two 3.5m lanes each with 1.5m shoulder) over a 12m formation.

Noting the issues with respect to the section of Obley Road used by visitors to the Taronga Western Plains Zoo, AZL proposes the following additional road upgrades.

- Upgrade to the intersection between Obley Road and Taronga Western Plains Zoo to provide a Channelised Right (CHR) turn into the zoo. As illustrated on Sheet 201205-32 of **Appendix 2**, the concept provides for a right turn storage bay of approximately 350m in length (with taper) to provide maximum storage during busy periods. Lighting of the intersection will be discussed with the relevant stakeholders (TSCA and DCC) during the preparation of final engineering plans for the intersection and prior to construction.
- Use of an asphaltic concrete seal ('hot seal') between the Newell Highway and approximately 200m beyond the Zoofari Lodge entrance (a distance of 2.4km). This type of road surface is both harder wearing, i.e. far less subject to potholes and other road wear, and reduces the noise generated by passing vehicles.

- Maintenance of a 7.5m clear zone either side of the road edge line or, should the 7.5m clear zone encroach upon the existing walkway / cycle way, wire rope safety barriers would be installed.

As noted by TSCA, the issue of a cyclist pedestrian crossing on Obley Road near the zoo entrance requires consideration by a range of stakeholders. It is noted that preliminary investigations into the feasibility of a grade separated crossing (both over and underpass) identified significant constraints on both with respect to local drainage, amenity issues and hazard creation. In consultation with TSCA, RMS and DCC, however, AZL will review possible options for improvement (it is noted that the proposed road and intersection upgrades would provide for a better and therefore safer road environment already) and implement any feasible option identified.

TCSA wrote:

> *The Newell Highway/Obley Road intersection is also an area of concern to TCSA, due to potential conflicts between zoo user vehicles … TCSA requests discussions with Australian Zirconia Ltd (and with RMS and Council) regarding potential improvements to this intersection*

Response:

While the concerns of TSCA are noted, an analysis of the performance of this intersection was completed by CSPL (2013) using data extrapolated from AADT data of the RMS for the Newell Highway, traffic counts conducted by AZL for Obley Road as well as manual traffic counts of the intersection. The results of the analysis, as presented in *Table 16* of CSPL (2013) illustrate that the influence of the proposed DZP traffic on the performance of the intersection in it current form would be insignificant.

The above notwithstanding, AZL is happy to discuss the matter further with TSCA and the RMS.

TCSA wrote:

> *… TCSA would like to highlight the inappropriate nature of the posted speed limit (currently 100km/hr) on Obley Road adjacent to TWPZ … The addition of large numbers of heavy vehicles increases the already strong case to reduce the speed limit in this area to 80km/hr.*

Response:

AZL supports the reduction in the speed zone as nominated by TSCA. However, AZL note that ultimately this is a decision for Dubbo City Council who have indicated this change is unlikely. On the basis that the speed limit is unlikely to change, AZL has proposed all upgrades, safeguards and controls and completed the assessment of impact with respect to road safety, road condition and noise.

4.11.3 Hazardous Material Transport

TCSA wrote:

> *The EIS identifies a range of hazardous materials that are likely to be transported by truck along Obley Road adjacent to the zoo. A traffic incident involving a spill from one of these vehicles could potentially have serious consequences for the welfare of zoo patrons, staff and animals.*
>
> *… Section 4.14.4.1 of the EIS refers to a Sherpa (2013) report as identifying that transport risk screening thresholds are exceeded due to the movement of hazardous materials, and that a transport route selection study is required. The Sherpa (2013) report … specifically excludes (in Section 2.4) risks associated with transport of hazardous materials to and from the site. Appendix 11 of the EIS includes Material Safety Data Sheets for products that are dispatched from the site but not for those that would be incoming.*
>
> *Section 4.14.4.2 of the EIS identifies various measures proposed to address the risks associated with the transport of hazardous materials. These include the preparation of a Transport Management Plan for the project. There is however little indication of the types of measures that would be included in the Transport Management Plan.*

Response:

As documented in Section 3.4, the transport hazard analysis completed by Sherpa (2013b) (see **Appendix 4**) illustrates that the potential hazards associated with the transport of reagents (and specifically dangerous goods) are understood and that there are management and protection measures available to ensure safe operation appropriate emergency response.

Prior to the transport of any reagent, product or dangerous good, the transporter would be required to prepare a detailed Route Risk Analysis for each to meet licensing requirements under the *Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Edition* (ADG 7) (NTC, 2011). As nominated in Section 3.4.5, AZL would ensure that in completing the Route Risk Analysis, TSCA, the District Emergency Management Committee (DEMC) and other relevant stakeholders are consulted and that the specific sensitivities of the local environment are considered. AZL has already engaged with the DEMC regarding the transport of dangerous goods on roads with the Dubbo City LGA.

4.11.4 Traffic Noise

TCSA wrote:

> *… Taronga Conservation Society Australia acknowledge that predicted road noise levels meet the relevant criteria under the Road Noise Policy in relation to the zoo as expressed in terms of LA_{eq},… .*
>
> *The LAeq measure does not however necessarily provide a clear indication of the impact of intermittent noise increases caused by trucks. An assessment of maximum noise assessment typically provides a more complete picture of this type of noise…as*

truck noise at night potentially has an impact on the quality of the experience provided by the zoo's existing and proposed accommodation products, such as Zoofari Lodge and the Eco Cabin precinct currently under development …

There is also the potential for zoo animals to be disturbed by intermittent high levels of truck noise …

Section 5.4 of the Noise and Vibration Impact Assessment Specialist Report provides a sleep disturbance assessment that includes a maximum noise assessment of loading and unloading a train at the proposed facility. No maximum noise assessment is however, provided for road traffic noise.

TCSA requests that Australian Zirconia Ltd:

- *Undertake additional noise assessment to identify maximum noise levels associated with truck movements, at key locations within the zoo, including the Black Rhinoceros breeding facility and the Zoofari Lodge precinct.*
- *Consider additional mitigation depending on the outcomes of the maximum noise level assessment.*

Response:

Section 3.2 provides a summary of the additional noise monitoring and modelling undertaken by EMM with respect to noise levels received at Taronga Western Plains Zoo (see also **Appendix 2**. As noted in Section 3.2.4, on the basis of the noise modelling, AZL has committed to:

- Apply an asphaltic concrete seal ('hot seal') to a 2.4km section of Obley Road between the Newell Highway and approximately 200m south of the Zoofari Lodge entrance (a distance of 2.4km); and
- ensure, through contractual arrangements with transport operators, that the trucks used achieve sound power levels specified in Australian Design Rule (ADR) 28/01 External Noise of Motor Vehicles.

Should the measures outlined above fail to mitigate the impacts of increased traffic on TWPZ animals and overnight guests AZL would investigate construction of a vertical noise barrier adjacent to the breeding pens (on advice from TCSA). However, on the basis of the noise modelling and implementation of the proposed mitigation measures, impacts on either zoo animals or visitors are expected to be negligible.

4.12 RECOMMENDED CONSENT CONDITIONS

4.12.1 Environment Protection Authority

4.12.1.1 Introduction

The EPA has provided recommended conditions of consent with respect to the management of air emissions, water management and noise emissions. These recommended conditions of consent are considered in the following subsections.

4.12.1.2 Air Emissions

The following conditions of consent have been recommended by the EPA with respect to air emissions.

Stack design

All emission points at the site must be designed and constructed to achieve the minimum stack height listed in the project Environmental Impact Statement:

> *Dubbo Zirconia Project Environmental Impact Statement Development Application SSD 5251, September 2013*

All emission points must be designed to be TM-1 compliant, as defined in the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW, 2006 (or its later version).

General Dust Conditions

The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

Activities occurring in or on the premises must be carried out in a manner that will minimise the generation, or emission of dust from the premises.

Air Quality Management Plan

For all emission sources (point and fugitive) at the site the proponent must prepare an air quality management plan that includes, but is not limited to:

- *Benchmark site operations against best management practice and emission control;*
- *Benchmark site operations against regulatory emission limit(s), as set out in the Protection of the Environment Operations (Clean Air) Regulation, 2010;*
- *Key performance indicator(s);*
- *Monitoring method(s);*
- *Location, frequency and duration of monitoring;*
- *Record keeping;*

- *Response mechanisms; and*
- *Compliance reporting.*

The air quality management plan must be submitted to the Environment Protection Authority (EPA) in conjunction with the application for an Environment Protection Licence under the Protection of the Environment Operations Act 1997 for the project.

The air quality management plan must be implemented prior to the commencement of any dust generating activities at the site.

Requirement to monitor weather

The licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Point(s) 1

Parameter	Units of measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm/hour	continuous	1 hour	AM-4
Sigma theta	degrees	continuous	10 minute	AM-2 and AM-4
Siting				AM-1
Temperature at 2 metres	kelvin	continuous	10 minute	AM-4
Temperature at 10 metres	kelvin	continuous	10 minute	AM-4
Total solar radiation	watts per square metre	continuous	10 minute	AM-4
Wind Direction at 10 metres	degrees	continuous	10 minute	AM-2 and AM-4
Wind Speed at 10 metres	metres per second	continuous	10 minute	AM-2 and AM-4

Monitoring of all parameters listed in Column 1 must commence prior to earth moving activities being undertaken at the site.

AZL does not object to the conditions of consent nominated by the EPA.

4.12.1.3 WATER

The following conditions of consent have been recommended by the EPA with respect to water management.

Discharge criteria

The Proponent must ensure that all surface water discharges from the site comply with:

a) Section 120 of the POE0 Act;

b) a maximum of 50 milligrams per litre of suspended solids in any discharge of water from sediment basins, and any other discharge limits (both volume and quality) that may be specified by licensing instruments issued under environment protection legislation administered by the EPA …

The proponent must establish water quality trigger values appropriate to the monitoring location, including:

a) refine the salinity and salinity species trigger values for surface water monitoring based on the source sub-catchment so that significant changes in salinity due to mining operations can be detected in each sub-catchment. Trigger values for determining change should be based on detectable change away from the range of salinity values that are present in a sub-catchment prior to mining commencing. Site specific trigger values should be developed in accordance with ANZECC (2000) methodology, eg. using appropriate reference sites and monitoring as defined in the ANZECC guidelines.

b) at all relevant monitoring locations, more clearly define the trigger values for "salinity species" currently described in the monitoring program.

c) describe any proposed flocculant to be used in sediment basin(s) that discharge to the environment and demonstrate that flocculants selected have low toxicity (LC50 >100mg/L).

The Proponent must prepare and implement a Water Management Plan for the project to the satisfaction of the EPA. This plan must:

a) be prepared in consultation with EPA and by a suitably qualified and experienced person(s)

b) be submitted to the EPA's Regional Manager for approval prior to the commencement of activities

c) address construction, operation and post closure monitoring, management and response arrangements

d) include:

- *a Site Water Balance*
- *a Water Reuse Management Plan*
- *an Erosion and Sediment Control Plan*
- *a Residue Storage Facility Management Plan;*
- *a Surface Water Monitoring Program*
- *a Groundwater Monitoring Program*
- *a Surface and Ground Water Response Plan to respond to issues identified by the Surface and Groundwater monitoring programs.*

The Site Water Balance must include, as a minimum:

a) how any water removed from the Liquid Residue Storage Facility or water management structures to return to the design freeboard will be managed.

The Water Reuse Management Plan must include, as a minimum, the following components:

a) Water Reuse Management Procedures that ensures salinity, sodicity and bicarbonate levels in water used on-site is fit-for-purpose and managed to prevent:
- *cumulative impacts on soil and vegetative condition*
- *impacts on water quality in receiving waters.*

The Residue Storage Facility Management Plan must include, as a minimum:

a) final design of the solid residue storage;

b) final design of the liquid residue storage facility, including:
- *detailed analysis and calculations demonstrating how the freeboard would be maintained to accommodate rainfall and runoff up to the design rainfall event, including the additional height required to account for wave run-up under windy conditions*
- *detailed analysis and calculations regarding the depth of additional freeboard required for the lowest liquid residue storage facility*
- *operational procedures to maintain the freeboard to accommodate rainfall and runoff up to the design rainfall event*
- *a contingency plan for emergency release of water where extreme rainfall and/or flooding could threaten the integrity of the structure.*

The Erosion and Sediment Control Plan must include, as a minimum:

a) describe how soil erosion and sediment pollution will be managed following the guidelines and recommendations in Volume 1 of Managing Urban Storm water: Soils and Construction (the Blue Book) during the construction/commencement stages;

b) provide plan drawings showing the locations for best management practices for the site during all construction/commencement stages

c) include written text detailing the installation, monitoring and maintenance requirements for each of the recommended best management practices for erosion and sediment control

d) include drawings of any engineering structures such as sediment basins and clean water diversion structures, including design standards and management regimes to return the erosion and sediment control system to design capacity following rainfall events

e) design calculations and sizing for all clean water diversion bunds and sediment basins on site

f) consideration of the potential for increasing the size of sediment basins to maximise water reuse and reduce the reliance on `make-up' water

g) a commitment to construct and maintain unsealed roads consistent with 'Managing Urban Stormwater - Soils and Construction Volume 2C Unsealed Roads'

h) a commitment to install and manage erosion and sediment control measures during construction of the water and gas pipelines consistent with 'Managing Urban Storm water - Soils and Construction - Volume 2A Installation of Services'.

i) include management provisions for any disturbance of soils affected by organochlorine pesticides associated with the former grain storages to minimise their potential for mobilisation into sediment basins during construction or operation.

Surface Water Monitoring

The Surface Water Monitoring Program must include, as a minimum, the following components.

a) Baseline monitoring of salinity and salinity species at SW12, SW13 or SW14 in order to asses suitable trigger values prior to operation of the mine.

b) Initial monitoring of salinity in sediment basins 1, 2 and 3 and the Reuse Dam as a basis for revising trigger values and potential need for licence limits for salinity.

c) Initial monitoring of the water quality collected in, and potentially discharged from, the Reuse Dam for a full suite of relevant indicators that are included for surface water assessment and additional indicators relevant to the elements being mined, e.g. based on the list of indicators used for TCLP testing, including zirconium, hafnium, niobium, tantalum, and yttrium.

d) A program for ongoing monitoring in sediment basins 1, 2 and 3 and the reuse dam of a reduced set of indicators based on initial monitoring and any indicator with elevated levels identified in the initial monitoring program of the full suite of indicators.

e) Trigger values for action and associated actions or mitigation measures if trigger values are exceeded.

Groundwater Monitoring

The Groundwater Monitoring Plan must include:

a) the objectives of groundwater monitoring

b) the types, depths and locations of monitoring clearly justified and mapped

c) baseline monitoring of water levels and water quality

d) in addition to the analytical suite for quarterly groundwater monitoring recommended in the EIS, initial baseline monitoring of indicators relevant to the elements being mined, e.g. based on the list of indicators used for TCLP testing, including zirconium, niobium, and yttrium

e) monitoring to detect any potential leaching to groundwater from ore material or waste material in the open cut void, waste rock emplacement, ROM pad, liquid residue storage facility, solid residue storage facility, salt encapsulation cells,

based on the analytical suite for quarterly groundwater monitoring recommended in the EIS specialist groundwater report

f) monitoring of potential shallow groundwater pathways to detect any pollutants losses from the site via groundwater to surface waters or offsite aquifers

g) trigger values for action and associated actions or mitigation measures if triggers are exceeded including the triggering of monitoring a wider suite of indicators including the elements being targeted in mining.

AZL does not object to the conditions of consent nominated by the EPA.

4.12.1.4 Noise Emissions

The following conditions of consent have been recommended by the EPA with respect to noise emissions.

Limited Conditions

L6.1

Noise generated at the premises must not exceed the noise limits in the table below. The location numbers are taken from Table 201 of the report *Dubbo Zirconia Project – Noise and Vibration Impact Assessment* prepared by EMGA Mitchell McLennan dated August 2013.

Location	NOISE LIMITS dB(A)			
	Day	Evening	Night	
	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{A1\ (1\ minute)}$
R4, R6, R7, R8A, R8B, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28A, R28B, R30A, R30B, R31A, R31B, R32, R35A, R35B, R36, R38, R40, R42, R43, R46, R61	35	35	35	45
R11 (Toongi Hall and Tennis Court)	40	40	40	N/A
R13 (Environmental Education Centre)	35	35	35	N/A
Any other residential receiver	35	35	35	45

NOTE: Noise limits have not been provided for sensitive receivers with predicted impacts above the project specific noise level.

It is noted that the $L_{A1\ (1\ minute)}$ noise criteria refer to noise managed and measured under the INP, i.e. noise generated on-site. L_{max} noise levels of truck passbys would be managed in accordance with the Road Noise Policy (refer to Section 3.2).

L6.2

For the purpose of condition L6.1;

- *Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.*
- *Evening is defined as the period 6pm to 10pm.*
- *Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.*

L6.3

The noise limits set out in condition L6.1 apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 metres/second at 10 metres above ground level.

b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or

c) Stability category G temperature inversion conditions.

L6.4

For the purposes of condition L6.3:

a) Data recorded by a meteorological station installed on site must be used to determine meteorological conditions; and

b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L6.5

To determine compliance:

a) with the Leq(15 minute) noise limits in condition L6.1, the noise measurement equipment must be located:

- *approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or*
- *within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable*
- *within approximately 50 metres of the boundary of a National Park or a Nature Reserve.*

b) with the $L_{A1(1\ minute)}$ noise limits in condition L6.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.

c) with the noise limits in condition L6.1, the noise measurement equipment must be located:

- *at the most affected point at a location where there is no dwelling at the location; or*
- *at the most affected point within an area at a location prescribed by conditions L6.5(a) or L6.5(b).*

L6.6

A non-compliance of condition L6.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- *at a location other than an area prescribed by conditions L6.5(a) and L6.5(b); and/or*
- *at a point other than the most affected point at a location.*

L6.7

For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

Requirement to Monitor Noise

M8.1

To assess compliance with Condition L6.1, attended noise monitoring must be undertaken in accordance with Conditions L6.5 and:

a) at each one of the locations listed in Condition L6.1;

b) occur annually in a reporting period;

c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:

- *1.5 hours during the day;*
- *30 minutes during the evening; and*
- *1 hour during the night.*

d) occur for three consecutive operating days.

There are 33 locations listed in the table associated with Condition L6.1. It is impractical to consider each would be monitored. It is suggested that the condition require that a selection of representative locations, to be reviewed by EPA) be monitored annually.

R4 Noise Monitoring Report

A noise compliance assessment report must be submitted to the EPA within 30 days of the completion of the yearly monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:

a) an assessment of compliance with noise limits presented in Condition L6.1; and

b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits contained in Condition L6.1.

Except where noted above (Conditions L6.1 and M8.1), the conditions are considered acceptable.

4.12.2 DEPARTMENT OF PRIMARY INDUSTRIES

4.12.2.1 NSW OFFICE OF WATER

The following are the recommended conditions of consent (in *italics*) provided by DPI-NOW.

- *The proponent is required to obtain the necessary water licenses for the project under the Water Act 1912 or Water Management Act 2000 prior to commencement of activities.*
- *The proponent shall ensure works within waterfront land are carried out in accordance with the NSW Office of Water Guidelines for Controlled Activities on Waterfront Land.*
- *The Proponent shall prepare a Water Management Plan for the project. This Plan must be developed in consultation with the NSW Office of Water and include:*
  - *details of water use, metering and water management on site,*
  - *details of water licence requirements,*
  - *Surface Water Management Plan, and*
  - *Groundwater Management Plan.*
- *The Surface Water Management Plan must include:*
  - *a program to monitor:*
    - *surface water flows and quality,*
    - *surface water storage and use, and*
    - *sediment basin operation,*
  - *sediment and erosion control plans,*
  - *surface water impact assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts, and*
  - *a protocol for the investigation and mitigation of identified exceedences of the surface water impact assessment criteria.*

- *The Groundwater Management Plan must include:*
  - *baseline data on groundwater levels and quality,*
  - *a program to monitor groundwater levels and quality,*
  - *groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts,*
  - *a protocol for the investigation and mitigation of identified exceedences of the groundwater impact assessment criteria.*

AZL does not object to the conditions of consent nominated by DPI-NOW.

4.12.2.2 Fisheries NSW

The following conditions of consent have been recommended by DPI-Fisheries NSW.

1. *Formulate an adaptive monitoring program for the local endangered Murray-Darling population of Freshwater Catfish within Wambangalang Creek, Toongi. In particular, monitor and manage the aquatic ecological impacts and proposed mitigation measures during the replacement of the rail bridge.*
2. *Detailed designs of the water extraction pump and proposed pump screens on the intake structure at the Macquarie River are to be provided to Fisheries NSW for review and comment, to ensure that Fisheries NSW is satisfied that entrainment and entrapment of juvenile fish and larvae is minimised. Details of the operation and management of the pump and intake structure should also be provided to Fisheries NSW, in particular the "start up" operations and water intake velocity.*
3. *Detailed Construction Environmental Management Plans (CEMPs) are to be provided to Fisheries NSW for review and comment prior to the construction of the intake structure at the Macquarie River, and are to outline:*
   - *details of the dredging footprint,*
   - *details of proposed coffer dams during works,*
   - *translocation protocols for fish if site dewatering is required,*
   - *erosion and sedimentation control plans, and*
   - *potential blockages to fish passage and how they are to be managed.*
4. *Waterway crossings are to be designed so as to comply with the Department's Policy and Guidelines for habitat conservation and management, chapter 4, In-stream structures and barriers to fish passage, 2013. www.dpi.nsw.gov.aulfisherieslhabitatlpublicationslpolicies.guidelines-and-manualslfish-habitat-conservation.*
5. *Details of the designs for all waterway crossings (bridges, culverts, access tracks and pipeline crossings) and detailed Construction Environmental Management Plans (CEMPs) are to be provided to Fisheries NSW for review and comment prior to the construction, and are to outline:*

- *details of the footprint and damage to aquatic or riparian vegetation,*
- *construction details of coffer dams where required,*
- *erosion and sedimentation control plans,*
- *construction methods for the crossing,*
- *potential blockages to fish passage, and*
- *site rehabilitation.*

6. *A construction notification system must be in place for any waterway crossings (bridges, culverts, access tracks and pipeline crossings) to ensure that Fisheries NSW are notified prior to construction activities occurring within waterways.*

AZL does not object to the conditions of consent nominated by the DPI-Fisheries NSW.

4.12.3 Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy

The following conditions of consent have been recommended by the DRE.

Final Land Use

The proponent must develop a final land use that is consistent with existing surrounding land uses and zonings.

Rehabilitation Plan

The Proponent must prepare and implement a Rehabilitation Plan to the satisfaction of the Director General of the Department of Trade & Investment, Regional Infrastructure & Services. The Rehabilitation Plan must:

- *be prepared in accordance with DRE guidelines;*
- *be submitted and approved by the Director General of Department of Trade & Investment, Regional Infrastructure & Services prior to the commencement of surface disturbing activities within the Mining Lease;*
- *address all aspects of rehabilitation and mine closure, including post mining land use, rehabilitation objectives, completion criteria and rehabilitation monitoring and;*
- *include a final landform design that is consistent with the surrounding topography of the area and considers natural drainage design and relief patterns and principles*

AZL does not object to the conditions of consent nominated by the DRE.

4.12.4 NSW Heritage Council

The following condition of consent has been recommended by the NSW Heritage Council.

> *It is recommended that the following condition relating to the discovery of relics be included if approval is granted:*
>
> - *The Applicant must ensure that if substantial intact archaeological deposits and/or State significant relics are discovered, work must cease in the affected area(s) and the Heritage Council of NSW must be notified. Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.*

AZL does not object to the conditions of consent nominated by the NSW Heritage Council.

4.12.5 Commonwealth Department of the Environment

The following condition of consent has been recommended by the DoE.

> *The Department requests the Department of Planning and Infrastructure to consider incorporating the proposed offset into any approval conditions, including provision for in perpetuity protection and management of the proposed offsets.*

This condition is considered reasonable and acceptable to AZL.

5. PUBLIC SUBMISSIONS

5.1 INTRODUCTION

As noted in Section 1, 48 individual public submissions were lodged with the DP&I supporting, objecting or commenting on the EIS and DZP. Of the 48 individual public submissions:

- six (6) support the DZP;
- 31 object; and
- 11 provide comments only without nominating support or objection.

Nine special interest groups[10] also lodged submissions with the DP&I as follows.

1. The Australia Institute: objects on grounds that the socio-economic assessment was not completed adequately.
2. Central West Environment Council: objects on the basis of a variety of environmental concerns, in particular the management of residues, increase in truck movements and the potential for the site to be developed as a uranium mine.
3. Hunter Environment Lobby: objects siting major concerns over the radioactive materials associated with the DZP and concerns it could be "a back door to uranium mining in NSW".
4. Mudgee District Environmental Group: objects on the basis of a variety of environmental concerns, in particular the possibility the DZP may proposed management of radioactive materials and "create a backdoor entrance into uranium extraction in NSW".
5. Rylstone District Environmental Society Inc: objects on the basis of a variety of environmental concerns, referencing the lack of a cost benefit analysis, impacts on EEC's and impacts on water resources.
6. The Wilderness Society Newcastle: objects on the basis of its opposition to all uranium mines[11], as well as potential impacts associated with: radioactive materials, clearing of EEC's, management of residues, impacts on local waterways and aquifers, consultation with Aboriginal stakeholders and the lack of a "socio-economic analysis compliant with NSW government guidelines".
7. Dubbo Field Naturalists (DFN): commented on the DZP highlighting the following issues for specific consideration in assessment: management of the Pink-tailed Worm-lizard; potential pollution of downstream waterways; and truck movements. The DFN also requested assessment of the electricity transmission line and water pipeline to the DZP Site.

[10] For the purposes of this document, a Specialist Interest Group is considered an organisation which advances the interest of a specific issue, range of issues or group of people. These groups may be formal incorporated organisations, e.g. The Wilderness Society, or more informal collections of people with similar interests or concerns, e.g. action groups of regional representative groups.

[11] It is noted that the DZP does not represent a uranium mine, nor is it the intention of AZL to develop the DZP for the purposes of uranium mining.

8. Uranium Free NSW: objects primarily on the basis of the radioactivity of the material to be mined and deposited as residues.
9. ICAN: comments and provides a statement as to the objectives and capabilities of this organisation to partner with AZL in achieving Aboriginal training and employment goals.

Each of the submissions was comprehensively reviewed and specific objections or requests for further information categorised. A separate file included with this Response to Submission (Objection Summary.xls) lists the 48 individual and 9 special interest group submissions and categorises the issues raised, first by environmental parameter, e.g. '*Aboriginal Heritage*' or '*Radiation'*, then by subject area, e.g. '*Impacts to Aboriginal Sites'* or '*Health Issues'*, and finally by specific issue, e.g. 'Destruction of Indigenous Heritage Sites' or '*Potential Health Risk From Radioactive Dust*'. This categorisation of issues has been used to format the remainder of Section 4.

For each specific issue identified, a direct quote or series of quotes from one or more submissions has been provided to illustrate the objection or request for additional information. A response is then provided to provide clarifying or additional information to address the issue raised.

The environmental aspects for which issues or request for additional information have been made are presented in alphabetical order as each submission has been considered equally meritorious and it is not the intention of the author to suggest any priority to the issues raised.

5.2 ABORIGINAL HERITAGE

5.2.1 Impacts to Aboriginal Sites

5.2.1.1 Destruction of Areas/Sites of Indigenous Heritage

The issue of the destruction of 14 areas of indigenous heritage and the risks of destruction of heritage items was raised in a submission provided by the Central West Environment Council and in 2 public submissions.

Representative Comment(s)

> *The environmental assessment for the proposal has identified high and extreme risks associated with……. removal or destruction of Aboriginal heritage items.*
>
> *Cilla Kinross, Central West Environment Council*

> *The impact on aboriginal heritage sites is further reason for concern. There are 14 areas of great significance to indigenous people that the project would destroy. This signals harm to past, present and future generations.*
>
> *Sarah Kendell, Submission 83340*

Response

As is documented in the Aboriginal Heritage Assessment (OzArk, 2013b) and the EIS, considerable effort was taken to modify the layout of the DZP Site to avoid impacts on sites of Aboriginal heritage. Notably, 38 sites would be avoided and remain in situ many of which would originally have been impacted based on original plans for the site.

It is important to note that the Aboriginal community has been consulted at all stages through the process of field survey, site identification, development of management measures and assessment of final impacts. OzArk (2013b) documents that the Registered Aboriginal Parties (RAPs) for the DZP confirmed that the proposed management of impacted site and sites to remain in situ was acceptable. The RAPs will continue to be consulted as part of the preparation of an *Aboriginal Cultural Heritage Management Plan* that will provide final confirmation as to the collection, salvage, recording and relocation of the identified artefacts to an appropriate keeping place and management of sites that may be identified throughout the life of the DZP.

5.2.2 Consultation with Aboriginal Traditional Owners

5.2.2.1 Consultation with Aboriginal Traditional Owners

The issue of consultation with Aboriginal Traditional Owners in the environmental assessment process and consideration in decision-making was raised in the submission from the Wilderness Society, Newcastle.

Representative Comment(s)

> *TWS is not satisfied that the Aboriginal traditional owners have been included in the decision or the cultural heritage impacts, that span further than the sites in the exact vicinity of the mine footprint.*
>
> *Naomi Hogan, The Wilderness Society Newcastle*

Response

It is noted that the identification of Aboriginal stakeholders and subsequent consultation was undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements* (ACHCRs) (DECCW, 2010).

5.3 AGRICULTURE

5.3.1 Impacts to Local Agricultural Setting

5.3.1.1 Contamination of Stock and/or Crops

This issue of potential contamination of local stock and/or crops and what corrective actions would be taken in response, should this occur, was raised in a submission provided by Mr Ross and Mrs Helen Whiteley of Dubbo NSW.

Representative Comment(s)

What plans are in place to compensate the adjoining landholders if stock is contaminated by substances known now or in the future which will effect the sale of livestock or cereal crops either wind born or leakage from the Toongi Mine site?

Mr Ross and Mrs Helen Whiteley, Submission 83286

Response

The dispersion modelling undertaken for the DZP by PEL (2013) indicates that the level of deposited dust on and adjoining the DZP Site would be very low (refer to *Figures 27* and *31* of PEL, 2013). In any event, the dust generated by the DZP would be the same as the dust generated on other properties in the local area, i.e. non-contaminating.

The controls and safeguards nominated in the EIS to prevent, monitor and manage the potential for any leakage or spillage of contaminated residue or water would ensure that the potential for such an event is very low but if it occurs is identified and mitigated before contamination can migrate from the DZP Site onto neighbouring properties or into waterways of the catchment.

5.3.1.2 Transformation of the Agricultural Landscape

Concerns that the Proposal would transform the agricultural landscape to an industrial one with the associated noise pollution and additional trucks on the roads were raised in two public submissions.

Representative Comment(s)

The landscape of the area would change enormously with the approval of this project. The massive infrastructure will change the current agricultural landscape to an industrial one which has long term negative impacts on the community.

Sarah Kendell, Submission 83340

Response

It has been acknowledged in the EIS that the DZP would alter the local landscape in the immediate vicinity of the DZP Site. It is noted, however, that the processing plant area, assumedly the 'massive infrastructure' noted in the quoted submission, represents less than 25ha and, as demonstrated by the visual collages provided by ***Figures 4.46*** to ***4.49*** of the EIS, the visual impact of this industrial infrastructure would be largely screened from most vantage points by topography and/or vegetation.

Significant effort has been made by AZL to reduce the noise emissions of the DZP and as a result, the predictions of noise associated with DZP demonstrate compliance with the nominated noise criteria at all non-project related locations surrounding the DZP Site. While it is noted that the DZP would generate heavy vehicle traffic on Obley Road, AZL is committed to managing the transport of materials to and from the DZP Site in a manner that minimises the impacts on other road users (see Section 3.3, also Section 5.17.6).

The impact on the local setting would be minimised by the fact that AZL proposes to maintain agricultural production on the DZP Site and other properties that it will own. This ensure that there is continuity both between the land uses on the DZP Site and surrounding properties, but also between the current (pre-mining) land use and future land use on the DZP Site. The Agricultural Impact Statement (*Appendix 9* of the EIS) provides significant detail as to the relative production levels currently, over the life of the DZP and following rehabilitation when significant areas of the DZP Site are to be returned to agricultural production.

AZL has also provided for the conservation and enhancement of native vegetation on and adjoining the DZP Site as part of a Biodiversity Offset Area. While to be established primarily to offset disturbance to native vegetation on the DZP Site, this conservation would also improve the general amenity of the DZP Site and surrounds by increasing the coverage of woodland vegetation and creating habitat corridors which should result in greater diversity of fauna utilising the local setting.

Overall, the immediate landscape affected by the DZP will change for at least 20 years and potentially 80 years. This project is a new industry being established in an agricultural setting and this does represent change and opportunity. However, this change should not be seen as permanent with rehabilitation planned to return the disturbed areas back to stable ecosystems equivalent to the pre-disturbance landform. The extent of landscape and land use change from the DZP will be relatively minor when compared to the change in landscape and landscape function imposed by agriculture across the DZP Site.

5.4 AIR QUALITY

5.4.1 Emission Rates / Concentrations

5.4.1.1 Dust and Other Emissions from the Proposal

Concerns that dust and other emissions from the Proposal are too high were raised in 16 public submissions.

Representative Comment(s)

> *I support the proposed mine but want fewer emissions and less dust. Dubbo is currently a fairly clean city and it would be nice to keep it that way.*
>
> *Roger Knight, Submission 80549*

> *I am against the mine proposal due to the amount of dust and pollution it will create in Dubbo. We are a great rural centre with lots of kids here, and I don't want their health jeopardized, nor the health of anyone in the community.*
>
> *Name Withheld, Submission 80120*

Response

The concerns of the public with respect to the potential impacts on health and local amenity from air emissions are noted.

The commitments of AZL to minimising air emissions through the adoption the management and mitigation measures described in *Section 4.3.6* of the EIS are reiterated as are the results of air quality modelling which illustrate emissions of the DZP would remain well below the EPA and NEPM nominated criteria (NEPC, 1998). Further to compliance with these criteria, the EIS demonstrates that any increases in emissions would be very small.

- The incremental increases in annual average Total Suspended Particulates (TSP), PM_{10}, $PM_{2.5}$ and deposited dust received on properties and residences on and surrounding the DZP are small (generally 10% or less than the established background - refer to Table 24 and 25 of the Air Quality and Greenhouse Gas Impact Assessment [AQGIA] of PEL, 2013).
- The maximum 24hr concentration of PM_{10} and $PM_{2.5}$ is, in all but one instance, less than 50% of the EPA or NEPM criteria/guideline. In most cases, the maximum incremental contribution is less than 20% of the relevant criteria.
- Simulation involving 250 000 variations of background 24hr PM_{10} concentrations at surrounding residence failed to predict a single additional exceedance of the cumulative 24hr maximum criteria.
- As illustrated by Tables 27 to 29 of the AQGIA (PEL, 2013), the predicted emissions would be well below the relevant criteria at all but a single AZL-contacted residence. As discussed in Section 4.4.2, further interrogation of the modelling data confirms the noted exceedance would be restricted to a single occurrence under adverse weather conditions. This notwithstanding, additional commitments made by AZL will ensure that compliance at this receiver is also achieved under all weather conditions (Commitments 5.7 and 5.12).

The EIS and subsequent analyses included in this document (see **Appendix 5**) confirm that the DZP is highly unlikely to have a detrimental impact on the amenity of the Dubbo LGA or health of it's inhabitants as a consequence of air emissions.

5.4.1.2 Adequacy of EPA Guideline Levels

The issue that the Applicant had established emission levels that met the maximum allowed within EPA guidelines rather than aiming to reduce these as much as possible was raised in three public submissions.

Representative Comment(s)

> *That the MAXIMUM measures are employed in order to obtain the MINIMUM dust and radioactivity exposure.*
>
> *Brent Richards, Submission 83274*

> *Despite the claims of the EIS that the mine's emissions will be within the EPA levels, I am personally concerned that these levels are still too high, especially given recent research such as the August 2013 Senate enquiry on "Impacts of air quality in Australia" which specifically targets dust emissions from mining……*

> *My concern is simply this: the project as it stands will emit the MAXIMUM emissions possible under the EPA guidelines, but given recent developments in our understanding of dust and pollution that have not yet been incorporated into EPA guidelines, the mine should reduce its pollutants to the MINIMUM that is possible with today's technology.*
>
> *Wayne Connor, Submission 79849*

Response

With reference to the quoted "*Impacts on health of air quality in Australia, August 2013"* report which followed a recent Senate enquiry, it was concluded that any increase in emissions (with an emphasis on particulate matter) could be detrimental on the health of those exposed, i.e. there is no level where it can be stated there would be no health impacts. The validity of these findings are not questioned, however, it is noted that the predicted emission levels in this case are well below the relevant criteria and that measures to minimise emissions to the greatest extent feasible would be implemented.

- The claim that the DZP will emit the maximum allowable concentration of various emissions misinterprets the information presented. Yes, for many of the particulate matter and gaseous emissions considered, the EPA or NEPM criteria/guideline concentration would be reached (generally reflected by a blue contour line on the figures of the AQGIA – PEL, 2013). However, this is invariably very close to the source and includes the local background concentrations. Notably, the incremental contributions of the DZP (refer to *Tables 24 to 31* and *Figures 24 to 44* of PEL, 2013) are in almost all cases <u>well below</u> the nominated criteria or guideline level.
- In addition to the commitments referenced in *Section 11* of PEL, 2013 (and *Section 4.3.6* of the *EIS*), the air quality emission modelling assumed the following measures nominated in *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining, 2011* (Katestone Environmental, 2011).
  - Covering of stockpiles (not just watering). 70% vegetation coverage to be achieved.
  - Non use of front end loaders to move mined material.
  - Scheduled grading and gravelling of roads. The proposed schedule would form part of DZP's Air quality Management Plan.
  - Grader speed limits of 8km hr.
  - Use of conveyors to transfer solid waste to the SRSF.
- Furthermore, emission rates assumed in the modelling of gas dispersion from stack sources were highly conservative and assumed worst case performance and conditions, i.e. these emission rates would normally be zero or very close to. Even considering these conservative assumptions, with the exception of a single AZL-contracted receiver under adverse weather conditions, emissions are minimised and well below criteria (refer to *Tables 27 to 29* and *Figures 30 to 42* of the *AQGIA*). As discussed in Section 4.4.2, additional commitments made by AZL will ensure that even this single exceedance does not occur.

5.4.2 Conclusions of Impact Assessment are Inaccurate or Flawed

5.4.2.1 Health Risks from the Emission of Pollutants

Concerns that the emission of pollutants into the local environment presents too great a health risk to the community and environment were raised in twenty public submissions.

Representative Comment(s)

> *The increased dust levels may also be a concern to the health of people in the area and needs to be addressed.*
>
> *Colin McKay, Submission 80560*

> *I don't support the mine because of the large amount of dust and pollution that will be produced.*
>
> *Deborah Stanbridge, Submission 79867*

Response

Confirmation that the air emissions of the DZP would remain well below the nominated EPA and NEPM criteria is provided in the response of Section 5.4.1.1.

It is important to note that these criteria, in particular the NEPM criteria, have been established on the basis of the potential implications on human health of inhalation of particulate matter and gaseous emissions. Given the fact that the emission concentrations received at locations surrounding the DZP Site would be well below these criteria, it can be stated with great confidence that the DZP would not detrimentally impact on the health of residents or visitors to the local area surrounding the DZP Site or Dubbo LGA more generally as a consequence of air emissions.

5.4.2.2 Air Quality Impacts at Toongi Hall

Concerns that the air quality impacts expected at Toongi Hall have been understated in the EIS and should be reconsidered were raised in a submission provided by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

> *If this graph were properly thought about, it is the AREA between the 2 graphs that is important as this shows the total increase in PM10 emissions and this is significant given the Senate report saying that ANY reduction in particle emissions has a health benefit.*
>
> *Wayne Connor, Submission 79849*

Response

The maximum background (current) 24 hour PM_{10} and $PM_{2.5}$ concentration will vary significantly from day to day. The results of the *AQGIA* (PEL, 2013) simply demonstrate that

the contribution at the DZP will be well within this natural variation and not result in any additional exceedances of criteria (two exceedances per year are already expected due to natural conditions such as bushfires or major dust storms).

5.4.2.3 Outcomes of August 2013 Senate Enquiry on Impacts of Air Quality not Considered or Applied

Concern that the Air Quality Impact Assessment did not consider the findings of the August 2013 Senate enquiry provided in the research paper titled *Impacts of Air Quality In Australia* was raised in a submission provided by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

> *In August this year the Senate Community Affairs References Committee released it's paper entitled 'Impacts on health of air quality in Australia' where it claims the EPA guidelines need to be revisited in light of recent research.*
>
> *Wayne Connor, Submission 79849*

Response

The EIS can only consider the criteria available at the time of writing. This notwithstanding:

a) the Applicant has committed to the adoption of many of the measures nominated in *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining, 2011* referenced by Mr Connor (see response in Section 5.4.1.2); and

b) In almost all cases the predicted emissions are well below the current nominated criteria, e.g. particulate matter emissions from the DZP are predicted to be in the order of 10% of background at most receivers.

On the basis of the above (and previous responses of Sections 5.4.1.1 to 5.4.2.2), it is confirmed that AZL has provided for best practice dust minimisation measures and that detrimental impacts on health and amenity are highly unlikely as a result of air emissions.

5.4.3 Air Quality and Emissions Management

5.4.3.1 Management of Emissions

The issue of management of pollutants released into the local environment was raised in two public submissions.

Representative Comment(s)

> *I do not feel enough has been outlined on how to protect the environment in a sustainable way for citizens now and into the future. In particular that the mine will release up to 700,000 tonnes of slightly radioactive dust into the air each year. The mine will produce up to 100kg/hour of Sulphur dioxide, 100kg/hour of nitrous Oxide*

(NO2), 23kg/hour of SO3, 29kg/hour of Hydrochloric Acid plus other toxic gasses, all directly into the air.

Name Withheld, Submission 80117

The mine will release up to 700,000 tonnes of slightly radioactive dust in the air each year. ... The mine will produce up to 100kg/hour of Sulphur dioxide, 100kg/hour of nitrous Oxide (NO2) (sic), 23kg/hour of SO3 (sic), 29kg/hour of Hydrochloric Acid plus other toxic gasses, all directly into the air!

Wayne Connor, Submission 79849

Response

Both the accuracy and application of the statements made in these submissions is responded to.

- The submissions rely on an extrapolation of the emissions inventory used to establish the deposition rates and airborne concentrations of the dispersion modelling.
- While this is a spurious use of the inventory (see following point), the calculation is incorrect (the correct quantum is 700 000**kg** [700t]).
- The submission appears to be inferring that the public would be exposed to this quantum of dust in total. This is incorrect as the amount of dust received at any one point at any given time would be a tiny fraction of this total. *Section 10*, supported by *Tables 24* to *26* and *Figures 24* to *36*, of the AQGIA (PEL, 2013) (and summarised as *Section 4.3.7* of the EIS) provides a more detailed analysis of the predicted impacts. In summary, however, the incremental contribution of the DZP to particulate matter concentrations is generally <10% of the established background of TSP, PM_{10}, $PM_{2.5}$, and deposited dust. The resultant cumulative concentration of particulate matter received at surrounding receivers remains well below the relevant EPA and NEPM criteria or guidelines.
- The claim of 'slightly radioactive dust' should also be put into perspective. This dust is the same dust as generated by farming, wind erosion, vehicle movements and other surface disturbing activities of the local setting, i.e. it is a reflection of the naturally occurring radiation levels of the local setting. This notwithstanding, as an exposure pathway to residents of surrounding properties, inhalation of particulate matter is predicted to result in an exposure of 0.02mSv/yr (2% of the internationally established public exposure limit of 1mSv/yr).
- When the gas emissions are presented as by the submissions, these may seem excessive. Notwithstanding the fact that the submissions appear to have overstated the hourly emission rates[12], these emissions should be considered with reference to several key facts.

[12] A review of the emission rates of *Table 23* of the *AQGIA* provide for the following hourly emissions.
- SO_2: 66kg/hr - SO_3: not calculated - PM_{10}: 4kg/hr
- NO_2: 46kg/hr - HCl: 1kg/hr - $PM_{2.5}$: 4kg/hr

- The rates applied are considered highly conservative. In most instances, effective scrubbing and other mitigation will reduce the rates of criteria to zero or very close.
- These in-stack concentration limits easily comply with those prescribed by NSW regulations of the *Protection of the Environment Operations Act*.
- These gases will readily disperse into the atmosphere, reflected by the concentration levels provided in *Tables 27 to 29* and *Figures 24 to 44* of the AQGIA (PEL, 2013).
- Following the application of **Commitment 5.7**, compliance with the relevant gas concentration criteria would be achieved, by at least an order of magnitude at most receivers.
- Furthermore, AZL has committed to reviewing the reasonability and feasibility of emissions reduction technology which can be applied to the DZP Processing Plant and remodelling the emissions prior to application for an Environment Protection Licence for the DZP (**Commitment 5.12**).
- Put simply, the DZP provides for best practice emissions reduction, will reduce emissions to the greatest extent feasible and will easily comply with relevant regulatory and health standards.

5.4.3.2 Implementing Best Practice Measures

The question of whether the Applicant planned to implement best practice measures for reducing emissions including those based on the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* was raised in a submission provided by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

> *……the mine should: Implement measures to SIGNIFICANTLY reduce the levels of dust to the minimum possible amounts by using Best Mining practices. ("NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining" 2011).*
>
> *Wayne Connor, Submission 79849*

Response

It is confirmed that the majority of the Best Mining practices of Katestone (2011) have been assumed in modelling and will therefore be adopted as part of DZP operations. It is also noted that given the very low incremental increases in concentration, the application of additional mitigation measures would do very little in terms of the cumulative (background + incremental) concentrations received.

As noted previously, scrubbers and emission elimination/minimisation technology will be applied. The AQGIA took a conservative approach to the assessment of impacts and even so still illustrates compliance (following the implementation of **Commitment 5.7**) at all receivers.

5.4.3.3 Adverse Weather and Operating Controls

The issue of operational controls and response measures during adverse weather conditions and ensuring adequate coverage of potentially radioactive material was raised in a submission provided by Mr Brent Richards of Clermont QLD.

Representative Comment(s)

> *That as much of the works be encapsulated as physically possible. Therefore no open cargoes of ore, reagents, or waste. No work to be completed on windy days.*
>
> *Brent Richards, Submission 83274*

Response

All reagents transported to the DZP Site would either be within closed or covered containers. Similarly, storage of these reagents would either be in containers, tanks or stockpiles managed to reduce potential wind erosion.

The dispersion modelling undertaken by PEL (2013) considered particulate and gaseous emissions under a range of wind conditions which indicate that subject to the implementation of the nominated controls, particulate matter and gas emission criteria would be complied with. As a consequence, no further restriction on operations during windy days is proposed.

5.4.3.4 Contamination of Rainwater Collected in Rainwater Tanks

The issue of potential contamination of rainwater collected in tanks was raised in the submission of Ms Carolyn Pascoe.

Representative Comment(s)

> *Has the Applicant considered to what extent such contamination might travel and what action it intends to take to provide suitable potable water for the community's residents. What about the water collected from the roof of the Toongi Hall (according to 4.1.4.2 is located 280m west of the DZP Site), which is used by hundreds of visitors and overnight campers/caravaners each year for washing, tea/coffee making and drinking water.*
>
> *Carolyn Pascoe, Submission 83475*

Response

The dispersion modelling conducted by PEL (2013) illustrates that the concentration of deposited dust attributable to the DZP at Toongi Hall (Receiver R10) would be less than $0.1 g/m^2$/month. Notwithstanding the fact that this would incorporate no greater concentration of radionuclides than dust blown off local paddocks over the volcanic outcrops, the concentration is so small it would not affect the quality of the water collected off the roof of the Toongi Hall.

5.4.4 Odour

5.4.4.1 Noxious Odours

The issue of the spread of noxious odours from the Mine was raised in a submission provided by Mr Jethro Geier of Dubbo NSW.

Representative Comment(s)

> *I am concerned that if this Mine was put here Dubbo would be thought of as that town with the smelly mine.*
>
> *Jethro Geier, Submission 80322*

Response

An odour impact assessment was completed by PEL (2013) and this confirmed that the DZP would easily comply with the most stringent EPA odour criterion, i.e. the DZP would not generate the 'noxious odours' suggested by Mr Geier.

5.5 ECOLOGY

5.5.1 Threatened Species

5.5.1.1 Impact to Endangered Ecological Communities and Native Species

The issue of potential impacts to three Endangered Ecological Communities and threatened species native to the area such as the Pink-tailed Worm Lizard was raised in three submissions from special interests groups and eight public submissions.

Representative Comment(s)

> *The environmental assessment for the proposal has identified high and extreme risks associated with……. clearing of endangered ecological communities and impacts on threatened native species.*
>
> *Cilla Kinross, Central West Environment Council*
>
> *The project will disturb 170 ha including three endangered ecological communities and habitat for the threatened pink tailed worm lizard.*
>
> *Margaret Edwards, Submission 83459*

Response

In line with Step 4 of the *Draft Guidelines for Threatened Species Assessment* (DEC and DPI, 2005), the design of the DZP was undertaken to minimise impacts on threatened communities, population and species by avoiding, then mitigating and finally offsetting impacts. The specific design features, operational controls and management measures proposed to avoid, minimise and then offset impacts on local flora and fauna are provided in *Section 4.7.5* of the EIS.

The residual impacts presented in the EIS therefore represent the smallest reasonable impact which, as discussed in Section 4.7.6.2 of the EIS, are suitably offset in line with the *NSW OEH Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, State Significant Development (SSD) and State Significant Infrastructure (SSI) Projects* (OEH, 2011), *Principles for the use of Biodiversity Offsets in NSW"* (DECC, 2008)[13] and *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (DSEWPaC, 2013).

5.6 ENVIRONMENTAL MONITORING

5.6.1 Monitoring Results

5.6.1.1 Publishing Monitoring Results

The suggestion that the results of environmental monitoring should be made publicly available as close to real time as possible was raised in a submission provided by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

> *The results of air quality monitoring, and water monitoring bores (EIS 2.9.2.7), and radioactive dust results (4.4.9) should be publicly available on a website as close to real time as possible.*
>
> *There should be a requirement for timely reporting of all exceedances with the public release of these events within 3 months of the event……..*
>
> *Wayne Connor, Submission 79849*

Response

Results will be published on the website of AZL (Alkane Resources Ltd). Furthermore, it will be a requirement of the Applicant to report exceedances and incidents under NSW Legislation (POEO Act).

5.7 GROUNDWATER

5.7.1 Chemical Contamination

5.7.1.1 Impact of Potential Chemical Spills

The issue of potential contamination of groundwater as a result of chemical spills was raised in a submission provided by the Central West Environment Council.

[13] Subsequently superseded by *NSW offset principles for major projects (state significant development and state significant infrastructure)* (OEH, 2013).

Representative Comment(s)

The environmental assessment for the proposal has identified high and extreme risks associated with …… Chemical spills contaminating surface and groundwater. CWEC does not agree that the proposed mitigation of these impacts or the statement of commitments will address the extent of the risks.

Cilla Kinross, Central West Environment Council.

Response

It is noted that on application of the proposed design, operational and management controls described in Sections 4.5.4 and 4.6.4 of the EIS, the risk assessment of residual impacts (*Table 6.2*) does not identify any 'extreme'/'very high' or 'high' risks associated with chemical spills. In fact, the potential for chemical spills to result in contamination of groundwater and surface water is considered low to non-existent given all chemical storage, use and transfer would be in appropriately licensed containers, on appropriately licensed vehicles, to designated areas of the DZP Processing Plant and Administration Area which are concrete lined and bunded.

The above notwithstanding, EES (2013) identified one source of groundwater contamination as representing a high risk.

- Chemical Impact to Groundwater Resulting from a Leakage of the LRSF Liner.

However, as noted in *Section 4.6.5.3* of the EIS, this risk assessment is considered overly conservative. While the potential for a leak of the LRSF liner cannot be discounted, AZL would implement and enforce controls and measures to reduce this possibility to As Low As Reasonably Possible (ALARP) given the proposed design of the LRSF. The subsequent impact on the aquifer would be minimised, such that in the event of a leak any impacts on groundwater quality would be prevented from extending beyond the DZP Site through the implementation of the proposed monitoring system and Leak Detection Response Strategy.

5.7.2 Conclusions of Impact Assessment are Inaccurate or Flawed

5.7.2.1 Impacts Have Not Been Clearly Identified

The concern that impacts to local groundwater were not clearly identified in the EIS was raised in four special interest group submissions and two public submissions.

Representative Comment(s)

There is high risk of waste water leachate and impacts on groundwater (that) have not been clearly acknowledged. Tailing ponds often leak the acids, heavy metals and radioactive materials into groundwater. We must protect groundwater.

Sarah Kendall, Submission 83340

The impacts on groundwater have not been adequately investigated, and are unclear.

Rylstone District Environment Society Inc.

Response

It is acknowledged that there are many examples of poorly designed, operated or maintained residue (tailings) storage facilities which have led to contamination. *Section 2.9* and *Appendix 6* of the EIS provide the details of the proposed design features, standards and management measures to be implemented, to reduce the risk of such occurrences to As Low As Reasonably Possible (ALARP).

Section 4.6.4 of the EIS clearly outlines the potential impacts of the DZP on local groundwater resources. This assessment includes impacts:

- associated with the physical conditions of local aquifers as a consequence of changes to recharge to groundwater and sub-surface flows;
- of potential contamination events;
- on availability;
- on groundwater dependent ecosystems; and
- on dryland salinity conditions.

For each potential impact, proposed management, mitigation and/or contingency measures are presented based on the recommendations of EES (2013), SEEC (2013) and SSM (2013) amongst others. On the basis of the proposed management, the risk associated with impacts has been reduced to moderate or lower by EES (2013) for all but:

- chemical impact to groundwater resulting from a leakage of the LRSF liner; and
- physical impact to groundwater resulting from enhanced recharge due to no runoff.

In both cases, the risks of impact have been reduced to As Low As Reasonably Possible (ALARP) given the proposed design of the DZP. In the case of the potential contamination resultant from a breach of the LRSF liner, the proposed contingency management is considered adequate and sufficient to ensure that should this occur the scale of impact would be controlled, minimised and remediated. In the case of the increased recharge to groundwater, the resultant impact which could eventuate, being an increased rate or duration of spring flow, is not considered to be of detriment to the local setting or surrounding land owners.

It is therefore considered that the EIS, based upon the Groundwater Assessment of EES (2013), does acknowledge the potential impacts and risks of impacts on groundwater and does provide for adequate investigation of these.

5.8 HAZARDS

5.8.1 Bush and Site Fires

5.8.1.1 Traffic Accidents Resulting in Bushfires

Concern that the Applicant has not considered the potential for traffic accidents, chemical spills or train accidents to cause bushfires was raised in a submission provided by Ms Carolyn Pascoe of Dubbo NSW

Representative Comment(s)

> *There is no mention of whether the Applicant has considered that these factors significantly increase the risk of a truck or motor vehicle accident/rollover, chemical spill, or train incident resulting in a fire away from the Site but within the wider community.*
>
> *Carolyn Pascoe, Submission 83475*

Response

While the EIS does not explicitly discuss the potential for fire initiation as a consequence of a traffic accident or incident, it worthy of note that the following operational controls, safeguards and management measures have all been proposed which would minimise the risk of such an occurrence.

- Preparation and implementation of a Construction Traffic Management Plan.
- Construction of all road and intersection upgrades in accordance with Austroads Standards and Council specifications with suitable dimensional capacity to accommodate the anticipated oversized loads.
- Intersection upgrades to provide simplified traffic interaction and provide appropriate warning(s) relating to the increased volume of heavy vehicles.
- Preparation and implementation of a Code of Conduct for contractors / employees travelling to and from the DZP Site.
- Scheduling of shift changes to avoid peak traffic periods in Dubbo by at least 1 hour.

Further to these measures referred to in *Section 4.12.4* of the EIS, it can be confirmed that all reagents transport to, and products from the DZP Site would be transported to the DZP Site would all be undertaken using road registered vehicles licensed appropriately under the *Australian Code for the Transport of Dangerous Goods by Road And Rail 7th Edition* (ADG 7) (NTC, 2011). Transport would be restricted to the gazetted RAV routes through Dubbo on which vehicles carrying dangerous goods already travel. Furthermore, all containers used would either be Intermediate Bulk Containers (IBC's), in compliance with Chapter 6.5 of (ADG 7), or designed for the dangerous goods classification, e.g. flammable liquid, in accordance with ADG 7.

Further to the above, a Transport Route Risk Assessment Study would be completed following confirmation of the specific details of the transport task, either by AZL or more likely the company responsible for transporting the reagent. This notwithstanding, a transport hazard analysis has now been completed by Sherpa (2013b) (see **Appendix 4**) illustrating that any risks associated with the transport of materials are known and can be appropriately managed.

Finally, AZL has already engaged with the District Emergency Management Committee (DEMC) regarding the transport of dangerous goods on roads with the Dubbo City LGA. Once the routes, volumes and materials of the transport task are confirmed, discussions with the DEMC will be undertaken again with the possibility of specific contingency and incident management training being developed.

5.8.1.2 Managing Fires

The issue that on-site fire prevention and extinguishing measures are not suitable to combat potential fires was raised in a submission provided by Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *I am not sure that one water cart would be sufficient to fight more than a small fire given the probable high number of ignition sources within the Site.*
>
> *Carolyn Pascoe, Submission 83475*

Response

As noted in *Section 4.14.3.5* of the EIS (refer also to Section 4.2.5), the maintenance and use of a water cart would be one component of an overall bushfire management strategy. Acknowledging that multiple measures would be necessary to manage a fire incident on the DZP Site, or an approaching fire event off the DZP Site, AZL has included a commitment to prepare and implement a Bushfire Mitigation Plan (refer also to **Commitment 19.2**) (see Section 4.2.5). This Bushfire Mitigation Plan would be prepared in consultation with the Orana Team of the NSW RFS, with AZL having already commenced discussions with the Mr Patrick Westwood (Inspector - Community Safety Officer Orana Team) in relation to the preparation of this plan.

5.9 MINE DESIGN

5.9.1 Liquid Residue Storage Facility

5.9.1.1 Slopes of the Liquid Residue Storage Facility

Concern that the slopes of the Liquid Residue Storage Facility should be widened as a precaution against leaking and structural stability problems was raised in a submission provided by Mr Matt Parmeter of Dubbo NSW

Representative Comment(s)

> *Because of the high salinity of the stored liquids, and because of what they contain, and because of the effect of a spill on downstream users implementing the precautionary principle should mean that a very wide base was used, to minimise risk. It would cost some more, but would mean downstream users could have more confidence in retaining what they already have.*
>
> *Matt Parmeter, Submission 83447*

Response

It is noted that the structural stability of the LRSF would be of the highest standard, meeting the requirements of the Dam Safety Committee such as stability under 1 in 10 000 Average Recurrence Interval (ARI) rainfall event. Widening of the base would not provide for any additional structural stability, i.e. the risk of a spillage as a result of the LRSF structure being compromised would not be altered.

By providing for comprehensive protocols for design, construction, testing and monitoring of the LRSF (see *Section 4.6.4.2.6* of the EIS), the DZP demonstrates the application of the Precautionary Principle.

5.9.1.2 Weather Impacts to the LRSF

Concern that the Liquid Residue Storage Facility is not suitable to withstand weather conditions over the nominated life of the Proposal and possible extended life was raised in a submission provided by Ms Elsie Howe of Dubbo NSW.

Representative Comment(s)

> *The proponent mentions the potential for extending the life of the mine, increasing the long-term possibility of problems, particularly considering the wide fluctuations being now experienced in weather patterns, which give unpredictability to future weather predictions.*
>
> *Elsie Howe, Submission 85401*

Response

Should AZL propose an extension of the DZP beyond the life nominated in the current application, a separate development application would be required. Should the planning framework currently in force remain, this would require the preparation of a new EIS, considering the various (and possibly changed) environmental conditions relevant at the time of preparation.

5.9.2 Processing Plant and Waste Treatment Works

5.9.2.1 Location

The suggestion that the placement of the mineral processing plant and waste treatment works should be reconsidered to preserve the amenity of those living around Toongi Hall was raised in a submission provided by Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

If the Applicant decides not to pursue the reopening of the rail line and the Department does not insist that the rail line be redeveloped prior to the project's commencement, the Applicant should be required to completely reassess the location of these ugly, noisy and smelly facilities.

Carolyn Pascoe, Submission 83475

Response

With reference to Section 2, AZL is committed to a review of the feasibility of the preferred rail transport option. Should the location of the processing operations be relocated away from the rail line, i.e. more distant from Toongi, this would compromise the feasibility of the rail transport option. In order to rail to be considered, the processing plant must be located adjacent to the rail line.

It is also worthy of note that should the processing plant be relocated away from Toongi, it would almost certainly be located at a higher elevation. This would almost certainly be more visible and result in higher noise levels at receivers surrounding the DZP Site.

5.9.3 Pipelines and Power Line

5.9.3.1 Omission from the EIS

Concern that the potential impacts of the proposed pipeline and power line were not included in the EIS was raised in two special interest group submissions and five public submissions.

Representative Comment(s)

> *It is of concern that the total impact of the proposal has not been included in the preliminary EA. It is understood that the proposal will require both an electricity transmission line and water pipeline to the site. These linear infrastructure components have a potentially significant ecological and community.*
>
> *Tim Hosking, Dubbo Field Naturalists and Conservation Society Inc.*
>
> *The impacts of the proposed pipeline and powerline have not been included in the impact assessment.*
>
> *Dr Cilla Kinross, Submission 83424*

Response

As discussed in the EIS (Section 1.1), the appropriate assessment pathway for the proposed 132kV electricity transmission line is under Part 5 of the EP&A Act. As discussed in Section 4.3.8, while the Geurie Limestone Quarry would supply limestone to the DZP, it would operate separately and therefore needs to be assessed and approved separately to the DZP. The appropriate planning pathway for a development of the type and scale of the Geurie Limestone Quarry would be under Part 4 of the EP&A Act. AZL can confirm that the appropriate rigour will be applied to both assessments.

5.9.3.2 Damage to Existing Infrastructure

The issue of potential damage to existing water pipelines extending to the Macquarie River during construction of the gas pipeline was raised in a submission provided by Ms Laurie Pryde of Dubbo NSW.

Representative Comment(s)

> *There are a number of water pipelines extending west from the Macquarie river which will be impacted by the proposed gas pipeline to be constructed in the railway corridor. The EIS does not mention this fact and the need to ensure that they are not damaged during construction.*
>
> *Laurie Pryde, Submission 83300*

Response

Prior to any surface disturbance, AZL would undertake a Dial-Before-You-Dig application to identify any listed infrastructure along the alignment of the proposed gas pipeline. Acknowledging the fact that many water pipelines may not be registered, AZL would also undertaken comprehensive consultation with landowners adjoining the rail easement and relevant government agencies to identify water pipeline to be managed during construction.

The design and planning work necessary for an application for a pipeline under Part 3 of the *Pipelines Act 1977* would ensure that potentially impacts pipelines and other infrastructure are identified and appropriate management measures in place.

5.9.4 Fencing

5.9.4.1 Separating Adjoining Properties

A question regarding the approach to fencing that will separate the active mine areas from adjoining properties was raised in a submission received from Mr Ross and Mrs Helen Whiteley of Dubbo NSW.

Representative Comment(s)

> *What sort of fencing will be in place to separate and define the area of the mine and land that has been acquired by the mine.*
>
> *Mr Ross and Mrs Helen Whiteley, Submission 83286*

Response

The exact nature of fencing has not been specified, however, it would likely be agricultural fencing with signage at regular intervals noting the occurrence of mining operations within and prohibiting entry (except via the DZP Site entrance or if previous authorisation granted).

5.10 NOISE

5.10.1 Monitoring

5.10.1.1 Noise Monitoring at Cockleshell Corner

A request to install noise monitoring devices at the residences of Cockleshell Corner due to their being the closest homes to the Toongi plant was provided in a submission received from Mr Ross and Mrs Helen Whiteley of Dubbo NSW.

Representative Comment(s)

> *Why has there never been any noise monitoring equipment placed at either of the residences of Cockleshell Corner when these are some of the closest homes that are affected by the Toongi plant and trucks accessing the residue salt facility.*
>
> *Mr Ross and Mrs Helen Whiteley, Submission 83286*

Response

The choice of noise monitoring locations was to determine the background noise levels of the local setting and identify whether there was any significant variation between locations. The background noise environment for all locations were equivalent and less than 30dB(A) (refer to Section 4.2.2 of the EIS). As "Cockleshell Corner" occurs within the same setting as those locations included in the background monitoring, the established background of 30dB(A) would apply to this location without the requirement to monitoring here specifically.

Acknowledging the proximity of "Cockleshell Corner" to the DZP Site, it is reasonable that the residences on this property be included in the Noise Monitoring Program that AZL has committed to preparing (**Commitments 4.16** to **4.19** and **19.2**).

5.10.2 Operational Noise Impacts

5.10.2.1 Noise from Residue Management

More information was sought regarding the noise levels and hours of operation for the deposit and removal of salt waste in a submission received from Mr Ross and Mrs Helen Whiteley of Dubbo NSW.

Representative Comment(s)

What will be the noise level of the conveyers and hours of the day and frequency of the depositing and removal of this solid residue of salt?

Mr Ross and Mrs Helen Whiteley, Submission 83286

Response

The conveyor between the DZP Processing Plant and SRSF was included in the noise modelling completed by EMM (2013).

While not included specifically in *Table 4.11* of the EIS, the noise generated by the construction of the Salt Encapsulation Cells (SECs) would be equivalent to that of the SRSF Embankments (<43dB(A)). As discussed in *Section 4.2.7.1* of the EIS, On the basis of the short duration and commitment of the Applicant to implement the mitigation and management measures, the exceedances are considered acceptable.

The placement of salt excavated from the LRSF and placed within the SECs would be undertaken during the daytime only. The scenario of noise sources presented as *Figure 4.11* in the EIS is representative of the noise levels likely to be received during placement of salt within the SECs (a front-end loader and haul truck is modelled at LRSF Area 3 for the excavation of salt, the dozer nominated for use on the WRE would be relocated to the SECs).

5.10.2.2 Noise Impacts from Heavy Trucks

The issue of noise pollution caused by the increase to heavy truck traffic was raised in five public submissions.

Representative Comment(s)

> *We are very concerned about the additional noise from vehicles, both during the construction phase of the refining plant, and after with the number of trucks intended to operate onto Obley Road … ... trucks as they change up and down through the gears and use exhaust brakes will create a large increase, particularly at the intersection of Toongi Road and Obley Road.*
>
> *Ken Riley, Submission 83192*
>
> *Further the issue of noise associated with truck movements, especially on rough sections of Obley Road, e.g. Cumboogle Creek Bridge, have not been addressed.*
>
> *Laurie Pryde, Submission 83300*

Response

Section 3.3 provides a summary of the additional noise monitoring and modelling undertaken by EMM with respect to noise levels received at Receiver R1 (the residence of Mr K. Riley) (see also **Appendix3**. As noted in Section 3.2.4, on the basis of the noise modelling, AZL has committed to:

- Apply an asphaltic concrete seal ('hot seal') to a 950m section of Obley Road from the intersection with Toongi Road (**Commitment 14.9**); and
- ensure, through contractual arrangements with transport operators, that the trucks used achieve sound power levels specified in Australian Design Rule (ADR) 28/01 External Noise of Motor Vehicles (**Commitment 4.16**).

More generally, the upgrade and maintenance of Obley Road would reduce the frequency and volume of impact truck noise, e.g. banging wagons, as the sealed surface would be wider with less potential for truck wheels to roll over the edge of the pavement and the upgraded surface would be less likely to form pot holes (**Commitment 14.4**).

On the basis of the implementation of the proposed mitigation measures, maximum noise levels received at residences along Obley Road are likely to be reduced to below sleep disturbing levels.

5.11 PALEONTOLOGY

5.11.1 Fossil Record on the DZP Site

5.11.1.1 Management of Fossils on Grandale

Concern regarding management of potential middle Triassic fossils, including unique flora, known to have been found on part of the property known as 'Grandale' will require additional care was raised in an anonymous submission.

Representative Comment(s)

> *Part of the Property known as "Grandale" has Middle Triassic Flora Fossils including unique flora known to be present within the topsoil on an area that is marked as going to be disturbed.*
>
> *Name Withheld, Submission 78268*

Response

AZL requested the DRE conduct an inspection of the 'Fossil Hill' area of the "Grandale" property. This inspection was completed on 6 November 2013 by Mr Gary Burton (Senior Geologist) and Dr Lawrence Sherwin (contract palaeontologist). A report documenting the inspection, assessment of the potential impacts of the DZP on the fossil assemblage and recommendations on management was subsequently produced by DRE and is provided in full as **Appendix 7**.

The DRE do not consider that the DZP will adversely impact upon what is already a disturbed site. The DRE recommend, however, that any excavation work at the site be inspected by a qualified person for any further geological and paleontological information and if possible at least one exposure be retained for future reference. AZL accept this recommendation and the Statement of Commitments has been updated accordingly (refer to **Commitments 2.5** and **2.6**).

5.12 PLANNING ISSUES

5.12.1 Land Use Planning

5.12.1.1 Strategic Regional Land Use Plans for Central West NSW

The concern that the lack of a strategic regional land use plan in Central West NSW leaves the area without suitable protections and assessment directions for new mining projects was raised in a submission provided by the Mudgee District Environment Group and one anonymous submission.

Representative Comment(s)

> *MDEG does not support the approval of mine proposals in the Central West prior to the development of a strategic regional land use plan, as expected.*
>
> *Mudgee District Environment Group.*
>
> *The lack of a strategic regional land use plan in central west NSW leaves no parameters for environmental, agricultural and social protections for new mining proposals.*
>
> *Name Withheld, Submission 78268*

Response

While there may not be a strategic regional land use plan for the Central West of NSW, the Catchment Action Plan 2006 – 2016 (Central West CAP) produced by the Central West Catchment Management Authority (CW-CMA) represents a regional strategy document which 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.

Notably, the DZP is not inconsistent with broader Catchment Targets, and in many cases would actually assist in the achievement of Management Targets.

While a formal strategic regional land use plan is absent, reference is made to the following.

- The Socio-economic Assessment completed for the EIS by Diana Gibbs & Partners (DGP) (Part 12 of the *Specialist Consultant Studies Compendium*). DGP (2013) considers the relative impacts and benefits of the DZP on the social and economic setting and concludes that the impact would be largely positive[14].
- The Agricultural Impact Statement (AIS) completed for the DZP by DGP and RWC (*Appendix 9* of the EIS). The AIS considers the relative impact and

[14] It is noted that some criticism has been made of DGP (2013) by several submissions and these are addressed in detail in Section 5.16.

contribution of the DZP on local land, specifically agricultural resources and enterprises. The AIS illustrates that the DZP would be able to operate without significant adverse impacts on local agricultural production, both during the life of and following the completion of the DZP.

To suggest that in the absence of a strategic regional land use plan for the Central West of NSW there are no environmental, agricultural and social protections for assessment of mining proposals is outlandish. The EIS assesses the DZP against a wide range of environmental criteria nominated by the relevant government authorities for each parameter. In each case, the EIS demonstrates that the DZP could be undertaken in compliance with these criteria. DGP (2013) and the AIS then illustrate that the DZP could be developed and operated to provide a net socio-economic benefit and with acceptable impact on agricultural resources and enterprises.

5.12.2 Public Assessment of the Proposal

5.12.2.1 Need for a Public Enquiry

It was suggested that it would be in the national interest to hold a Public Enquiry to assess all aspects of the Proposal in a submission provided by Ms Elsie Howe of Dubbo NSW.

Representative Comment(s)

Given the unique and complex nature of the Proposal, and the possibility that the next stage of development could include extraction of uranium and thorium, I consider it would be in the national interest to hold a Public Inquiry, to allow an independent panel of specialists to assess all aspects of the Proposal, including adverse social impacts, long-term implications to the environment and any matters not addressed in the Proposal.

Elsie Howe, Submission 85401

Response

AZL has no intention of developing the DZP as a Uranium Mine, now or in the future. It is understood the determination of the DZP will be referred to the Planning Assessment Commission which is considered an appropriately qualified authority.

5.13 RADIATION

5.13.1 Health Concerns

5.13.1.1 Radioactive Dust

Concern at the potential health risk from radioactive dust was raised in four submissions from special interest groups and fifteen public submissions.

Representative Comment(s)

Radon is a tasteless, colourless, odourless by-product of uranium. It is radioactive and its inhalation can cause cancer, particularly bronchial and lung cancers. Erosion by wind can carry radioactive particles and radon many kilometres.

Dust particles: Blastings, rock evacuations and the exposure of the open-cut mine to winds will have a significant effect on air quality. Southerly winds would carry mining dust to Dubbo. The harmful effect of fine particles on health in other mining communities, such as the Upper Hunter, has been well documented. In this case however, there would be the added hazard of radioactivity. The amounts of radioactivity may be small, but the effects are cumulative and carcinogenic. Each dose inhaled adds to the risk of cancer.

Uranium Free NSW

I don't want to be breathing in radioactive dust! Do you??! A huge plus to living in the country is getting access to all this fresh air, why pollute it with harmful waste?

Kathryn Buster, Submission 79870

Response

Noting the potential impacts of radon and radionuclides contained within the dust that would be emitted from the DZP Site, AZL commissioned JRHC Enterprises to complete an assessment of the potential impacts of radioactivity on surrounding residences, neighbouring landowners and the local setting more generally. In summary, the pathways for radiation impacts on workers, general public and biota, and the impact predicted by JRHC (2013) are as follows.

- Gamma radiation emitted by materials within the process plant (machinery or workforce only).

  The maximum exposure concentration predicted was 2mS/yr (10% of the internationally accepted occupational dose limit).

- Inhalation of radionuclides which form a component of particulate matter.

  For DZP personnel operating in areas subject to the highest concentration of this dust, the exposure level would not exceed 8.5mS/yr (less than 45% of the internationally accepted occupational dose limit). The maximum combined gamma and dust concentration exposure for the DZP personnel would be 9mS/yr (less than 45% internationally accepted occupational dose limit).

  At receivers surrounding the DZP Site, dust containing radionuclides would result in exposure of <0.02mS/year. This is less than 2% of the internationally established public dose limit.

- Inhalation of the radioactive decay products of Radon, an inert gas emitted from the ore and solid residues.

  Radon is primarily an issue for enclosed spaces and accordingly, JRHC (2013) predicts exposure as a result of inhalation of Radon gas (Rn^{222}) to be 0.0075mS/yr (<1% of the internationally established public dose limit).

It is noted that radiation is an issue likely to raise emotions due to the potential health implication of exposure. However, as documented in the comprehensive Radiation Assessment completed for the DZP, the level of exposure that the public would be exposed to is very minor and likely to be equivalent to that which they are currently exposed to. The appropriate occupational health and safety measures would of course be followed to ensure the health and safety of the DZP workforce.

5.13.1.2 Radioactive Waste and By-Products

Concern regarding the risk to the local community from radioactive waste and by-products was raised in ten public submissions.

Representative Comment(s)

> *Leaving behind anything radioactive is not something that should be considered good for the community.*
>
> *Name Withheld, Submission 79886*
>
> *The proponent would need to commit responsibility for the ongoing storage of such radioactive waste for the full lifetime, which may be hundreds of years.*
>
> *Sarah Kendall, Submission 83340*

Response

In responding to these, and other equivalent submissions, no radionuclides or other radiation emitting products would be added to the processing operations. Therefore, the residues which contain trace concentrations of radionuclides are simply returning the same radionuclides which were excavated from the open cut to the landform. In fact, given the addition of materials such as salt and limestone to the processing and or neutralisation operations, the volume of material returned to the landscape would be greater than that removed. Therefore, the overall concentration of radionuclides would be reduced.

Considering the management of residues more generally, the various design features, operational controls, management measures, monitoring programs and contingency measures described in *Sections 2.9*, *4.5.4* and *4.6.4* of the EIS would reduce the risk of an incident leading to contamination of land, air, surface water or groundwater to an acceptably low level.

5.13.2 Impacts to the Environment

5.13.2.1 Radioactive Waste, By-Products and Dust

Concern regarding the risk to the environment from radioactive wastes, by-products and dust was raised in 13 public submissions.

Representative Comment(s)

I would like to see more protection for ALL toxic matter that will go into the air, even if it is expected that only minimal will be released over 12 months - it is too much.

Nikki Sinclair, Submission 79863

I don't approve of this mine due to the amount of pollutants that will be emitted from it - especially the radioactive pollutants.

Name withheld, Submission 79842

Response

The Radiation Assessment of JRHC (2013) considered the potential sources of radiation to which surrounding land holdings and the general environment would be exposed to. contained within the dust that would be emitted from the residue storage facilities. *Section 4.4.8* of the EIS provides a summary of the assessments undertaken by JRHC (2013) which illustrates that the level of radiation to which people and the environment would be exposed to would be low, equivalent to background radiation and well below the internationally accepted criteria for exposure.

The above notwithstanding, AZL has proposed a comprehensive monitoring program (see *Section 4.4.9* of the EIS) which will demonstrate ongoing compliance with criteria and minimal exposure to radiation on the land surrounding the DZP Site.

5.13.3 Uranium Mining

5.13.3.1 Precursor to Uranium Mining in NSW

Concern that the DZP will eventually lead to uranium mining in NSW was raised in five submissions from special interest groups and eight public submissions.

Representative Comment(s)

We are concerned that there is an ulterior motive to mine the uranium and thorium which have been also found to be present.

Uranium Free NSW

The radioactive materials associated with the project are of major concern. Toongi has the largest deposit of uranium in NSW. This project could be a back door to uranium mining in NSW.

Margaret Macdonald, Submission 84563

Response

The concentration of uranium and thorium within the ore is very small and not nearly sufficient to support a uranium mine. Notwithstanding this fact, AZL has no intention of developing a uranium mine.

5.13.4 Other Sites and Alternatives

5.13.4.1 Environmental Impacts of Other Rare Earth Projects

This issue of performance at other Rare Earth Projects was raised in a submission provided by Uranium free NSW.

Representative Comment(s)

> *The Australian mining company Lynas Corporation extracts rare earth minerals from Australia's largest rare earth mine in WA, and transports them to be processed in a refinery in the port city of Kuantan, in Malaysia. According to a scientific report by Germany's Oeko Institute, the project's pollution and waste management are seriously deficient. The project is vehemently opposed by at least a million Malaysians.*
>
> *Uranium Free NSW*

Response

The comparison of the DZP to the Lynas Corporation rare earth project is not appropriate. Lynas concentrate rare earth containing ore in Australia and processes the concentrate (containing radionuclides) in Malaysia (outside the control and jurisdiction of Australian regulatory agencies). Malaysia owns the waste products of that project. The DZP includes the processing operations to produce specific products at the Toongi site and all wastes remain on site. As such, operations from extraction to product despatch would be under the regulatory control of the NSW EPA and other regulatory agencies.

The above notwithstanding, the EIS demonstrates that AZL understands the various environmental issues related to the DZP, the relevant criteria associated with these and has demonstrated that compliance with these criteria and achievement of acceptable environmental outcomes can be achieved. The DZP will be conditioned accordingly and required to demonstrate compliance against these criteria and specific conditions of consent under NSW statutory control.

5.13.4.2 Alternative Sources of Rare Earths

This issue of the need for rare earth minerals was raised in a submission provided by Uranium free NSW.

Representative Comment(s)

> ***RARE EARTHS - WHY DO WE NEED THEM?***
>
> *… A recently developed source of rare earths is electronic waste and other wastes that have significant rare earth components. New advances in recycling technology have made extraction of rare earths from these materials more feasible, and recycling plants are currently operating in Japan, where there is an estimated 300,000 tons of rare earths stored in unused electronics. In France, the Rhodia group is setting up two factories, in La Rochelle and Saint-Fons, that will produce 200 tons a year of rare earths from used fluorescent lamps, magnets and batteries.*
>
> *Uranium Free NSW*

Response

AZL has reviewed annual consumption of rare metal and rare earth products, comparing this to forecast production of the DZP (see **Table 8**).

Table 8
Rare Metal and Rare Earth Market

Resource	World market in 2012 (tpa)	Expected DZP output in 2016 (tpa)
Zirconium materials (ZrO_2)	200,000 (↑10% pa)	16,000
Rare earth oxides	125,000 (↑4-5%pa)	4,900
Ferro Niobium (FeNb)	90,000 (↑10%pa)	3,000
Source: Alkane Resources Ltd (http://www.alkane.com.au/index.php/projects/current-projects/dubbo)		

To suggest that recycling alone can provide for the world's demand of rare earths is not reasonable.

5.14 RISK ASSESSMENT

5.14.1 Risk Mitigation

5.14.1.1 High and Extreme Risks

Concern that high and extreme risks identified in the EIS have not been adequately mitigated was raised in a submission provided the Mudgee District Environment Group and an anonymous submission.

Representative Comment(s)

> *There are a range of other high risk impacts from this proposal including the scale of water use, tailings management, evaporation ponds, drawdown of groundwater, possible of pollution of surface and groundwater, loss of high value biodiversity and habitat, and a range of social and health impacts.*
>
> *Mudgee District Environment Group.*

> *There are too many high and extreme risks identified in the environmental assessment that have not been adequately mitigated*
>
> *Name Withheld, Submission 83479*

Response

The approach taken to identifying, managing and assessing the risks posed by the DZP was as follows.

1. An initial workshop was conducted (January 2012) where the sources of risk, potential incidents and risk as determined by considering the likelihood and consequence (if not mitigated). These **unmitigated** risk levels are presented in ***Table 3.9***.

2. Operational controls, safeguards, management and mitigation measures were developed, in consultation with the specialist consultant team, to either reduce the likelihood or consequence of the specific incidents. These controls, safeguards and measures focussed on those parameters for which high risk levels were initially identified. In many cases, the development of these was an iterative process whereby impacts were reviewed with additional controls until the risk could be reduced to an acceptable level.
3. Following the confirmation of all design features, operational controls, safeguards, management and mitigation measures, contingency measures and offsets, the risk assessment was undertaken again. The results of this risk assessment, which present the **mitigated** risk levels, are presented in ***Table 6.2***.

Contrary to the submissions received, the risk levels noted in ***Table 6.2*** of the EIS have all been reduced from those identified in ***Table 3.9*** of the EIS. Furthermore, on application of the proposed design features, operational controls, safeguards, management and mitigation measures, contingency measures and offsets, the only incidents for which a high risk is retained are those for which it is not possible to reduce the risk level any further. *Section 6.2.1* of the EIS provides a detailed assessment of each of these incidents for which the risk has been reduced As Low As Reasonable Possible.

5.15 SOCIO-ECONOMIC ASSESSMENT

5.15.1 Inadequate Assessment Provided in the EIS

5.15.1.1 Cost Benefit Analysis

While a number of submissions questioned the adequacy of the Scio-economic Assessment on the basis that a Cost Benefit Analysis (CBA) was not completed, the submission of The Australia Institute (TAI)[15] provides the most in depth review and is therefore the focus of this subsection.

The Australia Institute wrote:

> *There are several aspects of the Gibbs assessment that should be of concern to decision makers. First is the lack of benefit cost analysis. Gibbs lists the Director-Generals Requirements for the EIS as including:*
>
> > *a detailed assessment of the costs and benefits of the development as a whole, and whether it would result in a net benefit for the NSW community.*
>
> *To a trained economist, this is a clear call for benefit cost analysis … Last year the NSW Treasury published specific guidelines to improve the standard and consistency of benefit cost analysis of mining projects, which expanded on earlier Planning NSW guidelines which stated:*

[15] The Australia Institute identifies itself as an independent public policy think tank which carries out highly influential research on a broad range of economic, social and environmental issues.

> *The accepted technique for assessing changes in the economic well-being of a community is benefit-cost analysis (BCA) … This evaluation criterion is described as net present value (NPV).*

Instead of benefit cost analysis, Gibbs provides unsourced, unsubstantiated estimates of:

- *Capital costs*
- *Production rate and gross value*
- *Incomplete aspects of operating costs*
- *Public sector revenues*

The estimates presented by Gibbs, with no attempt at calculating net benefits, ie benefits minus costs, or of considering how any net benefit is distributed, falls a long way short of the NSW Treasury guidelines for mining projects, which suggest:

> *The net public benefit or cost of a project or policy can be calculated through the net benefit of mining or coal seam gas (CSG) compared with the other land uses, less any associated public expenditure (not paid for by the mining company) and any negative social, health or environmental impacts. There may also be other economic impacts on local business that may be positive or negative.*

……

As Gibbs provides none of this analysis, decision makers should treat claims of jobs and revenues with suspicion. It is unclear what movements in commodity prices or input costs might result in the proponent suspending or delaying the project, or lobbying for altered conditions.

As the Treasury guidelines point out, beyond the net benefits of the project to the proponents, considerations need to be made of net public infrastructure costs.

……

Gibbs makes no disclosure around which party will pay for such infrastructure and to what extent the community might bear costs related to increases in heavy traffic volume

……

Gibbs makes no attempt to incorporate environmental impacts into a net benefits calculation, despite identifying that noise and dust impacts would have economic impacts on local residents:

> *[It] is acknowledged that use of the rail line would change "free use" of the rail easement … but merely dis-used [sic] for a time.*

Not only will residents lose use of the easement, but will be subject to noise and dust impacts. It is not appropriate to acknowledge "minor (and one-off) slight" losses of value to the community without some quantification.……

Furthermore, Gibbs makes no mention of potential environmental difficulties that are common to rare earths projects, involving management and disposal of radioactive substances … The impacts of contamination on water tables or other natural assets could outweigh any financial benefits of the project.

Conclusion

… Gibb's assessment of the net benefits of the Dubbo Zirconia project are based on qualitative speculation rather than socio-economic analysis compliant with NSW government guidelines …

Response (prepared by Diana Gibbs & Partners)

The DGR's require that the EIS provide a "*detailed assessment of the costs and benefits of the development as a whole*". The Guidelines prepared by Planning NSW (dated 2002) suggest that a CBA is one option available to deliver an economic assessment, in a "toolbox" of many options.

In the case of the DZP, the Present Value (PV) (at a 10% discount rate) of anticipated production over the 20 year anticipated "life" of the DZP is $4.257 billion (see p 12-35 of DGP, 2013), with annual output from the DZP estimated to have a Gross Value of $500 million. Given that this level of output is so large, it was considered (after discussion with relevant agencies) that a formal CBA would not add any real value to the assessment in this instance.

Moreover, there are also other factors which are considered to mitigate against the preparation of a formal CBA.

- At this stage of project development, financing arrangements are not complete, and therefore items required to complete a methodologically correct CBA (such as debt/equity splits, whether capital is to be sourced locally or from offshore, and thus the ability to calculate dividend/interest/capital repayments streams leaving Australia) are not yet available.

  TAI questions the "financial strength" of the DZP on the basis that it does not provide information on the:

  - proposed production schedule;
  - estimates of commodity prices;
  - estimates of capital and operating costs; and
  - discounting of future costs and benefits.

  Notwithstanding that much of this information is available within the Socio-economic Assessment (DGP, 2013), the estimated gross value of output of $500 million is clear evidence of "strong financials". The implied assertion of "weak financials", and the suggestion that the DZP is therefore "marginal", is rejected as being totally without foundation. On the contrary, the potential for the DZP to provide for significant alternative sources of Zirconium (8%), Niobium (3%) and rare earth products (4%) to meet global demand (see **Table 8**) supports the financial case for the DZP.

- Many of the factors which are considered as "costs" in the economic efficiency analysis involved in a CBA are more correctly considered as "benefits" in the economic equity analysis required in the assessment of the impact of a project in a regional location. For example, cash flow streams such as wages, payments for other goods and services, and payments to the public sector are all costs when examining economic efficiency, but are largely benefits when the distribution (equity) impacts of new capital investment in a regional area are being examined, and are certainly of more interest to the local community

  The examination of economic impacts of the DZP has therefore concluded that "*on balance, the proposal is assessed as providing a significant benefit to the region*" (p. 12-46 of DGP, 2013). This conclusion is factual and is totally supported by the information provided in the EIS.

- It is noted that a CBA approach has been used in the more discrete analyses conducted as part of the wider economic studies prepared for the DZP, such as the Agricultural Impact Statement (where the costs imposed by changing land use over the area involved in the DZP are assessed) and the evaluation of transport options. While output from the transport options evaluation is (at this stage) confidential to Alkane, the AIS concluded that the NPV of changing land use from agriculture to mining was $4.2 billion over the 20 years of mining and 20 years of production from the rehabilitated site (see p. A9-69).

Other criticisms of the Socio-economic Assessment are addressed as follows..

1. Environmental values have not been priced.

   As recognised in the EIS, the DZP would result in some environmental costs being imposed on certain sectors of the community, e.g. emissions of noise and dust. Personal interviews have been conducted with residents of the Toongi locality, and the entire Toongi community have been kept informed of project developments via a series of meetings at Toongi, and via a Newsletter prepared at regular intervals and delivered to all interested parties. Impacts on landowners within and immediately adjoining the DZP Site have been mitigated via entering into contracts for purchase of this land.

   Further, AZL will consider any request for purchase of properties based on the environmental costs imposed, although it is noted that some local landowners have indicated a preference to remain. Through purchase of affected properties, the environmental cost of the DZP is being identified and affected persons appropriately compensated.

2. The public sector is being expected to pay for infrastructure required by the DZP.

   The submission misunderstands the commitments of AZL in assuming that infrastructure costs would be imposed on the public sector by the DZP. While the discussion of transport issues in the EIS does indeed outline the costs involved in the refurbishment of the rail line, and the upgrades required for the Obley Road, at no stage is it stated that the public sector is being expected to bear these costs. Indeed, it is clearly stated (p. 12-39) that expenditure of around $15 million on

road upgrades would be borne by AZL. The statement contained in the submission that there is "*no disclosure around which party will pay for such infrastructure*" is therefore inaccurate and misleading.

3. DZP data used in the EIS are not substantiated.

   All data used to describe the economic dimensions of the DZP, such as capital costs, anticipated output values, and operating costs (including public sector payments) were provided by AZL from their feasibility studies. Many of these data have also been provided in various presentations given by senior company executives (such as the Managing Director) to the communities of Dubbo and Toongi. Examples of such presentations are also publically available on the Alkane website (www.alkaneresources.com.au).

   It is not clear how such data could be "substantiated" from other sources, given that this information can only come from AZL's own assessments. Relevant data indicating the anticipated economic dimensions of the project are clearly listed, and the damaging statement that "*claims of jobs and revenues (should be treated) with suspicion*" is a value-laden and unfounded judgement that is not based on the reality of the EIS information.

4. Comparison to large scale mining operations.

   The comparison of the DZP to large scale mining operations such as Rocky Hill and Bulga, which are open-cut coal mines, is not helpful, nor pertinent, and indicates a lack of understanding of the unique nature of the DZP. The Toongi deposit would be accessed by a single small open cut, with output consisting of hard igneous rock rather than friable coal accessed via large surface area open cuts.

5.15.1.2 Breadth of Coverage / Assessment

The issue that residents of Benolong Road were not considered in the impact assessment of the EIS was raised in a submission provided by Mr Glenn Shepherd of Dubbo NSW.

Representative Comment(s)

> *Whilst their vehicle numbers are included in the various analyses in the EIS, the residents of Benolong Road aren't even mentioned in the EIS. They will be equally affected in terms of increased traffic and accident rates as those on the Obley Road as they have to use the latter to access the Benolong Road.*
>
> *Glenn Shepherd, Submission 83302*

Response

In assessing the impact of increased traffic on Obley Road, the impacts on road users was considered in total, i.e. no distinction was made as to the source or destination of traffic using Obley Road.

The assessment of impacts included in *Section 4.12.5.2* of the EIS and *Section 3.3* of CSPL (2013) confirms that the additional traffic would not result in traffic volumes beyond the effective capacity of Obley Road. It has been acknowledged that the DZP would introduce more heavy vehicles to Obley Road which would likely exacerbate issues associated with the current road standard which include sections of poor road geometry, inadequate stormwater drainage and inadequate pavement. As documented in the EIS (*Sections 2.2.5.2* and *4.12.4*), and in response to requests for further information or comments of Dubbo City Council (Section 4.2.2.2), AZL is committed to upgrading Obley Road to address these existing issue and accommodate the increased traffic volumes.

Furthermore, AZL has committed to implementing transport management procedures which would manage the arrival and departure of trucks on Obley Road to minimise the impacts associated with truck movements.

5.15.1.3 Consultation

Four public submissions raised concerns that public consultation regarding the Proposal was not inclusive.

Representative Comment(s)

> *As a resident of the Obley Road in the area bounded by the Newell Highway and the Toongi road I have not been approached or have been consulted by Alkane Resources or any persons, companies or groups acting on behalf of Alkane Resources in person, by mail (electronic or hard copy) or telephone at any time before or after attending the meeting at the Dubbo RSL.*
>
> *Venn Roberts, Submission 83562*

Response

AZL has concentrated face to face meetings with those residents immediately surrounding the DZP Site, or those who have specifically requested such meetings. AZL has heavily advertised community meetings, both in Toongi and Dubbo, at which invitation was provided to all attending to request a meeting (either at Alkane's Dubbo office or at their residential address). Notably, the proposed use of Obley Road by trucks was identified and discussed. The level of consultation is considered appropriate given the scale of the DZP.

5.15.2 Infrastructure

5.15.2.1 Cost of Infrastructure

The issue of public cost for transport and energy was raised in a submission provided by the Rylstone District Environment Society.

Representative Comment(s)

> *The costs of infrastructure have not been adequately dealt with, e.g. infrastructure required for transport and energy.*
>
> *Rylstone District Environment Society*

Response

Notably, and as discussed in Section 1.1 of the EIS as well as previously in this document, the power line infrastructure is to be assessed separately under Part 5 of the EP&A Act.

The cost of the gas pipeline infrastructure has been included in the capital investment value quoted for the DZP of $996 million. Indicative costs for road and rail infrastructure are also included in the EIS and CIV estimate. The Socio-Economic Assessment of DGP (2013) clearly demonstrates that on the basis of the Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) of an anticipated $5.4 billion over the 20 year life[16] that the DZP is feasible.

It is considered that the costing of infrastructure has been accounted for sufficiently in the EIS and DGP (2013) to allow for the feasibility of the DZP to be confirmed and net benefit to NSW demonstrated.

5.15.2.2 Benefits of Infrastructure

The issue of publicly funded benefits from infrastructure provisions such as the reopening of the rail line, placement of the gas line, water pipeline and power line only being of advantage to the Applicant was raised in a submission received from Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *One of the Objectives of the DZP as stated at 1.3.2 of the Traffic Impact Assessment is to "establish, re-establish and/or upgrade local/regional infrastructure for the purposes of the Proposal but which could also have beneficial uses for other industry/activities". The reopening of the rail line and the placement of a gas line to the plant would go a long way to meeting this objective, although the apparent lack of commitment to sharing the benefit of these is discussed below. This point could also be made regarding the construction of the water pipeline and the new electricity line which appear not to benefit anyone else except the Applicant.*
>
> *Carolyn Pascoe, Submission 83475*

Response

It is acknowledged that the primary reason for the installation / construction of the proposed infrastructure is to provide for the DZP. The quoted objective is not intended to suggest that this infrastructure would be made available to the general community, rather that the availability of natural gas, high voltage power, water and improved road and rail infrastructure could provide associated benefits to other potential industries or land uses. For example, interest has been expressed in the establishment of solar energy developments within the Dubbo LGA. The presence of a 132kV power line on the DZP Site, could make Toongi a potential hub for such development in the future.

[16] It is noted that the rare metal and rare earth resource significantly exceeds that which could be mined and processed within 20 years. Subject to a future development application, there is potential for the operation of the DZP to continue well beyond 20 years with a commensurate increase in the EBITDA generated by the DZP.

The proposed road infrastructure upgrades would, however, address existing issues associated with poor road geometry, inadequate stormwater drainage and inadequate pavement, would ultimately benefit frequent road users of Obley Road. Furthermore, the installation of a high voltage power line (132kV) to the DZP would necessitate some minor realignment of existing power lines which could provide a catalyst for resolution of some of the power outage issues experienced within the Toongi locality.

5.15.3 Economic Impacts

5.15.3.1 Environmental Tax or Levy

The suggestion that the Applicant pays an environmental tax or levy to the Dubbo City Council, in addition to current Federal and State requirements, that would be used for environmental purchases and maintenance was provided in a submission received from by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

> *I would like to see a scheme where an extra amount above the government rate (eg equivalent of 10% of the yearly CO_2 tax) is put directly into Dubbo to be used for environmental purchases and maintenance of parks, river care.*
>
> *Wayne Connor, Submission 79849*

Response

This statement ignores the fact that the greenhouse gas emissions of the DZP would be significantly reduced by the co-generation of 70% of power requirements from excess heat generation of the acid plant.

This statement also ignores the fact that greenhouse gas emissions result in global change (not local). To suggest greenhouse gas emissions generated by the DZP will be having a direct measurable impact on Dubbo is wrong.

It is also important to note that the contribution of the DZP to the Dubbo economy would be very large (approximately $50M on wages, goods, services, rates and other contributions). Furthermore, AZL would provide for the upgrading of local infrastructure (Obley Road) and the conservation of regionally significant vegetation (Dowds Hill and surrounds). The contribution of DZP to Dubbo, economically as well as in terms of local conservation, would be great and the suggestion of further contribution is rejected. Section 4.2.6 provides a discussion on the approach being taken to developing a fair and reasonable agreement with Dubbo City Council in relation to possible increased maintenance and management costs of local services and infrastructure.

5.15.3.2 Property Values

Concern that the Proposal will devalue local properties was raised in two public submissions.

Representative Comment(s)

> *Alkane have not addressed the issues to residential and rural landowners on and adjoining Obley Road in any way. Especially with regard to the potentially negative impact to property prices due to the increase in traffic both in terms of heavy vehicle (trucks) and light vehicles (cars) in addition to the traffic currently.*
>
> *Simone Pye, Submission 83023.*

Response

It is beyond the scope of an EIS to consider the impact of a development on property values. This notwithstanding, it has been assessed that the proposed traffic would remain within the capacity of Obley Road and, considering the proposed road upgrades and operational safeguards, impacts of DZP transport would be effectively managed and mitigated.

5.15.4 Impacts to Local Tourism and Amenity

5.15.4.1 Taronga Western Plains Zoo and Local Walking or Cycle Tracks

Concern that the Proposal will impact on tourism and local amenity (safety) uses for the area in the vicinity of the Taronga Western Plains Zoo and local cycle and walk ways was raised in three public submissions.

Representative Comment(s)

> *There is obviously particular concern for its effect on the visitation and viability of Taronga Western Plains Zoo, Dubbo's iconic tourist attraction, the one attribute for which Dubbo is widely recognized.*
>
> *Elsie Howe, Submission 85401*

Response

AZL has consulted with Taronga Conservation Society Australia (TCSA) through the planning of the DZP and following exhibition of the EIS. As identified in the submission of TCSA, zoo management "*express its general support for this project in recognition of its likely contribution to the local and broader economy*". As addressed in Section 4.11, TCSA raised several concerns in relation to traffic safety and traffic noise, each of which have been addressed.

AZL also recognises the presence of a cycle way / walkway on the eastern side of Obley Road between the Newell Highway and Dundullimal Homestead, as well as the tourist circuit which incorporates Obley Road, Camp Road and the Newell Highway (effectively surrounding the Taronga Western Plains Zoo. Considering the proposed road upgrades (Section 3.2), noise mitigation measures (Section 3.3), assessment of potential hazards and management (Section 3.4), and the proposed management of transport schedules (refer to Section 5.17.6), it is considered that the proposed use of Obley Road for the transport of reagents, products and other materials could be operated without adversely impacting on the safety or amenity of these tourist features.

5.15.4.2 Local Villages

Concern that the Proposal will impact tourism to local villages such as Yeoval and Cumnock was raised in two public submissions.

Representative Comment(s)

> *Obley Road recently has become a tourist drive and the smaller communities past Toongi, namely Yeoval, Cumnock and Molong have worked hard to boost numbers to their towns through The Animals on Bikes initiative (www.animalsonbikes.com.au). A number of sculptures line the Obley Road between Toongi and Dubbo, including hanging in trees close to the road. Alkane neglect to mention what will happen to these sculptures when the road is widened and how will they guarantee the safety of tourists who pull over on the road to look at these.*
>
> *Tamara Shepherd, Submission 83282*

Response

AZL do not proposed to undertake significant tree clearing within the Obley Road easement, with the current clear zone generally sufficient to provide for the Austroads (2010) recommended clear zone requirements (see Section 4.2.4). In the unlikely event that a tree containing a sculpture requires branch or tree removal, either an alternative replacement tree would be identified for the sculpture or a wire rope safety barrier would be installed in lieu of the clear zone (**Commitment 14.5**).

Impacts on the local villages and towns are not expected as the proposed increase in traffic on Obley Road would be mitigated by the proposed road upgrades and other management measures, e.g. truck scheduling. Furthermore, these movements would be restricted to between the Newell Highway and Toongi Road, with no trucks travelling on the remaining 65km to Molong. It is considered highly unlikely that the proposed traffic would prevent the majority of locals or tourists from travelling between Dubbo and these villages if that had been their intent. In fact, the presence of a high standard road, at least to Toongi, could even encourage some visitors, e.g. those to Taronga Western Plains Zoo, to continue to these locations.

5.15.5 Social Impacts

5.15.5.1 Significant Social Impacts

The issue of significant social impact from the Proposal was raised in two submissions received from special interest groups and three public submissions.

Representative Comment(s)

> *The increase in truck movements and other social impacts will also cause unacceptable impacts from this project.*
>
> *Central West Environment Council*

The increase in truck movements and social impacts are not acceptable

Fiona MacDonald, Submission 83349

Response

The issue of potential social impacts was assessed by DGP (2013) and summarised in *Section 14.5.5* of the EIS. This assessment illustrates that the impact of the DZP on the local and regional social setting would be relatively limited, and unlikely to be noticeable beyond the immediate vicinity of the DZP Site (Toongi).

The focus of submissions on this matter is the impact that truck movements on Obley Road might have on the local setting. As has been discussed in the EIS and in previous sections of this document, AZL has made significant commitments with respect to upgrading local roads and road infrastructure (Section 3.2) and minimising impacts associated with transport such as noise emissions (Section 3.3).

On the basis of the proposed transport management and mitigation, and considering the significant socio-economic benefits to be provided by the DZP, any residual impact on the social setting along Obley Road is considered acceptable.

5.16 SURFACE WATER

5.16.1 Local Waterways

5.16.1.1 Wambangalang Creek and Macquarie River

The issue of significant risk of impact to Wambangalang Creek and Macquarie River was raised in five submissions received from special interest groups and six public submissions.

Representative Comment(s)

The environmental assessment for the proposal has identified high and extreme risks associated with……Chemical spills contaminating surface and groundwater. CWEC does not agree that the proposed mitigation of these impacts or the statement of commitments will address the extent of the risks.

Cilla Kinross, Central West Environment Council

The potential impact on the downstream areas of Wambangalang Creek and Macquarie River are a significant cause for concern. There should be no short-cuts when dealing with potentially radioactive and definitely toxic materials upstream of both sensitive aquatic ecosystems (eg Macquarie Marshes Ramsar site) and drinking and irrigation water sources for several communities.

Tim Hosking, Dubbo Field Naturalists and Conservation Society Inc.

The possible impacts on the health of Wambangalang Creek and Macquarie River are high.

Margaret Macdonald, Submission 84563

Response

The potential for impact on Wambangalang Creek, the Macquarie River and other waterways has been acknowledged with the initial risk assessment identifying several potential incidents of 'high' risk (see *Section 3.5.2* ad *Tables 3.6* to *3.9* of the EIS). The detailed and comprehensive assessments of surface water (SEEC, 2013), groundwater (EES, 2013), aquatic ecology (AHA, 2013) and terrestrial ecology (OzArk, 2013a) all considered the potential impacts of the DZP on the local catchment and provided recommendations as to impact avoidance, mitigation and offset measures. These recommendations have been accepted by AZL and adopted within the Statement of Commitments for the DZP (see Section 6).

On the basis of the acceptance of these recommendations, each of the specialist consultants determined that the DZP could be undertaken without unacceptable impact on the local hydrological / aquatic environment. An assessment of the mitigated risks associated with the DZP (see Section 6.2.1 of the EIS) confirms that the risk of impact has been reduced to low or moderate, or As Low As Reasonably Possible for each of the potential incidents.

AZL can confirm that it will take no short-cuts in managing the DZP and potential impacts on the local catchment.

5.17 TRAFFIC AND TRANSPORT

5.17.1 Commitment to Rail Transport

5.17.1.1 Preference for Rail Transport Option

The public preference for rail transport and request that a rail feasibility study be completed and commitment made before construction commences was raised in twelve public submissions.

Representative Comment(s)

> *I would like to see Alkane be required to commit to use of the rail line and thereby committing to the option of lowest impact and keeping Obley Road as safe as possible for my family.*
>
> *Tamara Shepherd, Submission 83282*

> *Alkane must consider Rail as the preferred option due to the least impact it has to said landowners and residents on adjoining Obley Road.*
>
> *Simone Pye, Submission 83023*

Response

Section 2 provides further detail on the commitment of AZL to progress the rail transport option, identifying the approach being taken to assessment of feasibility and providing commitment to confirming the feasibility within 5 years of development consent.

5.17.1.2 Inadequate Information Provided in EIS

Concern that there is not enough information provided in the EIS regarding the decision that the rail option is not feasible was raised in three public submissions.

Representative Comment(s)

> *… there is very limited detail provided of what these various "logistical, operational and economic factors" are which make the option initially unfeasible.*
>
> *Carolyn Pascoe, Submission 83475*

Response

Section 2 provides further detail on the commitment of AZL to progress the rail transport option, identifying the approach being taken to assessment of feasibility and providing commitment to confirming the feasibility within 5 years of development consent.

5.17.1.3 Uses for the Re-Opened Rail Line

The issue of the Applicant backing out of its commitment to reopening the rail line and extending its use for tourists and commuters to Dubbo was raised in a submission received from Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *At one of the Toongi community meetings, residents were advised that the Applicant was keen to see the rail line used as a tourist facility to transport visitors to the Zoo and Dundullimal. We were also advised that employees could catch the train to and from work, thus reducing the number of light vehicles on the road. I now see no mention of either of these proposals in the EIS documentation.*
>
> *Carolyn Pascoe, Submission 83475*

Response

No firm commitment to either of the ancillary uses of the rail was ever given. Neither potential ancillary uses were identified in the EIS as they do not form part of the proposed operation of the DZP.

5.17.2 Pollution

5.17.2.1 Increased Traffic

The issue of increased trucks on the road causing air pollution was raised in two public submissions.

Representative Comment(s)

I am also concerned that the rail option would not be implemented for a number of years after the mine starts to operate. This will increase traffic on Dubbo Streets and consequent transport air pollution.

Colin McKay, Submission 83526

Response

AZL would require that trucks transporting reagents, products and other materials be of a high standard, well maintained and include industry leading emissions reduction technology. It is also noted that up to 70% of electricity requirements for the DZP would be co-generated using the excess heat of the acid plant.

Section 4.3.7.10 of the EIS assesses the annual average and total greenhouse gas emissions that would be generated by the DZP. Notably, the emissions related to road transport only would be marginally higher than those if rail was undertaken. As discussed in the EIS, the overall contribution of the DZP to greenhouse gas emissions would be relatively low.

5.17.2.2 Idling Trucks

The issue of air pollution emanating from idling trucks and the adequate assessment of this in the EIS was raised in a submission provided by Mr Wayne Connor of Dubbo NSW.

Representative Comment(s)

With such a large truck fleet in operation it would be prudent to investigate NO_2 exhaust treatment devices and onsite idling guidelines.

Wayne Connor, Submission 79849

Response

AZL is committed to operating an efficient and well-maintained fleet of vehicles, implementing all practically applicable best practice pollution controls.

5.17.3 Road Upgrades / Construction

5.17.3.1 Adequacy of Obley Road

Concern that Obley Road has been maintained as a country road and would not accommodate Proposal traffic without improvements was raised in three public submissions.

Representative Comment(s)

If the road traffic is to increase, particularly with heavy traffic, the width of Obley Road would need to increase in areas to allow for the safe passage of cyclists, walkers, runners, myself with small children and to ensure general road traffic safety.

Name Withheld, Submission 83422

Response

Section 3.2 summarises the commitments made by AZL with respect to upgrading the standard of Obley Road to accommodate the safe and efficient operation of the proposed transport fleet. The presence of the Obley Road cycle way / walkway that runs along the eastern side of Obley Road between the Newell Highway and Dundullimal Homestead has been acknowledged and provision made for the use of a wire rope safety barrier instead of a 7.5m clear zone here to avoid impact on this existing infrastructure. AZL is also consulting with TCSA regarding the possibility of providing some modification to pedestrian access to the Taronga Western Plains Zoo via this cycle way / walk way.

Given the significant commitments made by AZL to road upgrade and accommodation of other road users, it is considered that the safety of cyclists, walkers, runners would not be adversely affected.

5.17.3.2 Timetable for Upgrades and Construction

The issue of road upgrade and construction not being completed before construction on the DZP Site commences was raised in two public submissions.

Representative Comment(s)

> *The estimated 7560 heavy vehicle movements over the 420 day construction period is a huge amount of movements. The Applicant must be required to have completed all road upgrades prior to these movements commencing.*
>
> *Carolyn Pascoe, Submission 83475*

Response

It is not practical to complete the road upgrades prior to commencement of DZP Site infrastructure construction. However, AZL is committed to liaising closely with Dubbo City Council and the RMS to ensure that the proposed road upgrade works are undertaken in a safe and efficient manner. As noted in *Section 4.12.4* of the EIS, AZL is committed to the preparation and implementation of a *Construction Traffic Management Plan* which would identify and provide for management of all potential issues and incidents.

5.17.3.3 Conflicting Information in the EIS

The issue of conflicting statements contained in the EIS and Specialist Consultant Studies Compendium related to the upgrade of Toongi Road was raised in a public submission received from Ms Constance Pascoe of Dubbo NSW.

Representative Comment(s)

> *There seems to be quite a difference in what the Specialist considers is required and what the Applicant is prepared to undertake. (Section) 4.2.3 does not indicate which parts of Toongi Road are to be widened, however I assume that the Applicant is only*

proposing to upgrade Toongi Road as far as the Site entrance and not its whole extent. This needs to be clarified.

Carolyn Pascoe, Submission 83475

Response

As noted in *Section 2.2.5.3* of the EIS, AZL would upgrade Toongi Road between Obley Road and the DZP Site Entrance. Following review of the submission of Dubbo City Council, AZL has agreed to provide for an 8.5m pavement over a 10m formation on Toongi Road between Obley Road and the DZP Site entrance (**Commitment 14.12**).

5.17.3.4 No Consideration Given to Roads with Dubbo Urban Area

Concern that proposed upgrades were only considered for Obley and Toongi Roads and did not include all approaches to the DZP Site was raised in a submission received from Ms Elsie Howe of Dubbo NSW.

Representative Comment(s)

I have not managed to pick up in the documents any mention of Alkane's proposed contributions to road reconstruction and other associated traffic management requirements outside of those they mention (2:12.4.2) they will contribute to works they deem necessary along the Obley and Toongi Roads.

This appears to leave the stretch of the Newell Highway through Dubbo, from the Obley Rd junction to the railhead access 'in limbo' regarding funding for upgrades and maintenance, and cause for considerable concern regarding increased traffic conflict, insufficient lane-width and road-pavement strength.

Elsie Howe, Submission 85401

Response

The EIS considers the route to be taken by trucks in the event that rail to Dubbo and road to the DZP Site is identified as the preferred option. This would involve the rail transport of bulk reagents (sulphur, caustic soda and hydrochloric acid) to a rail terminal operated by Fletcher International Exports Pty Ltd on the Dubbo-Coonamble Rail Line. The reagents would be unloaded at this rail terminal and transferred to trucks for delivery to Toongi by road utilising an approved heavy haulage route between the rail terminal and the Newell Highway and turning:

- right onto Yarrandale Road; then
- left on Boothenba Road before crossing the Merrygoen Rail Line at a signalled level crossing; then
- left onto the Newell Highway.

Upgrades to these roads are not considered necessary as they are gazetted RMS Restricted Access Vehicle Routes which currently carry heavy vehicle traffic.

5.17.3.5 Adequacy of Road Upgrades

Concern that the proposed upgrade of intersections, level crossings and other road improvements were inadequate to manage expected traffic increases was raised in a submission received from Ms Laurie Pryde of Dubbo NSW.

Representative Comment(s)

> *There are a number of potentially dangerous intersections between Dubbo and Toongi which will be a cause of concern for especially heavy trucks. Some of these include the intersection of Obley Road and the Newell Highway, the entrance to the zoo, Dundullimal Homestead and Benolong Road intersection. The zoo entrance, particularly in school holiday times, is frequently so congested that traffic builds up at a standstill from the Newell Highway to the zoo entrance. There are also a number of poorly aligned corners of the Obley Road particularly the one just south of the Camp Road intersection – a site of many accidents in the past. There are also quite a number of concealed entrances especially those on the crests of hills along the length of the Obley road.*
>
> *Laurie Pryde, Submission 83300*

Response

The Traffic Impact Assessment of CSPL (2013) considered the adequacy of each of the intersections and concluded that each in their current arrangement was suitable for the proposed volume of traffic to be generated by the DZP. It is also noted that realignment of Obley Road would be undertaken where the curve radius does not meet the 100km/hr road requirement.

As documented in Section 3.2, AZL has now committed to significantly upgrading the intersection of the Taronga Western plains Zoo main visitor entrance and Obley Road (**Commitment 14.6**).

5.17.4 Road Maintenance

5.17.4.1 Financial Contributions to Maintenance

The issue of the Applicant contribution to towards the continual upkeep of roads and bridges used by traffic associated with the Proposal was raised in a submission received from Ms Constance Pascoe of Dubbo NSW.

Representative Comment(s)

> *The Applicant must be required to contribute a fair and reasonable amount towards the continual upkeep of the roads and bridges which will be used by project traffic.*
>
> *Carolyn Pascoe, Submission 83475*

Response

As noted in Section 4.2.6, AZL is committed to making a fair contribution to road maintenance.

5.17.5 Flooding / Drainage

5.17.5.1 Flooding on Obley Road

Concern that the Traffic Assessment had not considered all flooding possibilities on Obley Road was raised in a submission received from Ms Laurie Pryde of Dubbo NSW.

Representative Comment(s)

> *Between Dubbo and Toongi the road is subject to flooding at five separate locations to my direct knowledge. Two of these sites are not considered for improvement (Zoo creek and Dundullimal creek).*
>
> *Laurie Pryde, Submission 83300*

Response

Final engineering designs for the Obley Road upgrade will consider all possible flooding locations, with upgrades to these creek crossings likely where flooding occurs for events less than a 1 in 20 ARI. It is noted that AZL does not propose to completely 'flood proof' Obley Road with it likely that, temporary road closures may still occur. Reagent storage would accommodate the potential for occasional road closure with alternative personnel access arrangements established in the event Obley Road is closed for a period.

5.17.6 Traffic Types and Levels

5.17.6.1 Increase to Truck Movements

The issue of increase to heavy truck movements was raised in a submission received from the Central West Environment Council and in 18 public submissions.

Representative Comment(s)

> *The increase in truck movements and other social impacts will also cause unacceptable impacts from this project.*
>
> *Central West Environment Council*
>
> *The proposed amount of trucks using Obley Road is also a big concern, even with upgrades to the road. That will be too many trucks on a beautiful stretch of road with many, many children and families living on it.*
>
> *Name Withheld, Submission 80120*

Response

In acknowledgement of the change to local traffic that would result should the DZP be approved, AZL has made various commitments to reduce the impact of this change.

- The standard of the road would be improved to address many of the existing issues associated with poor road geometry, inadequate stormwater drainage and

inadequate pavement. Following a review of the Dubbo City Council submission, this road upgrade now provides for:

- Two 3.5m lanes, 1.5m sealed shoulder on both sides of the road over a 12m formation (**Commitment 14.4**).
- Improved horizontal alignment of various corners.
- Establishment of a vegetation clear zone in accordance with Austroads (2010) (7.5m from the edge line on straight sections and inside curves and at least 9m on the outside of curves) (**Commitment 14.5**).
- Upgraded pavement as required to provide for a 20 year life (**Commitment 14.13**).
- Additional sealing as required on approach and exit to bus shelters (**Commitment 14.14**).
- Upgrades to the crossings of Wambangalang, Hyandra and Twelve Mile Creeks (**Commitment 14.8**).
- Apply an asphaltic concrete seal to 2.4km section of Obley Road from the Newell Highway (200m beyond Zoofari Lodge / Dundullimal Homestead intersections) and 950m section of Obley Road from the Toongi Road intersection (**Commitment 14.9**).

- AZL would require all drivers (of both heavy and light vehicles) to comply with a Driver Code of Conduct. Failure to comply with this code, which would address such issues as speed, driving to conditions, general courtesy, braking, compliance with scheduling, fatigue management, drugs and alcohol, would result in potential dismissal or refusal of entry (**Commitment 14.2**).
- The Driver Code of Conduct would include specific rules for heavy vehicle operators on Obley Road. The specific nature of these remains to be developed, requiring the input of the transport operators (yet to be confirmed) and the RMS (with respect to compliance with road operation standards). The aim of the specific rules would be to minimise the maximum number of trucks using Obley Road at any one time or over restricted periods (e.g. per hour), to prevent convoying of trucks along the road, and to avoid where possible the operating periods of the local school bus operators.
- All heavy vehicles contracted to deliver to the DZP Site would be fitted with a common GPS which will enable real time measurement of average and actual speed, braking events, stopping events, accident recording, position on Obley Road, etc. Transport service providers would be contractually obliged to conform to the scheduling procedure and the GPS system would enable compliance to be confirmed and/or audited.
- AZL would maintain a record of school bus pick-up / drop-off points along Obley Road. This inventory would updated each school term and provided to drivers along with instruction (as part of Driver Code of Conduct) to be aware of potential for school children beside (or on) the road (see also Section 5.17.10).

While whilst ever there are cars utilising these roads, there remains the possibility of an incident. However, the proposed road upgrades, safeguards and management measures proposed by AZL would limit the potential for such an incident involving a DZP generated vehicle as far as considered practically possible.

AZL remains committed to working with Dubbo City Council, RMS, TCSA and other local stakeholders, e.g. bus operators, tourist facility managers, local residents, to minimise the potential for incident.

5.17.6.2 Hours of Operation

The issue of proposed transport of materials to and from the Site for 24 hours of the day was raised in five public submissions.

Representative Comment(s)

> *EIS outlines (Section 2.14) proposed hours of various mine operations, but fails to comment on the transport. Fails to provide information about transport and nothing to state that heavy vehicle movements would not occur 24 hours per day.*
>
> *Simone Pye, Submission 83023*

> *Obviously if there is a high level of heavy vehicle movements after dark, the risk to other road users is increased. If trucks are to be operated at night it would also be a concern if they made loud noises when backing and dumping their loads. Trucks turning and braking at night at the Obley Road/Toongi Road intersection would also be a concern for nearby residents.*
>
> *Carolyn Pascoe, Submission 83475*

Response

The specific details of the road transport task remain to be confirmed, however, it has been assumed as part of the EIS that transport operations would be undertaken 24 hours per day. Importantly, the Noise and Vibration Impact Assessment (EMM, 2013) considered 24 hour road transport and confirmed the relevant noise criteria would be met. AZL has committed to applying an asphaltic concrete seal to the 2.4km section of Obley Road from the Newell Highway (200m beyond Zoofari Lodge / Dundullimal Homestead intersections) and 950m section of Obley Road from the Toongi Road intersection and noise monitoring and modelling undertaken by EEM has confirmed that truck pass-by noise levels would comply with Road Noise Policy (INP) sleep disturbance criteria at local residences along Obley Road (see Section 3.3). Strict adherence to a Driver Code of Conduct, which would require drivers to modify operations at night to limit noise, e.g. no engine braking, no excessive acceleration, proper securing of trailers, would further reduce the potential for loud noises.

While as noted above, the actual transport task remains to be confirmed, the volume of traffic operating on Obley Road at night is likely to be much less than that operating during the day, primarily as the delivery of limestone which makes up a significant proportion of the total transport is likely to be only transported during the day (to coincide with likely quarry operating hours).

5.17.7 Adequacy of Assessment

5.17.7.1 Reagent Transport

The issue of the adequacy of information provided in the EIS on the transport of reagents was raised in a submission received from Mr Glenn Shepherd of Dubbo NSW.

Representative Comment(s)

> *Of greatest concern to Obley Road residents is the lack of information provided in the EIS with regard to transportation of reagents (and to a lesser degree, processed end products).*
>
> *Glenn Shepherd, Submission 83302*

Response

The reagents and other materials to be transported to the DZP Site would all be undertaken using road registered vehicles licensed appropriately under the *Australian Code for the Transport of Dangerous Goods by Road And Rail 7th Edition* (ADG 7) (NTC, 2011). Transport would be restricted to the gazetted RAV routes through Dubbo on which vehicles carrying dangerous goods already travel. In accordance with ADG 7, Dubbo City Council would be informed of the transport routes, volumes and materials to be transported prior to utilisation of these routes. Furthermore, AZL has already engaged with the District Emergency Management Committee (DEMC) regarding the transport of dangerous goods on roads with the Dubbo City LGA. Once the routes, volumes and materials of the transport task are confirmed, discussions with the DEMC will be undertaken again with the possibility of specific contingency and incident management training being developed.

Further to the above, a Transport Route Risk Assessment Study would be completed following confirmation of the specific details of the transport task, either by AZL or more likely the company responsible for transporting the reagent. This notwithstanding, a transport hazard analysis has now been completed by Sherpa (2013b) (see **Appendix 4**) illustrating that any risks associated with the transport of materials are known and can be appropriately managed.

5.17.7.2 Light Vehicle Movements

Concern that the EIS did not provide assessment of the potential impact of light vehicles associated with DZP personnel was raised in three public submissions.

Representative Comment(s)

> *The figures in Table 2.17 of the EIS only refer to TRUCK movements ONLY, thus misleading readers. Where are the figures that include the extra 220 light vehicle movements per day in addition to the trucks???*
>
> *Simone Pye, Submission 83023*

Response

Section 4.12.3 of the EIS provides the anticipated light vehicle movements proposed and *Table 4.79* of the EIS provides a projection of forecast traffic including these light vehicle movements. The assessment of impacts provided by *Section 4.12.5* of the EIS, following from the assessment of CSPL (2013), accounts for light vehicle movements. Most notably, the SIDRA analysis of intersection performance (*Section 4.12.5.1* of the EIS) accounts for the peak hourly movements of light vehicles currently and following approval of the DZP.

5.17.7.3 Accuracy of Assumptions

The accuracy of the assumption that that B-Double truck-trailer combination transport is allowed to use Obley Road between the Newell Highway and Benolong Road as stated in the EIS was raised in two public submissions.

Representative Comment(s)

> *The Applicant claims that according to RMS records, the Obley Road, from the Newell Highway to the Benolong Road is a B-Double route. When I consulted the RMS website, this is not the case. It is either a glaring error or deliberate mid-representation by The Applicant.*
>
> *Glenn Shepherd, Submission 83466*

Response

This error is acknowledged, however, was based on maps provided by Dubbo City Council (see **Figure 5**) which identify the section of Obley Road to Benolong Road and a B-Double Route. Obley Road would be upgraded and gazetted as a B-Double Route on approval of the DZP.

5.17.8 Transport Routes

5.17.8.1 Transport Through Dubbo

Concern regarding the transport of material through Dubbo was raised in a submission received from Mr Alan Coghill of Dubbo NSW.

Representative Comment(s)

> *Sorry I don't support the mine due to the dust and pollution as well as the transport of this material through Dubbo by ether truck or rail.*
>
> *Alan Coghill, Submission 79853*

Response

It is noted that the road transport routes through Dubbo would either be restricted to the State Highway network, or Yarrandale Road / Boothenba Road, all of which are gazetted Restricted Access Vehicle (RAV) routes for B-Doubles.

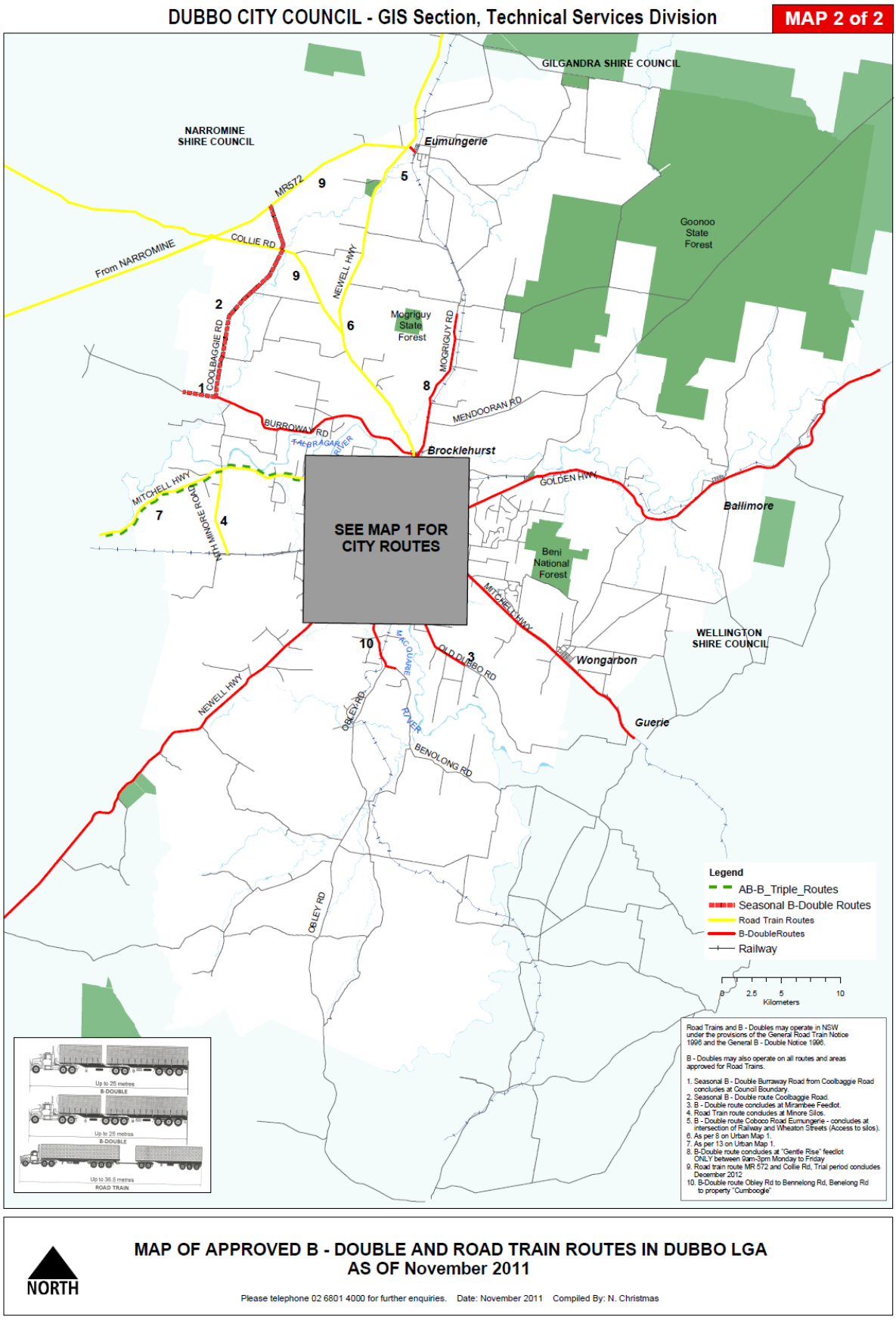

Figure 5
DUBBO CITY COUNCIL PROVIDED B-DOUBLE ROUTE MAP

5.17.9 Risk of Accidents

5.17.9.1 Potential Increase in Motor Vehicle Accidents

Concern that the Traffic Assessment does not adequately consider the potential increase in traffic accidents, fatalities and serious accidents was raised in three public submissions.

Representative Comment(s)

> *For all the modelling of traffic volumes that has been done, there does not appear to be any modelling of expected traffic fatalities or serious accidents as a result of the proposed increased traffic.*
>
> *Matt Parmeter, Submission 83477*

Response

The proposed road upgrades and operational safeguards and management measures have been proposed to minimise the potential for traffic accident or incident on Obley Road. Assuming appropriate driver behaviour, no accidents or incidents are forecast.

5.17.10 School Bus Services

5.17.10.1 School Transport Routes / Safety of Embarking and Disembarking Students

Concern that the EIS does not adequately consider the impact of heavy trucks on the school bus routes or the safe embarking and disembarking of students was raised in three public submissions.

Representative Comment(s)

> *Section 4.12.2.2 says there are 6 known bus stops on the Obley Road, whilst acknowledging these will change over time. The reality is there are approximately 15 bus stops and 2 separate bus routes that service the Obley Road.*
>
> *Glenn Shepherd, Submission 83302*

> *Will this mean that buses can no longer pick up children from in front of their houses because two B-Double trucks passing each other as a bus is pulled over is too dangerous?*
>
> *Tamara Shepherd, Submission 83282*

Response

AZL has now contacted the two bus operators on Obley Road (Langley's and Ogden's) to obtain an accurate picture of school pick-ups / drop-offs on Obley Road. As identified in **Table 9**, there are currently 15 pick-ups / drop-offs on Obley Road with the buses generally on the relevant section of Obley Road for approximately 20 minutes.

Table 9
School Bus Operations*

Time	Langley's	Ogden's
Morning Pick-up		
8.00am	218 Obley Rd	
8.01am		83R Obley Road
8.02am	216 Obley Rd	78R Obley Road
8.03am		Obley Road Bus Shelter
8.04am		58L Obley Road
8.05am	Oakdene Rd	44R Obley Road
8.07am		Belowrie Road
8.09am		Camp Road
8.10am	136 Obley Rd	16L Obley Road
8.14am	102 Obley Rd	
8.15am	100 Obley Rd	
8.20am	Camp Rd	
Afternoon Drop-off		
3.58pm	Camp Rd	
4.03pm	100 Obley Rd	
4.04pm	102 Obley Rd	
4.08pm	136 Obley Rd	
4.13pm	Oakdene Rd	16L Obley Road
4.14pm		Camp Road
4.15pm		Belowrie Road
4.16pm	216 Obley Rd	44R Obley Road
4.17pm		58L Obley Road
4.18pm	218 Obley Rd	Obley Road Bus Shelter
4.19pm		78R Obley Road
4.20pm		83R Obley Road
Note *: As of December 2013		

AZL has contacted both bus operators and committed to maintaining a register of school pick-ups / drop-offs on Obley Road. AZL would avoid, as far as practicable, scheduling arriving or departing trucks during the morning and afternoon periods coincident with school bus operation on Obley Road. AZL would also identify the periods when the school buses operate on Obley Road within the Driver Code of Conduct with specific instructions to be provided for operation during these periods.

AZL is also committed to providing the safest possible traffic environment for the school buses and would liaise with the bus operators and Dubbo City Council regarding possible engineered measures, i.e. widened shoulders at pick-up points, to allow for the bus to completely pull off the lane when picking up or dropping off.

5.17.11 Miscellaneous

5.17.11.1 Speed Zones

The issue of justification for any changes to speed zones associated with the Proposal was raised in a submission received from Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *At 4.12.4 the Applicant states that it will consult Council and RMS in relation to moving the 60km/hr speed zone on Obley Road to the south of Dundullimal Homestead access road. There is no indication of why this is proposed and in fact it is an 80km/h speed zone at present. The Applicant should be requested to provide further information and justification for this proposal.*
>
> *Carolyn Pascoe, Submission 83475*

Response

Dubbo City Council has indicated it is unlikely to support any change in the speed zone, however, AZL will continue to investigate.

5.17.11.2 Preference Given to Cyclists and Taronga Western Plains Zoo in the EIS

Concern that traffic assessment gave preference to cyclist groups and impacts to the Western Plains Zoo above local residents was raised in a submission received from Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *The EIS documentation contains very little mention or concern about the impact of the increase in traffic on individual residents, especially those whose houses are close to the road. This indicates to me that the cycling lobby is strong and the residents' voice is not, or that the Applicant does not consider it to be important.*
>
> *Carolyn Pascoe, Submission 83475*

Response

Local cycling groups and traffic associated with the Taronga Western Plains Zoo have been identified as these are existing users of the local roads that required consideration in the EIS. This was not meant to imply any greater value or importance on Dubbo's cyclists or traffic to and from the zoo.

The impact of the proposed traffic generation on local residents of Obley Road was considered in combination with all other users of the road. The impacts of traffic noise were also considered for all residential receivers along Obley Road (for which compliance with Road Noise Criteria was confirmed. It is beyond the scope of this, and any, assessment to consider the intersection of property or residential accesses to Obley Road. Ultimately, this is the responsibility of the land owner.

5.17.11.3 Economic Assessment of Transport Options

The issue that the economic assessment of the various transport options was not made available was raised in a submission received from Ms Carolyn Pascoe of Dubbo NSW.

Representative Comment(s)

> *At 1.7, 1-21 it is stated that Mrs Diana Gibbs has "also undertaken an economic assessment of the various transport options of the Proposal ..." I have not been able to find this documentation on the Department's or Alkane's websites, but it would be very helpful to have had this detail available.*
>
> *Carolyn Pascoe, Submission 83475*

Response

The assessment of DGP (2013) was of the overall socio-economic impact of the DZP on the local, regional and NSW communities and economies. Mrs Gibbs has completed an initial business case analysis of the various transport options, however, as this remains preliminary in nature it has not been provided for public review.

5.18 WASTE MANAGEMENT

5.18.1 Accumulated Salt Waste

5.18.1.1 Storage and Management

The issue of salt waste disposal as a preference to it being encapsulated at the Site was raised in 11 public submissions

Representative Comment(s)

> *Companies that develop projects that generate a significant amount of waste (especially wastes known to be harmful to humans and/or the ecosystem) MUST accept that the cost of *effective* disposal of these wastes is their responsibility.*
>
> *Les Follent, Submission 80373*

> *The mine will leave behind 6.7 million tonnes of toxic salt buried in the ground because the mine operators have decided it is too expensive to dispose of this toxic salt (it will cost $33 million per year) so they are going to leave it there, sparred in plastic, hoping it won't leak into the groundwater.*
>
> *Name Withheld, Submission 80117*

Response

As discussed in *Section 6.1.5* of the EIS, AZL has considered various options for the disposal of the crystallised salt residue, however, at this time encapsulation remains the only viable option. The assessment demonstrates that this method of disposal, similar to the disposal of solid residues of the DZP or tailings of other mining developments, can be undertaken without adversely impacting on the local environment. Furthermore, the EIS provides for specific

rehabilitation methods aimed at maximising the revegetation of the Salt Encapsulation Cells on completion.

It is noted that it is unlikely that AZL would need to excavate and manage accumulated salts for at least 5 to 10 years. During this time, AZL will continue to investigate the possible re-use of the salt in processing (there is a financial incentive for this as the DZP would import approximately 90 000t of salt annually), sale of the salt (again there is a financial incentive for this as a solution) or alternative off-site disposal solutions.

5.18.2 Leaks and Contamination

5.18.2.1 Security and Monitoring

The issue of security measures to be put in place to detect leakage or contamination from the salt waste residue was raised in a submission provided by Mr Ross and Mrs Helen Whiteley of Dubbo NSW.

Representative Comment(s)

> *Can there be monitoring equipment to detect any groundwater leakage or contamination from these deposits before it impacts on the adjoining property of Cockleshell Corner. This was asked at the community meeting held at Toongi and we were under the impression from lan Charmers that this was something that would be looked into.*
>
> *Mr Ross and Mrs Helen Whiteley, Submission 83286.*

Response

Section 4.6.6.3 of the EIS confirms that a groundwater monitoring program would be implemented as a component of a Groundwater Management Plan (**Commitment 19.2**).

5.18.2.2 Contamination of Local Groundwater

The issue of potential leakage of salt waste storage and contamination of local groundwater was raised in seven public submissions.

Representative Comment(s)

> *…….The proposal is to bury 6.7 million tonnes of toxic salt in plastic and leave it there, hoping it won't leak into the groundwater. This is absurd. The cost of disposal of the salt should be factored into the development and he (sic) waste should be disposed of not left behind.*
>
> *Wayne Connor, Submission 79849*

> *The mine is to remove/treat/deposit its toxic waste in a manner which ensures that no groundwater contaminant testing is required.*
>
> *Brent Richards, Submission 83274*

Response

The currently proposed disposal option, the Salt Encapsulation Cells, incorporates two HDPE plastic liners, separated by a leak detection and management system within a purpose designed encapsulation cell of low permeability materials. This provides a far more sophisticated method of disposal and management than implied by several submissions.

Considerable effort has been and continues to be made into alternative options for salt disposal. As and when a feasible alternative is identified, which could include re-use, commercial sale, or off-site disposal, it will be investigated and implemented (following completing of all necessary due diligence and environmental assessments).

5.18.2.3 Contamination of Local Waterways

The issue of potential leakage of salt waste storage and risk of contamination of local waterways and drinking water was raised in six public submissions.

Representative Comment(s)

> *There is a risk of contamination to surrounding waterways.*
>
> *Dr Cilla Kinross, Submission 83424*
>
> *The nature of the waste would severely damage the environment if it was to leak out of the plastic containers.*
>
> *Colin McKay, Submission 80560*

Response

The proposed construction of the SEC's provides two HDPE plastic liners, separated by a leak detection and management system within a purpose designed encapsulation cell of low permeability materials. Groundwater monitoring bores would be installed around the SEC's to identify if there is any breach of both liners allowing for contingency measures to be implemented prior to the discharge of saline water to local water ways.

The concerns of those submitting objections are noted, however, the reality is that the SEC's would be highly unlikely to leak and that suitable warning would be provided to allow for impact mitigation and remediation.

5.18.3 Post Mine Life

5.18.3.1 Security and Management Post Mine Life

Concern that the Proposal does not say what would happen if a leak is detected in buried waste after the operation has closed was raised in two public submissions.

Representative Comment(s)

Leak detection is provided, but no indication of a procedure if a leak is detected after the operation has closed.

Colin McKay, Submission 80560

Response

AZL would be required to manage the DZP Site until it can be illustrated that there is no ongoing liability. This would likely require several years of monitoring to demonstrate no leakage.

5.18.4 Tailings and Waste Water

5.18.4.1 Management and Risk

Concern regarding the high risk of managing residues and waste water was raised in three submissions provided by special interest groups and in six public submissions.

Representative Comment(s)

The management of tailings and waste water leachate is high risk.

Wilderness Society Newcastle.

There is high risk of waste water leachate and impacts on groundwater have not been clearly acknowledged. Tailing ponds often leak the acids, heavy metals and radioactive materials into groundwater.

Sarah Kendall, Submission 83340

Response

The proposed construction of the SRSF provides two HDPE plastic liners, separated by a leak detection and management system within a purpose designed encapsulation cell of low permeability materials. Groundwater monitoring bores would be installed around the SRSF to identify if there is any breach of both liners allowing for contingency measures to be implemented prior to the discharge of saline water to local water ways.

It is also noted that the residues would not be acidic, as they would be subject to neutralisation prior to disposal, and would not contain concentrations of heavy metals or radionuclides in any greater concentration than the ore which was mined from the open cut.

The concerns of those submitting objections are noted, however, the reality is that the SRSF would be highly unlikely to leak and that suitable warning would be provided to allow for impact mitigation and remediation.

5.19 WATER USE

5.19.1 Annual Water Requirements

5.19.1.1 Impact to Local Water Supply

Concern that the Proposal's requirement for 4 000 million litres of water annually is excessive and will impact water supply to Dubbo and the local environment was raised in eight public submissions and two submissions provided by special interest groups.

Representative Comment(s)

> *I am concerned with the impact that the Dubbo Zirconia Project will have upon the Macquarie River & water supply for Dubbo & it's surrounds.*
>
> *Name Withheld, Submission 79872*

> *The use of water from the Macquarie River will severely impact that waterway and the ecosystems associated with it. The impact of interrupting flows on our waterways is known and we must protect against this.*
>
> *Sarah Kendall, Submission 83340*

> *The proposal, for an opencast mining excavation requiring vast volumes of water for the mineral extraction process is unacceptable without totally transforming negatively the character of the area.*
>
> *Mary Twidell, Submission 83304*

Response

The Water Supply Strategy nominated in *Section 2.8.2* of the EIS, which follows from a review of the availability of water from various sources conducted by Mr Peter Hennessy of Peter Hennessy Water (***Appendix 7*** of the EIS), demonstrates that this volume of water can be legally obtained within the rules and regulations of various Water Sharing Plans.

The various specialist assessments completed for the EIS, in particular a Surface Water Assessment completed by SEEC (2013) and Aquatic Ecology Assessment completed by AHA (2013), assessed the potential impacts of the proposed use of water and concluded that subject to appropriate management would not detrimentally impact on the local catchment of aquatic ecosystems.

In addition, the AIS of RWC / DGP (2013) confirmed that the purchase and use of this volume of water would not impact unacceptably on local agricultural production.

Finally, information was provided to the Commonwealth Department of the Environment (DoE), in referring the DZP under the EPBC Act, on the potential impact of drawing 4GL from the Macquarie River on the Macquarie Marshes (Wetlands of International Significance). The DoE determined that this was not likely to impact on the Macquarie Marshes and therefore was not deemed a Controlled Action for the purposes of potentially significant impacts on Wetlands of International Significance.

6. FINAL STATEMENTS OF COMMITMENTS

Table 10 presents a revised set of commitments, reflecting additional commitments made in response to issues raised in the submissions of the government agencies or general public. Commitments revised or added to those presented in the *Environmental Impact Statement* are provided in red text.

Table 10
Final Statement of Commitments for the Dubbo Zirconia Project

Page 1 of 23

Desired Outcome	Action	Timing
1. Environmental Management		
Compliance with all conditional requirements in all approvals licences and leases.	1.1 Comply with all commitments recorded in **Table 5.1** (this table).	Continuous and as required.
	1.2 Comply with all conditional requirements included in the: • Development consent; • Environment Protection Licence; • Mining Lease(s); • Approval under the EPBC Act; and • any other approvals.	Ongoing.
2. Area of Activities		
All approved activities are undertaken generally in the location(s) nominated on the figures shown in Sections 2 and 4.	2.1 Mark, and where appropriate, survey the boundaries of the areas of proposed disturbance on the DZP Site.	Prior to the commencement of construction in the respective component area.
	2.2 Mark, and where appropriate, survey the alignment of the Toongi – Dubbo Rail Line and Gas Pipeline Corridor.	Prior to the commencement of the relevant activity.
	2.3 Mark, and where appropriate, survey the alignment of the Macquarie River Water Pipeline.	Prior to the commencement of the relevant activity.
	2.4 Mark, and where appropriate fence, boundaries relevant to the Biodiversity Offset Area.	Within 6 months of approval of the Biodiversity Offset Area.
Undertake earthworks with regard to paleontological record of 'Fossil Hill'.	2.5 Undertake (or provide for) an inspection of the 'Fossil Hill' location by a qualified person for any further geological and paleontological information.	Prior to earthworks over or in the vicinity of 'Fossil Hill'.
	2.6 Retain at least one exposure for future reference.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

<table>
<tr><th>Desired Outcome</th><th colspan="2">Action</th><th>Timing</th></tr>
<tr><td colspan="4">3. Operating Hours</td></tr>
<tr><td rowspan="2">All operations are undertaken within the approved operating hours.</td><td>3.1</td><td>Undertake all activities, where practicable, in accordance with the following operating hours.</td><td>Continuous and as required.</td></tr>
<tr><td colspan="3">
<table>
<tr><th>Activity</th><th>Proposed Days of Operation</th><th>Proposed Hours of Operation</th></tr>
<tr><td>Vegetation clearing and topsoil stripping</td><td>7 days a week (per campaign)</td><td>Daylight hours</td></tr>
<tr><td>Construction operations</td><td>7 days a week</td><td>Daylight hours[1a, 1b]</td></tr>
<tr><td>Open cut mining operations</td><td>5.5 days a week</td><td>7:00am to 6:00pm</td></tr>
<tr><td>Blasting operations</td><td>5.5 days a week</td><td>9:00am to 5:00pm[2]</td></tr>
<tr><td>Maintenance operations</td><td>7 days a week</td><td>24 hours per day</td></tr>
<tr><td>Processing operations</td><td>7 days a week</td><td>24 hours per day</td></tr>
<tr><td>Rehabilitation operations</td><td>5.5 days a week</td><td>Daylight hours</td></tr>
<tr><td colspan="3">Note 1a: Low noise generating work such as electrical installation and selected plant construction and fit-out may be undertaken outside of these nominated hours of operation.
Note 1b: Other construction activities may be undertaken outside of the nominated hours if compliance with noise criteria can be achieved at surrounding residential receivers.
Note 2: Unless required for misfire re-blast, emergency or safety reasons.</td></tr>
</table>
</td></tr>
<tr><td colspan="4">4. Noise</td></tr>
<tr><td rowspan="12">Noise generated by construction and operational activities does not exceed intrusiveness criteria nor significantly impacts on neighbouring landowners and/or residents.</td><td>4.1</td><td>Strictly adhere to the INP nominated standard hours of operation.</td><td>On-going.</td></tr>
<tr><td>4.2</td><td>Install and maintain appropriate mufflers and noise retarding barriers to mechanical plant and equipment.</td><td>Ongoing.</td></tr>
<tr><td>4.3</td><td>Prohibit unnecessary idling of equipment during construction operations.</td><td>Ongoing during construction.</td></tr>
<tr><td>4.4</td><td>Fit broadband (frequency modulated) reversing alarms to mobile equipment.</td><td>Ongoing.</td></tr>
<tr><td>4.5</td><td>Notify local residences of plans for nearby construction, duration of construction and plans in place to mitigate noise impacts.</td><td>As required during construction.</td></tr>
<tr><td>4.6</td><td>Educate all contractors and personnel regarding the sensitivities relating to noise</td><td>As part of site induction.</td></tr>
<tr><td>4.7</td><td>Construct semi-enclosed barriers and screens around the crushing plant and ore handling circuit as final design indicates that this is required to meet noise criteria.</td><td>Prior to commencement of plant operation.</td></tr>
<tr><td>4.8</td><td>Complete a detailed review of potential enclosures, noise barriers and other attenuating measures prior to construction, taking into consideration the frequency and amplitude generated by the processing plant.</td><td>Prior to construction of processing plant noise attenuation.</td></tr>
<tr><td>4.9</td><td>Avoid night time loading and unloading of trains (unless necessary to meet allocated rail path).</td><td>Ongoing.</td></tr>
<tr><td>4.10</td><td>Enforce low noise operation of forklifts for night time loading and unloading of trains.</td><td>Ongoing.</td></tr>
<tr><td>4.11</td><td>Prepare a Noise Management Plan (NMP) detailing activities to manage construction and operational noise emissions from project-related activities.</td><td>Prior to the commencement of the construction activities.</td></tr>
</table>

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
4. Noise (cont'd)			
Noise generated by blasting does not exceed criteria nor significantly impacts on neighbouring landowners and/or residents.	4.12	Design and implement blasting events by a suitably qualified blasting engineer or experienced shot-firer to ensure all relevant noise and safety criteria are met.	Ongoing.
	4.13	Prepare a *Blast Management Plan* (BMP) detailing activities to manage blasting and vibration emissions from project-related activities.	Prior to the commencement of blasting.
Noise generated by DZP traffic does not exceed criteria nor does it significantly impact on neighbouring landowners and/or residents.	4.14	Ensure, asphaltic concrete seal applied to Obley Road for 2.4km from Newell Highway and 950m from Toongi Road intersection (see also Commitment 14.9).	During construction.
	4.15	Include noise minimisation requirements, e.g. minimise use of engine brakes on approach to Toongi Road, within a Driver Code of Conduct.	Prior to commencement of operations.
Noise generated by the DZP is monitored and procedures developed and implemented to respond to ensure compliance is maintained.	4.16	Install real-time noise monitoring and communication equipment at an appropriate location.	Prior to commencement of operations.
	4.17	Establish noise monitoring procedures for identifying and managing elevated noise levels.	
	4.18	Ensure that a 24-hour complaints telephone line is maintained and that the surrounding community is made aware of the number.	Prior to the commencement of operations.
	4.19	Ensure that prompt action is taken to identify the nature of any complaint received and verify the relevant noise levels using the real-time noise monitoring equipment.	Within 24 hours of receipt of complaint.
5. Air Quality			
Dust generated during the construction stage does not exceed the nominated air quality criteria	5.1	Identify triggers and procedures for dealing with unfavourable meteorological conditions, such as when it is dry and windy.	Prior to commencement of construction stage.
Dust generated during the operations stage does not exceed the nominated air quality criteria	5.2	Prepare an *Air Quality Management Plan* (AQMP) prior to the commencement of operations to record procedures for controlling dust impacts during operations.	Prior to commencement of operations.
	5.3	Undertake watering of haul roads to control of dust.	Ongoing and as required.
	5.4	Implement dust control measures during drilling of ore and overburden.	Ongoing and as required.
	5.5	Prevent wind erosion on stockpiled material.	Ongoing and as required.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
5. Air Quality (cont'd)		
Minimise emissions to the atmosphere from the processing plant.	5.6 Use dust control measures at relevant crushers and miscellaneous transfer points.	Ongoing and as required.
	5.7 Incorporate emission reduction design to reduce operating SO_2 concentration of the Sulphuric Acid Plant stack to comply with criteria at sensitive receivers.	Ongoing.
	5.8 Operate a dust capture system such as a bag house to capture particulate matter from the grinding mill.	Ongoing.
	5.9 Regulate emissions from the stacks and vents by operating within the prescribed in-stack concentrations limits.	Ongoing.
	5.10 Undertake periodic extractive monitoring to demonstrate compliance with in-stack limits.	Every 3 months for the first year of operation and then annually, if compliance achieved.
	5.11 Implement a regular and documented maintenance and inspection program for all plant items where emissions to air are deemed likely.	Prior to commencement of processing and then ongoing.
	5.12 Complete modelling of gaseous emissions from the final plant design and provide results, along with discussion on application of all reasonable and feasible emissions reduction technology, to the Environment Protection Authority.	Prior to, or as part of an application for an Environment Protection Licence.
6. Radiation		
Provide for appropriate controls to minimise potential for discharge or dispersal of radiation.	6.1 Design the residue storage facilities as a zero-discharge facility with a geo-membrane lining and leak detection system.	Complete.
	6.2 Ensure that all heavy mining equipment is air conditioned to minimise impacts of dust to workers.	Ongoing.
	6.3 Minimise dust using standard dust suppression techniques (refer to Commitments 5.2 to 5.5).	Ongoing.
	6.4 Construct a separate wash-down pad for vehicles that have come from any operating areas.	During construction phase.
	6.5 Construct bunding to collect and contain spillages from tanks containing process slurries.	During construction phase.
	6.6 Bury or bund the residue pipelines to control spillage from residue pipeline failures.	During construction phase.
	6.7 Ensure sufficient access and egress for mobile equipment to allow clean-up where there is the possibility for large spillages.	Ongoing.
	6.8 Achieve nominated leach and precipitation of radionuclides from ore prior to production of final compounds.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
6. Radiation (cont'd)			
Provide for appropriate controls to minimise potential for discharge or dispersal of radiation. (cont'd)	6.9	Install a system to capture and remove volatilised Polonium 210 and Lead 210 prior to ventilation from the FeNb processing circuit.	During construction phase.
	6.10	Remove and residues from the scrubbing circuit and combine with other solid residues for disposal in the SRSF.	Ongoing.
Appropriately classify work areas to allow for implementation of appropriate OHS management.	6.11	Define and operate the DZP Site as a "supervised area" (as defined in ARPANSA, 2005).	Prior to commencement of mining and processing.
	6.12	Define and operate the open cut, crushing and grinding areas, light rare earths processing area and FeNb processing circuit as "controlled areas" (as defined in ARPANSA, 2005).	
	6.13	Define and designate employees working in the controlled areas as designated radiation workers.	
	6.14	Ensure "designated workers" change into work clothes at the commencement of their shift and then shower and change into "street clothes" at the end of their shift.	
	6.15	Launder dirty clothes on-site, with waste water sent to an on-site water treatment plant.	
Ensure only authorised access to the DZP Site.	6.16	Ensure all visitors entering and departing the DZP Site report to the gatehouse or other nominated locations for registration including time of arrival and departure, and an induction, if required.	Prior to commencement of mining and processing.
	6.17	Link access to the DZP to a record keeping system to ensure that all personnel accessing the DZP Site have been appropriately inducted.	
	6.18	Ensure vehicle access is through a controlled access point.	
	6.19	Ensure the exit from the DZP Site of all vehicles having trafficked a controlled area pass through the wheel wash.	
Establishment of site-wide administrative controls.	6.20	Ensure pre-employment and routine medical checks for workers.	Prior to employment.
	6.21	Ensure inductions and regular training of all employees and contractors	As part of induction and then ongoing.
	6.22	Develop safe work procedures which will include: radiation safety aspects; procedures to segregate, isolate and clean up contamination or contaminated equipment; and procedures for equipment or materials leaving the controlled area.	Prior to commencement of operations.
	6.23	Enforce mandatory use of personal hygiene facilities (wash facilities) at entrances to lunch rooms and offices.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
6. Radiation (cont'd)			
Establishment of site-wide administrative controls. (cont'd)	6.24	Employ suitably qualified and experienced radiation safety professionals to assist during the final design, construction and the operational phases of the Proposal.	As required.
	6.25	Use a computer-based data management system to store and manage all information relating to radiation management and monitoring.	Develop prior to commencement and operate for the life of the DZP.
Systems for managing potentially radioactive wastes.	6.26	Ensure material such as contaminated equipment and wastes from operational areas, including discarded conveyor belts, rubber lining material, pipes, filter media and used protective equipment is cleaned within the Processing Plant Area and disposed of in accordance with approved regulatory controls.	As required.
7. Surface Water			
Appropriately document water management measures including erosion and sediment control.	7.1	Prepare and continuously update a *Water Management Plan* for the Proposal, including a detailed *Erosion and Sediment Control Plan* prepared by a suitably qualified expert.	Prior to commencement of operations.
Separate clean water from dirty water	7.2	Ensure that all surface water flows from undisturbed sections of the DZP Site are diverted around disturbed sections and are permitted to flow to natural drainage.	Ongoing.
Design and construct surface water management structures to prevent the discharge of polluted water from the DZP Site and minimise impacts on environmental flows	7.3	Ensure that all potentially salt or chemical-laden water is retained within the DZP Site and is used for processing operations or is sent to the LRSF.	Ongoing.
	7.4	Ensure 1m freeboard is maintained to provide for 1 in 10 000 ARI event and effects of wave run-up in the LRSF.	Prior to discharge of liquid residue.
	7.5	Complete a detailed analysis of wave run-up and (if necessary) provide for management measures as required.	Prior to LRSF construction.
	7.6	Ensure that all runoff from mineralised ore or waste rock, i.e. from the ROM Pad or WRE, is directed to storage basins capable of accepting double the 1 in 100 ARI storm event and equipped with pumps.	Ongoing.
	7.7	Activate pumps following in-flow of water to the storage basins and discharge to the LRSF.	As required.
	7.8	Ensure that all potentially sediment-laden water is directed to appropriately designed sediment basins and is either used for processing operations or dust suppression or, following testing to verify the quality of the water is acceptable, is discharged to natural drainage.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
7. Surface Water (cont'd)			
Site infrastructure does not compromise surface water management.	7.9	Ensure that all roads within the DZP Site are constructed in accordance with Soils and Construction: Managing Urban Stormwater Vol. 2b (DECC, 2008b).	Prior to the commencement of the relevant activity.
	7.10	Ensure that all areas where reagents or processing-related chemicals are used or stored are bunded and, where appropriate, covered. If not covered, a suitable sump for the collection and removal of incident rainfall will be included.	
	7.11	Maintain a >20m buffer between the DZP Site Administration Area and Watercourse C.	Ongoing.
Surface water control structure integrity is maintained through life of the Proposal.	7.12	Inspect all surface water control structures at least quarterly and following any significant rainfall event (to be defined within the Surface Water Monitoring Program – see Commitment 19.2).	Ongoing and in response to rainfall events.
Water access does not exceed harvestable rights.	7.13	Ensure that the capacity of existing and proposed water storages to be constructed under the Applicant's harvestable rights does not exceed 182ML.	Ongoing.
Construction within 40m of waterfront land is completed appropriately.	7.14	Design and construct any infrastructure with 40m of waterfront land in accordance with the Controlled Activity Approval Guidelines issued by NOW.	During construction.
Natural surface water management is in effect when site is relinquished.	7.15	Ensure that all areas of proposed disturbance, with the exception of the proposed open cut, are progressively rehabilitated and that surface water control structures are removed once the rehabilitated areas have achieved a 70% cover.	Progressively with rehabilitation.
8. Groundwater			
Minimisation of groundwater contamination from the SRSF and SEC's.	8.1	Construct each cell of the SRSF and SEC with a double liner, at least one of which is HDPE.	Prior to the commencement of processing operations.
	8.2	Construct the SRSF and each SEC cell with a leak detection system and leak / seepage collection mechanisms.	
	8.3	Maintain the leak detection system following the completion of the SECs until such time as leakage is deemed (by hydrogeologist) to be unlikely.	
	8.4	Install groundwater monitoring bores around the SRSF and SECs to monitor for changes in water chemistry which could indicate a leak.	

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
8. Groundwater (cont'd)			
Minimisation of groundwater contamination from the LRSF.	8.5	Construct each cell of the LRSF with a HDPE liner.	During construction.
	8.6	Weld the liner to form a continuous barrier over the internal embankments.	During construction.
	8.7	Adopt and implement a *Cell and Liner Construction Protocol* which would incorporate the following. • Certification of all lining material from the manufacturer prior to delivery to the DZP Site. • Registration of all individual batches of the lining material recorded by the contractor. • Construction of cell foundations in accordance with the extents and grades shown on the final drawings. • Preparation of the cell foundations to ensure removal of all roots, rocks and other matter which could impact on the liner. • Procedures for reviewing works completed if delays incurred between cell foundation preparation and liner laying. • Final inspection procedures and contingency measures.	Prior to construction of the LRSF.
	8.8	Adopt and implement a *Liner Integrity Testing Protocol* which would incorporate the following. • Installation of the HDPE lining by an experienced contractor. • Conformance of all lining material and construction methods and testing to the relevant Australian Codes. • Certification of all equipment prior to the start of installation and at regular intervals during the work. • Testing of the welding of the liner by the contractor and by an independent testing organisation. • Removal and off-site laboratory testing of small sections of the liner and contingency measures.	Prior to construction of the LRSF.
	8.9	Monitor the water balance within each cell, based on on-site monitoring of rainfall, evaporation and discharge.	Ongoing following commencement of discharge to the LRSF.
	8.10	Monitor water levels and quality beyond the downstream toe of all external embankments.	Monthly.
	8.11	Design and implement a *Leak Detection Response Strategy*.	Prior to commencement of discharge to the LRSF.
	8.12	Harvest precipitated salts in accordance with a *Salt Harvesting Protocol*.	Prior to and during salt harvesting campaigns.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
8. Groundwater (cont'd)			
Minimise impact to Groundwater Dependent Ecosystems	8.13	Manage potential leakage from the LRSF, SRSF and SECs in accordance with Commitments 8.1 to 8.12 above.	Ongoing.
Minimise potential for dryland salinity	8.14	Manage potential leakage from the LRSF, SRSF and SECs in accordance with Commitments 8.1 to 8.13 above.	As above.
	8.15	Establish deep rooted vegetation between LRSF Areas 2 and 3 within the proposed Biodiversity Offset Area.	Over initial 5 years of operations.
Appropriately document water management measures including monitoring design in and implementation	8.16	Ensure a *Groundwater Management Plan* is prepared by a suitably qualified expert including guidance on interpretation of groundwater data (see also Commitment 19.2).	Prior to commencement of mining operations.
Ensure groundwater is available to all surrounding groundwater users	8.17	Include monitoring of standing water levels in *Water Management Plan* and any significant rise or decline of these levels be investigated immediately.	Ongoing.
9. Terrestrial Ecology			
Avoid impacts on native flora and fauna.	9.1	Locate the DZP Site activities and infrastructure so as to avoid the majority of remnant native vegetation. Restrict disturbance of remnant native vegetation to (approximately): • 0.1ha of CW138 Fuzzy Box – Inland Grey Box on alluvial brown loam soils of the NSW South West Slopes Bioregion; • 27.1ha of CW212 White Box – Tumbledown Gum woodland on fine-grained sediments on the Central West slopes; • 43.7ha of CW213 White Box – White Cypress Pine – Inland Grey Box woodland on the western slopes of NSW (Quality Remnants); and • 414.0ha of CW213 White Box – White Cypress Pine – Inland Grey Box woodland on the western slopes of NSW (Derived Grasslands western slopes of NSW Central West slopes ZP Site subject , SRSF, open cut, WRE and Salt Encapsulations C).	Ongoing.
	9.2	Undertake Obley Road realignment and clear zone creation activities to limit disturbance to 2.05ha of CW213 White Box - White Cypress Pine - Inland Grey Box woodland on the western slopes of NSW.	Ongoing.
	9.3	Avoid disturbance to Pink-tailed Worm-lizard habitat Areas 2, 3, 4 and 6 by restricting disturbance to areas presented on **Figure 2.1**. Disturbance is to be limited to 25.5ha of good and 9.8ha of medium quality habitat.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
9. Terrestrial Ecology (cont'd)			
Avoid impacts on native flora and fauna. (cont'd)	9.4	Clearly mark areas of ground disturbance prior to commencement of activities and disturbance restricted to these areas.	During site establishment phase.
	9.5	Establish clearing procedures or protocols to identify (and avoid) disturbance to nests or roosting sites of threatened fauna. If impact is unavoidable, engage a suitably qualified and experienced ecologist to remove the animal(s) and/or nest/roosting habitat nests prior to clearing.	During site establishment phase.
	9.6	Schedule the clearing of trees between April to September, unless impracticable, to reduce risk of impact to tree dependent microchiropteran bats and birds.	Ongoing.
	9.7	Undertake all clearing of trees in accordance with a *Vegetation Clearing Protocol* (VCP) which requires that the clearing supervisor: • check all trees for the presence of nesting or roosting fauna before felling or pushing, then start tree removal immediately after visual inspection; • gradually nudge the tree that requires removal, at intermittent intervals so that any animal occupying the tree has the chance of vacating the area after the initial disturbance period; then • ensure that the felled trees are removed in accordance with the Applicant's proposed timber management strategy (see Section 2.3.2.2) within two weeks.	Ongoing.
Mitigate unavoidable impacts on native flora and fauna.	9.8	Clear sufficient vegetation for the subsequent 12 months of mining operation only.	Ongoing.
	9.9	Directly transfer stripped soil materials onto rehabilitation areas where practicable.	Ongoing.
	9.10	Manage tree trunks, major limbs, minor branches and other biomass from felled vegetation in accordance with the Applicant's timber management strategy.	Ongoing.
	9.11	Erect signs to notify of the location and significance of vegetation stockpiles.	Ongoing.
	9.12	Implement an *Erosion and Sediment Control Plan* for all areas of disturbance likely to generate sediment or be subject to erosion.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
9. Terrestrial Ecology (cont'd)			
Mitigate unavoidable impacts on native flora and fauna. (cont'd)	9.13	Familiarise staff undertaking pre-clearing assessments prior to the clearing campaign in order to: • ensure they understand the nature and extent of each stage of clearing; • determine what habitats are to be affected, the species which could be affected and how to manage species that may be affected by the activity; and • orientate themselves with the location, nature and extent of unaffected habitat so that they will know the best locations to release relocated fauna.	Prior to commencement of clearing campaign.
	9.14	Confine, where practicable, vehicular access to formed and marked roads and tracks.	Ongoing.
	9.15	Limit vehicle speeds within the DZP Site to limit the potential for vehicle trauma to wildlife.	Ongoing.
	9.16	Fence, as appropriate, sections of the DZP Site not required for ongoing operations to limit access by non-authorised personnel.	Following completion of clearing campaign.
	9.17	Finalise a *Pink-tailed Worm-lizard Plan of Management* and implement all management and mitigation measures with respect to: • conservation, enhancement and management of known high-quality potential habitat areas; • passive relocation of Pink-tailed Worm-lizards from the eastern half of the open cut; • assisted relocation of Pink-tailed Worm-lizards from the western half of the open cut; and • monitoring and reporting.	Prior to disturbance of Pink-tailed Worm-lizard habitat.
	9.18	Plan all bridge upgrades to avoid nesting and breeding period of Rainbow Bee-eater. If this timing is not possible, inspect any creek bank to be affected for mouse size / snake sized horizontal holes in the expose incised creek bank.	Ongoing.
	9.19	(If suitable holes detected), commission an experienced ecologist to determine if Rainbow Bee-eaters could be affected by the activity and manage them accordingly.	As necessary.
	9.20	Limit the speed of all machinery on the DZP Site at night (nominally maximum of 20km/h) to reduce the risk of collision with arboreal fauna and nocturnal birds (dunnarts, gliders and owls).	Ongoing.
	9.21	Require employees to obey speed limits when travelling to and from work.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
9. Terrestrial Ecology (cont'd)			
Offset residual impacts on native flora and fauna.	9.22	Develop a *Biodiversity Offset Strategy*, in consultation with OEH, in accordance with the general strategy presented in Section 2.17.8 and **Figure 2.23**. The *Biodiversity Offset Strategy* should provide for the following. • Protection and conservation of existing remnants of native woodland and derived grassland vegetation (1 021ha). • Protection, conservation and enhancement of habitat of the Pink-tailed Worm-lizard.	Within 12 months of receipt of development consent.
	9.23	Establish legally binding arrangement over lands included in the *Biodiversity Offset Strategy* to for conservation of the land in perpetuity.	Within 18 months of receipt of development consent.
	9.24	Prepare an *Integrated Land Management Plan* (incorporating measures for application, measurement and management of the specific activities to be implemented as part of the *Biodiversity Offset Strategy*) in consultation with the relevant government agencies.	Within 12 months of receipt of development consent.
Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Project Site.	9.25	Revegetate the DZP Site as described in Section 2.17 and in accordance with a MOP or REMP to be prepared prior to the commencement of activities on the DZP Site.	Ongoing.
	9.26	Ensure species used during rehabilitation operations are consistent with vegetation community types located within the vicinity of the area to be rehabilitated and are suitable for the proposed final landform and land use.	Ongoing.
	9.27	Monitor all areas of progressive and final rehabilitation and undertake remedial action in the event that rehabilitation does not comply with the relevant completion criteria.	Ongoing and as required.
	9.28	Prepare an *Integrated Land Management Plan* nominating standard and additional management actions to be undertaken on rehabilitation lands, habitat enhancement areas and the BOA.	Within 12 months of development consent.
10. Aquatic Ecology			
Avoid, minimise or mitigate impacts as a result of DZP construction activities on aquatic biota and habitats.	10.1	Design and construct all new structures across watercourses in line with the *Guidelines and Policies for Aquatic Habitat Management and Fish Conservation* (NSW Fisheries 1999) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull & Witheridge 2003)	Prior to construction.
	10.2	Install pipelines across perennial waterways by directional drilling (under-boring) methods.	During construction.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
10. Aquatic Ecology (cont'd)			
Avoid, minimise or mitigate impacts as a result of DZP construction activities on aquatic biota and habitats. (cont'd)	10.3	Install pipelines across ephemeral drainage lines by trench excavation during periods of no flow within the channels and in accordance with Controlled Activities on Waterfront Land Guidelines 2012 for laying pipes and cables in watercourses on waterfront land.	During construction.
	10.4	Ensure the location of components such as the SRSF and LRSF are at least 200m from the Wambangalang Creek and 50m from other major drainage lines through the DZP Site.	Ongoing.
	10.5	Mark exclusion zones around riparian vegetation to avoid potential impacts.	Ongoing.
Avoid, minimise or mitigate impacts as a result of DZP operations on aquatic biota and habitats	10.6	Contain all hazardous and potentially contaminating materials within bunded areas and on impermeable surfaces.	Ongoing.
	10.7	Prevent leakage of residues or salts from SRSF, LRSF and SEC's in accordance with Commitments 8.1 to 8.13.	Ongoing.
Avoid, minimise or mitigate impacts as a result of water extraction from the Macquarie River on aquatic biota and habitats	10.8	Fit the intake system with a screen with a maximum 2mm mesh size and ideally have an approach velocity no greater than 0.4m/s.	During construction.
	10.9	Enforce pumping protocols that require pumping rates gradually increase and decrease and the commencement and cessation of pumping cycles.	Ongoing.
11. Aboriginal Heritage			
Avoid the 26 heritage sites located away from the impact footprint and ensure no accidental disturbance or damage	11.1	Mark the locations of these sites on mine plans and instruct personnel to avoid these areas.	Prior to commencement of surface disturbing activities.
Manage the 11 sites located adjacent to component disturbance areas and face possible indirect impacts.	11.2	Ensure all DZP personnel are aware of the locations of Aboriginal sites and identify these sites on mine plans.	Prior to commencement of surface disturbing activities.
	11.3	Commission a suitably qualified archaeologist to revisit each site, resurvey and install temporary fencing.	
	11.4	Induct any work crews in the vicinity of any of these sites to inform them of the site's location and its legislative protection under the NPW Act. All work crews should be informed that the fenced area remains a no-go area for the duration of the works.	Prior to commencement of surface disturbing activities.
	11.5	Ensure that if at the time of construction it becomes necessary to disturb any of these sites, appropriate consultation is undertaken to develop specific management measures.	Prior to disturbance of specific site.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
11. Aboriginal Heritage (cont'd)			
Monitor disturbance to one site (TS-GG-01; 36-1-0314) that could be indirectly impacted over time.	11.6	Complete regular assessments of condition.	Following commencement to the eastern half of the open cut.
Manage 14 sites that occur within the impact footprint in accordance with the wishes of the RAPs	11.7	Prepare an *Aboriginal Cultural Heritage Management Plan* (ACHMP) including a Statement of Commitments with respect to the management of the identified (and any unidentified) sites. The ACHMP would incorporate the proposed management of sites included in this EIS, measures which have been reviewed by the RAPs for the Proposal.	Prior to surface disturbing activities.
	11.8	Draft and implement a Care Agreement, in consultation with the Registered Aboriginal Parties for the DZP, for the collection, salvage and management of artefacts to be disturbed.	Prior to disturbance of affected sites.
	11.9	Ensure disturbance on the DZP Site, unless appropriately cleared by the RAPs, would remain with the limit of disturbance nominated in this EIS.	Ongoing.
	11.10	Ensure if any other objects or Aboriginal sites be identified during the course of construction, the Applicant would implement an *Unanticipated Finds Protocol*, as presented in *Appendix 5* of OzArk (2013b).	As necessary.
12. Historic Heritage			
Minimise the potential for adverse Proposal-related impacts on historic heritage sites within and surrounding the DZP Site.	12.1	Identify on plans held by the Environmental Manager and Mine Surveyor, where relevant, all identified sites and ensure that activities in the vicinity of those sites are appropriately managed.	Prior surface disturbing activities.
	12.2	Avoid impacts on sites DZP-HIF1 and DZP-HIF2 by establishing a fence and buffer zone around the sites.	Ongoing.
	12.3	Ensure that unless unavoidable due to rail line upgrade, avoid DZP HS1.	Ongoing.
	12.4	Document and record sites DZP-HS2, DZP-HS3 and DZP-HS4, and provide this record to Dubbo City Council and the NSW State Archives.	Prior to dismantling.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
12. Historic Heritage (cont'd)			
Minimise the potential for adverse Proposal-related impacts on historic heritage sites within and surrounding the DZP Site. (cont'd)	12.5	Ensure that if items of suspected historic heritage significance are identified throughout the life of the Proposal, implement the following procedures; 1. No further earth disturbing works would be undertaken in the vicinity of the suspected item of historic heritage significance. 2. A buffer of 20m x 20m would be established around the suspected artefact. No unauthorised entry or earth disturbance would be allowed with this buffer zone until the area has been assessed. 3. A qualified archaeologist would be contacted to make an assessment of the discovery. Mitigation procedures would then be developed and implemented based on the assessment.	Ongoing.
13. Soils and Land Capability			
Undertake soil stripping such that impacts on the quality of the soil for future rehabilitation is maximised.	13.1	Strip soil material to the depths identified in Section 2.3.3.3 and **Tables 2.1** and **2.2.**	Ongoing.
	13.2	Ensure that soil material to be stripped is maintained in a slightly moist condition during stripping. Material should not be stripped in either an excessively dry or wet condition.	During soil stripping.
	13.3	Minimise compaction of soil materials during grading or pushing of soil into windrows and loading into trucks.	During soil stripping.
	13.4	Use soil materials immediately in areas undergoing progressive rehabilitation, where practicable.	When areas available for rehabilitation.
Stockpile soil such that impacts on the quality of the soil for future rehabilitation is maximised.	13.5	Minimise, as far as practicable, the operation of machinery on soil stockpiles to minimise compaction.	Ongoing.
	13.6	Ensure that soil stockpiles have a maximum height of 3m for subsoil and 2m for topsoil material.	Ongoing.
	13.7	Ensure that if long term storage (>3 months) is planned, fertilise and establish an appropriate vegetative cover as soon as possible on all soil stockpiles to be retained for more than 3 months.	On storage of soil for > 3 months.
	13.8	Ensure that where practical and when conditions are suitable, occasional grazing on the vegetated stockpiles is undertaken to encourage natural return of organic material, e.g. manure.	Ongoing.
	13.9	Cease grazing on stockpiles when the soil is wet enough that stock impact on the soil structure.	As necessary.
	13.10	Remove livestock when groundcover is less than 70% to encourage survival and growth of the pasture species.	As necessary.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
13. Soils and Land Capability (cont'd)		
Respread soil such that impacts on the quality of the soil for future rehabilitation is maximised.	13.11 Test the subsoil to ensure that it is not toxic to plant growth.	Prior to soil respreading.
	13.12 Ensure that subsoil to be worked is moist, or dry but not wet.	
	13.13 Place subsoil to achieve similar density (or slightly less) than natural subsoil.	
	13.14 Lightly tine the surface between lifts to reduce creation of slowly permeable layers.	
	13.15 Test the topsoil prior to respreading to determine the ameliorants required to achieve the desired level of plant growth.	
	13.16 Tine the surface of underlying subsoil material below the depth of compaction to minimise formation of a dense layer at the top the subsoil / growth material.	
	13.17 Ensure that topsoil is not respread when either excessively dry or wet.	
	13.18 Place the soil material with only a few lifts from an elevating scraper or similar with sufficient regrading to create a density similar to natural soil.	During respreading.
	13.19 Minimise, as far as practicable, the operation of machinery / vehicles on respread topsoil material to minimise compaction.	Following respreading.
	13.20 Establish vegetation on topsoiled areas as quickly as possible to minimise the risk of erosion from wind or water.	
Establish an appropriate Soil and Land Capability Class on the final landform	13.21 Establish Land and Soil Capability Classes as nominated in Table 4.71.	As part of rehabilitation of the DZP Site.
14. Traffic and Transportation		
Achieve safe and efficient transport operations.	14.1 Prepare and implement a *Construction Traffic Management Plan*.	Prior to commencement of construction activities.
	14.2 Prepare and implement a *Code of Conduct* for contractors / employees travelling to and from the Site.	Prior to commencement of construction activities. Review annually.
	14.3 Construct all road and intersection upgrades in accordance with Austroads Standards with suitable dimensional capacity to accommodate the anticipated oversized loads.	During road upgrading works.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
14. Traffic and Transportation (cont'd)			
Achieve safe and efficient transport operations. (cont'd)	14.4	Upgrade Obley Road to provide a 10m pavement seal (two 3.5m lanes + two 1.5m shoulders) over a 12m formation between the Newell Highway and Toongi Road.	During road upgrading works.
	14.5	Provide for a 7.5m clear zone on all straight sections, and at least a 9m clear zone on the outside of all curves, of Obley Road between the Newell Highway and Toongi Road. Where the establishment of such a clear zone cannot be attained without impacting on important fauna habitat, e.g. breeding hollows, existing infrastructure, e.g. walkway / cycleway, or encroaching on freehold land, wire rope safety barriers would be installed 500mm from the outer edge of the pavement.	During road upgrading works.
	14.6	Upgrade the intersection between Obley Road and the main visitor entrance to the Taronga Western Plains Zoo to provide an extended channelized right turn into the zoo.	During road upgrading works.
	14.7	Upgrade the intersection between Obley Road and Toongi Road to provide channelized left turn deceleration lane, an auxiliary right turn acceleration lane on to Obley Road and channelized right turn from Obley Road into Toongi Road.	During road upgrading works.
	14.8	Upgrade the crossings of Hyandra Creek, Twelve Mile Creek and Wambangalang Creek.	During road upgrading works.
	14.9	Apply an asphaltic concrete seal to 2.4km section of Obley Road from the Newell Highway (200m beyond Zoofari Lodge / Dundullimal Homestead intersections) and 950m section of Obley Road from the Toongi Road intersection.	During road upgrading works.
	14.10	Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible modification to pedestrian / cyclist access to Taronga Western Plains Zoo and implement if identified as reasonable, feasible and without creating subsequent drainage, amenity or other traffic hazard.	Prior to completion of road upgrading works.
	14.11	Liaise with Taronga Conservation Society Australia, Dubbo City Council and the RMS regarding possible installation of lighting at entrances to the Taronga Western Plains Zoo subject to confirmation as to compliance with relevant standards and agreement of payment of operating costs.	Prior to completion of road upgrading works.
	14.12	Upgrade Toongi Road to provide an 8.5m sealed pavement over a 10m formation.	During road upgrading works.
	14.13	Upgrade Obley and Toongi Roads to provide a 20 year pavement life.	During road upgrading works.
	14.14	Provide additional pavement seal as required on approach to and exit from existing bus shelters.	During road upgrading works.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
14. Traffic and Transportation (cont'd)		
Achieve safe and efficient transport operations. (cont'd)	14.15 Undertake regular discussions with school bus companies to ensure that information regarding school bus routes, times and pick-up / drop-off locations remains up to date.	At least annually.
	14.16 Consult with organisers of "Zoo to Zoo" road cycling and other annual event organisers to minimise impacts on construction activities, mine operations and the events.	At least annually.
	14.17 Schedule shift changes to avoid peak traffic periods by at least 1 hour	Ongoing.
	14.18 Where possible, schedule trains outside the peak traffic periods (8:00am to 9:00am and 3:00pm to 4:00pm) to reduce the impact of traffic delays at rail crossings.	Ongoing.
	14.19 Advise personnel on 'Fatigue Management' as part of Staff induction.	On employment of personnel.
	14.20 Consult with the relevant cycling groups to provide specific consideration of safety aspects associated with their use of the road, particularly where sight distance is limited.	Prior to and during construction / road upgrade activities.
15. Visual Amenity		
Manage the impact of activities on the visual amenity surrounding the DZP Site.	15.1 Design Stockpile Area 1 (refer to **Figure 2.6**) to run along the western side of the rail easement and vegetate with fast growing tree species to create a vegetated amenity bund.	Prior to placement of soil within Stockpile Area 1.
	15.2 Progressively rehabilitate the outer embankments of the LRSF, SRSF, WRE and Salt Encapsulation Cells.	Ongoing.
	15.3 Complete enhancement of native vegetation across and surrounding the DZP Site (see Section 2.17.8).	Within 5 years of development consent.
	15.4 Construct the processing plant and other infrastructure within the DZP Site from predominantly non-reflective, neutral coloured material.	During construction.
	15.5 Select and place permanent and temporary lights that are directed downwards and towards the activity area, i.e. not outward from the DZP Site.	Ongoing.
	15.6 Consider any reasonable request by a potentially affected resident for assistance to create a visual screen adjacent to their residence through planting of fast growing vegetation and/or landscaping, where such a screen would effectively reduce the visual impact of activities during the life of the Proposal.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
16. Hazards		
Prevent the escape of reagents from the Processing Plant and DZP Site Administration Area.	16.1 Store all chemicals within concrete bunded areas or within appropriate self-bunded containers.	Ongoing.
	16.2 Complete all tanker deliveries over sealed areas with kerbing and drainage design preventing any runoff to the environment if a spill occurs.	Ongoing.
	16.3 Provide spill kits as appropriate, enabling recovery of small quantities of spilt materials.	Ongoing.
Prepare appropriately for the possibility of a bush fire event.	16.4 Consult with Dubbo Local Emergency Management Committee and engage with Cumboogle and Benolong brigades.	Ongoing
	16.5 Prepare and implement a Bushfire Mitigation Plan which will include: • establishment of hazard reduction and land management activities in order to manage fuel loads within the DZP Site (while also managing for conservation of biodiversity); • consideration of appropriate areas for burns, grazing or mechanical hazard reduction would be focused on protecting AZL infrastructure and neighbouring properties; and • formation of first response and patrol strategies would be included to enable appropriate land management for mitigating the spread of fire.	Prior to commencement of operations.
	16.6 Discuss boundary management with the RFS, identify appropriate methods to reduce the potential for a fire to leave the DZP Site and include in Bushfire Mitigation Plan.	Prior to commencement of operations.
Manage a local bush fire to minimise the potential for property damage or personnel injury.	16.7 Maintain an Asset Protection Zone (APZ) of at least 50m around the open cut.	Ongoing.
	16.8 Monitor fuel loads within the APZ and reduce as required (in accordance with the Bushfire Mitigation Plan).	At least annually.
	16.9 Maintain the internal haul road to ensure safe access and egress from the open cut in the event evacuation is called.	Ongoing.
	16.10 Maintain accessibility to the water infrastructure within the Processing Plant Area for management of ember attack on the buildings.	Ongoing.
	16.11 Provide training to site personnel in relation to specific fire fighting tasks and procedures	Annually.
	16.12 Develop Emergency and Evacuation Management Procedures.	Prior to commencement of operations.
	16.13 (In the event of a local bush fire event that threatens the safety of personnel), require all personnel within the affected area to assemble at the designated Emergency Assembly Area and complete a head count.	As necessary.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
16. Hazards (cont'd)		
Minimise risks associated with initiation of a bush fire within the DZP Site.	16.14 Ensure refuelling is undertaken within designated fuel bays or within cleared area of the DZP Site.	Ongoing.
	16.15 Ensure vehicles are turned off during refuelling.	Ongoing.
	16.16 Ensure no smoking policy is enforced in designated areas of the DZP Site.	Ongoing.
	16.17 Ensure fire extinguishers are maintained within site vehicles and refuelling areas.	Ongoing.
	16.18 Ensure a focus on housekeeping by DZP management.	Ongoing.
	16.19 Ensure that a water cart is available to assist in extinguishing any fire ignited.	Ongoing.
	16.20 Establish appropriate maintenance of mechanical equipment that is being used in the natural landscape, i.e. slashers, mowers, belt driven machinery, etc.	
	16.21 Establish hot work protocols for welding, grinding, oxy work on tenure, including availability of portable water and a lookout for potential ignitions.	
	16.22 Monitor equipment with exhaust stacks capable of throwing embers.	
	16.23 Monitor for lightning strikes on tenure after dry electrical storms.	
	16.24 Minimise the use petrol/diesel vehicles in long grass during hot and dry periods.	
Reduce residual risks of traffic accidents on roads used by Proposal related traffic.	16.25 Erect Give Way signs at the exit of the Site to Toongi Road.	Prior to commencement of construction.
	16.26 Liaise with Dubbo Traffic Committee and erect appropriate signage at intersection of Toongi and The Springs Roads.	Prior to commencement of construction.
	16.27 Advise all truck drivers of the potential conflict between Proposal-related traffic and the general public.	As part of induction process or contract negotiation.
	16.28 Prepare and require contracted truck drivers (or Company representatives) to sign a *Driver's Code of Conduct* identifying minimum standards for driver behaviour.	As part of induction process or contract negotiation.
	16.29 Implement a comprehensive *Transport Management Plan* for construction and DZP operation.	Prior to commencement of construction deliveries.
Avoid conflict between aircraft and stacks of the processing plant	16.30 Consult with the relevant government agencies with respect to specifications of the 90m ventilation stack and implement any required visual or other identifiers, e.g. flashing light.	Prior to commencement of construction of the stack.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
17. Social-economic Setting			
Maximise the positive impacts and minimise any actual or perceived adverse impacts on the social fabric or facilities available to the community surrounding the DZP Site.	17.1	Engage the community surrounding the Proposal in regular dialogue in relation to the proposed and ongoing operation of the Project and maintain an "open door" policy for any member of the community who wishes to discuss any aspect of the DZP.	Ongoing.
	17.2	Proactively and regularly consult with those residents most likely to be adversely impacted by the DZP.	Ongoing.
	17.3	Continue to support community organisations, groups and events, as appropriate, and review any request by a community organisation for support or assistance throughout the life of the DZP.	Ongoing.
	17.4	Consult with residences adjoining the Toongi-Dubbo Rail Line to ensure that all reasonable expectations related to local amenity are met, e.g. fencing or no fencing of the rail easement along Margaret Crescent.	Prior to construction of the rail line.
	17.5	Implement a comprehensive and targeted *Environmental Monitoring Program*, provide the local community with access to the results of monitoring and use these results, in consultation with the local community, to improve environmental performance at the DZP Site.	Within 6 months of development consent.
	17.6	Give preference when engaging new employees, where practicable, to candidates who live within the Dubbo Local Government Area over equivalent candidates with equivalent experience and qualifications based elsewhere and ensure that the mining and other contractors do so as well.	Ongoing.
	17.7	Encourage the involvement of the local Aboriginal community in the workforce.	Ongoing.
	17.8	Encourage and support participation of locally based employees and contractors in appropriate training or education programs that would provide skills and qualifications that may be of use following completion of the DZP.	Ongoing.
	17.9	Enter into an agreement with Dubbo City Council, e.g. a Voluntary Planning Agreement, to provide a fair and reasonable contribution to any increase in management or maintenance costs of local services and infrastructure incurred as a consequence of the DZP.	Prior to commencement of operations.
	17.10	Ensure that infrastructure and services installed for the Proposal, including the gas pipeline, electricity transmission line, appropriate buildings and hardstand areas, remain available for alternative uses following completion of the Proposal	Post-Proposal.
	17.11	Maintain agricultural operations on land not required for active mining or biodiversity offsetting purposes.	Ongoing.

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action		Timing
17. Social-economic Setting (cont'd)			
Maximise the positive impacts and minimise any actual or perceived adverse impacts on the social fabric or facilities available to the community surrounding the DZP Site. (cont'd)	17.12	Undertake final landform construction and rehabilitation as nominated in Section 2.17 (so as to return all but 1 200ha of the DZP Site to agricultural production post-DZP).	Ongoing.
Maintain ongoing consultation with the local community and Council.	17.13	Form and maintain a Community Consultative Committee (CCC), including representative members of the community and Dubbo City Council.	Within 6 months of receipt of development consent.
	17.14	Regularly brief the CCC on activities within the DZP Site and seek feedback in relation to Proposal-related impacts whether real or perceived.	As necessary.
Respond to environmental complaints.	17.15	Establish and maintain an environmental complaints line and register of complaints in accordance with the requirements of the Environment Protection Licence, once issued.	Within 6 months of receipt of development consent.
	17.16	Respond promptly to any issue of concern or complaint raised by the community or a government agency.	Ongoing.
18. Waste			
Manage waste appropriately on the DZP Site.	18.1	Maintain a register of the types and quantities of wastes produced on the DZP Site.	Ongoing.
	18.2	Design and maintain storage areas to contain spillages.	
	18.3	Segregate and retain recyclable and non-recyclable waste in designated storage areas prior to removal from the DZP Site.	
	18.4	Keep the DZP Site in a clean and tidy condition.	
	18.5	Ensure waste is regularly removed from the DZP Site by a licensed contractor.	
Manage potentially restricted or hazardous waste and/or dangerous goods appropriately	18.6	Classify all wastes to be disposed of in accordance with the NSW Waste Classification Guidelines. Restricted or hazardous wastes would not leave the DZP Site without obtaining prior EPA approval.	Ongoing
	18.7	Clean used bulky bags, drums and pallets within the relevant covered and bunded storage areas in accordance with the product MSDS or relevant Australian Standard.	
	18.8	Complete a visual (or other required) inspection to confirm any remnant reagent has been removed.	
	18.9	Remove waste materials from the DZP Site by licensed waste removal contractor.	

Table 10 (cont'd)
Final Statement of Commitments for the Dubbo Zirconia Project

Desired Outcome	Action	Timing
19. Environmental Management System		
A systematic set of documents are in place to guide the planning and implementation of all environmental management strategies.	19.1 Incorporate the environmental procedures in an on-site management system.	Prior to relevant activity.

	19.2 Prepare or update the following monitoring programs, management plans and protocols.
	• Environmental Monitoring Program.
	• Dose Assessment Monitoring Program.
	• Environmental Radiation Monitoring Program.
	• Mining Operations Plan (or equivalent).
	• Integrated Land Management Plan.
	• Noise Management Plan (incorporating and Noise Monitoring Program).
	• Blast Management Plan (incorporating and Blast Monitoring Program).
	• Air Quality Management Plan (incorporating and Air Quality Monitoring Program).
	• Water Management Plan: including:
	  ○ Groundwater Management Plan (including a Groundwater Monitoring Program);
	  ○ Surface Water Management Plan (including a Site Water Balance, Erosion & Sediment Control Plan(s) and Surface Water Monitoring Program); and
	  ○ Water Reuse Management Plan;
	  ○ Residue Storage Facility Management Plan (including a Cell and Liner Construction Protocol, Liner Integrity Testing Protocol, Leak Detection Response Strategy and Salt Harvesting Protocol); and
	  ○ Surface and Ground Water Response Plan.
	• Aboriginal Cultural Heritage Management Plan.
	• Care Agreement (for management of artefacts).
	• Construction Traffic Management Plan.
	• Transport Management Plan.
	• Pink-tailed Worm-lizard Plan of Management.
	• Vegetation Clearing Protocol.
	• Cell and Liner Construction Protocol.
	• Liner Integrity Testing Protocol.
	• Leak Detection Response Strategy.
	• Salt Harvesting Protocol.
	• Bushfire Mitigation Plan.
		Various and as nominated by development consent.

	19.3 Incorporate relevant environmental data / information in *Annual Reviews*.	Annually.

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Appendices

NOTE: All Appendices are available on the CD accompanying this document (not printed)

(Total No. of pages including blank pages = 120)

Appendix 1a	NSW Office of Environment and Heritage Feedback re Water Pipeline Realignment and Impacts to Native Vegetation for the Dubbo Zirconia Project, Toongi NSW (OzArk, 19 December 2013)
Appendix 1b	Heritage Letter Report - Pipeline Realignment, Dubbo Zirconia Project, Toongi NSW (OzArk, 18 December 2013)
Appendix 1c	Dubbo City Council Feedback re Obley Road Improvement Impacts to Native Vegetation for the Dubbo Zirconia Project, Toongi NSW (OzArk, 19 December 2013)
Appendix 2	Dubbo Zirconia Project Obley Road Alignment Investigation and Intersection Treatment Concept Design (Constructive Solutions, 19 December 2013)
Appendix 3	Response to Submissions – Dubbo Zirconia Project (EMGA Mitchell McLennan, 19 December 2013)
Appendix 4	Transport Hazard Assessment (Sherpa Consulting Pty Ltd, 20 December 2013)
Appendix 5	Post submission works for Dubbo Zirconia Project (Pacific Environment Limited, 19 December 2013)
Appendix 6	Material Safety Data Sheets
Appendix 7	Letter Report from NSW Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources re: Plant Fossil Site at Grandale, DZP (20 November 2013)

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