

JERVOIS PROJECT EIS SUPPLEMENT TRAFFIC

JULY 12

**CONSONE CONSULTING PTY LTD
CLIENT: KGL RESOURCES**





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1 EXECUTIVE SUMMARY

1.1 The Supplement

KGL Resources Pty Ltd (KGL) propose to develop new operations at the Jervois Mine site in the Anayte region of the Northern Territory. As required by legislation KGL prepared an Environmental Impact Statement (EIS) for the project which was lodged with the Northern Territory Environment Protection Authority (NT EPA) in October 2018.

In response to the EIS KGL received a number of responses highlighting concerns and request for additional information regarding traffic impact and proposed traffic management. These were received from the following stakeholders (as detailed in Appendix G):

- Department of Tourism and Culture
- Department of Infrastructure, Planning and Logistics (DIPL) – Transport Civil Services
- Northern Territory Police and Fire Emergency Services (NTPFES)
- NT EPA
- Tourism Central Australia
- Central Land Council

The areas of concern raised by stakeholders are specifically around the following issues:

- Concerns about the additional traffic that will be generated by the mine in both construction and operation phases
- The traffic impact assessment undertaken as part of the EIS did not address adequately the impact on the road itself with the high number of additional road trains proposed
- Road safety is a concern raised by all stakeholders
- A traffic management plan was not included in the EIS and has been requested by DIPL
- Insufficient detail was provided in the EIS with respect to a risk assessment as required in the preparation of a Traffic Management plan (TMP)
- The assessment of the requirements to upgrade any intersections on the Plenty Highway, Lucy Creek Access Road or the Stuart Highway provided in the EIS did not provide sufficient information for an appropriate assessment by stakeholders.

This document (The Supplement) has been prepared to undertake additional investigations, address concerns raised and provide additional information. Following is a summary of additional investigations and preliminary design undertaken as part of The Supplement:

- An independent review of the information supplied in the EIS and any deficiencies omissions highlighted. The scope of additional works to be included in the EIS developed. The findings of the Independent Review are outlined in Section 3
- Since the lodgement of the EIS, KGL have developed the design of the project further and undertaken procurement negotiations with prospective suppliers, contractors and



transport companies. As such additional information relevant to the traffic impact and management are now available and these are outlined in Section 4

- To ensure stakeholders concerns raised in response to the EIS are understood and resolved extensive consultation with stakeholders has been undertaken and the outcomes of the consultations are outlined in Section 5
- The original EIS provided detailed information with respect to traffic generation loads numbers and operations. Additional information has been developed/sourced with respect to the following (Outlined in Section 6):
 - Existing traffic numbers
 - Construction traffic generation, including vehicles type, size, number and program movements
 - Operational traffic generation, including vehicles type, size, number and program movements
 - Parking requirements
 - Intersection assessment including suitability and safety
 - A revised intersection upgrades scope has been developed and concept design provided
- A main concern raised in the responses to the EIS is safety of road users on the Plenty Highway and the impact on both road safety and road condition. A detailed risk assessment workshop was undertaken by KGL, preferred Transportation Company (QUBE) and Balance Logistics. The risk identified and associated risk mitigation measures to be developed which are outlined in Section 7
- Road Safety is a concern for stakeholders with the increase in the number of heavy vehicles. A detailed field Stage 6 Road Safety Audit of the Plenty Highway and Lucy Creek Access road was undertaken to review any deficiencies in the roads that may be of concern. The outcomes of the RSA are summarised in Section 8 and a detailed report provided in Appendix D. The audit has reviewed issues including but not limited to:
 - Vertical and horizontal alignments
 - Sight distances at all intersections and crests
 - Road super-elevation
 - Delineation and signage
 - Clear zone defects (safe system operation)
 - Road surface
 - Road drainage
- The effect of the increase in traffic on road condition was raised as a concern and to investigate this a high level road condition assessment was undertaken to review the various different formations along the alignment. This was undertaken in conjunction with a review of proposed upgrades programmed by DIPL and current maintenance regime. Recommendations with regard to the prioritisation of proposed upgrades and the likely future maintenance regime prepared. The findings are detailed in Section 9
- The most key aspect of the supplement is the development of the Traffic Management Plan (TMP). Whilst it is not appropriate to fully develop the TMP for construction and operations phases at this time as contracts for all areas and design development are still



ongoing, the key aspects of the TMP are detailed in Section 10. The details in section 10 highlight the intention of KLG to ensure worlds best practice in traffic and safety management to be included in all operations of transportation along the proposed transport routes. This sections details the intention of the future TMP to cover all aspects of proposed traffic management and safety procedures being developed for the project that will manage how KGL staff, contractors and transportation companies operate including:

- The use of Journey Management Plans (JMP) as to be developed by Qube (Preferred transportation company of product for KGL) with worlds best practice in journey management planning and then adopted as generic plans for the overall project
- The key use of state of the art in vehicle systems to improve safety
- The intention and ability of KGL to supplement emergency response in the regions and proposed new management principles and agreements with respect to emergency response
- In house KGL requirements contractually to ensure best practice is maintained across the project
- Specific operational requirements around staging of vehicles to ensure limited interruption to the public
- Operational requirements around wet weather and protection of the existing roads in these periods
- Ongoing maintenance and future upgrade recommendations

1.2 Conclusions and Recommendations

The conclusions and recommendations from the “The Supplement” are detailed in Section 11. For simplicity these are duplicated following:

Original Recommendation	Revision
A minimum road width of 8.7m be provided on site access and internal roads consisting of a 3.7m width unsealed lane with 2.5m wide shoulders in accordance with Austroads (2010) requirements	An assessment in design for road widths be undertaken of internal roads that will be utilised by oversize mine vehicles (CAT777 or similar) and at this location road widths will be modified accordingly
The proposed site access be located to achieve 367m sight distance on Lucy Creek Access and 120m site access roads in accordance with the requirements Austroads (2010)	The Lucy Creek Access road intersection be upgraded in accordance with figure SK005 and swept paths. This includes relocation of the intersection approx. 300m north of its current location to improve intersection geometry and sight distances



Original Recommendation	Revision
On site parking for 10 light vehicles plus the expected number of site vehicles be provided, designed in accordance with the Northern Territory Planning Scheme (DIPL) 2017 and AS2890.1 (Standards Australia 2004)	In addition on-site mine vehicle parking is to be designed to ensure all vehicles can reverse park in accordance with mine safety requirements. On-site parking at the accommodation village to include parking for 50 vehicles and a bus laydown area – Refer proposed camp layout included in the overall supplement to the EIS
On-site bus and road train parking bays for two buses and maximum number of road trains expected on-site be provided, to accommodate largest bus and road train expected	Unchanged
Queuing provision for 2 cars and one road train be provided at the accommodation camp access and the mine site access	This is applicable to ticketed / controlled parking areas which is not applicable here
Pedestrian and Cyclist activity to be discouraged on-site	
6m three chord truncations be provided on both corners of the site access intersection on Lucy Creek Access to facilitate quad train access to the site indicated in Fig 4.5	Intersections to be in accordance with Figures SK004 and SK005 of the Supplement. Quad access to the site is no longer applicable
The proposed development contribute towards the cost of maintenance on the Stuart Highway and the Plenty Highway based on the increase in ESA loading associated with the mine	KGL will undertake consultation with DIPL with regard to contributions to maintenance of the Plenty Highway, highlighting prioritisation listed in the Supplement
The client consult with the Northern Territory Government and other stakeholders to arrive at and implement solutions to improve road safety and reduce the risk of driver fatigue on the Plenty Highway	KGL have completed a RSA for the Plenty Hwy and will consult with DIPL in regard to implementation of recommendations

1.2.1 Supplement Recommendations

The following recommendations have been developed subsequent to the independent review of the EIS and ongoing design development and investigations:

- KGL and Consone approach all levels of Government to review the findings of road condition, Road Safety Audit and preliminary TMP to review options for acceleration of the following:

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- Widening of single seal sections to dual lane
- “The Outback Way Program” and proposed sealing from Harts Range to Lucy Creek intersection
- Edge treatments to the single lane seal sections to reduce edge of seal drop to existing shoulders
- Ongoing maintenance grading and a program designed around grading post rainfall events
- Implementation of recommendations listed in the Road Safety Audit
- That KGL enter into an agreement with NTPFES for provision of Emergency Response resources in the region and implement an Emergency Response Policy in accordance with the recommendations listed in Section 10, within the internal management plans and Mine Management Plan
- KGL engage Qube to draft as part of it’s management procedures a detailed Journey Management Plan for the proposed routes including speed restrictions and geo referenced areas for restrictions. KGL to implement Qube procedures across all transportation contracts – Refer Section 10
- KGL prepare a generic JMP for the project and procedures for inclusion in contract documentation
- That KGL finalise an overall Traffic Management Plan during the final design process and that this be included in the overall Mine Management Plans
- That KGL liaise with DIPL regarding design and upgrade of the following intersections:
 - Stuart Highway / Plenty Highway
 - Lucy Creek Access Road / Plenty Highway Intersection
 - Mine Access / Lucy Creek Access Road
 - Accommodation Village / Lucy Creek Access Road
- Implement Induction and auditing procedures outlined in Section 10 as part of the TMP and OH&S plans



2

INTRODUCTION

KGL Resources Pty Ltd (KGL) propose to develop new operations at the Jervois Mine site in the Anayte region of the Northern Territory. As required by legislation KGL prepared an Environmental Impact Statement (EIS) for the project which was lodged with the Department of Primary Industry and Resources (DPIR) in October 2018.

As part of the EIS process various government Departments and stakeholders provided government with responses / queries back to the applicant (KGL) raising any concerns regarding the EIS or additional information required for the various departments to provide environmental approval. KGL received comments relating to the Jervois Project in December 2018. KGL are required to provide a Supplement to the EIS back to government addressing any queries or concerns raised.

With respect to the Jervois project KGL received several concerns relating to the proposed impact of traffic in the region as documented within Appendix G. These concerns have been raised by a number of parties specifically:

- Department of Tourism and Culture
- Department of Infrastructure, Planning and Logistics (DIPL) – Transport Civil Services
- Northern Territory Police and Fire Emergency Services (NTPFES)
- NT EPA
- Tourism Central Australia
- Central Land Council

The areas of concern raised by stakeholders are specifically around the following issues:

- Concerns about the additional traffic that will be generated by the mine in both construction and operation phases
- The traffic impact assessment undertaken as part of the EIS did not address adequately the impact on the road itself with the high number of additional road trains proposed
- Road safety is a concern raised by all stakeholders
- A traffic management plan was not included in the EIS and has been requested by DIPL
- Insufficient detail was provided in the EIS with respect to a risk assessment as required in the preparation of a Traffic Management plan (TMP)
- The assessment of the requirements to upgrade any intersections on the Plenty Highway, Lucy Creek Access Road or the Stuart Highway provided in the EIS did not provide sufficient information

KGL approached Consone Consulting to undertake an independent review of the documents provided in the EIS and to provide relevant information, reports and plans to ensure relevant Departments concerns are addressed in the proposed supplement with respect to traffic.



The scope of works KGL engaged Consone to undertake are detailed separately. Key aspects are to undertake independent assessment of existing reports, undertake liaison with various Departments and ensure Departments concerns are addressed. This will include the preparation of a Traffic Management Plan and Risk Assessment in accordance with AUSTRROADS publication “AGTM12-19-Guide-to-Traffic-Management-Part-12-Traffic_Impacts-of-Developments”.

In order to undertake these works Consone first undertook a Stage 6 Road Safety Audit to inform both the risk assessment and Traffic Management Plans. This investigation also sought to highlight any issues with the existing road or deficiencies with respect to the proposed increase in traffic. The goal being to enable both government and KGL to be better informed with regard to road safety areas and prioritise any areas of road improvements in the future with an emphasis on road safety and the increase in road traffic, specifically heavy vehicles. A review of Government’s proposed capital works and maintenance upgrades for the road was also undertaken to inform Government of suitability of proposed program both in relation to safety and road condition.

In addition, Consone have also undertaken an assessment of likely impact of the increase in traffic on road condition and likely implications to road maintenance requirements.

2.1 Independent Review Process

To enable the audit to be undertaken a review of existing documents in the EIS was undertaken including the following documents from the EIS.

- C-2 Traffic and Transport Assessment (TTA)
- C-9 Social Assessment and Community Engagement (SACE)
- 4.7 Social, Economic and Cultural Surrounds (SECS)

Information extracted from the reports included proposed traffic generation from the mine during construction and operations. Subsequent to the review a number of activities were completed including:

- Consone Consulting undertook a review of existing traffic data and sourced more recent traffic data from Department of Infrastructure, Planning and Logistics – Transport Civil Services (DIPL).
- Traffic Accident data was sourced from DIPL and reviewed
- Meetings were held with various Departments prior to the road safety audit to highlight any perceived deficiencies along the alignments of the Plenty Highway and Lucy Creek Access road. This included the following:
 - Gunalan Sivachelvan of DIPL Alice Springs to review maintenance and capital works
 - Mike Tait of DIPL Darwin
 - Alice Fleming Central Land Council (CLC) to ensure the CLC were clear on Consone’s Scope and issues raised previously by traditional owners
 - Michael Wyatt of Northern Territory Police (Harts Range) and chairman of Regional Emergency Response Committee



- A desktop review of the alignment was undertaken prior to the site visit being undertaken.
- Meetings were held with the preferred transport company to review the accuracy of nominated traffic generation listed in the EIS. In addition, a review of proposed operational logistics of the transport company to ensure the road safety auditors had a clear understanding of how the operations would be undertaken

2.2 Responses to EIS

The responses KGL received from the various Departments with respect to traffic are included in the table in Tables 2 - 4 of this report. In summary the main concerns raised included the following:

- Concerns for road safety and condition during peak periods from December through to January – risk and mitigation strategy required.
- Concerns of proposed single lane treatment on Lucy Creek Access and sight distances for the Lucy Creek Road intersection. Recommended this be reviewed.
- Operational period listed to be 47 weeks operation. EIS did not clarify when these operations are likely to be.
- Concerns raised over the gravel sections and proposed sealing program; construction will commence prior to sealing of all unsealed sections. A request was made to review the proposed sealing program.
- Concerns that increased traffic will have a detrimental effect on road condition.
- Concerns raised with respect of plans not clearly showing Lucy Creek Access Road, location of proposed gravel pits and likely remediation.
- Concerns of dust to tourist vehicles operations such as Gem Tree Caravan Park
- No information provided on cumulative risk to road users due to increased heavy vehicles.
- No Traffic Management Plan for either construction or operations.
- Concerns with both the Lucy Creek Access / Plenty Hwy intersection and Mine Site Access / Lucy Creek Access Road intersection. Assumption that full width of roads may be used for turning is not permitted and new swept paths and detailed proposed upgrades to be provided.
- No assessment of the need for acceleration lane at the Stuart Highway (specifically South bound has been undertaken).
- Risk in the dry season associated with additional vehicles has not been addressed.
- The comments from DIPL highlighted the requirements for approval of new roads and intersections
- Due to the remote location emergency services are not in a position to adequately respond to emergencies – Risk assessment and emergency response strategy to be developed.



- NTPFES are concerned about the overall 5 mines being developed in the area and the cumulative effect this will have on emergency services and policing.
- No information of the proposed increase in maintenance and funding of this as a whole, NTPFES recommend that any upgrade works proposed be based on identified sections of road that have safety issues.

The responses to the EIS received by KGL also included other areas of concern including social, environmental and economic impacts. These are to be addressed in separate reports prepared by others.

2.3 Supplement Objectives

The aim of the assessment was to complete field investigations and associated desktop studies to evaluate the proposed development and the likely impacts on the existing road network with respect to traffic generation, access requirements, traffic safety and impacts on the wider road network. The study has been completed generally in accordance with Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development (2019).

The objective of this Traffic Supplement is not to replace reports that were prepared as part of the EIS, the supplement is as it infers a supplement to the existing reports. Key objectives are to address the following:

- Address concerns raised by Departments and omissions that are highlighted previously.
- Update the information previously provided where the existing information has changed or certain aspects have been developed further since the lodgement of the original EIS (for example additional traffic generation estimates have been developed further).
- Provide detailed Traffic Management Plan addressing concerns raised including procedures and contractual requirements required by KGL to ensure both public and internal safety.
- Provide update on transportation routes and traffic movements associated with both mine construction and operations.



3

INDEPENDENT REVIEW

3.1 Documentation Review

As part of the independent review of the information provided regarding traffic in the EIS the following sections of the EIS have been reviewed:

- C-2 Traffic and Transport Assessment (TTA)
- C-9 Social Assessment and Community Engagement (SACE)
- 4.7 Social, Economic and Cultural Surrounds (SECS)

The outcomes of the review are listed in the following sections.

3.2 Traffic Operations

3.2.1 Traffic Routes

The traffic routes listed in the report are detailed from the railyard in Alice Springs off Whitaker Street, the Stuart Highway, Plenty Highway and Lucy Creek Access Road to the mine site. The report does not highlight in sufficient detail the following:

- The mine site access intersection and internal roads to the mine site.
- The location of proposed accommodation village and proposed access and parking.
- The additional traffic route from Lucy Creek Station airstrip to the proposed mine site. It is understood that this strip will likely be utilised by the mine as opposed to the Bonya airstrip and an assessment of upgrades to the airstrip is currently being undertaken.
- The report does not confirm routes for road trains through Alice Springs to the site and suitability of these routes

This report provides the relevant information listed above in the following sections.

3.2.2 Existing Traffic Data

The original report includes existing traffic data for the ten-year period from 2007 – 2016. Additional data is available within the DIPL Annual Traffic Report 2017 for the 2017 year. Raw data has also been supplied to Consone by DIPL for 2018 and part 2019 at the Plenty Highway site closest to the Stuart Highway. This data is summarised within Tables 5 and 6 of this report and has been used for updated calculations relating to proposed traffic generation. This data is pertinent as anecdotal comments provided during stakeholder consultation (both from CLC and NTPFES) suggests that there has been an increase in traffic utilising the Plenty Highway in recent times. This is assessed further within this report.

3.2.3 Traffic Generation

The traffic generation predicted in the original EIS is detailed for both the construction and operational phases. Subsequent to the original report KGL have negotiated a contract with a transportation and logistics company for transport of product which has provided more detailed information regarding traffic generation. Additionally, KGL have developed significantly more



detailed traffic generation estimates and program for both construction and operations as detailed within Sections 6.

3.2.4 Traffic Distribution

As listed above KGL have updated information with respect to traffic distribution including number and type of vehicles to be utilised. This information is included in this report – refer Section 6.

3.2.5 Intersection Performance

As noted by DIPL in the responses to the EIS, intersections along the alignment were not adequately assessed as part of the TIA. Specifically, DIPL requested additional information and design assessment of the following intersections

- The Lucy Creek Access Road and Plenty Highway Intersection
- The Mine Access and Lucy Creek Road Intersection
- The Stuart Highway and Plenty Highway Intersection

It is noted in the comments that the assumption that vehicles can utilise the full extent of the carriageway for turning movements is not acceptable. Consone have prepared conceptual layouts for these intersections based on swept path movements (see SK001 and SK002) which are generally in accordance with keeping the design vehicle within lanes during turning movements. The proposed upgrades (see Figures SK003, SK004, SK005 and SK005A) to the intersections have been prepared and included in the following sections. This includes appropriate calculations with respect to sight distance requirements at these intersections.

It is noted that the existing reports did not review any minor intersections along the alignment. As part of the RSA works for the Plenty Highway Consone have reviewed all minor intersections and reported on safe sight distances for each intersection; these are included within Section 6.5.

3.2.6 Vertical and Horizontal Alignments

We note that the original reports have been based on a desktop review only, which does not include any review of both the horizontal and vertical alignments. When reviewing the safety of the road and suitability of the road to adequately perform under the nominated traffic this assessment needs to be undertaken on ground or by review of detailed engineering survey. Consone completed these investigations as part of the RSA and note deficiencies as listed within Table 1. This assessment highlights deficiencies in the network that should be upgraded or at the very least fed into Qube's Journey Management Plan and specific procedural requirements for proposed KGL road users. This is specifically pertinent to sight distances at crests (especially in the gravel pavement sections of the road).



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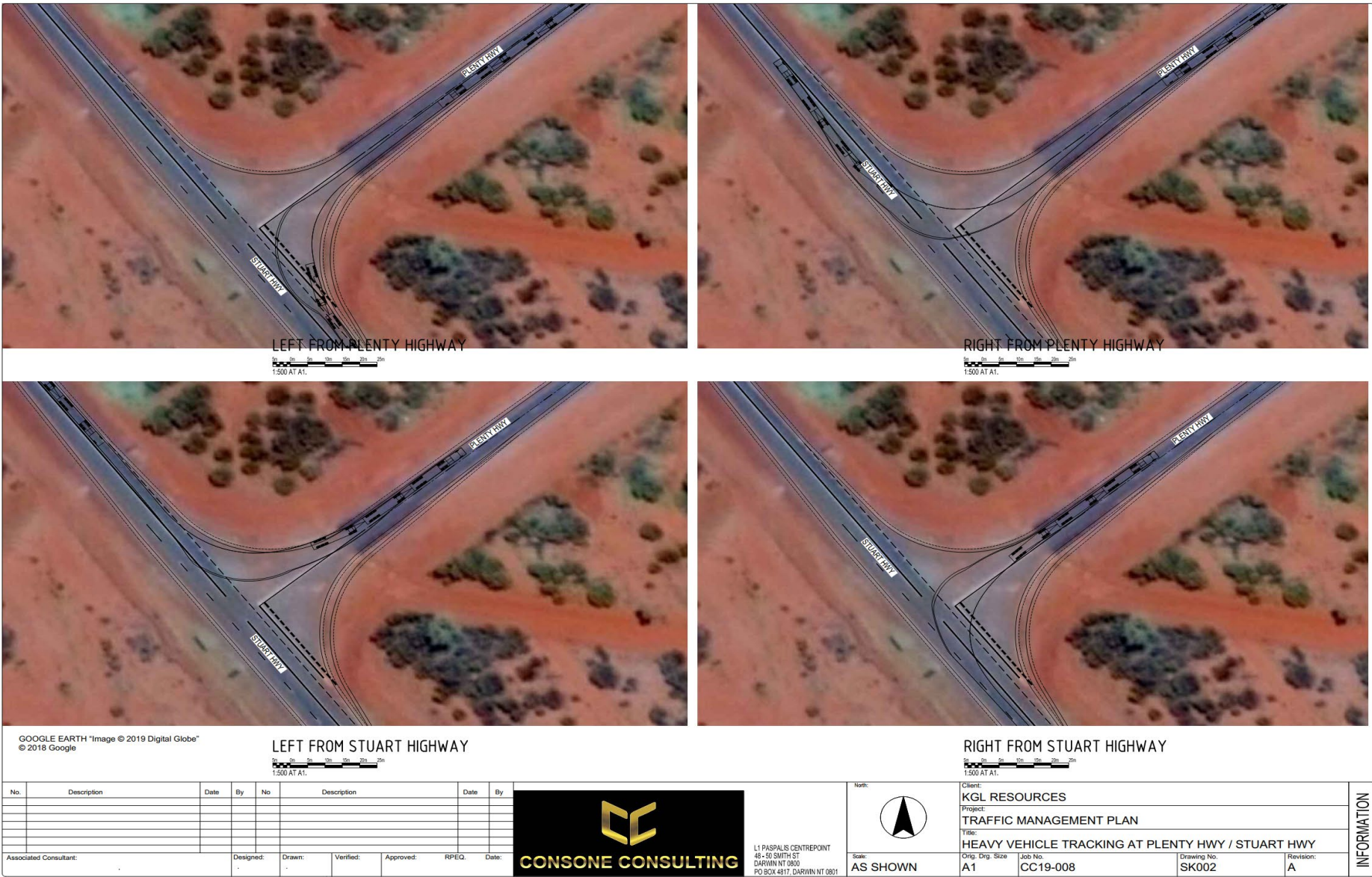




Table 1 – Horizontal and Vertical Alignment Deficiencies

Location	Chainage (km)	Deficiency	Recommendation
Plenty Highway	45.90	Poor sight distance through crest curve	Install crest signs and double barrier line marking
Plenty Highway	51.30	Poor sight distance, end line marking	Install double barrier line marking
Plenty Highway	170.60	Limited sight distance through horizontal curve	Realign road and/or remove vegetation to inside of curve
Plenty Highway	229.09	Crest sight distances 115m west, 220m east	Lower crest
Plenty Highway	240.08	Poor sight distances through crest curve	Lower crest
Plenty Highway	273.20	Poor sight distances through crest curve	Lower crest, install crest signage
Plenty Highway	273.95	Poor sight distances through crest curve	Lower crest, install crest signage
Plenty Highway	277.92	Poor sight distances through crest curve	Lower crest, install crest signage
Plenty Highway	285.03	Poor sight distances through crest curve	Lower crest, install crest signage
Plenty Highway	295.44	Very poor sight distance leaving floodway crest. Tight right hand curve follows crest	Lower crest
Plenty Highway	295.60	Tight sub-standard right hand horizontal curve with estimated radius of >150m follows crest	Realign horizontal curve to provide minimum standard radius
Lucy Creek Access	5.90	Poor sight distance through crest curve	Lower crest, install crest signage
Lucy Creek Access	14.50	Poor sight distance through crest curve	Lower crest, install crest signage
Lucy Creek Access / Mine Access	18.21	Sub-standard horizontal	Relocate intersection as detailed within SK005



Location	Chainage (km)	Deficiency	Recommendation
Lucy Creek Access	22.36	Poor sight distance through short horizontal curve	Install advisory speed signs
Lucy Creek Access	24.94	Crest, poor sight distance and tight RH curve after crest. Poor coordination of alignments	Realign horizontal curve and lower crest
Lucy Creek Access	45.33	Tight horizontal curve	Install advisory speed signs

3.3 Pavement and Road Condition

The original report details the various sections of the proposed route and undertakes an assessment of the increase in equivalent axles for each section. The report recommends that KGL provide a contribution to the maintenance of the road.

The report does not however provide the following information that is relevant to management and safety of the road network.

- No assessment of the existing pavements is made.
- In order to ascertain possible contributions to future road maintenance no assessment of the existing NTG maintenance regime was undertaken or any assessment of future road upgrades undertaken.
- No assessment of possible road restrictions either weight or operational (wet weather) was made. We note that the quality of the pavement in the gravel sections of the road vary significantly and operational restrictions will be required as part of the TMP.
- No assessment of road drainage was undertaken and the effect of increased traffic may have on the pavement.

Whilst no geotechnical testing has been undertaken a high-level visual assessment of the road condition was undertaken as detailed in Section 9.

3.4 Road Maintenance

As listed previously no assessment of existing and future road maintenance was included in the reports. A detailed section on existing and proposed maintenance and future minor and capital works is included. This has been undertaken in conjunction with DIPL representatives in Alice Springs as detailed within Section 9.



3.5 Road Safety

The existing reports highlight various issues with respect to road safety and undertakes a review of historical incidents along the road network. The report does not adequately address a number of areas, such as identification and risk ranking of deficiencies on ground. Key to the assessment of road safety is the provision of a Stage 6 Road Safety Audit which was completed by Consone Consulting prior to undertaking this report. In addition the proposed TMP developed by Consone as part of these works addresses the following aspects with regard to safety:

- Procedural requirements with regard to internal and external traffic, specifically for KGL Contractors and Staff.
- Contractual Requirements for contractors utilising the network.
- Restriction to operations in wet weather.
- Load Restriction.
- Procedures for oversize vehicles.

3.6 Report Recommendations and Conclusions

The reports provided in the EIS makes a number of conclusions and recommendations. A number of these are revised in this report based on the additional investigations and assessments undertaken. This is detailed in Section 11.



4 SUPPLEMENTARY INFORMATION – PROPOSED DEVELOPMENT

The original EIS reports have a detailed description of the proposed project. Since the lodgement of the EIS the proposed development plans for the project have progressed and this section is intended to provide updates to the proposed development not included in the original EIS.

4.1 Off-Site Development

The original reports list an upgrade to either the Bonya Aerodrome, located approximately 13km south-west of the site; or the Lucy Creek Aerodrome which is located approximately 19km north of the site in conjunction with upgrades of the access road to the nominated site. Whilst it is still to be confirmed it is highly likely that the Lucy Creek airstrip will be upgraded and utilised

Operational requirements also include the transport and storage facility at the Genessee & Wyoming Australia (GWA) Rail Facility within the Alice Springs township. Access to the site is via the NTG approved Road Train Route for Alice Springs, namely Stuart Highway and Smith Street. GWA have adequate capacity within the facility to accommodate all of KGL's product with no need for any upgrades to the facility. The requirement for 24-hour access to the GWA site is still being negotiated with GWA. Further to this KGL intends to perform maintenance and refuelling operations from local industry in Alice Springs

Transportation of product (150,000t/annum) will be undertaken by transportation company QUBE and this companies safety requirements transportation vehicles and operational procedures and discussed in detail in the following sections

4.2 On-Site Development

4.2.1 Location

The location of the site is unchanged (see Figure 1). The location of the accommodation village and other mine site infrastructure has been confirmed and is shown within Figure 2.

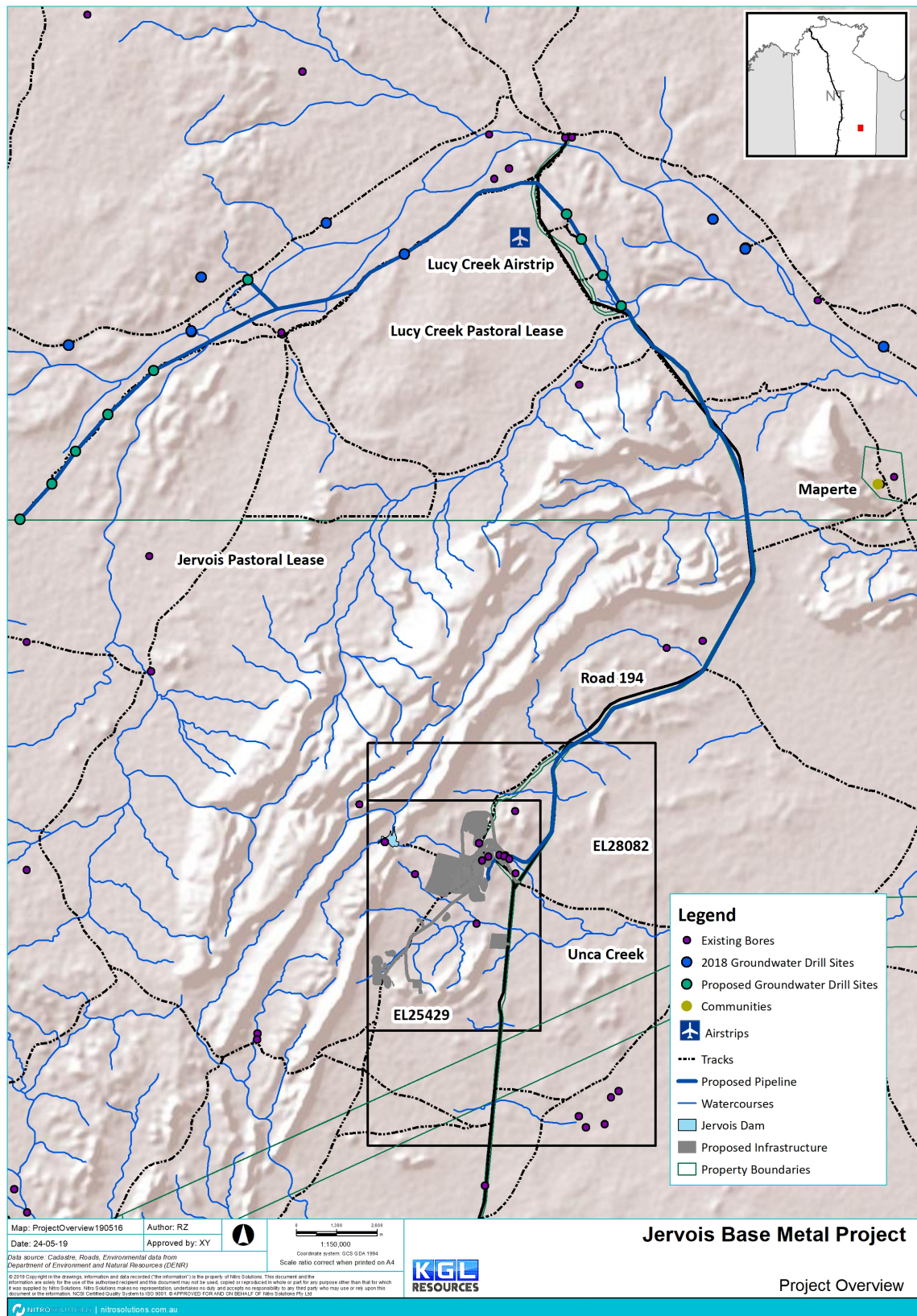


Figure 1 – Mine Site Locality Plan



4.2.2 Site Plan

An updated Site Plan for internal works has been developed and this is included following:

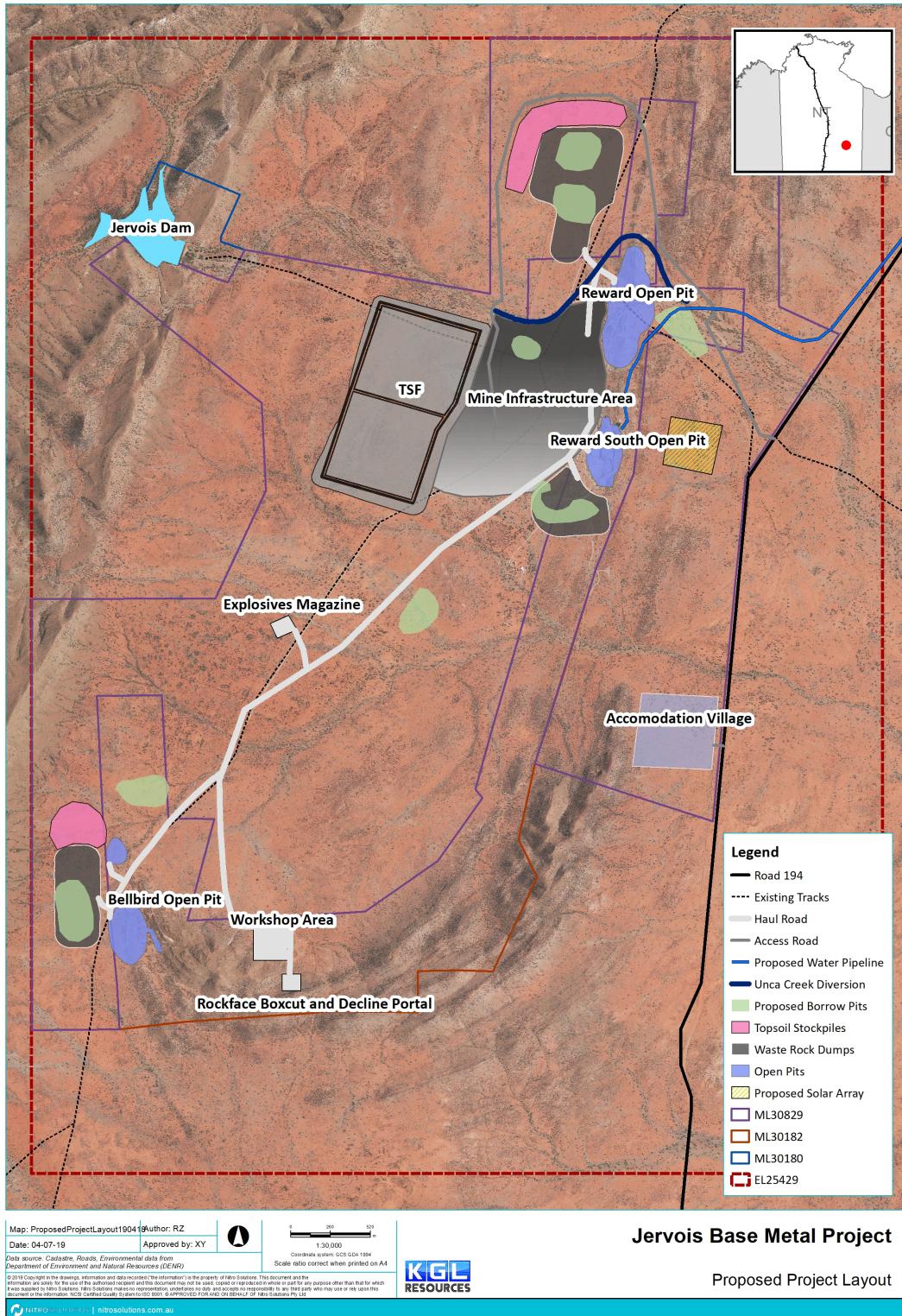


Figure 2 – Site Plan



4.2.3 Programme

An updated program for the project has been developed and is listed following: See SECTION 6.3.1

4.3 Transportation Routes

The proposed transport routes for construction and operations will include the following:

4.3.1 Route 1: Accommodation Village/Operations to Airstrip

The airstrip is located approximately 20km due north of the mine site. Access to the strip is via a 27km road trip along the Lucy Creek Access. The route from site to the Lucy Creek Airstrip is shown following:

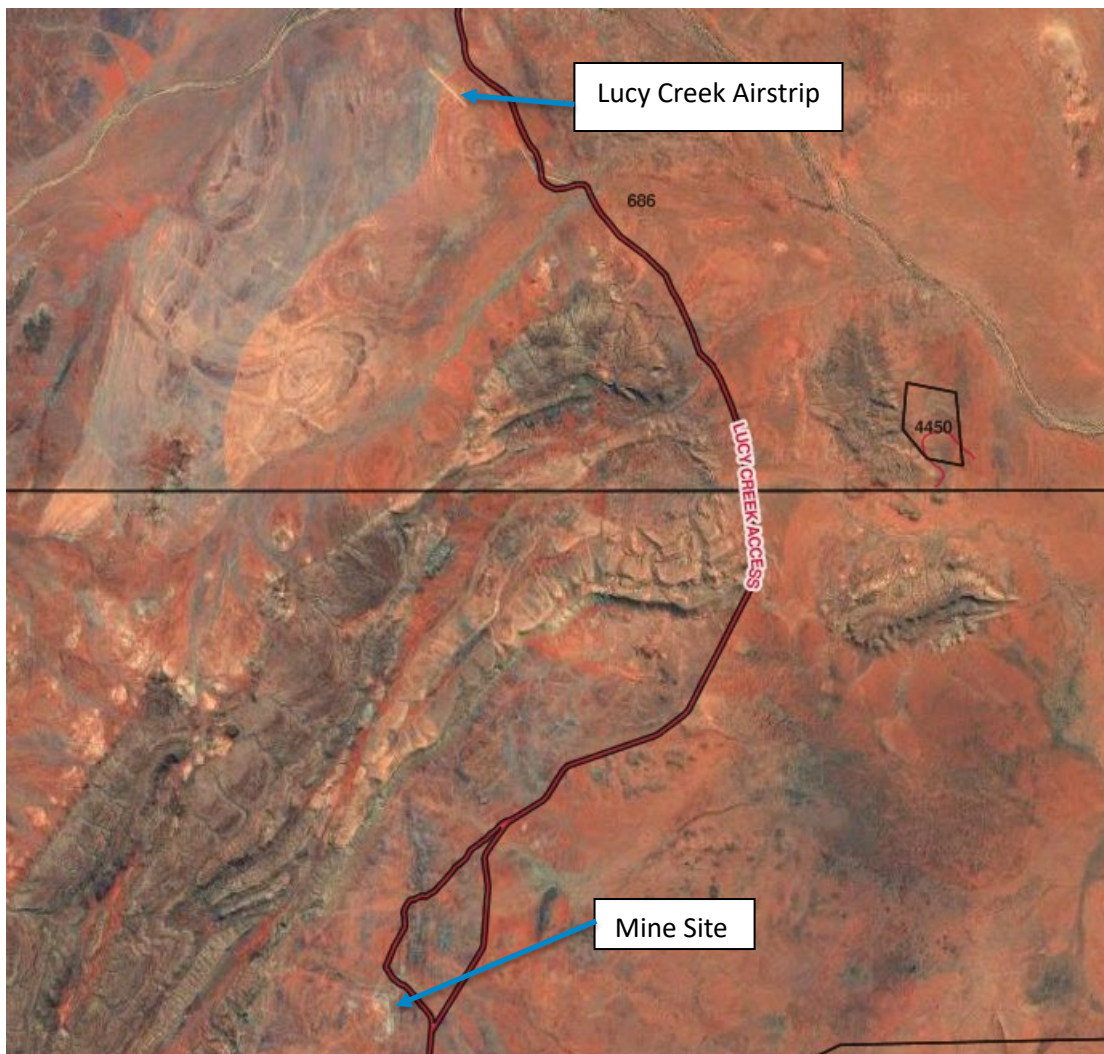


Figure 3 – Route to Airstrip



4.3.2 Route 2: Accommodation Village to Mine Site

The proposed accommodation village will be located approximately 2.5km south of the mine site. Access to the mine site is via the Lucy Creek Access to its proposed intersection (see Figure 5A) with the new camp access road.

4.3.3 Route 3: Alice Springs to Mine Site

The main transportation route is from the mine site to the rail storage facility in Alice Springs. This includes a leg which runs along the site access road before turning south onto Lucy Creek Access (Road 194). The route then travels in a southerly direction for a distance of 18.2km where it intersects with the Plenty Highway. Vehicles will then travel west along the Plenty Highway until meeting the intersection with the Stuart Highway, approximately 296km from the Lucy Creek Access turnoff. The final leg of the route encompasses travelling 67km south along the Stuart Highway before turning onto Smith Street before travelling a short distance to the railway yard. Movements upon entry to the Alice Springs township to the rail facility follow the NT Government approved Road Train Route (see Appendix E).

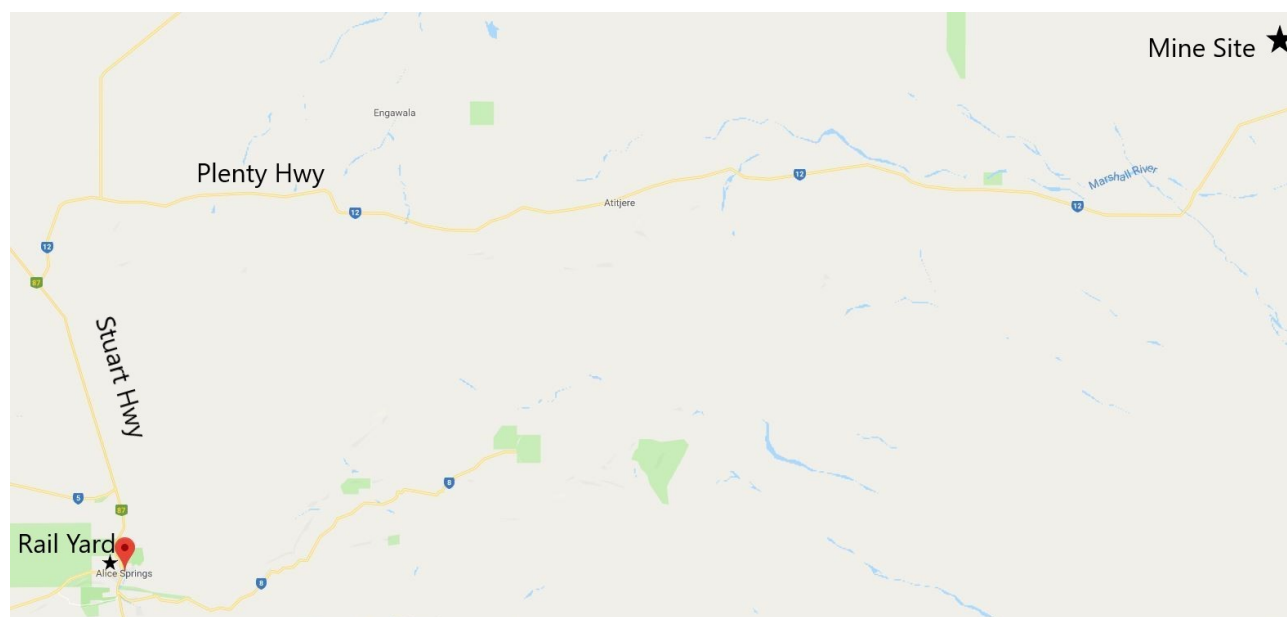


Figure 4 – Concentrate Transport Route

‘Image Landsat / Copernicus © 2018 Google’

4.4 Future Development

The current exploration phase and continued exploration post construction is ongoing within the existing pastoral lease. Ongoing exploration is focussing on the existing mining and exploration tenements: ML30180, ML 30182, ML30829, EL25429 and EL28082.



4.5 Construction Materials Gravel

Listed in the responses to the EIS is a request to nominate the location of gravel pits for construction of roads. At this several areas for potential gravel borrow pits have been identified, however these require further investigation to determine the quality and quantity of suitable materials. KGL are currently exploring the option to manufacture road base material for existing rock on-site. An area consisting of 3 Hectares of rock has been identified with the existing mining lease. Once confirmation of the viability of manufacturing this material or the location of potential borrow pits are confirmed appropriate applications will be made to the NT Government for approvals and subsequent remediation.

5 SUPPLEMENTRY INFORMATION – STAKEHOLDER ENGAGEMENT

5.1 General Stakeholder Engagement

It was clear from the comments received from key stakeholders that consultation with stakeholders with regard to traffic impact was limited in the preparation of the EIS. Consone Consulting's team have undertaken individual consultation sessions with Key Stakeholders and in conjunction KGL and QUBE (preferred transportation company product) provided a detailed presentation of RSA findings, proposed transportation procedures and proposed operational procedures for transportation to and from the mine. Through these consultations additional responses/questions were raised and responses given, these are listed in the following sections.

5.2 Central Land Council – Indigenous Communities

The Central Land Council raised a number of concerns that local indigenous communities have raised with respect to the increase in traffic and other additional aspects of the proposed mine development and operations; these are summarized following with responses that the KGL team have provided the CLC.

Table 2 – CLC EIS Responses

Item Raised CLC	KGL Response
Operational Times (47 Weeks)	KGL explained that there are no specific times listed for their operations with 47 weeks of transportation of product estimated per year which was adopted post review of possible road closures due to inclement weather. Accordingly, the periods of inactivity will vary



Item Raised CLC	KGL Response
	from year to year based on weather events. Contractual terms with the transportation provider are being negotiated on a 47 week program and this has been adopted in calculation of estimated traffic volumes.
Concern raised that there may be multiple road trains congesting the road and making it difficult for road users to overtake	QUBE highlighted that vehicles will be staged to a maximum of one road train per hour in each direction. Three vehicles would utilise the road per day with 2 return trips (for product only). This equates to a total of 12 trips per day meaning vehicles can be staged to a maximum of four hours apart in each direction. For construction and transportation of consumables the same restrictions will apply.
Concern raised regarding Lucy Creek Intersection	KGL have advised that the intersection will be upgraded and likely sealed.
Concerns regarding Road Safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to CLC and accepted as being industry best practice. KGL indicated that all staff and contractors will be contractually required to implement safety measures such as a generic journey management plan included in the traffic management plan
Concerns over number of vehicles	Revised numbers presented and accepted
CLC highlighted the desire to see the full section of gravel sealed	Consone noted that they will be working with government to highlight deficiencies in the network – including safety concerns raised with NT Government regarding single lane seal sections. It was accepted that there are budgetary restrictions and a focus should be



Item Raised CLC	KGL Response
	made on upgrading the sections that will provide the best benefit. Furthermore it is noted that an additional 26km of unsealed road is currently programmed for design or construction with the expectation that construction for these sections will be completed prior to the operational phase of the project. This will result in a total of approx. 60% sealed road between the mine site and the Stuart Hwy at the time of commencement of operations.
Concern raised regarding alcohol and drivers under the influence	KGL have confirmed previous advice that the mine will be a dry site – alcohol free
Safety Concerns	KGL and Qube provided a presentation on best practice. In addition, Qube have indicated that they and KGL are happy to provide educational presentations and information sessions to road users and local communities.

5.3 Department of Infrastructure Planning and Logistics

Consultation with DIPL involved meetings with both the Darwin based representatives that manage the road network across the territory and the local Alice Springs representatives that are responsible for maintenance and upgrades to the road network, specifically the Plenty Highway and Lucy Creek Access. The Darwin team's main concerns were around the appropriate upgrades to intersections and safety in general and also requested the development of the TMP. Consultation with the Alice Springs team was centred around current upgrade works for planning and ongoing maintenance.

Table 3 – DIPL EIS Responses

Item Raised DIPL	KGL Response
DIPL AS – Concerns with heavy vehicles utilising new sections in the first months after	KGL indicated options would be explored such as maintaining detours for a period (though



Item Raised DIPL	KGL Response
a new seal has been placed and oxidisation is not at a level to stop stripping of the stone (They noted these issues on the Tanami Road upgrades previously)	this is problematic with dust and traffic control). Another solution was to have temporary speed restrictions added to the journey management plans and TMP limiting the speed of heavy vehicles for a period post construction of the new seal
TMP Required	Agreed and a draft TMP (Subject to final design) is included in the supplement
Concern raised regarding Lucy Creek Intersection	KGL advised intersection will be upgraded and likely sealed. Consone noted appropriate assumptions would be included in this report and conceptual drawings have been provided
Concerns regarding road safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to DIPL and accepted as being industry best practice. KGL indicated that all staff and contractors will contractually be required to implement safety measures. In addition Qube have indicated that they and KGL are happy to provide educational presentation and information sessions to road users and local communities such as a generic journey management plan included in the traffic management plan.
Updated traffic counts	Consone requested and these were received for the Plenty Hwy traffic count station closest the Stuart Hwy.



5.4 Police Fire and Emergency Services

Consultations were undertaken with the local Harts Range police officers and the regional command.

Table 4 – NTPFES EIS Responses

Item Raised PFES	KGL Response
Raised concern around ability of emergency services to respond	KGL and Qube highlighted the staggering of vehicles and that all vehicles would be equipped with satellite communications which would reduce any likely delays in reporting of incidents. In addition, KGL highlighted that the mine will have medical facilities, fire fighting facilities and trained staff available 24/7. This will dramatically improve emergency response times from that currently experienced. It was noted that due to insurances requirements KGL would only act on the request of PFES.
Concern on Road Condition	KGL indicated the TMP will have restrictions both on weight and wet weather operations – essentially KGL will work with PFES and DIPL in managing operations in wet weather
Concern raised regarding Lucy Creek Intersection	KGL advised intersection will be upgraded and likely sealed. Consone noted appropriate assumptions would be included and conceptual design included in this report
Concerns regarding road safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to DIPL and accepted as being industry best practice. KGL indicted that all staff and contractors will contractually be required to implement safety measures. In addition Qube have indicated that they and KGL are happy to provide educational presentation and information sessions to road users and local communities such as a generic



Item Raised PFES	KGL Response
	journey management plan included in the traffic management plan.

5.5 KGL

KGL have indicated they are happy to engage with the community to provide information sessions on a regular basis. Consultations with the Bonya Community are exploring the development of a road maintenance team from the community to undertake road maintenance in the region with KGL supporting this strategy.

5.6 Lucy Creek Station / Jervois Station

KGL have ongoing consultation with both the stations owners and are working to develop joint water supplies, road material supply and road maintenance.

6 SUPPLEMENTARY INFORMATION – TRAFFIC OPERATIONS

6.1 Existing Traffic Volumes

Average annual daily traffic (AADT) volumes have been sourced from the Department of Transport, Road Network Division 'Annual Traffic Report, 2017.' The volumes were recorded at traffic count stations along the Stuart Highway and Plenty Highway as follows:

- Station RAVDP004 – Plenty Highway 4km east of Stuart Highway
- Station RAVDC025 – Plenty Highway 56km east of Stuart Highway
- Station RAVDC026 – Plenty Highway 10km east of Huckitta Station
- Station RAVDP014 - Stuart Highway 450m north of Tanami Hwy
- Station UAVDP002 – Stuart Highway south of Woods Terrace
- Station RAVDP001 – Stuart Highway 3km north of Alice Springs
- Station UAVDC001 – Stuart Highway south of Sargent Street

The Annual Traffic Report details traffic count data available to the public up to the end of 2017. Raw traffic count data (not yet published) for the period January 2018 until 31 March, 2019 was also sourced from DIPL. A summary of this data is included within Table 6.

Table 5 – Traffic Volumes 2008 - 2017

Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
Plenty Highway 4km east of Stuart Hwy	RAVDP004	2009	50	54	104	



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
		2010	52	56	108	
		2011	51	54	105	
		2012	53	56	109	
		2013	44	50	94	
		2014	43	49	92	
		2015	51	56	107	
		2016	66	64	130	19.3
		2017	66	65	131	20.5
Plenty Highway 56km east of Stuart Highway	RAVDC025	2009	42	40	82	
		2011	35	33	68	
		2013	37	36	73	
		2015	49	51	100	
		2017	48	50	98	
Plenty Highway 10km east of Huckitta Station	RAVDC026	2009	14	11	25	
		2011	8	7	15	
		2013	15	12	27	
		2015	21	18	39	
		2017	17	21	38	
Stuart Highway south of Woods Terrace	UAVDP002	2008	6740	6495	13 235	
		2009	6957	6704	13 661	
		2010	7043	6780	13 823	
		2011	6935	6559	13 594	
		2012	6830	6551	13 381	
		2013	6846	6569	13 415	



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
		2014	6909	6613	13 522	
		2015	7035	6749	13 784	
		2016	7152	6875	14 027	
		2017	7296	7026	14 322	
Stuart Highway	RAVDP001	2008	488	466	954	
		2009	509	485	994	
		2010	545	526	1071	
		2011	508	504	1012	
		2012	505	480	985	
		2013	494	469	963	
		2014	500	478	978	
		2015	525	505	1030	
		2016	567	539	1100	
		2017	552	529	1081	
Stuart Highway south of Sargent St	UAVDC001	2009	2864	2804	5668	
		2011	2854	2874	5728	
		2012	2775	2779	5554	
		2013	2593	3299	5892	
		2014	3137	3837	6974	
		2015	3574	3455	7029	
		2016	3738	3738	7476	
		2017	3312	3284	6596	
Stuart Highway 450m north of Tanami Hwy	RAVDP014	2010	224	289	513	
		2011	288	289	577	
		2012	276	283	559	



Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
		2013	299	291	590	
		2014	312	296	608	
		2015	325	309	634	
		2016	335	320	655	
		2017	344	325	669	

Table 6 – Traffic Volumes 2018 – March 2109

Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
Plenty Highway 3.3km east of Stuart Hwy		2018	50	54	104	22.0
		2019 (Jan – Mar)	52	56	108	23.5

6.2 Construction Traffic Generation

Estimates of construction traffic have been prepared by KGL by undertaking consultation with tenderers for various components of the construction of the mine. These consultations have been undertaken with the suppliers / contractors for the following work packages:

- Process Plant and Infrastructure
- Mining Contractor
- Power Station
- Accommodation Village
- KGL Personnel and Equipment
- Fuel Supply
- Allowance for Miscellaneous Transport

A detailed program for each work package has been prepared and estimated vehicle trips over the 63 week construction period have been prepared from this. Suppliers/contractors were also requested to break down the type and size of vehicles into the following categories:

- Light Vehicle
- Semi-trailer truck
- Double Trailer Road-Train



- Triple Trailer Road-Train
- Oversize Load / Low Loader (No Pilot)
- Oversize Load / Low Loader (Pilot)
- Oversize Load / Low Loader (Police Escort)

The overall program and estimate of vehicles per trip on a weekly basis over the period of construction is nominated and this is included in Appendix A. A summary of the estimates is included in Table 7.

Table 7 - Summary of Construction Traffic

Type of Vehicle	Return Trips Construction	Average V/Wk	Peak V/Wk	Peak V/Day	Length Peak (wk)	Period Peak
Light Vehicle	676	10.7	29	4.1	5	W55-W59
Semi-trailer truck	68	1.1	12	1.7	3	W57-W59
Double trailer road train	287	4.6	15	2.1	5	W46-W51
Triple trailer road train	6	0.1	3	0.4	2	W54-W55
Oversize Load/ Low Loader (No Pilot)	206	3.3	20	2.9	9	W3-W9
Oversize Load (Requiring Pilot)	50	0.8	8	1.1	2	W58-W59
Oversize Load (Requiring Police Escort)	24	0.4	7	1.0	2	W58-W59
Total Vehicles	1317	20.9	34-61	5-9	12	W47-W59

From the above table and review of the overall program it is clear that whilst the average of vehicles movements is relatively low (20 per week) there is a peak period of construction of approximately 12 weeks (Process Plant and Infrastructure) where the average number is 75% - 300% higher and there are other periods where the level of traffic is significantly lower. KGL are currently working with suppliers and contractors to ascertain if these vehicle movements can be spread out over an extended period. This is specifically the case for oversized vehicles where staggering of trips will reduce the impact to other traffic users.

This is discussed in more detail in draft Traffic Management Plan (see Appendix A) which includes the proposed staggering of heavy vehicle movements.

6.3 Operational Traffic Generation

Mining operations are expected to ramp up early 2021 with nameplate capacity occurring in the second half of 2021. At this stage the mine site will be operational 24 hours a day, seven days a week with estimated production and transportation of 150 000 tonnes of product annually. The mine is expected to be operational for up to 52 weeks a year with transport of product occurring over 47 weeks annually. Transportation times are based on production estimates and historical climate data and subject to change dependent on weather events and production scenarios.

We concur with the EIS assessment of staging and development scenarios however note that there have been updates subsequent to the completion of the EIS and also the road safety audit. Accordingly, the staging and traffic generation data has been updated with the most recently available data which is included within the following sections.



6.3.1 Development Staging

It is understood the proposed development will consist of two stages with an initial 14-month construction program scheduled to commence in February, with operations commencing early 2021. Therefore, the following development staging has been adopted:

- Traffic counts 2017
- Construction phase 2020 – 2021
- Operations 2021
- Operations plus closure phase 2031

6.3.1.1 Assessment Scenarios

The following assessment scenarios have been adopted

- Opening year (2021) pre-development
- Opening year (2021) post-development
- Future year (2031) pre-development
- Future year (2031) post-development

6.3.1.2 Background Traffic Growth

Background traffic growth rates of 3.8% and 2.5% per annum have been adopted on the Stuart Highway and Plenty Highway respectively. These rates have been calculated from historical data analysed at various traffic count stations over the years 2009 to 2017. The application of these rates equates to increases of 67% and 41% on the Stuart Hwy and Plenty Highway respectively over the 12-year period 2019 – 2031.



6.3.2 Traffic Generation

As noted in the previous section construction phase traffic is detailed in Section 6.2. Operational traffic generation is summarised in Table 8 noting that these are a total of all movements i.e. in each direction.

Table 8 - Summary of Traffic Generation

USE	VEHICLE TYPE	VPW	VPD
Operations Phase			
Output - Concentrates	Triple Road Train	84	12
Input - Diesel	Double Road Train	16	2
Input - Consumables Other	Double Road Train	6	1
Transport Operations, Admin & Contractors Staff	40 Seater Road Coach	2	1
Transport Management	Light Vehicle	6	1
Transport Contractors	Light Vehicle	12	1
Operations Phase Total		126	18

6.3.3 Increase in Traffic Volumes

Table 9 – Estimated Increase in Traffic Volumes

LOCATION	PRE-DEVELOPMENT 2031		POST-DEVELOPMENT 2031	
	AADT	%HV	AADT	%HV
Stuart Highway, 3km north of Alice Springs				
Northbound	942		950	
Southbound	930		938	
Total	1 872	20.6	1888	21.2
Stuart Highway, 0.45km north of Tanami Road				
Northbound	491		499	
Southbound	632		640	
Total	1 123	15.9	1 139	16.9
Plenty Highway, 4km east of Stuart Highway				
Eastbound	92		100	



LOCATION	PRE-DEVELOPMENT 2031		POST-DEVELOPMENT 2031	
	AADT	%HV	AADT	%HV
Westbound	93		101	
Total	185	20.5	201	25.8
Plenty Highway, 56km east of Stuart Highway				
Eastbound	68		76	
Westbound	66		94	
Total	134	20.5	170	24.4
Plenty Highway, 10km east of Huckitta Station				
Eastbound	28		36	
Westbound	24		32	
Total	52	20.5	68	36.3

6.4 Parking

The original EIS reports listed a requirement for parking to be in the order of 10 car spaces and additional spaces for internal vehicles. This has been revised to include the following:

- Bus Parking – two spaces at the village and drop off and pick up zone at the mine industrial areas
- Road Train Parking, two at mine industrial areas with appropriate provision for turning and loading of product

6.5 Intersection Assessment

Major intersections along the proposed transport route (excluding Stuart Hwy south of the Plenty Highway intersection) were reviewed on site as part of the road safety audit. Sight distances were measured along the major and minor roads of all major intersections using a hand held laser. Measurement were then used to assist with desktop calculations for Safe Intersection Sight Distance (SISD), Approach Sight Distance (ASD) and Minimum Gap Sight Distance (MGSD). Further assessment was completed at the desktop to review intersection layouts, swept path analysis and upgrade requirements.



6.5.1 Stuart Highway – Plenty Highway

It is noted that the existing intersection is an auxiliary right (AUR) type treatment. The intersection does not meet the warrants in terms of minimum volumes / turn volumes for either channelised or auxiliary type intersection treatments pre or post development. This type of treatment is excess to requirements when assessed against Section 4.8 of Austroads Guide to Road Design – Part 4A and therefore currently exceeds the recommended minimum standards.

It is noted that the EIS responses included commentary relating to provision of an acceleration lane on the Stuart Highway for southbound traffic from the Plenty Highway however, they are usually provided only where:

- insufficient gaps exist for vehicles to enter a traffic stream
- turning volumes are high (e.g. 300 to 500 vph), and
- the observation angle falls below the requirements of the minimum gap sight distance model (for example, inside of horizontal curves)

Further to this an acceleration lane treatment should also be considered where heavy vehicles pulling into the traffic stream would cause excessive slowing (defined as 30 – 40km/h of difference or more) of major road vehicles. While it is acknowledged that this situation may be present it should be noted that current AADT numbers for vehicles travelling south on the Stuart Highway are approx. 330 and 65 for westbound vehicles on the Plenty Hwy. Additional A-triple movements resulting from mining will total 6 in each direction (1 every 4 hours) per day of which 3 occur at night (for transport of product and additional 9/week for fuel and consumables) when there is very little traffic on either road. Accordingly, this scenario where vehicles will need to slow considerably will only be present infrequently. Even though this will occur infrequently there is an increased risk to the current operation of the intersection and one which should be managed accordingly.

There are several options available to manage the increased risk posed by the increase in heavy vehicle numbers using the intersection. These are in order of preference:

- Installation of a vehicle warning system using Intelligent Transport Systems (ITS) and modification to the intersection layout to allow faster turning movements for heavy vehicles turning left onto the Stuart Hwy (see SK003)
- Installation of a 550m long acceleration lane which allows A-triples to re-enter the traffic stream at 70km/h
- Installation of a 1500m long full length acceleration lane as specified within Table 5.6 of Austroads Guide to Road Design Part 4a (2010), which allows A-triples to re-enter the traffic stream at 90km/h

Installation of a variable message sign which is activated by the heavy vehicle management system on approach to the intersection will provide a warning to the presence of heavy vehicles to all drivers approaching the intersection on the Stuart Highway from the north. The sign would only be illuminated when heavy vehicles were approaching the intersection to make a left turn onto the Stuart



Hwy which provides maximum affect as opposed to installation of standard signage. Modification of the left turn from the intersection is also recommended to allow the triples to make the turning movement without stopping if traffic allows (see SK003).

Introduction of an acceleration lane for the left turn movement onto the Stuart Highway will allow heavy vehicles to enter the traffic stream at a higher speed than is possible with the current layout. This type of treatment will not however meet the minimum standards recommended within Austroads regardless of length of acceleration lane. In other words it is desirable that vehicles re-enter the traffic stream at a speed of no less than 20km/h below the free mean speed, however in this instance this is not possible as the speed limit through this section of road is 130km/h and the A-triples operated by Qube for the mine are speed limited to 90km/h. This means that excessive slowing as defined within the Austroads code will occur on occasions regardless of intersection treatment. It should be noted that sight distances measured in all directions exceeded 500m; with the distance measured only being limited by the limits of the laser measuring tool. The through leg of the Stuart Highway is straight for as far as the eye can see meaning that all vehicles will have significant time available to make decisions relating to slowing or overtaking manoeuvres at this location.

While adoption of any of the recommended options will not completely remove the risks associated with heavy vehicle / light vehicle interaction they all significantly reduce risks associated with this. Given the significant cost associated with installation of either acceleration lane option, the treatment involving minor intersection modifications combined with ITS offers the greatest value in terms of benefit to cost.

6.5.2 Lucy Creek Access Road – Plenty Highway

The intersection of Lucy Creek Access Road with the Plenty Highway is inherent with multiple defects. Sight distances from the Lucy Creek leg are approximately 280m to the west and 500m to the east meaning improvements are recommended to the west of the intersection. The intersection and associated roadway are also lower than the existing surrounding natural surface meaning that the road there is no clearly defined stormwater egress paths and therefore is prone to flooding. Additionally, the approach to the intersection includes poor sight distances through the crest at the eastern bank of the Bonya Creek floodway followed by a sharp horizontal curve with estimated radius of 120m. The horizontal curve is grossly sub-standard and badly corrugated.

An intersection upgrade to a standard T type intersection with geometry based on the swept path movements including sealing all legs is proposed as detailed within SK004. Further to this it is proposed to move the intersection 25m further to the east to make use of the higher ground, therefore removing the requirement to win / import large quantities of fill material that would be needed if the road were to remain on the existing alignment.



6.5.3 Mine Access – Lucy Creek Access Road

The existing intersection is a Y type junction located on a sweeping horizontal curve. The Lucy Creek leg of the intersection is located on a tight horizontal curve estimated to be less than 80m radius which is grossly sub-standard for the 110km/h speed environment. Relocation and formalisation of the intersection with geometry based on A triple movements is recommended as detailed within the proposed layout plan SK005 (below).

6.5.4 Camp Access – Lucy Creek Access Road

A new intersection (see Figure SK005A) providing access to the accommodation camp is proposed approximately 1.92km south of the existing site access (see Figure SK005). The proposed intersection is a standard T junction with geometry based on Class 4 service vehicle as the design vehicle.

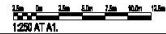


KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC



GOOGLE EARTH "Image © 2019 Digital Globe"
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STUART HIGHWAY / PLENTY HIGHWAY INTERSECTION

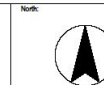


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Associated Consultant: Designed: Drawn: Verified: Approved: RPEQ: Date:



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48-50 SMITH ST
DARWIN NT 0800
PO BOX 4617, DARWIN NT 0801



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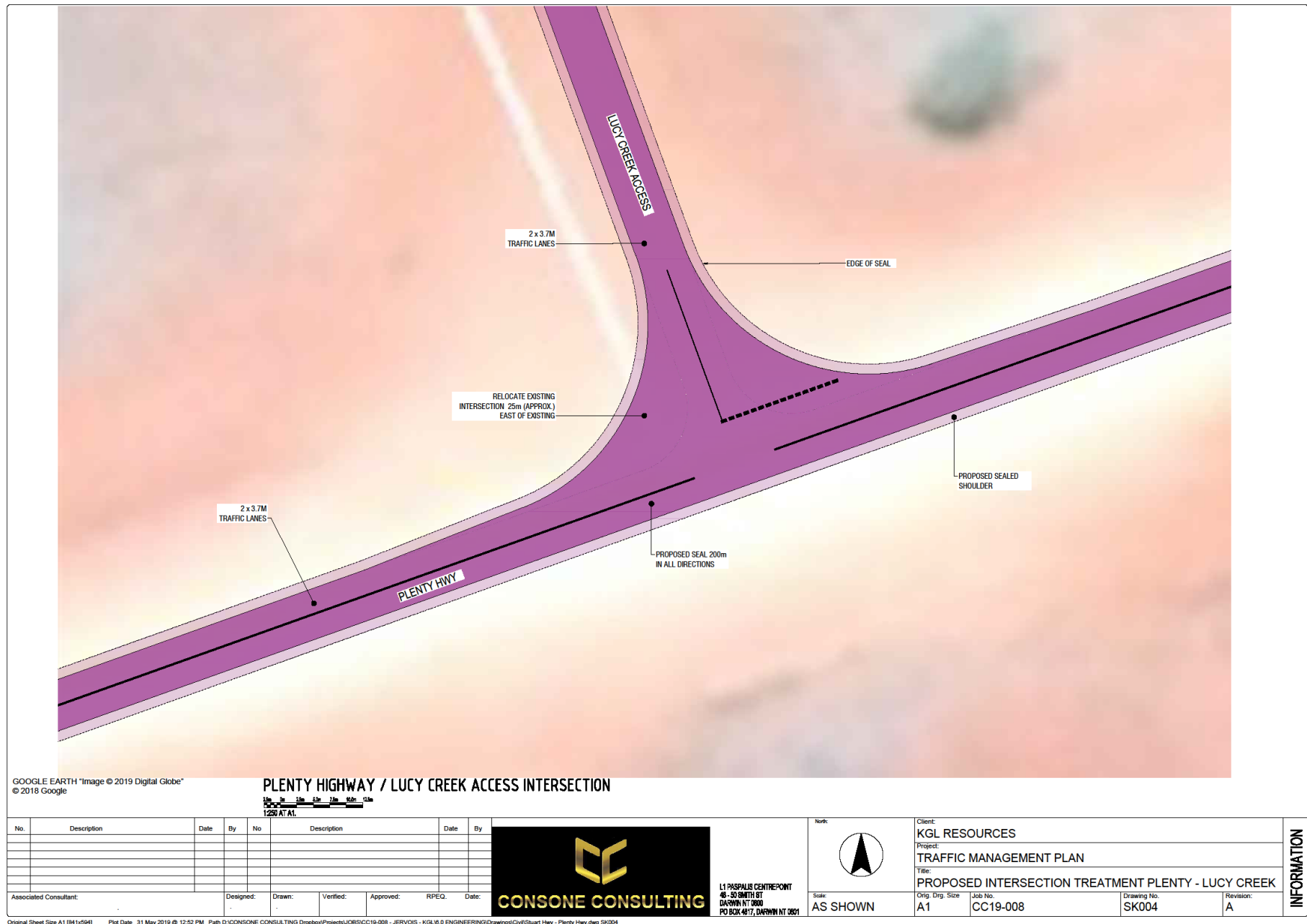
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Project:	TRAFFIC MANAGEMENT PLAN
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Drawing No.	SK003
Revision:	A

INFORMATION

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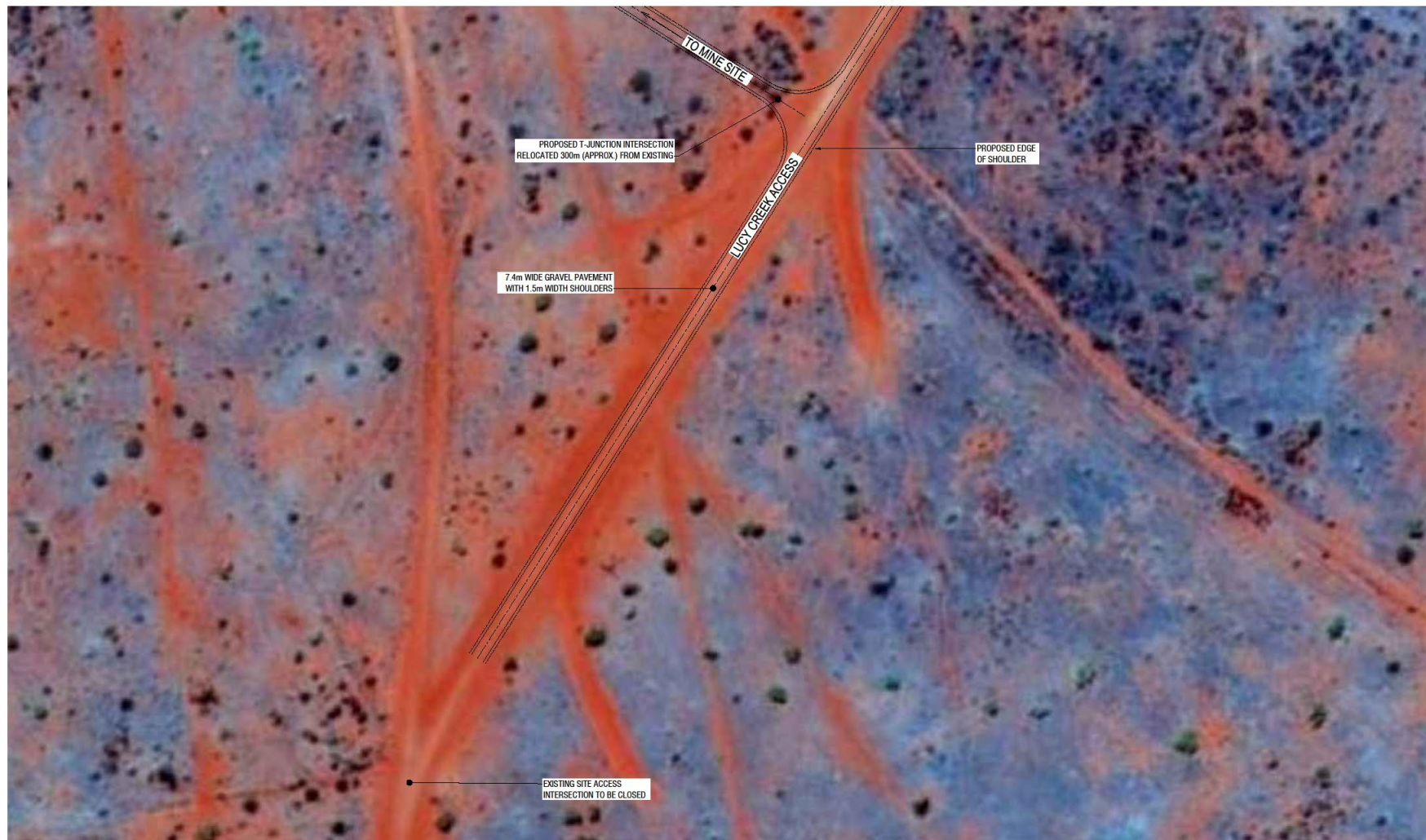


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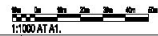


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LUCY CREEK ACCESS / MINE ACCESS INTERSECTION



No.	Description	Date	By	No.	Description	Date	By

Associated Consultant: Designed: Drawn: Verified: Approved: RPEQ: Date:



L1 PASPAUL CENTREPOINT
46 - 50 SMITH ST
DARWIN NT 0800
PO BOX 4877, DARWIN NT 0801

North:



Client:
KGL RESOURCES

Project:
TRAFFIC MANAGEMENT PLAN

Title:
PROPOSED INTERSECTION TREATMENT LUCY CK - MINE ACCESS

Scale:
AS SHOWN

Orig. Dwg. Size
A1

Job No.
CC19-008

Drawing No.
SK005

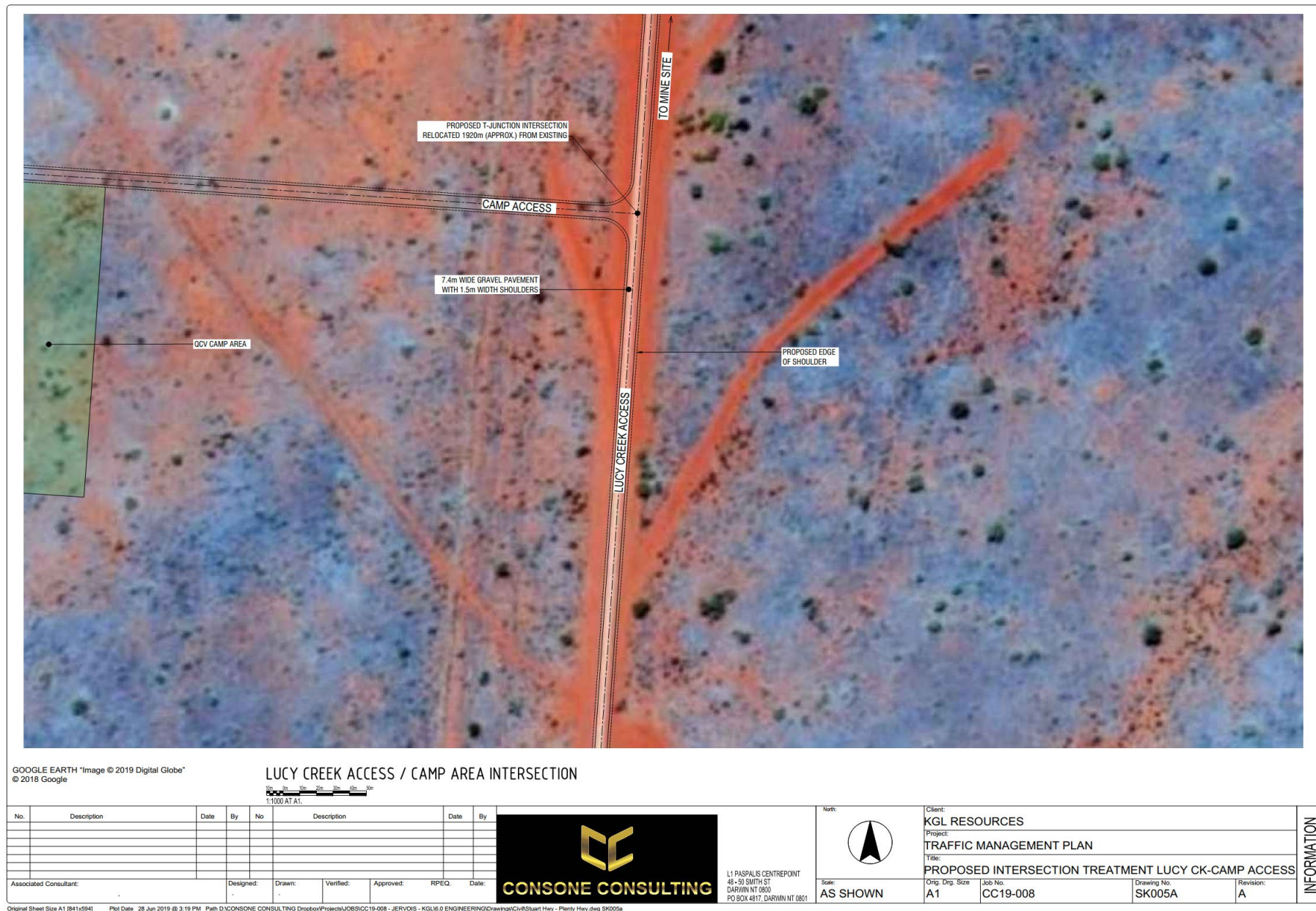
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INFORMATION

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6.5.5 Minor Intersections

There are a significant number of minor intersections along the alignment. These have been assessed for sight distance as part of the RSA undertaken. The following table outlines a summary of these investigations.

Table 10 – Intersection Sight Distances – Plenty Highway (major leg)

Intersection	Chainage	Sight Distances Measured	Sight Distance Requirements (Normal Design Domain)
Sandover Highway	0.00	>400m in all directions	
Bushy Park Station	45.32	280m west, 330m east	
Gem Tree Park	69.77	270m west 330m east	SISD >= 324m (car), 271m (truck) MGSD >= 181m LHT
Delmore Downs	84.01	>500m in all directions	
Jindalee	94.05	>500m in all directions	
Track to Bones bore	97.91	>500m in all directions	
Mt Riddock	117.41	>500m in all directions	
Harts Range	141.75	>400m in all directions	



Intersection	Chainage	Sight Distances Measured	Sight Distance Requirements (Normal Design Domain)
Harts Range Racecourse	143.42	>400m in all directions	
Harts Range Police Station	144.90	>400m east and west	
Atitjere Community Access	146.07	>400m east and west	
Bins Track	161.16	>400m in all directions	
Mt Eaglebeak	174.29	170m west 400m east	SISD >= 324m (car), 271m (truck) MGSD >= 181m LHT
Cattle yards	177.80	>400m east and west	
Camp site	185.30	>500m east and west	
Camp site	185.80	>500m east and west	
Indiana	192.24	>500m in all directions	
Huckitta Station	200.90	Not assessed as total reconfiguration of the intersection	



Intersection	Chainage	Sight Distances Measured	Sight Distance Requirements (Normal Design Domain)
		layout is recommended	
Blackbird Bore	208.90	>400m east and west	
Jinka	228.86	<300m east <200m minor leg (estimated)	SISD >= 324m (car), 271m (truck) MGSD >= 181m LHT
Pastoral Access	248.51	>400m east and west	
Jervois Station	278.08	210m west 390m east	SISD >= 324m (car), 271m (truck) MGSD >= 181m LHT

6.6 Recommended Upgrades

Upgrades to minor intersections are recommended as follows:

- Relocation of the Gem Tree Park intersection 30m east combined with lowering of the crest curve immediately west of the intersection
- Jinka Intersection - Realign the minor leg of the intersection to form a T junction with the Plenty Highway which meets sight distance requirements under the normal design domain
- Mt Eaglebeak Intersection – Realign road to provide minimum sight distances
- Jervois Intersection - Lower vertical crest to the west of the intersection.



7 SUPPLEMENTRY INFORMATION – RISK ASSESSMENT

7.1 Risk Assessment Workshop

As part of the development of the traffic Management Plan for the project a detailed risk assessment workshop was held to identify risk associated with traffic and measures to be developed to mitigate risk to KGL personnel, contractors and the public. The risk assessment workshop was held in Brisbane with representatives from the following organisations:

- KGL Resources
- Balance Advisory
- Qube transportation company
- Consone Consulting

At this workshop comments received in response to the EIS from stakeholders was tabled and in addition any additional concerns that were raised by stakeholders through the consultation process. The key attendees at the workshop were Qube representatives who are the nominated preferred transportation company for transportation of product from the site to the rail head in Alice Springs. KGL are currently negotiating with various suppliers for other aspects of transportation for the development and operation of the mine including the following:

- Transportation of fuel supply (diesel - 14 double road trains per week during construction and 16 per week during operations)
- Transportation of construction materials (Consumables – 6 Double Road trains per day)
- Transportation of operational consumables (2 Double road trains per day)
- Internal bus service from village, Bonya and Harts Range
- Transportation of product (6 triple road trains per day)

During the workshop Qube provided a presentation outlining company operational procedures and typical equipment utilised on a project of this nature (A similar presentation has now been made to stakeholders in Alice Springs and Darwin). This presentation provided an outline of the following:

- Internal systems and procedures to manage driver fatigue
- Internal management systems and on-board equipment to assist drivers to operate in a safe and best practice manner
- Zero tolerance policies for illicit drugs and alcohol and mobile phone use
- Development of Journey Management Plans for all routes used by Qube nationally
- On board camera's (6) for monitoring of vehicle operation, other road users and Qube operator
- Proposed transportation vehicle and mine to ship containerised system for transport of product
- Infra-red on-board system to identify line of site of animals, pedestrians and other road users especially at night time



- Driver safety workshops that Qube typically make in the community such as indigenous communities and at caravan parks and road stops to educate other drivers safe procedures to operate around road trains

The procedures and operations Qube utilise are outlined further in the Traffic Management Plan Section and in the Appendices. These procedures and systems are an integral part of the proposed risk management and mitigation as developed in the Risk Matrix following:

Table 11 - Plenty Highway / Stuart Highway Risk Assessment

Risk		Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
01	Single Sealed Lane and Gravel Shoulders	There are several issues relating to the existing single lane seal sections including: • vehicle stability at pavement edge drops • mix of traffic i.e. interaction of heavy vehicles and caravans • loose material on road shoulders • road trains meeting road trains • overtaking and leaving the sealed lane	There is anecdotal evidence that grey nomads are typically reluctant to move off the seal to give way to heavy vehicles with some refusing to give way. There is an increased risk of accidents including off road, loss of control and overturn. This is evidenced by the concentration of reported		Education – Qube propose to undertake education seminars on communities at rest stops and caravan parks to educate the public how to interact with road trains (Similar to their successful campaign in the Pilbara) Qube internal procedures will ensure loaded vehicle leaves the seal and stops to allow oncoming loaded vehicle to pass without leaving seal (internal communications between vehicles)	KGL Consone Qube



Risk		Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
			accidents occurring at single lane sections		Programmed upgrades – KGL have highlighted issues with the single lane in both condition and the RSA. KGL to engage with NTG to review priorities and possible acceleration of widening program Review introduction of passing lanes at several locations	
02	Sight distance deficiencies	There are a number of locations where sight distance does not meet minimum requirements at crests (see Table 1)	Increased accident risk – head-on and vehicle leaving road		Provide additional signage Lower crest curves Journey management plan to restrict speed at these locations to 70km/hr for 500m in each direction. To be incorporated into all contractors contracts undertaking transportation to the mine	Consone, Qube, KGL



Risk	Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
03	Sight Distances - Intersections	A number of intersections do not meet minimum sight distances at intersections although only 2 of these are non-compliant for heavy vehicle operations (Ch. 174.29, Ch. 278.08)	Increased risk of accidents	Modify intersection if possible Include speed restrictions in JMP for all heavy vehicles	Consone, Qube, KGL
04	Significant increase to traffic volumes	Peak volumes (total vehicles) will occur during the operations phase. This is currently noted as an additional 126 vehicles per week of which 108 are heavy vehicles. This is a moderate increase of 13% to the 2017 figure of 131 AADT	Increased accident risk Accelerated pavement wear and associated increase to maintenance costs	Review possible passing lanes within each single lane section Provide truck parking bays / rest areas (1 minimum for westbound traffic) Staging vehicle operations to minimise number of vehicles on the road at any one time. Part of JMP and 24 hour operations Condition assessment (see Section 7) highlights areas of concern. Review upgrade and	DIPL, Consone, Qube



Risk	Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
				re-sheeting program in conjunction with condition assessment Increased maintenance grades from 4- to 5 per year Wet weather restrictions for transportation of product and consumables Education program	
05	Intersection layouts	Design vehicles are unable to track safely through the major intersections i.e. Plenty Hwy / Stuart Hwy and Plenty Hwy / Lucy Creek Vehicle conflict Vehicle stability Pavement failure		Intersection upgrades and review of swept paths (see SK001- SK005)	Consone, DIPL
06	Night time (after dark) operations	There are no traffic control devices (TCD's) in place to aid visibility after dark Truck operations at night through Alice i.e. noise, dust, lighting		Installation of TCD's Infra-red line of site system to be installed in Cube vehicles to alert drivers to people or animals adjacent on the road	DIPL, KG, Qube



Risk		Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
					Running new trucks, decibel ratings are considerably less than existing vehicles measured at approx. 45% reduction. No compression breaking	
07	Off let drains	There are numerous locations where off let drains encroach into the road	Launch hazards		Reconstruct offlets	DIPL
08	Road condition	There are numerous locations where the road has defects relating to cross sectional profile	Run off road and other related incidents i.e. head on crashes Road closures		Re-profile sub-standard sections Lift the road where the wearing surface is lower than natural surface Re-sheet where gravel loss is excessive and in areas of sandy/loam type gravel as a priority	DIPL, KGL, Consone
09	Clear zone defects	There are isolated locations where clear zone defects are present	Not in accordance with safe system		Remove objects as identified within Consone RSA report	KGL, DIPL



Risk	Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
		Run into objects			
10	Emergency response	The Plenty Highway does not have any connection to the normal telecommunications network. NTPFES are concerned about incidents in a remote location	Response times in an accident are not considered adequate by NTPFES	Heavy vehicles are fitted with GPS tracking and satellite communications. Emergency response procedures will be developed as part of the mine management plan. Response times will be dramatically reduced because of the additional traffic on the road and the communications systems fitted to the heavy vehicles that allow telecommunications in areas where there is currently no service except via satellite communications. KGL will have medical and fire services at the mine to improve regional response times. Airstrip to be upgraded to allow	Qube, KGL



Risk	Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
				night-time flying doctor service Qube and KGL have an emergency management plan and will incorporate with regional plan and NTPEFS. Regular update and meetings with NTPEFS	
11	Interaction with caravans	Incidents with oncoming vehicles and overtaking vehicles	Increased incidents	Education Program Radio coverage, signs on back of trucks for calling driver i.e. channel and call sign	
12	Risk to cyclist	A small number of cyclist utilise the Plenty Highway – Gem Tree Caravan Park	Collision with cyclist	Education Program Infrared on-board system in vehicles will highlight cyclist in line of sight JMP slow down when passing or approaching oncoming cyclists JMP will require driver to notify other drivers in the	Qube Consone



Risk	Description	Potential risks/hazards	Cost	Mitigation measures	Actions / further work required
				fleet of presence of cyclist	
13	Visibility due to dust	Increased incidents		Head-on, poor overtaking availability, Run-off road JMP will stipulate safe distances required if visibility is reduced Infrared on-board system to highlight to driver other vehicles, animals or cyclist	Qube, KGL

7.2 Journey Management Plan

As part of the procedures implemented by Qube it is proposed that a Journey Management Plan be prepared that covers all aspects of the route of transportation. This plan is presented to the driver via an on-board screen that informs the driver about all aspects of the route during transport. The Journey Management Plan is a working document that is updated regularly as aspects of the route change e.g. sealing of unsealed sections as they occur. All Qube vehicles are equipped with on-board satellite tracking and communications such that driver and monitoring systems know where each vehicle is at any point in time; this system then controls and records speed of vehicles. Typically, the Journey Management Plan will highlight to the driver typical aspects such as:

- Informs the driver of approaching hazards
- Provides notification to the driver of approaching intersection (such as hidden intersections)
- Notifies if poor sight distances exist
- Informs the driver of approaching crests and sub-standard horizontal curves and where considered necessary advises of restrictions – for example a speed restriction each side of an approaching crest with limited sight distance
- Informs driver of areas where stock fencing is not in place
- Informs driver of speed restriction – say where roadworks are being undertaken

An example JMP for a similar project is provided as an example of what the JMP for this project may look like This is included as Appendix B.



8 SUPPLEMENTRY INFORMATION – ROAD SAFETY

8.1 Road Safety Audit

As considerable concerns were raised by stakeholders around safety of the proposed route to road users with respect to the increased traffic volumes, KGL engaged Consone Consulting to undertake a Stage 6 Road Safety Audit in accordance with AUSTROADS Guidelines. An audit of this detail requires an accredited road safety auditor to assess the current status of the existing alignments with respect to the current AUSTROADS Guidelines and Australian Standards. An audit of this type undertakes a visual review of road with respect to road safety and performance against relevant standards. A typical audit would assess various aspects of the road and highlight deficiencies and prioritise any recommended upgrades. An audit typically reviews aspects of the road(s) including but not limited to the following:

- Sight distances at intersections, horizontal curves, crests (vertical alignment) and opportunities for overtaking. An assessment is undertaken in accordance with design standard for the speed environment and design vehicle
- Delineation, line marking and signage for compliance
- Road rideability
- Chamfer of horizontal curves (superelevation)
- Horizontal curves and vertical curves for safety of road users
- Changes to road profile
- Safe system review

In addition a review of accident data was undertaken to review possible black spots and reoccurring incidents. Historical and future traffic counts and vehicle types were also assessed taking into account the future traffic that will be generated by the proposed Jervois mine.

8.2 RSA Findings

The audit findings were consistent with what would be expected on roads of this nature in the Northern Territory. In general, the road was considered to be relatively safe to road users with the following observations:

- Sight Distances are more than adequate for most intersections (with a small number of exceptions at main intersections)
- Generally roads are relatively flat with adequate sight distances along both horizontal curves and vertical curves (with a small number of exceptions)
- There is generally adequate opportunities for overtaking though issues exist in the single seal sections
- The clear zone is wide and mostly defect free and considered very good for a road of this nature and classification



- Sealed double lane sections are in good conditions and reported few minor defects

A list of defects and observations has been prepared as part of the RSA and an extract of these is included in Table 12 following (A full copy of the RSA Report is included in Appendix D).



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Table 12 – RSA Findings and Recommendations – Plenty Highway

Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
01	5.00	Floodway line marking faded	Reinstate line marking	Serious	Improbable	Medium
02	5.62	Narrowing of two-lane road to 3.8m. Treatment is not in compliance with AS1742.2	Modify treatment to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
03	9.85	Guide post missing	Install guide post	Serious	Improbable	Medium
04	12.70 – 21.54	Edge of seal frayed, drop off to shoulders. Loose material on shoulders	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
05	16.76	Guide post missing	Install guide post	Serious	Improbable	Medium
06	17.60 – 18.20	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
07	19.30 – 19.60	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
08	19.70	Guide post missing	Install guide post	Serious	Improbable	Medium
09		No floodway marker	Install depth marker	Serious	Improbable	Medium
10	21.40	End of single lane, 2 lanes approach to railway	Modify treatment on approach and departure to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
11	23.96, 25.40, 27.60, 29.59, 32.50, 33.40, 34.40, 35.80, 37.70	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium
12	24.95	Guide post missing	Install guide post	Serious	Improbable	Medium



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Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
13	28.00	Guide post missing	Install guide post	Serious	Improbable	Medium
14	31.56	Edge failing in 3 locations including significant drop off	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
15	34.59	No signage at floodway	Install signage and depth markers in accordance with AS1742.2	Serious	Improbable	Medium
16	35.54	Guide post missing	Install guide post	Serious	Improbable	Medium
17	35.80	No floodway marker	Install depth marker	Serious	Improbable	Medium
18	37.75	Floodway no depth marker (deep floodway)	Install depth marker	Serious	Improbable	Medium
19	38.10 – 38.90	Large edge drop – 80mm (62 approx)	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
20	38.95km	Road widened to 7.2m. No line marking, signage or guide posts have been installed to widening or narrowing sections	Install line marking, signs and guide posts to widening and provide narrowing treatments to comply with Figure 1	Serious	Improbable	Medium
21	39.40, 41.50, 42.10, 43.50, 44.10, 45.00, 45.40	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium
22	45.32	Intersection Bushy Park Station LHS. Sight distance 330m East, 280m West	Lower crest to improve sight distances	Serious	Occasional	High
23	45.70	Narrowing of two-lane road to 4m, no signage provided. Broken lane line is installed to crest.	Modify treatment to comply with Figure 1 and AS1742.2. Provide barrier line marking	Serious	Improbable	Medium
24	69.75	Defective DIP sign	Install new sign	Serious	Improbable	Medium
25	69.77	Gem Tree Park Entry. Sight Distance 270m west, 330m east	Consider moving intersection 30m east	Serious	Occasional	High



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Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
26	71.70 – 72.60	Large drop off from seal to shoulder	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
27	73.00 – 75.00	Section of large drop off from the seal to shoulder	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
28	76.80	Edge on right hand batter failing	Undertake typical edge treatment to right hand side	Serious	Occasional	High
29	77.50	Edge drop	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
30	83.00 – 84.20	Two lanes, with narrowing treatments at start and end. No signage or line marking provided	Modify treatment to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
31	83.85, 89.25, 89.70, 90.40, 90.80, 91.30, 92.10, 93.00, 93.40	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium
32	94.00 – 95.00	Guide posts missing	Install guide posts	Serious	Improbable	Medium
33	96.35	Non frangible sign in clear zone	Move sign or provide frangible sign supports	Serious	Improbable	Medium
34	96.60	2 lane x 3m, 0.5m sealed shoulders. Narrowing treatment is mostly in compliance with standard treatment. W4-11 sign is used where a divided road changes to an undivided road not where a single lane road changes to a two-lane road. Whilst this is not in compliance with	Install guide posts and extend line marking in compliance with Figure 1.	Serious	Improbable	Medium



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Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
		Australian Standards we don't believe this to be unsafe				
35	101.03	Culvert with headwall proud	Lower headwall	Serious	Improbable	Medium
36	108.80	Non-frangible sign in clearzone	Move sign or provide frangible sign supports	Serious	Improbable	Medium
37	120.87	Floodway sign facing wrong direction	Place correctly	Serious	Improbable	Medium
38	131.45	Floodway – two signs too close	Move signs	Serious	Improbable	Medium
39	141.57	Two signs too close together	Move Signs	Serious	Improbable	Medium
40	141.75	HRM Intersection – material loose and poses a skid hazard, line marking faded	Sweep loose material, reinstate line marking	Serious	Improbable	Medium
41	146.07	Harts Range Access Intersection, line marking faded	Reinstate line marking	Serious	Improbable	Medium
42	147.60	Floodway – no stormwater tail-out likely to cause ponding	Provide outlet drain	Serious	Improbable	Medium
43	148.90	Tree in clear zone	Remove tree	Serious	Improbable	Medium
44	156.73	Tree in clear zone	Remove tree	Serious	Improbable	Medium
45	161.00	Tree in clear zone	Remove tree	Serious	Improbable	Medium
46	167.35	Sealed section approaching truck parking bay, line marking faded	Reinstate line marking	Serious	Improbable	Medium
47	169.22	Tree in clear zone	Remove tree	Serious	Improbable	Medium
48	170.60	RH curve – limited sight distance – realign road	Realign road and/or remove vegetation to inside of curve	Serious	Improbable	Medium
49	171.80	Dip in road – no outlet formed	Provide tail out and signage	Serious	Improbable	Medium
50	172.40 – 172.70	Sealed floodway – washouts on approach	Regrade section on approaches	Serious	Improbable	Medium
51	174.29	Mt Eaglebeak Community intersection, no signage, sight distances 170m west – 400m west	Realign road to provide minimum sight distances	Serious	Occasional	High



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Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
52	180.69	Dead tree in clear zone	Remove tree	Serious	Improbable	Medium
53	180.01 – 186.60	Offlet drains and blocks drain uphill and in most cases are in the wrong direction. Road is significantly lower than surrounding terrain. Area will be subject to inundation	Raise road and construct tail out drain to grade away from road	Serious	Improbable	Medium
54	188.08	Tree in clear zone	Remove tree	Serious	Improbable	Medium
55	189.20	Tree in clear zone	Remove tree	Serious	Improbable	Medium
56	191.50 – 194.00	Road profile lower than surrounding terrain, offlet drains run uphill and in the wrong direction. Ponding and road failure likely	Raise road cross section and construct tail out drains correctly to drain away from the road	Serious	Improbable	Medium
57	195.55	Floodway – no signage	Install signage in accordance with AS1742.2	Serious	Improbable	Medium
58	200.90	Entry to Huckitta Station – Confusing intersection layout	Realign as T junction	Serious	Improbable	Medium
59	209.07	Tree in clear zone	Remove tree	Serious	Improbable	Medium
60	211.08	Floodway – with ponding and no tail-out	Provide tail-out to floodway	Serious	Improbable	Medium
61	218.16	Floodway sign damaged	Replace sign	Serious	Improbable	Medium
62	223.14	Tree in clear zone	Remove tree	Serious	Improbable	Medium
63	228.86	Intersection (Jinka turn off) – poor sight distance	Realign road and/or lower crest	Serious	Improbable	Medium
64	229.09	Crest – Sight distances 115m west – 220m east	Lower crest	Serious	Occasional	High
65	240.08	Crest – Sight distances poor	Lower Crest	Serious	Occasional	High
66	240.74	Floodway – no tail out	Construct tail out	Serious	Improbable	Medium
67	247.50	Tree in clear zone	Remove tree	Serious	Improbable	Medium
68	250.79	Floodway – poor drainage	Construct tail out	Serious	Improbable	Medium
69	243.00 – 245.00	Long straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue	Serious	Improbable	Medium



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Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
70	257.43km – 271.6km	Long straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue	Serious	Improbable	Medium
71	268.25	Tree in clear zone	Remove tree	Serious	Improbable	Medium
72	272.10	Tight curve with adverse superelevation	Reprofile road to provide appropriate superelevation	Serious	Improbable	Medium
73	273.08	Plenty River floodway – floodway sign damaged	Replace sign	Serious	Improbable	Medium
74	273.20	Crest – poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
75	273.60	Tree in clear zone	Remove tree	Serious	Improbable	Medium
76	273.95	Crest – poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
77	277.92	Crest, poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
78	278.08	Intersection Jervois Station – Sight distance 210m west – 390m east	Lower approach crest to improve sight distance	Serious	Occasional	High
79	285.03	Crest – poor sight distance	Lower approach crest to improve sight distance	Serious	Occasional	High
80	295.44	Very poor sight distance leaving floodway crest. Tight right-hand curve follows crest	Realignment required in conjunction with improving sight distances at Lucy Creek turn-off	Serious	Occasional	High
81	295.77	PRP Lucy Creek Station Access, sight distances 500m east – 280m west.	Realignment of intersection required in conjunction with Bonya creek floodway	Serious	Occasional	High



8.3 Recommendations

Recommendations from the audit are for KGL, Qube and DIPL to review the list of audit findings with priorities to be implemented according to rating to improve the safety of the route. The audit findings are of significant importance in the development of the Journey Management Plan. With funding and budgetary constraints any upgrade works and implementation of remediation works is likely to be undertaken over time with a number of items being considered part of the cyclic maintenance of the Plenty Highway and Lucy Creek Road.

It is recommended that in preparation of the Journey Management Plan by Qube (and the proposed generic JMP to be developed as part of the final Traffic Management Plan for all staff and contractors by KGL) that the RSA findings be reviewed and where possible managed within the plan. For example in the locations where sight distances are an issue at intersections, crests and horizontal curves the JMP will place restrictions on speed of vehicles. These locations are listed in the Traffic Management Plan.

An ultimate review of proposed upgrade works will involve a review of all aspects of this report to prioritise any proposed works. This includes issues raised in the road condition assessment, risk assessment, maintenance regime and findings of the RSA. Thus, developing within the TMP a priority of proposed upgrades, procedures, policies, management practices that ensure best practice and maximise safety to all users.

Key aspects raised by the RSA that are considered urgent works (high priority) are listed following:

- As a priority install relatively cost effective measures such as signage – especially at crests
- Upgrade to the Lucy Creek Access - Plenty Highway Intersection
- Upgrade to the Mine Access and Lucy Creek Access Road intersection
- Investigate with DIPL opportunities to accelerate re-sheeting program with a focus on areas where pavement has failed and areas where the sandy/loam gravel sections exists
- Investigate options with DIPL to accelerate the program of widening of single seal sections
- Investigate options with all Governments to accelerate the Outback Way Program
- Implement speed restrictions at curves and crest as nominated in the JMP
- Consider additional lowering of crest and modification of intersections over time
- Increase cyclic ongoing maintenance grading and maintenance to edge of seal and shoulders in the single seal sections



9 SUPPLEMENTARY INFORMATION – ROAD CONDITION AND MAINTENANCE

9.1 Condition Assessment

The condition of the road alignment and along the proposed transport route was assessed at a high level when the site inspection for the Stage 6 Road Safety Audit was undertaken. The route can loosely be categorised into various different sections, these being as follows:

9.1.1 National Highway

The road alignment from the GWA Railyard in Alice Springs along the Stuart Highway to the Plenty Highway is essentially a National Highway and is considered to be in good condition (sections on the outskirts of Alice Springs are currently being upgraded to dual carriageway).

9.1.2 Dual Lane Sealed Road – Plenty Highway

There are number of sections of the Plenty Highway that have been constructed as a dual lane sealed road with sealed shoulders. These sections are considered to be in good condition and suitable for all proposed traffic.



Photo 1 – Dual Lane Profile Plenty Highway

9.1.3 Single Lane Seal Upgraded to Dual Lane

Over recent years the NT Government has been undertaking an ongoing upgrade of sections of the Plenty Highway that were originally single sealed lane with gravel shoulders. In the areas where the single lane has been widened the road is considered in good condition with a very good join between the single lane and the new widening.



Photo 2 - Widened Single seal to Double Seal

9.1.4 Single Lane Seal with Gravel Shoulders

A number of sections of the Plenty Highway remain as a single seal lane with gravel shoulders. These sections have been highlighted in the RSA as a risk to road safety (Refer Section 8). With respect to the single seal lane there are a number of issues inherent with the current road condition. These include:

- The seal along the alignment is wearing and losing stone in the seal due to fretting, this is particularly pertinent in areas on the outside of horizontal curves
- In a number of areas there is a substantial drop from the edge of seal to the gravel shoulder. Again, these areas were raised in the road safety section as being an issue to safety. In some cases the edge of the seal is breaking away likely due to vehicles leaving the seal to allow other vehicles to either overtake or pass oncoming traffic. DIPL are fully aware of the issue and have a maintenance regime in place whereby the edge of the seal is patched with a small section (approx. 300mm) of hot-mix widening to the seal to provide a smooth transition from the seal to the gravel shoulder. DIPL maintenance crews regularly inspect the alignment and this type of maintenance is carried out when the “intervention point” is reached (the drop from the seal to shoulder reaches 100mm OR the edge of seal is significantly fretted or breaking away)
- In the location where the formation changes from double seal to single the transition taper treatment required under AUSTROADS Guidelines is not in place (refer Section 8 Road Safety)
- The overall condition of the seal apart from the edges is generally in good condition and suitable for widening in a similar manner to the upgrades that have been undertaken to widen the single lane seal previously



Photo 3 - Single Lane Seal and Gravel Shoulders

9.1.5 Formed Road with Gravel Pavement

A large percentage of the Plenty Highway is a locally formed formation with gravel pavement overlay. Most of these areas are considered to be in good condition for a road of this nature. There are small sections that have minor condition issues and these have been highlighted in the RSA. Typical issues include the following:

- Lack of delineation with little or no guide posts. Given the extensive clear zone in these sections this is not considered a major issue
- In some cases maintenance grades have been undertaken and the windrow from the grade has blocked off-let drains. This may lead to drainage issues in periods of inclement weather
- A small number of floodway's do not drain adequately – this over time will cause local failures of the wearing coarse
- Sections of the gravel formed roads are generally considered in good condition and with regular maintenance and ongoing re-sheeting program are suitable for the proposed traffic load
- In a number of locations table drain off-let drains do not daylight – (In many cases drains actually appear to drain uphill. This will be an issue for inundation of pavement during inclement weather).



Photo 4 - Gravel Pavement

9.1.6 Formed Road Sandy/Loam Gravel

A number of sections of the Plenty Highway and the Lucy Creek Road are a rural formation that has been formed with local sandy / loam material as pavement. Whilst these sections are performing relatively well they are likely to be an issue in the future with increased traffic load, especially during wet weather. Issues with these sections include the following:

- With ongoing dry grade maintenance grades the vertical level of carriageway formation has lowered over time to the extent that a number of areas are significantly lower than the surround terrain. In the very flat sections this causes an issue with drainage as the pavement will not drain and be subject to inundation and possible pavement failure. Even with appropriate drainage these sections will incur damage from heavy vehicles during wet weather
- The pavement material is considered relatively poor and does not appear to bind well in the surface

These sections are considered to be a priority for upgrade and maintenance and this is confirmed with DIPL.



Photo 5 - Sandy/Loam Gravel Pavement (Low Profile)

9.1.7 Condition Sections by Chainage

The following table lists the relevant sections of the proposed transport route by chainage and high level condition assessment.

Table 13 – Condition Assessment

Carriageway	Chainage From (km)	Chainage To (km)	Length	Formation	Condition / Suitability
Stuart Highway				National Highway	Good
Plenty Highway	0.0 km	5.3 km	5.3km	Dual Lane Seal (Single Lane upgrade)	Good
Plenty Highway	5.3 km	21.4 km	16.1km	Single Lane Seal	Poor-Ave
Plenty Highway	21.4 km	21. 81km	0.41km	Dual Lane Seal (Railway Crossing)	Good
Plenty Highway	21.81 km	40.00 km	18.19km	Single Lane Seal	Poor-Ave



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

Carriageway	Chainage From (km)	Chainage To (km)	Length	Formation	Condition / Suitability
Plenty Highway	40.00 km	51.54 km	11.54km	Dual Lane (Single Lane Upgrade)	Good
Plenty Highway	51.54 km	96.87 km	45.33km	Formed Gravel Pavement	Fair-Good
Plenty Highway	96.87 km	146.15 km	49.28km	Dual Lane	Good
Plenty Highway	146.15 km	161.25 km	15.1km	Formed Gravel Pavement	Good
Plenty Highway	161.25 km	167.11 km	5.86km	Formed Sandy/Loam Gravel	Poor - Average
Plenty Highway	167.11 km	167.99 km	0.88km	Dual Lane (Truck Stop)	Good
Plenty Highway	167.99 km	201.30 km	33.31km	Formed Sandy/Loam Gravel	Poor - Ave
Plenty Highway	201.30km	204.5 km	3.2km	Formed Sandy Loam Gravel	Poor
Plenty Highway	204.50 km	210.00 km	5.5km	Formed Sandy Loam Gravel	Poor – Ave
Plenty Highway	210.00 km	262.00 Km	52.0km	Formed Sandy Loam Gravel	Average
Plenty Highway	262.00 km	272.60 km	10.6km	Formed Sandy Loam Gravel	Poor - Ave
Plenty Highway	272.20 km	289.00 km	16.8km	Formed Sandy loam	Average
Plenty Highway	289.00 km	292.5 km	3.5km	Formed Gravel Pavement	Average
Lucy Creek Access	0.00 km	5.90 km	5.9km	Formed Sandy Loam (Insitu)	Poor



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

Carriageway	Chainage From (km)	Chainage To (km)	Length	Formation	Condition / Suitability
Lucy Creek Access	5.90 km	18.21 km	12.31km	Sandy Loam Gravel	Poor - Average

NOTE: Chainages shown are approximate only, recorded chainages have been modified to NT Government Road Log where available.



9.1.8 Road Alignment and Features

The following diagrams highlight the features of the Plenty Highway and condition sections listed previously.

Figure 5 Alignment Ch 0.0 km – Ch 51.30 km

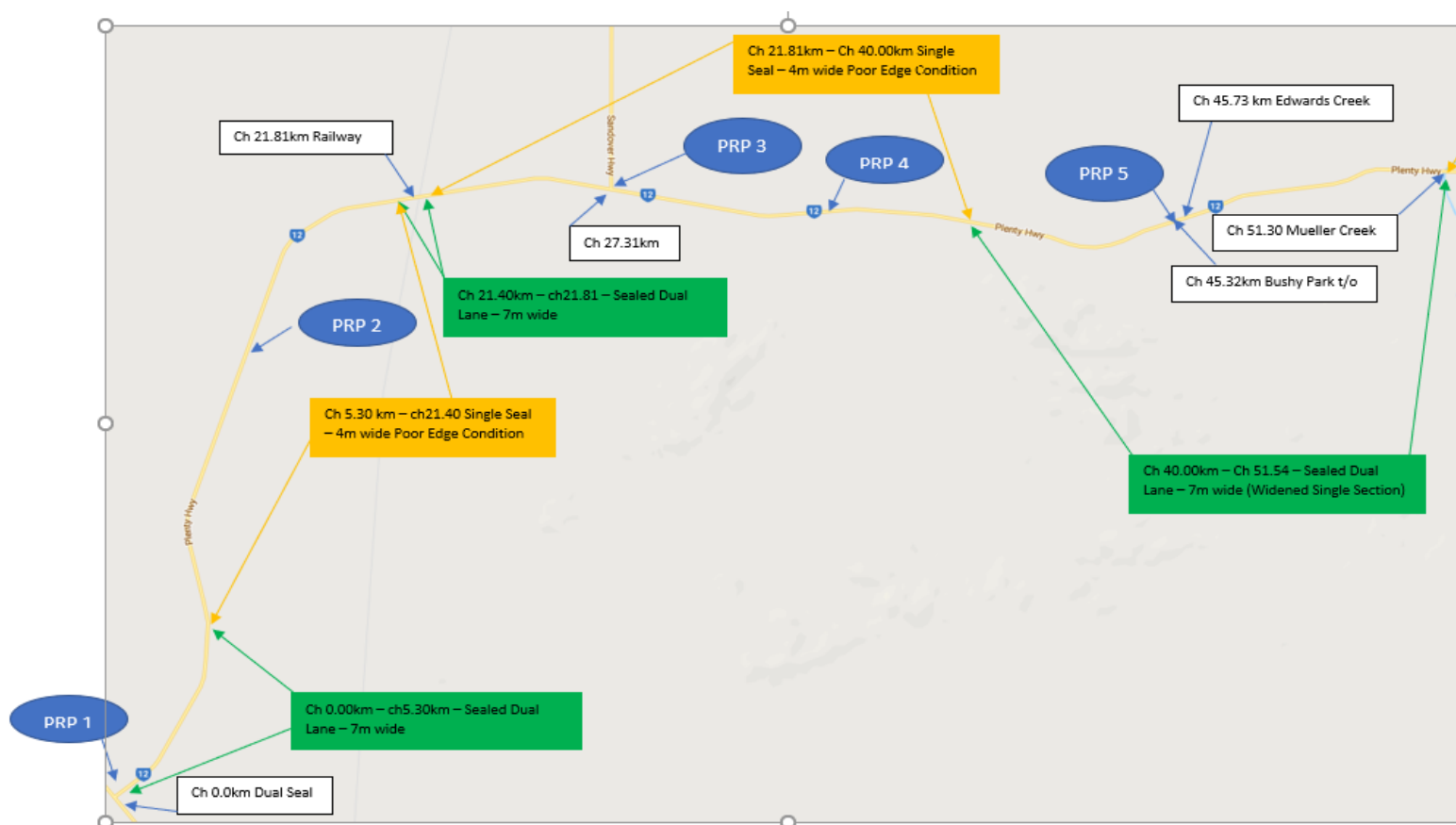




Figure 6 Alignment Ch 51.30 km – Ch 94.06 km

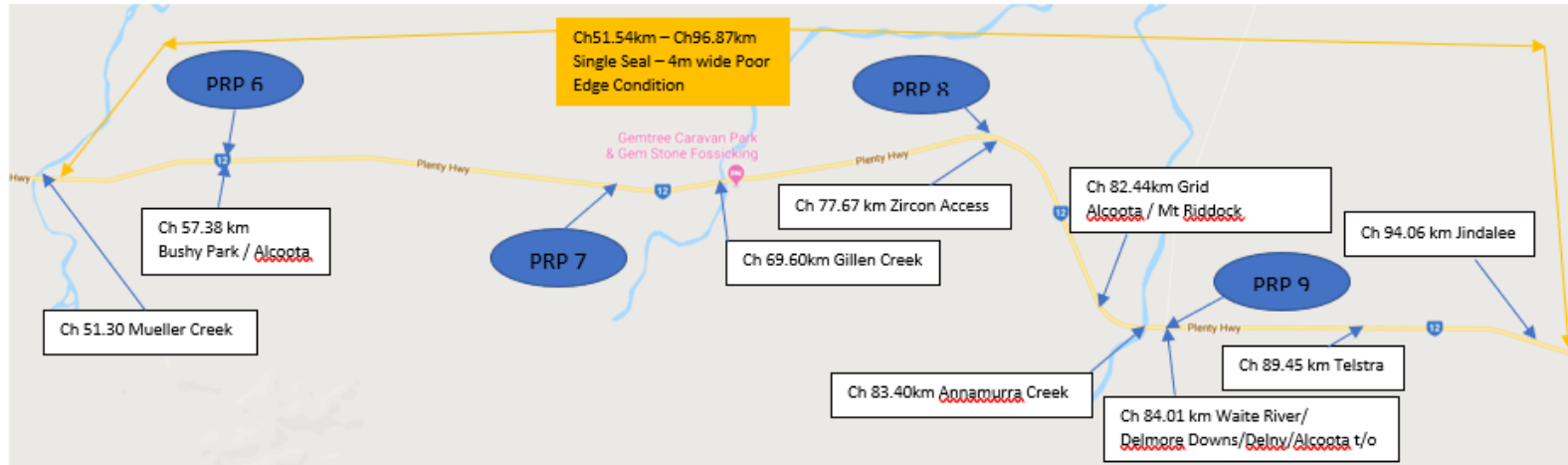


Figure 7 Alignment Ch 94.06 km – Ch 146.10 km

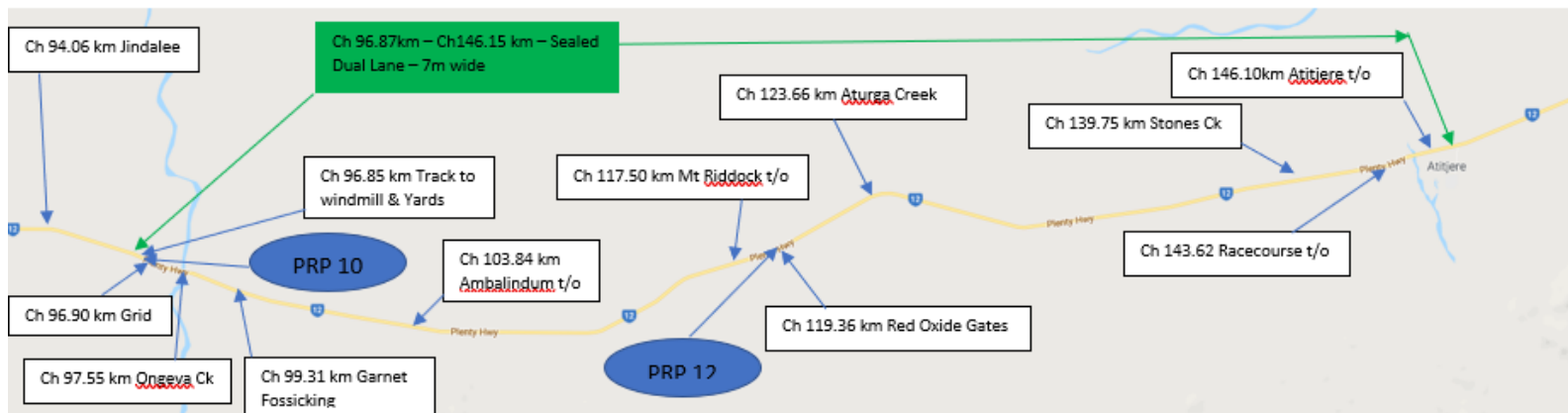




Figure 8 Alignment Ch 146.10 km – Ch 201.30 km

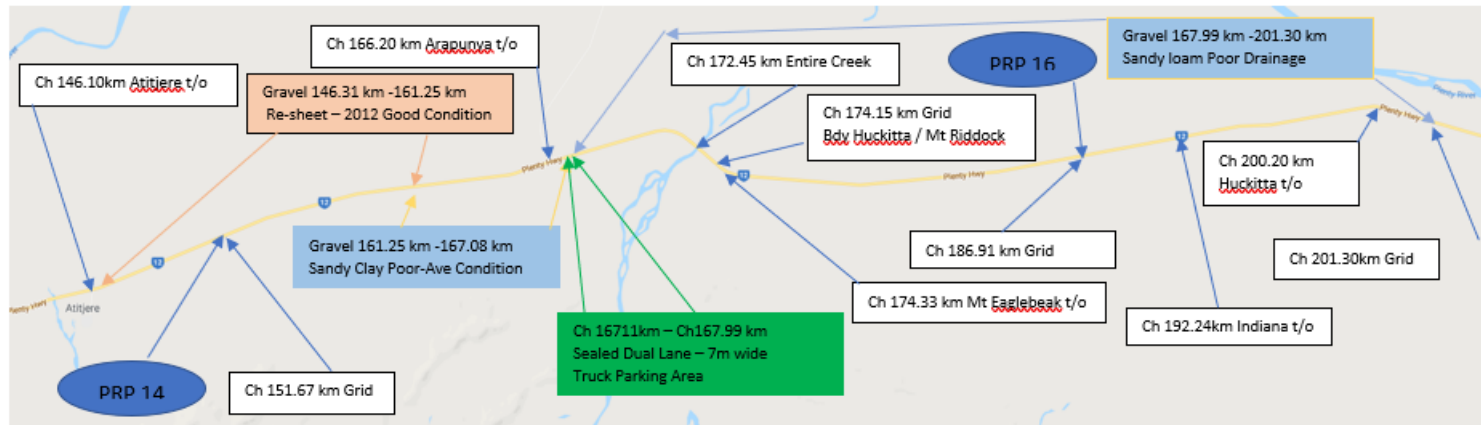
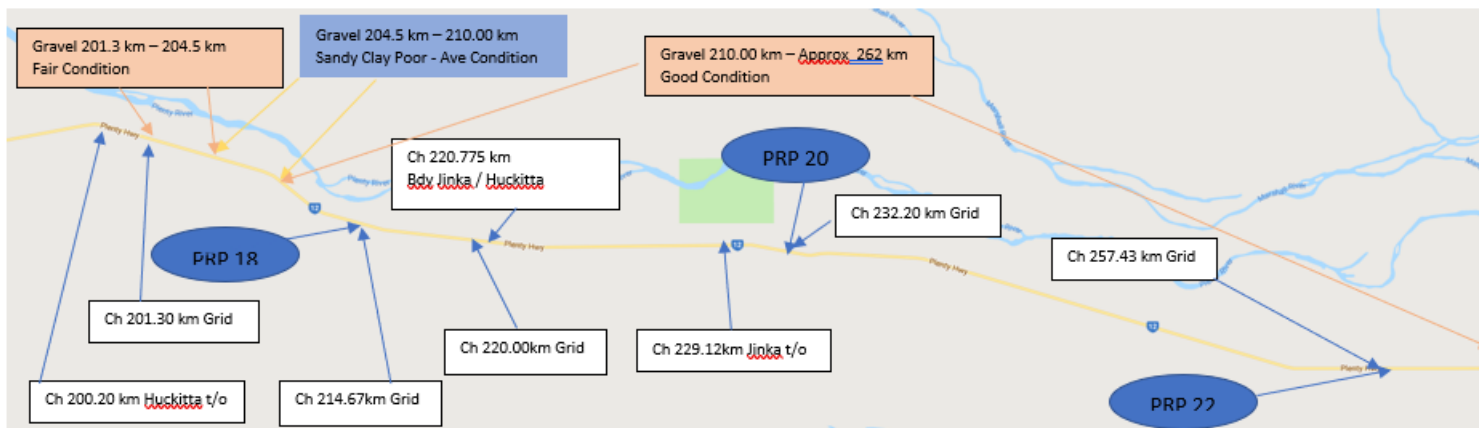


Figure 9 Alignment Ch 201.30 km – Ch 262.00 km





KGL RESOURCES JERVOIS MINE – EIS SUPPLYMENT - TRAFFIC



9.2 Current Road Maintenance Program

The current maintenance on the Plenty Highway is a cyclic maintenance program with additional maintenance carried out on a needs and case by case basis. The maintenance on the highway consists of the following:

9.2.1 Dual Lane Sections - Maintenance

Dual Carriageway sections undergo routine maintenance including:

- General pothole repair as required
- Maintenance of gravel shoulders (as and when required)
- Clear Zone maintenance

It is not anticipated that significant additional maintenance will be required to these sections as result of the increase in traffic from the proposed Jervois Mine.

9.2.2 Single Lane Sections – Maintenance

Maintenance of the single lane sections requires more effort to maintain these sections of the route. This includes the following maintenance:

- Potholing as and when required
- Patching and edge treatment to sections that have had excessive fretting of the edge, edge break and edge treatment to areas where the drop from the edge of seal to the shoulder exceeds 100mm (intervention point)
- Maintenance of the shoulder (it was noted during inspection that in certain areas the shoulder materials were loose and this presents a hazard when a vehicle has to have the outside wheels leave the road, which also leads to additional wear and tear)
- Maintenance of road furniture

We note that increase in heavy vehicles in these sections of single lane seal are likely to require additional maintenance as a result of the increase in vehicle numbers. The extent of increase to the existing maintenance regime is unclear and difficult to estimate. We do note that it is unlikely to be a direct correlation to the number of vehicles due to the following:

- Policies and procedures both Qube and KGL propose to implement. These involve management of vehicles speed, safety procedures and the use of Journey Management Plan for all vehicles
- Proposed educational program to inform other road users the benefit of safe driving principles when interacting with heavy vehicles – specifically teaching road users to leave the sealed section to heavy vehicles and reduction in speed

9.2.3 Formed Gravel Formation – Maintenance

The sections of the Plenty Highway that have a well formed and good quality gravel pavement require maintenance as follows:



- Maintenance grading (dry) of pavements on an as needs basis. Maintenance grades are undertaken when the carriageway shows the following characteristics:
 - Excessive corrugations that make the road uncomfortable to road users and reduced traction to the road surface
 - Surface material is loose and road traction is reduced as a result
 - Pavement failures specifically in wet weather
 - Road damage in excessive wet weather events
 - Pavement shows significant wear and tear
- A gravel re-sheeting program is currently undertaken on a cyclic basis. This is to both maintain the existing pavement from general wear and tear and cumulative effects of dry maintenance grades and to re-sheet areas of sandy loam gravel with an improved wearing course
- Cleaning of off-let drain
- Clearing of table drain blocks
- Maintenance of clear zone

Currently DIPL have increased the level of maintenance grading to up to four grades a year. The extent of re-sheeting varies dependant on extent of wet weather, budget and availability of gravel.

9.2.4 Sandy/Loam Gravel Pavement – Maintenance

The maintenance of the sandy loam gravel pavement is very similar to that of other gravel pavements. However, it is anticipated that these pavements will require additional maintenance in periods of wet weather. DIPL and NTPFES place restrictions on the road during these times and KGL will place additional restrictions on usage of the road as part of the Traffic Management Plan included in this supplement.

9.2.5 Road Maintenance – Budgets

The budget for road maintenance for the entire Plenty Highway varies from year to year. This is largely due to the extent of inclement weather and extreme events. DIPL have indicated that in recent years the Specific Road Maintenance budget (such as gravel re-sheeting and shoulder repairs) for the Plenty Highway varies from \$1 million – \$2 million per annum. The average budget for routine maintenance (cyclic maintenance) including grading, minor repairs and edge break / pothole repairs is \$1.5 million.

9.3 Current Upgrade Program

The proposed upgrade of the Plenty Highway is being jointly funded by the NT and QLD Governments and Federal Government. There are two primary funding arrangements / plans. The Federal Government has committed \$100Million to the program nominated as the “Outback Way”. This program is committed to the upgrade of existing gravel roads to dual lane sealed profile. The NT Government also has committed to upgrading various sections of the highway which has historically included the upgrade of the single lane sections to double lane. NTG advice as of April 2019 is that the following are the nominated priorities under the Outback Way program and NTG program. In addition there is a commitment by the NT Government to further upgrade the single lane sections (in sections of 5-10km at a time).



Programmed works (current as at April 2019) under the Outback Way are listed in the following table⁽¹⁾.

Table 14 – Proposed Plenty Highway Upgrades

Chainage	Length			Comments
	Dual Lane Seal [Km]	Single Lane Seal [Km]	Unsealed [Km]	
CH 0.000 - 5.300 Km	5.300			
CH 5.300 - 40.000 Km		34.700		
CH 40.000 - 45.900 Km	5.900			NT Gov
CH 45.900 - 51.543 Km	5.643			Nt Gov
CH 51.543 - 96.870 Km		45.327		Not Prioritised under OW
CH 96.87 - 108.87 Km	12.000			Outback Way Stage 1
CH 108.87 - 120.87 Km	12.000			Outback Way Stage 2A
CH 120.87 - 140.80 Km	19.930			NARP - linked to Outback Way
CH 140.80 - 146.150 Km	5.350			Outback Way Stage 2B
CH 146.150 - 152.075 Km			5.925	New Outback way Program
CH 152.075 - 167.110 Km			15.035	Currently Construction Tender
CH 167.110 - 209.000 Km			41.890	Later Priority OW
CH 209.00 - 224.00 Km			15	Current Design Tender
CH 224.00 - 498.89 Km (Qld/NT Border)			274.890	Later Priority OW
Total	66.123	80.027	352.740	

The sections nominated in yellow are the next stages of upgrade proposed to two lane sealed.

9.4 Recommended Future Maintenance Program

The future maintenance of all sections of road are anticipated to continue under cyclic maintenance as required to maintain the road. The most important of these will be the maintenance grading of the gravel sections of road. It is anticipated that with the increase in traffic from the Jervois Mine that additional maintenance grading will be required.

KGL have identified that the increase in maintenance will be minimised through the following:

- To restrict the use of the road network during periods of wet weather. DIPL currently will close the road when there are significant rainfall events. KGL propose to restrict any movements (other than to the Lucy Creek airstrip) of light or heavy vehicles for a minimum period after each rainfall event. Inspections of the road will be undertaken prior to the road being utilised and clearance given by PFES and DIPL prior to use of the gravel road sections
- KGL propose to restrict internal movements within the mine lease during similar periods
- Deliveries to the mine will be restricted during these periods
- KGL would like to investigate if the re-sheeting program can be accelerated with a focus on those low lying areas, and sections that are currently the sandy/loam type pavement
- It is recommended that the Lucy Creek Access Road be upgraded (as a priority the first 5-6km that are very low lying and the pavement material is considered poor). This would reduce the need for increased maintenance for these areas

Ongoing maintenance listed previously is expected to continue.



(1) NTG representative have noted that the proposed upgrades are subject to change.

9.5 Recommended Upgrade Program

9.5.1 Sealed Dual Lane Program

As listed previously the Outback Way program is an ongoing program to seal the various sections of the Plenty Highway as detailed in Table 14. Given the increase in heavy traffic from the Lucy Creek Road we recommend that KGL engage with both the NT and Federal Governments to investigate if these priorities can be modified and if there is a possibility that the sealing program be accelerated.

A focus for the seal program would be on those areas that currently are sandy/loam type gravel.

9.5.2 Upgrade of Single Seal Program

The sections of single seal are highlighted as being one of the main areas of concern around safety and is an area of increasing maintenance requirements. It is our recommendation that KGL engage with the NT Government to ascertain if the widening program can be accelerated. There is currently approximately 45km of single lane seal along the route. Consone discussed this with DIPL and at this stage no definitive program for the upgrade of the single seal has been defined.

9.5.3 Intersection Upgrades

The recommendations of this report are that specific intersections will require upgrade (as listed and detailed in Sections 6.5). The upgrades are as follows:

- Lucy Creek Access Road and Plenty Highway Intersection. From the Bonya Creek jump up to new alignment of Lucy Creek Road. Consideration should be given to sealing this section for a minimum distance of 200m on each leg of the intersection
- The Lucy Creek Access Road and Mine Site Entry Road. Upgrade to include relocation of all legs and formalise intersection movements for road trains
- The new entry to the accommodation village and appropriate intersection on Lucy Creek Access Road
- Upgrade of the Stuart Highway – Plenty Highway intersection to include a merging lane South bound on the Stuart Highway to enable road trains to turn a low speed and merge with the south bound traffic lane – This is detailed in section 6

9.5.4 Minor Road Safety Upgrades

A detailed list of road safety improvements has been listed in Section 8. These include relatively minor upgrades along the alignment to be considered by DIPL. These upgrades are prioritised specifically around road user safety and include items such as:

- Improved delineation
- Installation of signage at floodway's, crests and intersections
- Lowering of crests to improve sight distance
- Improving sight distances at minor intersections



- Installation of guide posts
- Installation of advisory signage (Specifically at those minor intersections where sight distances are sub-standard)
- Installation of standard tapers where road transitions from dual lane seal to single seal

The decision to implement these upgrades is a decision for DIPL to make after review of the RSA has been made and works programs developed

10 SUPPLEMENTARY INFORMATION – TRAFFIC MANAGEMENT PLAN DEVELOPMENT

10.1 Development of TMP

As noted in the introduction to the supplement the objectives of the Supplement to the EIS are to address all concerns raised by stakeholders in feedback from the EIS. As part of the comments received from DIPL was the request for KGL to submit a Traffic Management Plan for both the construction and operational phases of the project.

The TMP is one of suite of Management Plans that shall form an overall Mine Management Plan required to be developed and approved prior to construction of the mine. The TMP shall be a stand-alone controlled document and will incorporate in part information provided in the previous sections of this supplement and the original EIS. A draft TMP (still subject to final design) is included in the appendices. Aspects of the supplement that are included in the TMP from previous sections and the EIS includes the following:

- Project Description and Definition (Noting changes that have been developed in the overall Supplement to the EIS)
- Route Definition and Assessment
- Proposed mining Operations
- Internal Layout
- Vehicle Types and Numbers
- Safety Concerns within the Route
- Risk Mitigation
- Plant and vehicle requirements
- Traffic Generation Construction
- Traffic Generation Operations

The following sections outline additional information with respect to development of TMP including:

- Proposed Product Transport Qube
- Specific operational requirements
- Policies and procedures
- Proposed contractual requirements
- Operational restrictions
- Roles and Responsibilities
- Auditing and reporting



10.2 Worlds Best Practice Product Transportation – Qube

10.2.1 Preferred Contractor Product Transportation

KGL Resources have been in negotiations with a number of transportation companies for transportation of the 150,000 tonnes of product to the Alice Springs railhead since the EIS was lodged. After a multifaceted assessment criteria KGL have announced that the organisation Qube are the preferred supplier of transportation services for product from the site. Qube are a multi-national company operating across Australia including remote regions and are known to have world-wide best practices in transportation and safety, this being one of the reasons they have been selected by KGL to undertake the critical task of transportation of product.

Qube are the Australia's largest provider of bulk concentrates logistic solutions with extensive experience in similar projects across the country. A copy of the presentation provided to stakeholders in Alice Springs and Darwin is included in Appendix C.

10.2.2 Qube Equipment and Systems

Qube propose to utilise world best practice and systems for the Jervois project. This includes the following:

- New Triple road trains with Volvo 8x4 Prime Movers and Howard Porter “skel” trailer sets – being substantially quieter and more reliable than typical road trains in the NT
- All vehicles are equipped with In Vehicle Monitoring System (IVMS) that includes in-cab cameras, forward and rear facing cameras
- All vehicles operate forward looking infrared cameras – improving drivers ability to detect animals and other vehicles (pertinent to the proposed route with night operations and visibility due to dust)
- All vehicles are equipped with in house GPS and safety systems that are monitored 24/7 from a Fleet Monitoring Centre in Perth
- Qube are triple certified management and safety systems with online reporting and auditing
- All vehicles operate an in cab driver safety system that manages driver safety, protection, dynamic speed control and fatigue management

10.2.3 Key aspects of Qube Operational Procedures

Journey Management Plans

All Qube cyclic transport routes across Australia have a safety management system that includes a journey management plan. This plan includes a detailed assessment of the transport route specifically centred around road safety and interaction with other road users. An example of a Journey Management Plan (JMP) has been provided in Appendix B. Qube propose to develop a JMP specific to the Jervois project and this will be developed taking into account the issues raised in the Supplement; it is anticipated that the JMP will include the following:



- Details of the proposed route including those highlighted in Section 4
- Pre-start checklist for drivers in both directions
- Areas of concern for road safety as highlighted in the RSA
- Speed restriction zones including those specific to KGL personnel and contractors highlighted in Table 15
- Areas of concern with pavement wearing coarse especially in wet weather
- Emergency procedures
- Emergency Contact Details
- Procedures around dealing with oncoming traffic
- Location of all intersections and relevant point on the proposed route

Safety Policies

Qube have a number of overriding policies around road safety that KGL intend to replicate for all KGL operations relative to the operations at Jervois including:

- Zero tolerance to alcohol and drugs – Qube drivers have instant dismissal for registration with any level of alcohol within drivers bloodstream
- Instant dismissal for drivers who make hand contact with mobile phone
- Implementation of induction procedures to educate operators on all safety policies

Driver Education Seminars

Qube have had significant success previously with information and training sessions with regard to road safety and heavy vehicles. These sessions are undertaken at rest stops for caravan users in communities and schools to make people aware how to interact with road trains. Qube propose to undertake such seminars in Alice Springs, Gem Tree Park and at the communities of Bonya and Harts Range.

10.3 Specific Operational Requirements

10.3.1 Emergency Response Requirements

The NTPFES have indicated in the responses to the EIS that there are limited resources in the region to respond to emergencies along the Plenty Highway and Lucy Creek Access in a timely manner. KGL are preparing an Emergency Response Plan, this will be a formal controlled document as part of the Mine Management Plan and will cover operations other than traffic incidents such as establishment of a mine rescue team to be located in the vicinity of the administration area on the mine. Key aspects of the Emergency Response Plan are outlined following.

10.3.1.1 Emergency Response - Physical Infrastructure

As part of the Emergency Response Plan significant physical infrastructure will be developed at the mine early in the construction phase. This will include the following physical infrastructure:

- Mine Clinic – A fully equipped clinic will be established at the mine staffed by qualified paramedics, these staff will be contactable 24/7 on all days of operation of the mine. The clinic will be located at the administration area of the accommodation village.
- Ambulance building – A full equipped ambulance will be situated adjacent the clinic



- Firefighting Equipment – A fully equipped fire fighting vehicle with appropriately trained mine personnel
- Airstrip Upgrade – Either of the Bonya Community or the Lucy Creek Station airstrips is to be upgraded to enable FIFO operations from Alice Springs. As part of any upgrade the airstrips will be upgraded to enable night-time operations for the Royal Flying Doctor Service
- Mine Recovery Unit Infrastructure – Within the mine industrial area there will be an area for the storage of Emergency Mine Recovery unit equipment. This will include recovery vehicle and equipment. This will be staffed by appropriately trained mine staff.
- It will be a contractual requirement for all staff and contractors utilising the route to site to only utilise vehicles that are equipped with GPS tracking equipment, satellite communications, and first aid equipment.

10.3.1.2 Emergency Response Policies and Procedures

As part of consultation process KGL have undertaken several meetings with both the Regional Management of NTPFES and the local command at Harts Range. From these discussions an informal agreement has been reached that KGL would provide a supplement for regional emergency services through the facilities established at the mine. A specific requirement (for KGL Insurance) for KGL to provide additional emergency services to the region is that they would not provide services unless specifically requested by NTPFES. It is anticipated that a formal agreement be established with the following procedural requirements:

In the Event of Incident Reported to Police by the Public

Should an incident be reported to NTPFES by the public in the region of the Jervois mine Police may choose to contact KGL for assistance. In this event the contact for KGL will be the Mine OH&S Supervisor or in their absence the Mine Manager. Police may indicate the type and extent of assistance required and KGL would confirm availability and where appropriate mobilise personnel and equipment accordingly until such time as NTPFES can replace KGL personnel on-site. KGL may have the ability to mobilise the following (though this will need to be confirmed by KGL at the time of request – KGL do not guarantee availability)

- Ambulance and paramedic
- Mine rescue team in the event of trapped persons in vehicles
- Fire Services vehicle in the event of spilt fuel and/or fire
- Traffic control vehicles at appropriate locations to ensure other road users are aware of an incident and to prevent subsequent accidents occurring

In this event it is not anticipated that KGL will be required to contact pastoralist(s) or communities as this role will be undertaken by NTPFES.

Should medivac be required and requested by NTPFES, KGL will ensure airstrip is operational for RFDS.

In the Event of Incident being discovered or Involve KGL Personnel or Contractors

Should a traffic incident involve or be discovered by KGL staff or a KGL contractor, contact will be made with police and the Mine OH&S Supervisor (or Mine Manager should the Mine OH&S Supervisor not be



available). Mine Management will contact the Harts Range Police in the first instance and procedures as listed above will be implemented.

10.3.2 Wet Weather Restrictions

In the event of moderate level of rainfall in the region (defined by the presence of standing water) KGL contractors and staff will be restricted from using heavy vehicles on the Lucy Creek Access Road and the Plenty Highway until such time as the routes are inspected and cleared for use by either the NTPFES or DIPL. It is expected that in the case of major rainfall events this will be for an extended period of time to enable maintenance plant to undertake repairs to the roads. It is likely that roads will be closed to the public by NTG during these events.

KGL in preparing the EIS have taken this into account for estimation of production and planning for deliveries and transportation of product to Alice Springs. Construction and mining operations are estimated to occur for 47 weeks each year, with an estimated 5 weeks of the year having access to the site being restricted.

10.3.3 Vehicle Speed Restrictions

KGL resources have implemented strict guidelines with respect to road safety for personnel and contractors utilising roads as part of the operations for the mine. This applies to speed of vehicles operating both internally within the mine and operating to and from the site. Speed restrictions will form part of the traffic management plan and are introduced to improve both safety to the public and those associated with the mine.

External Speed Restrictions

Speed restrictions are to be implemented for all KGL staff and contractors, these will apply to all roads being utilised to and from the site in accordance with the following table:

Table 15 – Operating Speed Restrictions

Road Section	Speed Restrictions		
	Public Vehicle	Heavy Vehicle	Light Vehicle
Whittacker St (Rail Yard to Smith St)	50km/hr	50km/hr	50km/hr
Smith St (Whittaker St to Stuart Highway)	50km/hr	50km/hr	50km/hr
Stuart Highway (Smith St to Dixon Rd)	60km/hr	60km/hr	60km/hr
Stuart Highway (Dixon Rd to Ch. 7.0)	70km/hr	70km/hr	70km/hr
Stuart Highway (Ch. 7.0 to 10.0)	80km/hr	80km/hr	80km/hr
Stuart Highway (Ch. 10.0 to 12.0)	100km/hr	90km/hr	100km/hr
Stuart Highway (Ch. 12.0 to 30.0)	110km/hr	90km/hr	110km/hr
Stuart Highway (Ch. 30.0 to – Ch. Plenty Highway)	130km/hr	90km/hr	130km/hr
Plenty Highway Ch. 0.00 to Ch. 295.77 - Lucy Creek Access	110km/hr	90km/hr	110km/hr
Lucy Creek Access Road	110km/hr	90km/hr	90km/hr



Note: Chainage values are approximate only, to be confirmed after next site visit.

Additional restrictions to speed for KGL staff and contractors operating heavy vehicles along the Plenty Highway and the Lucy Creek Access Road are to be implemented at sections where the sight distances do not meet the required level. This occurs at certain intersections and at locations such as crests and horizontal curves. At these locations the speed will be limited to 80km/hr for 500m in both directions of the location. The nominated chainages that restriction occur are as follows:

Plenty Highway

- Ch 45.90km – Crest with poor Sight Distance
- Ch 51.30km – Crest with limited Sight Distance
- Ch 170.60km – Horizontal curve with limited Sight Distance
- Ch 174.20km – Mt Eaglebeak Intersection, insufficient Sight Distance
- Ch 229.09km – Crest with limited Sight Distance
- Ch 240.08km – Crest with limited Sight Distance
- Ch 273.20km – Crest with limited Sight Distance
- Ch 273.95km – Crest with limited Sight Distance
- Ch 277.92km – Crest with limited Sight Distance
- Ch 278.08km – Jervois Intersection, insufficient Sight Distance
- Ch 285.03km – Crest with limited Sight Distance
- Ch 295.44km – Crest with limited Sight Distance
- Ch 295.60km – Horizontal curve with sub-standard radius
- Ch 295.77km – The Lucy Creek Access Road and Plenty Highway Intersection

Lucy Creek Access

- Ch 5.90km – Crest with limited Sight Distance
- Ch 14.50km – Crest with limited Sight Distance
- Ch 18.21km – Horizontal curve with sub-standard radius

All restrictions to speed are to be included in the Journey Management Plans required for KGL staff, contractors and transportation companies. Refer Section 10 for details of the implementation of Journey Management Plans and Section 10 for contractual requirements. Modification to the Journey Management Plan and removal of restrictions will occur after defects have been rectified.

Internal Mine Roads Speed Restrictions

Internal roads within the mine site for operations will have posted speed limits and operational requirements to increase safety within the mine. The internal road layout for the mine is shown in Figure 2. These will typically be as follows:

- Internal Access Road to mine 60km/hr (Lucy Creek Road to Mine Infrastructure Area)
- Internal Haul Roads 60km/hr all vehicles (Reward Pit, Explosive Magazine Access, Bellbird Open Pit, Southern Workshop, Rockface Underground Portal, Reward South)
- A restriction to 20km/hr within 100m of specific mine infrastructure will apply including the southern workshop area, mine Infrastructure area, administration area and explosive magazine



- With regard to light vehicles utilising internal haul roads access will be restricted to mine department management and mine department service light vehicles operating in areas where the mine haulage and operating equipment operate. To do so those personnel will undergo an additional level of training/induction specifically targeted at protocols for interacting with different equipment, as will be the case for operating light vehicles in the underground areas.

10.3.4 Oversized Vehicles

As listed in the traffic generation summary for the construction of the mine it is anticipated that there will be a requirement for oversized vehicles to transport equipment to the site. Oversized Vehicles will require a Permit from the Northern Territory Government Department of Transport in accordance with the document “Permit Guidelines for Oversize and Overmass Vehicles – Version 6 February 2018” from the Vehicles Standards Section. Permit applications are to be made to the Department of Transport on the appropriate application form and payment of the nominated permit fee. A copy of the Guideline is included in Appendix F.

The following table highlights the type and number of oversize vehicles predicted over the estimated 64 week construction program.

Table 16 – Oversize Vehicles

Vehicle Type	Total No Over 64 Weeks	Weekly Peak Over Period	Period That Peak Occurs
Oversize Load / Low Loader (No Pilot) ****	196	20	5
Oversize Load / Low Loader (Requiring Pilot)	50	10	1
Oversize Load / Low Loader (Requiring Police)	24	8	1

**** Note: Peak demand for oversized vehicle is for initial transportation for village construction and may be mobilised from Queensland. All other oversized vehicles are mobilised from South Australia via Alice Springs via a combination of rail and road.

10.3.5 Staggering of Heavy Vehicles Movements

During both the construction phase and the operations phase there will be a requirement to stage/stagger heavy vehicles movements to and from the site. This will require careful planning across the various different transport operators. Staggering vehicles will be required to ensure that disruption to public traffic through delays behind heavy vehicles by managing the distance between each heavy vehicle on the route. Thus, ensuring maximum passing opportunities.



Peak periods for oversize vehicles during construction are shown in the previous section and total a maximum of 3-4 oversized vehicles a day over a period of 5 weeks. It is proposed that these be staggered with a period of three hours minimum between each vehicle.

Construction Peaks Heavy Vehicles

Analysis of the construction traffic generation was completed in section 6 and a detailed program and assessment is tabulated in the appendices. This showed a peak in heavy vehicle traffic between weeks 47 to week 59. It is anticipated that the peaks shown will be smoothed slightly to have a peak of heavy vehicles per week being in the order of 20 – 25 with approximately 50% being over-sized vehicles. It will be policy of KGL that no more than 6 heavy vehicle movements are allowed each way per day.

It will be a requirement that these heavy vehicle movement be staggered at a minimum of 1.5 hours between each movement and that these movements occur only in daylight hours

Construction Peaks – Operational Phase

Construction peaks for the operational phase are simpler to predict with the operations being cyclic in nature. The estimated transportation of concentrate by Qube is 3 vehicles operating in two shifts per day. This equates to 6 vehicle movements in each direction for 47 weeks of the year. Qube Journey Management Plan will have scheduled times for each shift and each trip. Whilst the JMP is still being developed it is the intention that Qube vehicles will operate on a minimum 3 hour stagger in each direction.

The Qube timetable for vehicle movements will be distributed to other transportation contractors such that those contractors can schedule trips to ensure a 1.5 hour stagger between all heavy vehicles. Thus, an overall schedule of daily movements in each week will be developed and this schedule will be distributed to all companies and reviewed regularly by the KGL Mine OH&S Supervisor. Audits will be undertaken of the schedule as part of the audit process in the TMP.

10.3.6 Management and Auditing of TMP

The management of the KGL Traffic Management Plan for both construction phase and operational phase will be the responsibility of the Mine OH&S Supervisor and approval of the TMP will be the responsibility of the General Manager.

An audit of the TMP will be undertaken at minimum 6 monthly interval. The audit will review the following as a minimum

- Incident reporting including near misses
- Safety improvement measures to be implemented
- Programmed scheduling against actual trips undertaken
- Future programmed schedule
- Road condition update
- Programmed road upgrades
- Update to JMP where applicable



10.3.7 Induction of Drivers and Pilots

All staff working for KGL or any of the transportation companies will be required to undergo a detailed induction course that will outline the following to any proposed driver or pilot:

- Overview of JMP
- Safety rules and procedures
- Requirement for mandatory drug and alcohol testing
- Internal mine safety requirements
- Emergency response procedures
- Speed restrictions and monitoring
- KGL internal policies and requirements

10.4 Contractual Requirements – Transport Companies

All companies that will be involved in transporting materials to or from the mine will have specific contractual requirements to comply with as part of their contract. This will include but not be limited to the following:

- Strict compliance with zero drug and alcohol policy
- Strict compliance with speed restrictions outlined in the final TMP
- Induction of all personnel
- Vehicle safety requirements and equipment
- Requirement for compliance with generic JMP or operate under an approved KGL JMP
- Requirements for staggering of heavy vehicle movements and record keeping
- Incident reporting and corrective measures

11 CONCLUSION AND RECOMMENDATIONS

11.1 Conclusion

The objectives of this Supplement to the Original Jervois Mine EIS is to provide stakeholders with additional information with respect to the proposed traffic impact and to address concerns / comments raised in the response to the original EIS. The original comments received and steps taken by KGL to address these concerns in this supplement including additional information where requested have been tabulated and the future actions that KGL are committed to being implemented are highlighted in tabular form in Appendix G and summarised following.

The main points to note from this Supplement are as follows:

- KGL propose to utilise Best Practice policies procedures and equipment across all aspects of transportation and traffic associated with the mine including:
 - Development of Journey Management Plans to strictly control how companies operate
 - Qube transportation company are the preferred contractor to transport product to Alice Springs (Qube being the largest transporter of concentrates in Australia with a specialist team to provide the highest level of road safety)



- Qube policies and procedures will be implemented across all transportation companies
- All heavy vehicle movements along the route are to be staggered to ensure minimal impact to other road users
- KGL propose to supplement NTPFES resources in the region with agreed Emergency Response Policies and Procedures
- KGL have undertaken a high level Road Condition assessment to prioritise future maintenance and upgrades based on the increase in heavy vehicles
- KGL have undertaken a Road Safety Audit to highlight deficiencies in the network that require rectification by DIPL over time
- KGL have assessed sight distances and safety at all intersections along the Plenty Highway and Lucy Creek Access Road and nominated speed restrictions to heavy vehicles and/or upgrades
- KGL have provided revised traffic numbers, vehicle types and program for both construction phase and the operational phase
- KGL have provided recommendations to upgrade the Lucy Creek / Plenty Highway, Stuart Highway / Plenty Highway intersections and upgrade mine access intersection

11.1.1 Original Recommendations

The recommendations in the original EIS have been listed below and where the original recommendation has been revised the revision is noted:

Table 17 – Revisions to EIS Recommendations

Original Recommendation	Revision
A minimum road width of 8.7m be provided on site access and internal roads consisting of a 3.7m width unsealed lane with 2.5m wide shoulders in accordance with Austroads (2010) requirements	An assessment in design for road widths be undertaken of internal roads that will be utilised by oversize mine vehicles (CAT777 or similar) and at this location road widths will be modified accordingly
The proposed site access be located to achieve 367m sight distance on Lucy Creek Access and 120m site access roads in accordance with the requirements Austroads (2010)	The Lucy Creek Access road intersection be upgraded in accordance with figure SK005 and swept paths. This includes relocation of the intersection approx. 300m north of its current location to improve intersection geometry and sight distances
On site parking for 10 light vehicles plus the expected number of site vehicles be provided, designed in accordance with the Northern Territory Planning Scheme (DIPL) 2017 and AS2890.1 (Standards Australia 2004)	In addition on-site mine vehicle parking is to be designed to ensure all vehicles can reverse park in accordance with mine safety requirements. On-site parking at the accommodation village to include parking for 50 vehicles and bus laydown areas. This is detailed in the overall supplement to the EIS
On-site bus and road train parking bays for two buses and maximum number of road trains expected	



Original Recommendation	Revision
on-site be provided, to accommodate largest bus and road train expected	
Queuing provision for 2 cars and one road train be provided at the accommodation camp access and the mine site access	This is applicable to ticketed / controlled parking areas which is not applicable here
Pedestrian and Cyclist activity to be discouraged on-site	
6m three chord truncations be provided on both corners of the site access intersection on Lucy Creek Access to facilitate quad train access to the site indicated in Fig 4.5	Intersections to be in accordance with Figures SK004 and SK005 of the Supplement. Quad access to the site is no longer applicable
The proposed development contribute towards the cost of maintenance on the Stuart Highway and the Plenty Highway based on the increase in ESA loading associated with the mine	KGL will undertake consultation with DIPL with regard to contributions to maintenance of the Plenty Highway, highlighting prioritisation listed in the Supplement
The client consult with the Northern Territory Government and other stakeholders to arrive at and implement solutions to improve road safety and reduce the risk of driver fatigue on the Plenty Highway	KGL have completed a RSA for the Plenty Hwy and will consult with DIPL in regard to implementation of recommendations

11.1.2 Supplement Recommendations

The following recommendations have been developed subsequent to the independent review of the EIS and ongoing design development and investigations:

- KGL and Consone approach all levels of Government to review the findings of road condition, Road Safety Audit and preliminary TMP to review options for acceleration of the following:
 - Widening of single seal sections to dual lane
 - “The Outback Way Program” and proposed sealing from Harts Range to Lucy Creek Intersection
 - Edge treatments to the single lane seal sections to reduce edge of seal drop to exist shoulder
 - Ongoing maintenance grading and a program designed around grading post rainfall events
 - Implementation of recommendations listed in the Road Safety Audit
- That KGL enter into an agreement with NTPFES for provision of Emergency Response resources in the region and implement an Emergency Response Policy in accordance with the recommendations listed in Section 10.3, within the internal management plans and Mine Management Plan



- KGL engage Qube to draft as part of it's management procedures a detailed Journey Management Plan for the proposed routes including speed restrictions and geo referenced areas for restrictions. KGL to implement Qube procedures across all transportation contracts – Refer Section 10.4
- KGL prepare a generic JMP for the project and procedures for inclusion in contract documentation
- That KGL finalise an overall Traffic Management Plan during the final design process and that this be included on the overall Mine Management Plans
- That KGL undertake liaison with DIPL regarding design and upgrade of the following intersections:
 - Stuart Highway / Plenty Highway
 - Lucy Creek Access Road / Plenty Highway Intersection
 - Mine Access / Lucy Creek Access Road
 - Accommodation Village / Lucy Creek Access Road
- Implement Induction and auditing procedures outlined in section 10 as part of the TMP and OH&S plans.



APPENDIX A – TRAFFIC GENERATION CONSTRUCTION

[illegible]



APPENDIX B – EXAMPLE JOURNEY MANAGEMENT PLAN

SHEMS Planning

Journey Management Plan **XXXXXX** Minesite to Darwin Ports

SHEMS-11-PL-NT0001

Version control

Version	Change from previous	Date	Comment
1.0	Issued as Draft	18/02/2019	Issued for Draft for Review by Stakeholders.

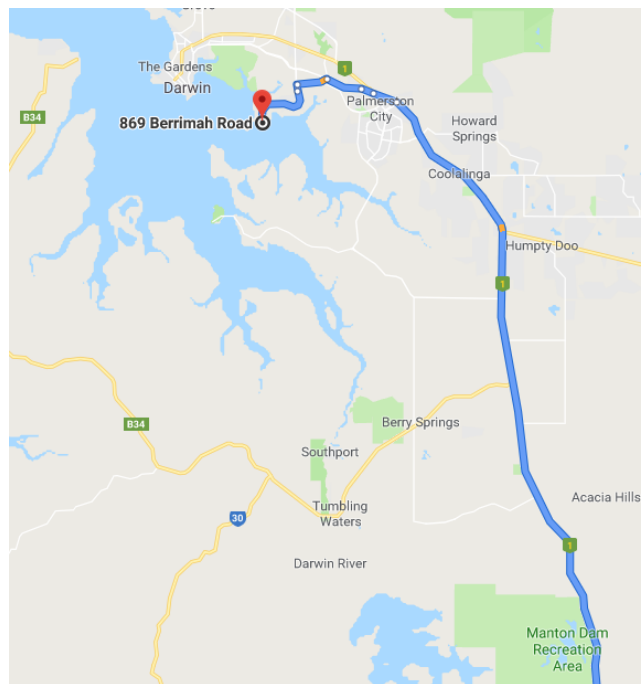
Journey Management Plan for XXXX Minesite to Darwin Ports

Customer Name	XXXX
Delivery Address	Darwin Ports - Berrimah Road
Pickup Location	XXXX Minesite – XXXX Road

Directions

The preferred route for the journey from XXXX Minesite to Darwin Ports is:

- Below is the preferred route from XXXX Minesite to Darwin Ports
- This JMP applies to journeys on both directions (Minesite to Port, Port to Minesite).



- Complete all pre-start requirements and paperwork
- Commence loading at the XXXX minesite as per loading/unloading SWI
- Depart Minesite

[insert photo of Loader when procured]

- Depart XXXX Minesite
- Turn Right onto XXXX Road

CAUTION: Proceed with caution and look out for tourists, caravans and all other vehicles in this area.

NOTE: Trucks will be monitored through the route and bad driver behaviour will not be tolerated.

- Continue along XXXX Road

NOTE: The highway speed limit at this point is 100 km/h, however trucks will be speed limited to 90 km/h.



- Proceed past the XXXX Road turn off.

NOTE: 80 km/h speed limit applies through the XXX Road Turnoff

CAUTION: Proceed with caution and look out for tourists, caravans and all other vehicles in this area.



- Proceed past the XXXX Turn off

NOTE: 80 km/h speed limit applies through the XXXX Turnoff

CAUTION: Proceed with caution and look out for tourists, caravans and all other vehicles in this area.



- Proceed past the XXXX Turn off and XXXX Area

NOTE: 80 km/h speed limit applies through the XXXX Area Turnoff

CAUTION: Proceed with caution and look out for tourists, caravans and all other vehicles in this area.



NOTE: Extreme caution to be taken through the XXXX township and School Precinct.

All Qube trucks are fitted with In-vehicle management systems (IVMS) that track speed, fatigue and driver behaviour in real time.

All school precincts will be geofenced in the IVMS system to a restricted speed and bad driver behaviour will not be tolerated.

All Trucks are to avoid the peak drop off/pick up times of the school to minimise interactions with school children in the school precinct.

Drop off time: (TBC – 7.30am) Pick Up Time: (TBC 3.30pm)

- Approach the township of XXXX

NOTE: 80 km/h speed limit applies through the XXXX Township *(not including the XXXX School Precinct)*



- Proceed to the XXXX precinct.
- White markings on the road will indicate the approach to the school precinct.

NOTE: 60 km/h speed limit applies through the XXXX Precinct during school hours 7am – 5pm. However, Qube trucks will be speed limited to 40 km/h in this area.

CAUTION: Proceed with caution and look out for school children and other vehicles turning in and out of the school area.

NOTE: Trucks will be monitored through geo-fencing in the IVMS system in XXXX and bad driving behaviour will not be tolerated.



- Proceed past the XXXX Township and turn offs.

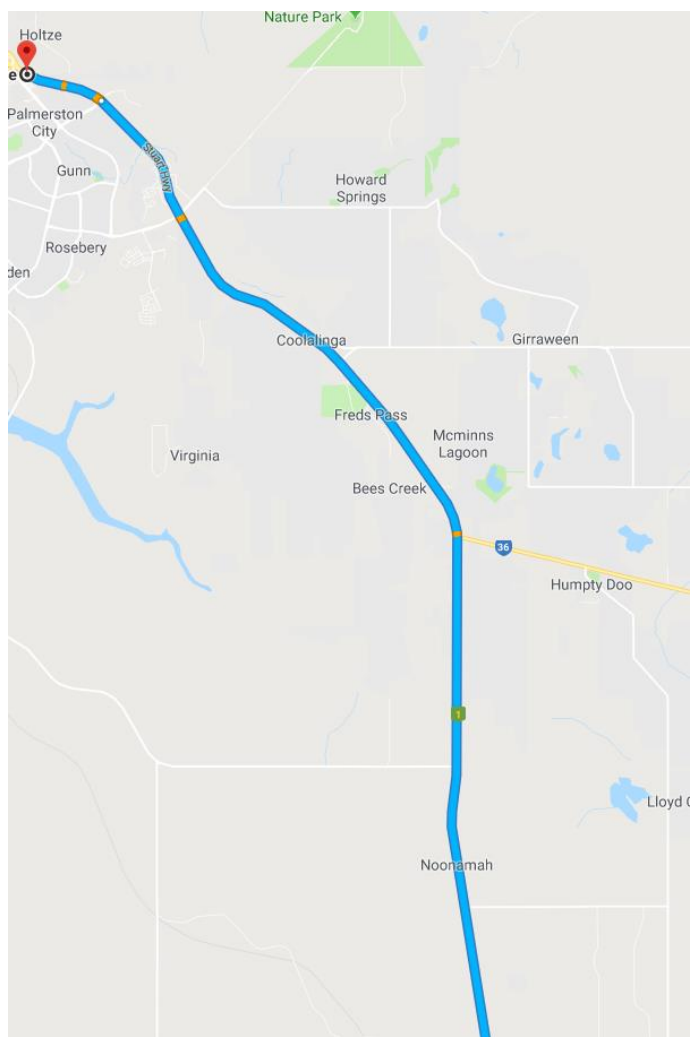
NOTE: 80 km/h speed limit applies through the XXXX Township.



- Continue along XXXX Road until the XXXX Highway Turnoff.
- Merge into the turn slip lane and turn Left towards Darwin.

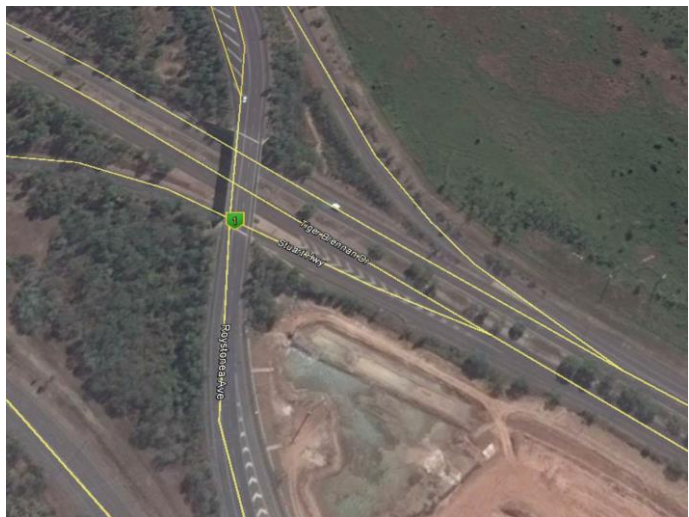


- Follow Stuart Highway towards Tiger Brennan Turn off.
- NOTE:** Obey all Stuart Highway signed speeds and drive to conditions.



- Take the exit to Tiger Brennan Drive, (Stuart Highway Turns into Tiger Brennan Drive – merge towards the right)
- Keep left where possible on dual freeways.

NOTE: 80 km/h speed limit applies.



- Turn left into Wishart Road
- NOTE:** 80 km/h speed limit applies.



- Turn left into Berrimah Road and continue to the Ports entrance.
- NOTE:** 80 km/h speed limit applies.
- Once at the Darwin Ports area, swipe into the port.
 - Follow all Darwin Ports rules and proceed to unloading area.
 - Follow loading/unloading SWI.
 - Return to minesite for further loads or continue to park up area for the last load the day.



Preferred Driving Plan

Start Location	Finish Location	Driving Time	Time Working	Time Resting
XXXX Minesite – XXXX Road	Stuart Highway Turn Off	XXmins XXkm	XXmins	Rest Breaks as per NT road rules.
Stuart Highway (XX Turnoff)	Tiger Brennan Drive	XXmins XXkm	XXmins	
Tiger Brennan Drive/Wishart Rd, Berrimah Road	Darwin Ports	XXmins XXkm	XXmins	

Specific Hazards

Stretch of Journey	Hazard Description
XXXX Mine Site Turn into XXXX Road	Limited view with corner near turn off
	Tourist and local traffic – remain alert and only turn out when clear
XXXX Park Turnoff	Tourist and local traffic
	Area prone to road closures – listen to ABC in emergency and follow advise of road closures/ emergency responders.
XXXX Township and School Area	School children in the area – bus pick up area, parents drop off area.
	High traffic area during school drop off and pick up.

General Hazards**Hazards of the area**

- Rail crossings are a hazard you need to be aware of, reduce speed and be prepared to stop. Ensure no trains are in your vision in both directions. If the vehicle you drive has a powered left hand window wind it down slightly to hear any warning from a train
- Take care at all intersections, vehicle interaction on all the main road junctions
- Wild life on road way, cattle, eagles, and birds
- Large contingent of triples and quad trucks are on this section of road this mixed with LV and public traffic make this section an area that needs constant attention by the operator.
- Oversize Loads.
- **This route goes through several townships, please ensure extreme caution through local areas.**

Note:

Road Train Operating Speed is 90 km/h if conditions permit

Maintain 500m following distance behind any other Road Train

Specific Instructions**Rest Stops**

- A driver must ensure their own safety and that of other road users by taking a break from the driving task if feeling symptoms of fatigue.
- Rest breaks should be scheduled to be taken at approved rest stops, However, should it be necessary to stop at a place not indicated on the map then the following points should be considered when choosing a place to stop:
 - Weather conditions and ground stability, do not move off the road unless into approved parking bays. Quad road trains can become bogged easily, even on dry ground.
 - Position of Road train in relation to the road. Make sure you can safely exit and move around the vehicle, and the vehicle is not obstructing or impeding normal traffic flow.
 - Road access for Entry and Exiting the parking area is flat and level, with good visibility in both directions.
 - Ice Pack secondary Air-conditioning system is available for use during stops and breakdown
 - All drivers are required to follow the Safe Work Method for Solo Driving as per the Driving Hours Legislation for the State or Territory.

Emergency Information

In the event of an emergency:

1. Notify Qube Management as soon as practicable (Include information from initial notification and person's name manning phone in your absence) – Mark George.
2. Collect all required details at scene
3. Contact Customer - Include information from initial notification and what response procedures have been put in place

Note

Do not make any statements

- Media and public enquiries are to be directed to Qube Manager

Emergency Contact Numbers

EMERGENCY 000 OR 112 FROM A SATELLITE/MOBILE PHONE			
	Location	Phone No	Role
Police/Fire	NT Police 24 hour assistance line	XXXX	Call 000 in an emergency.
	Humpty Doo Police Station	XXXX	To assist with emergency response – a full listing of policy and fire stations can be found at: https://www.pfes.nt.gov.au/Contact-us.aspx
	Humpty Doo Fire Station	XXXX	
	Berrimah (Peter McAulay Centre)	XXXX	
Qube Management	XXXX	XXXX	Regional Manager
	XXXX	XXXX	Area Manager
	XXXX	XXXX	National HSE Manager
XXXX Contact	XXXX	XXXX	XXXX

Driver/Operator Sign Off: I have read and understood the above Journey Management Plan.

[illegible]



APPENDIX C – QUBE OPERATIONAL INFORMATION



KGL Resources Jervois Mine Concentrates Road Haulage



SAFETY VALUES

QUBE
BULK

SYSTEMS

LEADERSHIP

BEHAVIOURS

OUR VALUES

ZERO HARM					
Zero Harm Safety, Health and the Environment is intrinsic in everything we do and is ingrained in decision making at all levels. We are committed to ZERO HARM.	Integrity We are honest and straightforward in our dealings with customers, team members and others. We always mean what we say!	People Capability Our people are recognised as highly skilled and maintain their knowledge of best practice to provide market leading services. Our people focus on goals and objectives.	Innovation We develop superior solutions to the products and services that our customers want. We think ahead!	Reliability We take personal accountability for our actions and results. We do what we say!	Performance Our results orientated culture provides an acceptable level of return to our customers and all stakeholders. We work as a team to accomplish results and win!

Qube Values Zero Harm –

We operate in an environment where risks are managed, and that work does not impact on our people's health and well-being. No job is so important that it can't be done safely.

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



QUBE - SAFETY FOCUS

QUBE
BULK



- **IVMS Project** – All trucks have consistent in-cab technology (MT Data)
- **DSS Seeing Eye Machine**
- **PBS Technology and Equipment**
- **24/7 Fleet Monitoring Centre**
- **Supervisor Leadership Training**
- **Mature Online HSE systems**
 - *Rapid Induct* (contractor management)
 - *SCRIMS* (HSE statistical information including incidents, hazards, actions etc)
 - *SHEMs* (Qube HSE management systems)
- **Triple Certified**
 - *ISO9001* – Quality Management Systems
 - *ISO14001* – Environmental Management System
 - *AS4801* – Occupational Health and Safety
- **Community Interactions**
 - *Road Train Awareness Education*
 - *Various Sponsorships* ie Clontarf
 - *1300 Safety Campaign*



"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

QUBE - SAFETY FOCUS

QUBE
BULK



SHEMS:

- SHEMs is the online portal where all documents (policies, procedures, forms etc) are kept.
- First port of call when looking for HSEQ information or instruction.
- Site HSEQ documents are stored here (ie site HSEQ plan, risk assessment and SWIs/SWMS).

Qube Ports & Bulk SHEMS

Actions ▾	
Type	Name
Folder	Element 01 System Description
Folder	Element 02 Safety Health and Environment Governance
Folder	Element 03 Behavioural Safety
Folder	Element 04 Continual Improvement
Folder	Element 05 Document Control and Records Management
Folder	Element 06 Risk Management
Folder	Element 07 Planning
Folder	Element 08 Asset Life Cycle Management
Folder	Element 09 Communication and Consultation
Folder	Element 10 Audits
Folder	Element 11 Operational System Safety
Folder	Element 12 Procurement and Contractor Management
Folder	Element 13 Incident and Emergency Management
Folder	Element 14 Inspection and Testing
Folder	Element 15 Health Management
Folder	Policies
Icon	SHEMS Document Index

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

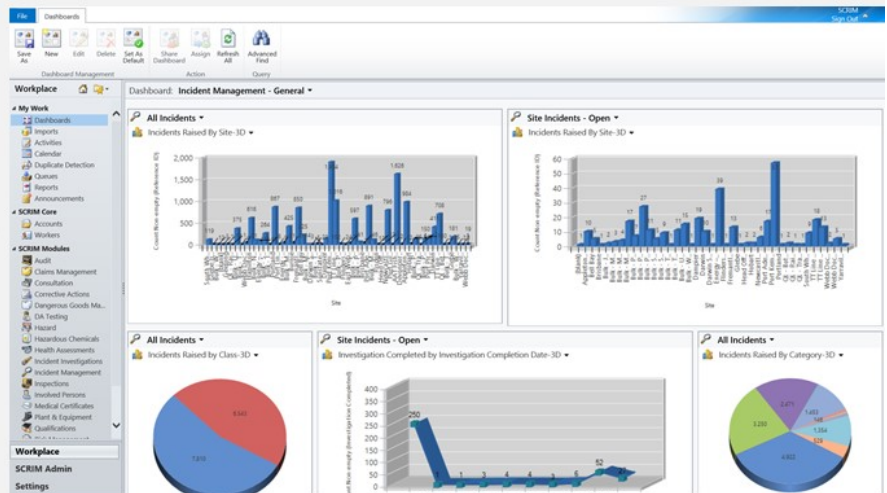


QUBE - SAFETY FOCUS

QUBE
BULK

SCRIM Application:

- SCRIMs is the online HSEQ reporting system.
- All incidents, hazards, actions, investigations and inspections/SAOs are to be entered into the system.
- Data entered into SCRIMs is used to compile monthly reporting (LTIFR, # of SAOS, overdue corrective actions etc).
- Auditing, statistics and reporting.



"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

QUBE - SAFETY FOCUS

QUBE
BULK

Rapid Induct:

- Rapid Induct is the online induction portal.
- Online inductions are available for employees and contractors to complete at their own pace.
- Administrators at each site are to be set up to manage the online inductions.

The screenshot shows the 'Qube Online Learning' portal. The main heading is 'Qube Online Learning'. Below it, the text reads 'Please select one of the following:'. There are three radio button options:

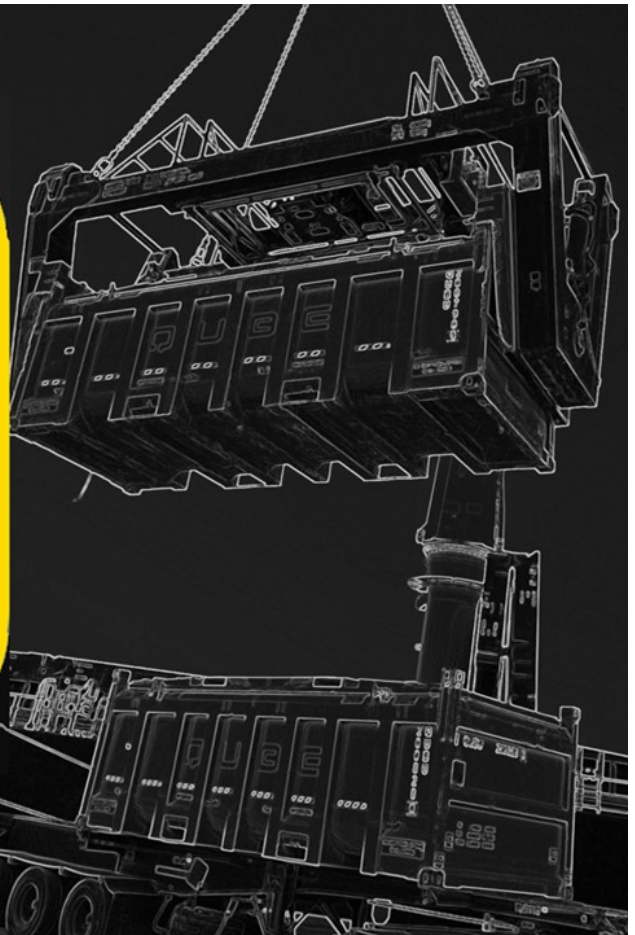
- ☐ I am a Qube employee and have been given a password to complete an induction.
- ☐ I am an employee or subcontractor of a contracting company and have been given a password to complete an induction.
- ☐ I am from a contracting company, have already registered and wish to manage my inductees and update company details/insurances.

At the bottom, it says 'Need Help? Call 1800 307 595'. On the right side, there are three vertical labels: 'Qube Employee', 'Contractor Employee', and 'Existing Contracting Company'.

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



PAST PERFORMANCE



EXPERIENCE

QUBE
BULK

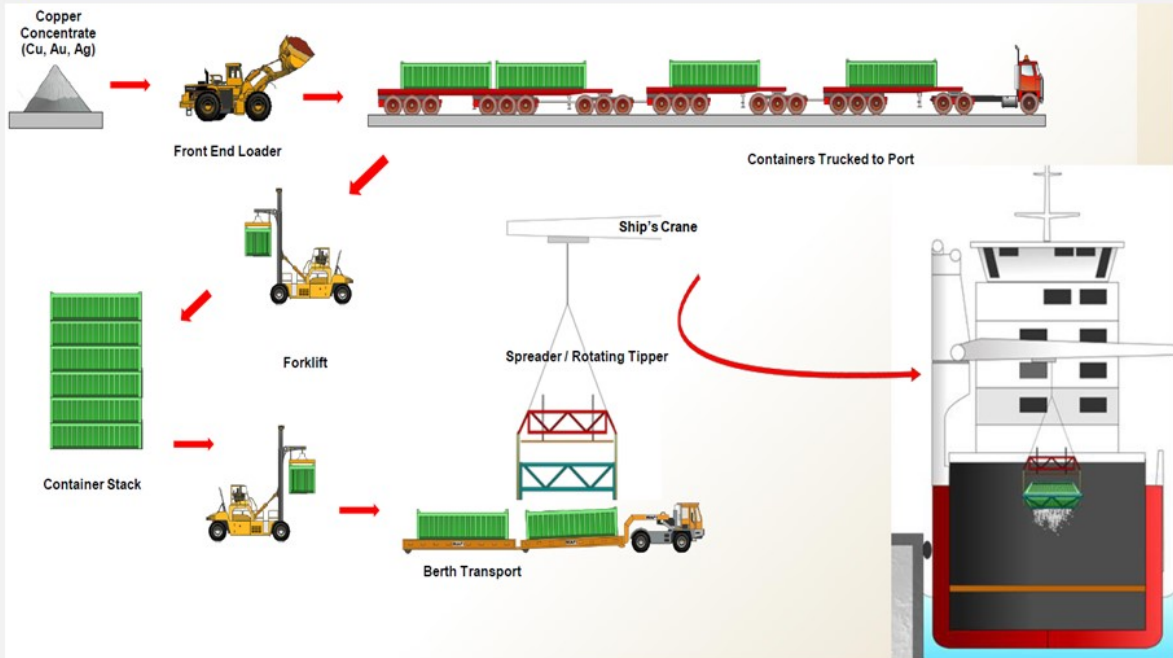
- Qube handles approximately 2 million tonnes per annum of concentrates with the majority being mine to vessel logistics solutions
- Australia's largest provider of bulk concentrates logistics solutions
- Qube was at the forefront of the containerised logistics solution for concentrates through the development (and continuous improvement) of Rotabox™ and the Qube Concentrates Containers (QCC)
- Over 400 road trains up to five trailer configurations of which over 100 are triple and quad configurations
- Undertook logistics study for Jervois PFS in 2014

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



CASE STUDY – SANDFIRE DEGRUSSA

QUBE
BULK



"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"





FLEET MONITORING CENTRE

QUBE
BULK



Qube's Fleet Monitoring Centre (FMC) setup in the West Perth Head Office and provides live 24/7 monitoring of Qube's national fleet.

The FMC analysts utilise the:

- In Vehicle Management System (IVMS) platform Hawkeye
- Supply Chain Management Interface platform Connect
- Driver Safety System (DSS)
- MT Data
- Safety Compliance Reporting Incident Management System (SCRIMS)
- Reporting and maintenance scheduling in Mainpac

The FMC allows the fleet to be remotely monitored so any incidents can be addressed immediately, rectified and reported on daily.



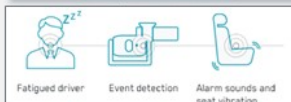
"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

DRIVER SAFETY SYSTEM

QUBE
BULK



Guardian



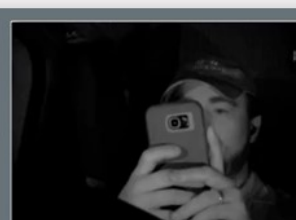
Real Qube Footage



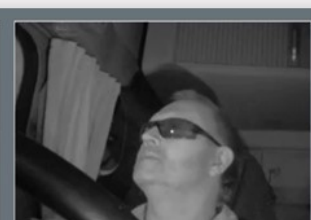
Driver State Sensor (DSS) Monitoring



Fatigue – False Positive



Distraction – Mobile Phone Use



Distraction – Not Looking Ahead



Fatigue – Micro sleep



Fatigue – Micro sleep

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



MT DATA
QUBE
BULK



Key Features of the system are:

- Live GPS tracking and speed monitoring
- Work and rest break notifications set to meet legislated fatigue requirements
- Fit for Duty and Pre Trip inspection interactive setup
- Safety and Communication through in vehicle terminal via messaging or voice
- Digital Video Recording to manage incidents and proactive training
- Electronic Documents and Safe Journey plans
- IAP, OBM and Mass Compliance to maximise loading
- Maintenance alerts and scheduling service notifications
- Monitor delivery time and to understand any delays or efficiencies

**INTRODUCING QUBE'S NEW
IN-VEHICLE MANAGEMENT SYSTEM**

QUBE
PORTS & BULK



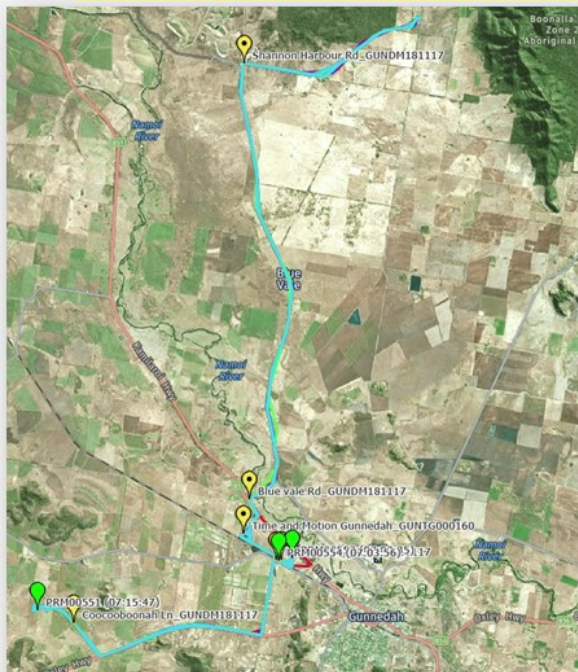
KEY BENEFITS

- ✓ Enhanced driver safety and protection
- ✓ Extended GPS and satellite tracking across entire fleet
- ✓ Driver communication across multiple channels
- ✓ Improved compliance
- ✓ Real time job management
- ✓ Better post incident investigation
- ✓ Dynamic speed control
- ✓ Safe driver initiative through points system

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



HawK - EyE
QUBE
BULK



Hawk-Eye, MTData's web-based software enables visibility over the installed units and operators with real time monitoring via the Qube Fleet Monitoring Centre



Event or Fatigue

Excessive idle

Operator in Waypoint

Waypoint (point of interest)

Ignition on

Ignition off - last known location

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

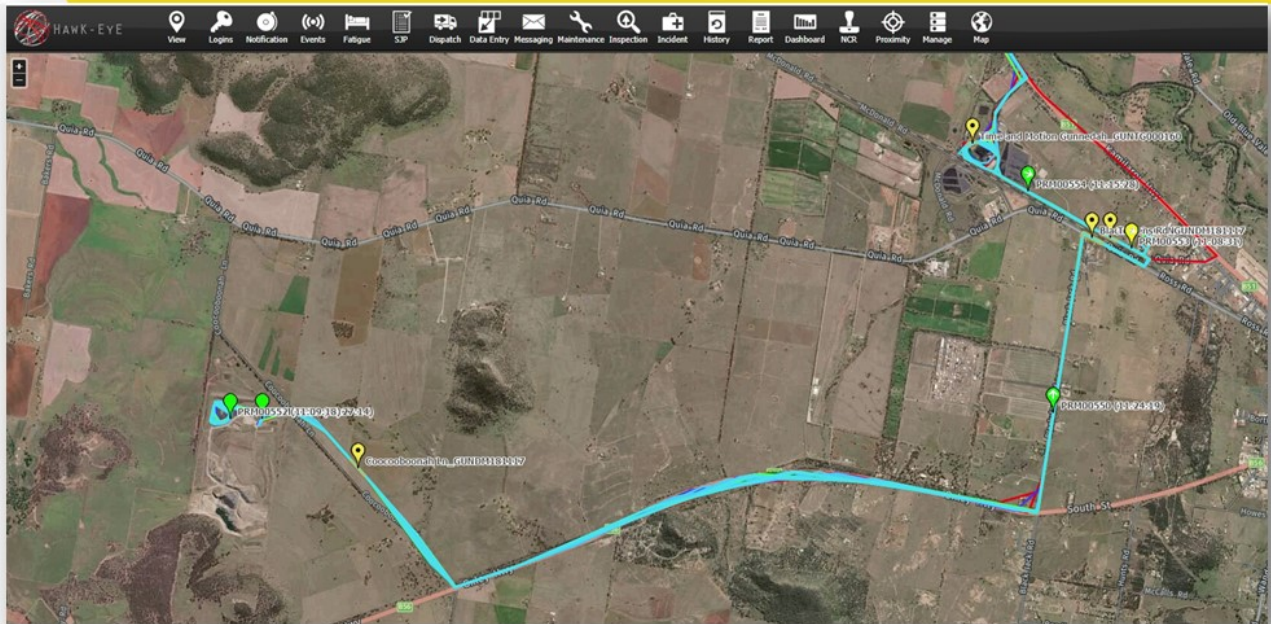
Consone Consulting Pty Ltd

"Excellence in Engineering & Surveying"



“SNAIL TRAIL”

QUBE
BULK



“SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE”

WAYPOINTS

QUBE
BULK



Waypoints

- Waypoints are geo fences that define areas which can be reported on when a vehicle enters or leaves a defined area.
Individual
- Waypoints can be setup for any location and configured for operator notification
 - Speed alerts
 - Area requirements
 - Actions to be taken

“SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE”



WAYPOINTS – TIME IN MOTION



QUBE
BULK



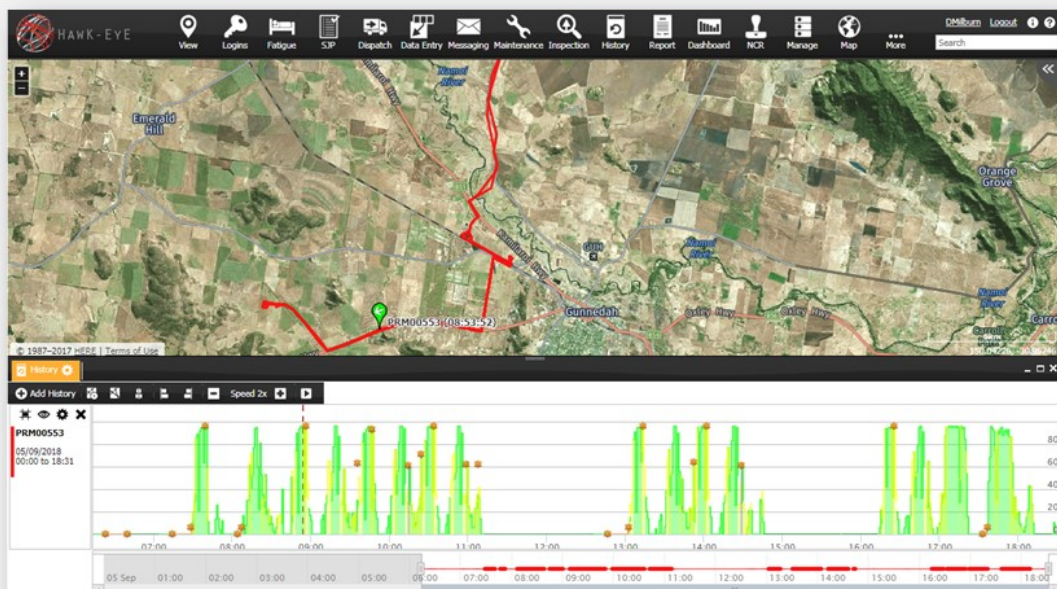
- Waypoints can also be used for time and motion studies for fleet optimisation

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

DATA COLLECTION AND ANALYSIS



QUBE
BULK



Unit history can be accessed at any time for further analysis

"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"



IN CAB CAMERAS

QUBE
BULK



Forward facing and in-cab cameras

- Remote “Safe act observations” can be undertaken at any time on the operator
- In the case of an event the footage can be retrieved

“SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE”



FORWARD LOOKING INFRARED - FLIR

QUBE
BULK



“SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE”



CONCENTRATE HAULAGE OPERATIONS



OPERATIONS OVERVIEW



QUBE
BULK



- New triple road trains with Volvo 8x4 Prime Movers and Howard Porter 'skel' trailer sets
- Managed from Alice Springs with haulage vehicles refuelling and maintained in Alice Springs with maintenance using a combination of Qube, local service providers and OEMs
- Alice Springs resident personnel
- Loading at Jervois
 - 1 Reach Stacker at site
 - Drivers self load at Jervois
 - Refer suggested alternative methodology
- 24/ 7 operations for Jervois
 - 1 trip per shift

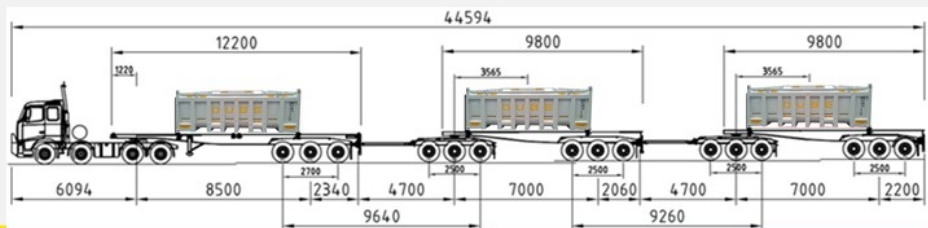


JERVOIS DEMAND MODEL



QUBE
BULK

Component	Base Case
No. Units	3
Design Payload (tonnes)	95
Practical Payload (tonnes)	88.5
Cycle Time (hrs)	11.0
Annual Volume (tonnes)	120,000
Trips per Annum	1,357
Operating Days/ Annum	350
Trips per Day	4



"SAFETY, VALUE FOR MONEY & CONSISTENT PERFORMANCE"

QUBE
BULK



APPENDIX D – ROAD SAFETY AUDIT



CLIENT: KGL RESOURCES



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Status: Review Issue



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1. INTRODUCTION

KGL Resources Pty Ltd (KGL) propose to develop new operations at the Jervois Mine site in the Anayte region of the Northern Territory. As required by legislation KGL prepared an Environmental Impact Statement (EIS) for the project which was lodged with the Department of Primary Industry and Resources in October 2018.

As part of the EIS process various government Departments and stakeholders provide the government with responses / queries back to the applicant raising any concerns regarding the EIS or additional information required. KGL received comments to the Jervois Project in late 2018. KGL are required to provide a supplement to the EIS back government addressing any queries or concerns raised.

With respect to the Jervois project KGL received several concerns relating to the proposed impact of traffic in the region. These concerns have been raised by a number of parties specifically:

- Department of Tourism and Culture
- Department of Infrastructure, Planning and Logistics – Transport Civil Services
- Northern Territory Police and Fire Emergency Services
- Department of Environment and National Resources, Rangelands Division, Land Management Unit

Some of the concerns raised by stakeholders are specifically related to road safety. Accordingly, KGL deemed it appropriate to undertake a Stage 6 road safety audit along the Plenty Highway between the Stuart Highway and Lucy Creek Access and along the Lucy Creek Access between Plenty Highway and the Lucy Creek Airstrip. KGL approached Conson Consulting to undertake this work for them as a precursor to preparation of their EIS supplement with respect to traffic.

The RSA seeks to highlight any issues with the existing road or deficiencies with respect to road safety. This will enable both government and KGL to be better informed with regard to road safety areas and prioritise any areas of road improvements in the future with respect to safety.

3.1 Review Process

To enable the audit to be undertaken a review of existing documents in the EIS was undertaken including the following documents from the EIS.

- C-2 Traffic and Transport Assessment (TTA)
- C-9 Social Assessment and Community Engagement (SACE)



- 4.7 Social, Economic and Cultural Surrounds (SECS)

Information extracted from the reports include proposed traffic generation from the mine during construction and in operations.

- Consone Consulting undertook a review of existing traffic data and sourced more recent traffic data from Department of Infrastructure, Planning and Logistics – Transport Civil Services (DIPL).
- Traffic Accident data was sourced from DIPL and reviewed
- Meetings were held with various Departments prior to the audit to highlight any perceived deficiencies along the alignment of the Plenty Highway and Lucy Creek Access road. This included the following:
 - Gunalan Sivachelvan of DIPL Alice Springs to review maintenance and capital works
 - Mike Tait of DIPL Darwin
 - Alice Fleming Central Land Council (CLC) to ensure the CLC were clear on Consone's Scope and issues raised previously by traditional owners
 - Michael Wyatt of Northern Territory Police (Harts Range)
- A desktop review of the alignment was undertaken prior to site visit being undertaken.
- Meetings were also held with KGL's preferred transport company to review the accuracy of nominated traffic generation listed in the EIS. In addition, a review of proposed operational logistics of transport company to ensure auditors have a clear understanding how the operations will be undertaken

All fieldwork and associated reporting was completed by Consone's Senior Road Safety Auditor, Scott Walter and Senior Civil Engineer Adrian White. The audit was completed generally in accordance with Austroads Guide to Road Safety Parts 6 and 6A, 2019, however it should be noted that no guarantee can be made that every deficiency has been identified. Further to this, if all of the recommendations tabled within the report were implemented, this would not guarantee that the roads are completely safe. Rather, adoption of recommendations will improve the level of safety along the road.

1.2 Commencement Meeting

A start-up meeting was held by phone with Paul Richardson of KGL to confirm scope of works, program and findings from review process.



1.3 Site Inspection

A site inspection was completed 15,16 & 17 March 2019. Conditions during the road safety audit were clear, dry and cool. The inspection included:

- An inspection of the Plenty Highway from Chainage 0.0km to 300.00km (from the Stuart Highway Intersection to the approx. 2km past the Lucy Creek Access road)
- The Lucy Creek Access road from Chainage 0.0km to Chainage 42km (From the Plenty Highway to the Lucy Creek Station Airstrip entry – Including the entry to the proposed mine)
- The Bonya Community access road and road to airstrip (Chainage 0km to Chainage 12km).
- A review of all intersections along the alignment and assessment of road conditions along the entirety of each alignment

1.4 Responding to the Audit

As referenced within the Austroads guide, the project manager is responsible for any works but is under no obligation to accept the recommendations within this road safety audit report. Also, it is not the role of the road safety auditor to agree to or approve any of the project manager's responses to the audit.

The road safety audit process provides the opportunity to highlight potential problems and have them considered by the project manager in conjunction with other considerations. A section for project manager response to the issues identified is included within Appendix A of this report.

2. REFERENCE MATERIALS

Austroads Guide to Road Safety Part 6: Managing Road Safety Audits, 2019

Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits, 2019

Austroads Guide to Road Design – Part 3: Geometric Design, 2010

AS 1742.2 Manual of Uniform Traffic Control Devices – Traffic Control Devices for General Use

Department of Transport 'Annual Traffic Report, 2017'



3. TRAFFIC DATA

3.5 Traffic Volumes – Historical and Current

Traffic volumes have been sourced from the Department of Transport, Road Network Division 'Annual Traffic Report, 2017.' The volumes recorded at traffic count stations along Plenty Highway are at stations RAVDP004, RAVDC025 and RAVDC026. These are included with Table 1 below.

Table 1 – Traffic Volumes

Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
Plenty Highway 4km east of Stuart Hwy	RAVDP004	2009	50	54	104	
		2010	52	56	108	
		2011	51	54	105	
		2012	53	56	109	
		2013	44	50	94	
		2014	43	49	92	
		2015	51	56	107	
		2016	66	64	130	19.3
		2017	66	65	131	20.5
Plenty Highway 56km east of Stuart Highway	RAVDC025	2009	42	40	82	
		2011	35	33	68	
		2013	37	36	73	
		2015	49	51	100	



Road Name / Location	ADT Station	Year	Direction		TOTAL	%HV
			Inbound	Outbound		
		2017	48	50	98	
Plenty Highway 10km east of Huckitta Station	RAVDC026	2009	14	11	25	
		2011	8	7	15	
		2013	15	12	27	
		2015	21	18	39	
		2017	17	21	38	

During the Consone team's consultation with key stakeholders it was recurrent with a number of stakeholders (CLC, PFES) that it was felt that there had been an increase in traffic in recent history with more tourist vehicles utilising the Plenty Highway. This appears to be consistent with the traffic data from Station RAVDP004 (4km east of the Stuart Highway) with a 27% increase in traffic since 2015. However, the station at RAVDC025, 56km east of the Stuart Highway does not reflect this increase. For the purpose of this report and the traffic management plan the higher number will be adopted in assessment of Road Safety in the following sections.

3.6 Traffic Volumes – Increased Traffic Generation

As part of the audit the proposed traffic generation from the mine and increase in traffic volumes has been reviewed and assessed for KGL's construction and operational phases. In addition, it is expected that the Garnets mine near Harts Range will contribute additional traffic commencing near term (at this stage the proposed vehicle numbers were unknown). For the purpose of this report it is assumed that additional construction phase traffic will occur in years 2020 and 2021. Additional predicted traffic for operations phase is assumed to begin from 2022 ongoing for life of mine which is currently 10 - 12 years.

Operational traffic volumes have been provided by the preferred transport providers and the mine development team for operational phases. The traffic volumes have been developed for various sections including:

- Mine site to Village (Lucy Creek)



- Mine to Airstrip (Lucy creek and Plenty Hwy)
- Alice Springs to Mine

Importantly to this report the more relevant assessment is for the volumes generated in the section from Alice Springs to the mine-site, these are shown in Table 3 Additional Traffic Volumes (*We note these volumes differ to those listed to those in the EIS and TIA previously submitted as transportation contracts are now further developed with operators and mine design is further advanced*).

Table 2 – Construction and Operational Traffic Volumes Alice Springs to Mine Site

USE	VEHICLE TYPE	Vehicles Per Week	Vehicles Per Day	Vehicles Per Hour
Construction Phase				
Input - Materials	Double Road Train	42	6	1
Input - Diesel	Double Road Train	6	2	1
Transport Admin and Construction Staff	40-Seater Road Coach	2	2	1
Transport Management	Light Vehicle	6	2	1
Transport Contractors	Light Vehicle	28	4	1
Construction Phase Total		84	16	5
Operations Phase				
Output - Concentrates	Triple Road Train	98	14	2
Input - Diesel	Double Road Train	16	3	1
Input - Consumables Other	Double Road Train	6	2	1
Transport Operations, Admin & Contractors Staff	40-Seater Road Coach	2	2	1
Transport Management	Light Vehicle	6	1	1
Transport Contractors	Light Vehicle	12	1	1
Operations Phase Total		140	23	7

With respect the increase traffic generation due to the impact of the proposed mine the larger increase in volumes is in the operations phase due to the reasonably high volume of product and consumables being transported.

The following table highlights the increase in volumes for the Alice Springs to site traffic volumes during the operation phase being the worst-case scenario.



Table 3 – Additional Traffic Volumes

Period	Average Veh/day	% Heavy Vehicles	% Increase Total	% Increase HV
2009-2015	102	19%	-	-
2016-2017	130	20%	27%	2%
Operations	153	25%	17%	73%

The above table highlights the proposed increase in heavy vehicle numbers during the mine's operational phase. With respect to this report we have assessed the road conditions with respect to safety with a view to the increased traffic generation and these findings are listed in the following sections.

It is pertinent to note that the increase in heavy vehicles numbers does not reflect directly in many areas of road safety as these vehicles travel at a slower speed and have significantly better sight distances at crest and intersections.

A focus of this report is to highlight areas of the alignment that can be improved from a road safety and safe system viewpoint. In addition to this report a traffic management plan is being prepared to develop procedures for operational movements on the road that improve road safety and manage the risks associated with any incidents. This report is being prepared separately in conjunction with the Mine Management Plan (MMP) for the project.



3.7 Accident Data

10-year accident data covering the period May 2009 to current was provided by the Department of Infrastructure, Planning & Logistics Road Safety Division. At the time of the site investigation accident data had only been supplied for the preceding five-year period. Accordingly, only the accident locations corresponding to the five-year data was reviewed on site.

No accidents were recorded along the Lucy Creek Access over the preceding ten-year period. There was a total of sixty-six accidents reported along the Plenty Highway. Fifty-four of these occurred over the section of road audited. Further details relating to these accidents have been presented graphically within figures 1 to 5 below.

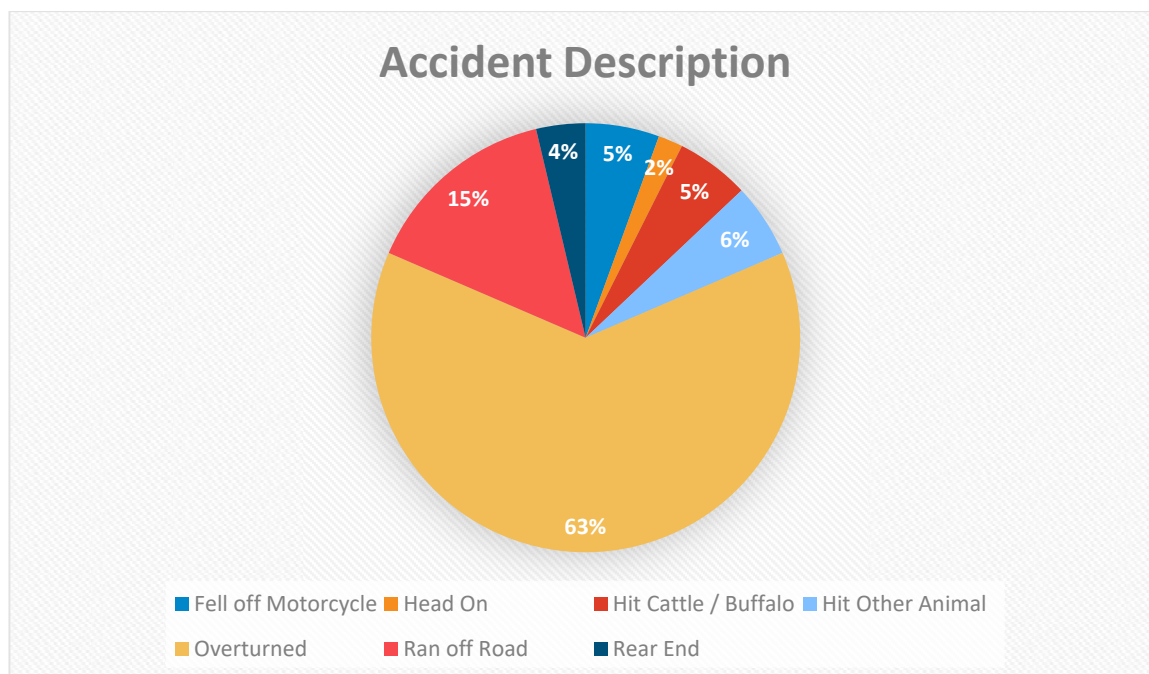


Figure 1 – Accident Description

The majority of accidents (34 of) that occurred along the Plenty Highway during the preceding 10-year period resulted in overturned vehicles. We believe that this is likely a result of the high-speed environment combined with loose pavement materials along the unsealed sections and on the shoulders of sealed sections. This is particularly noticeable on the shoulders of sealed one lane treatments.

There were two fatalities over this period with a further 19 people (29%) treated and admitted to hospital (see Figure 2). Of the reported accidents three involved alcohol and eleven occurred during daw / dusk or darkness.

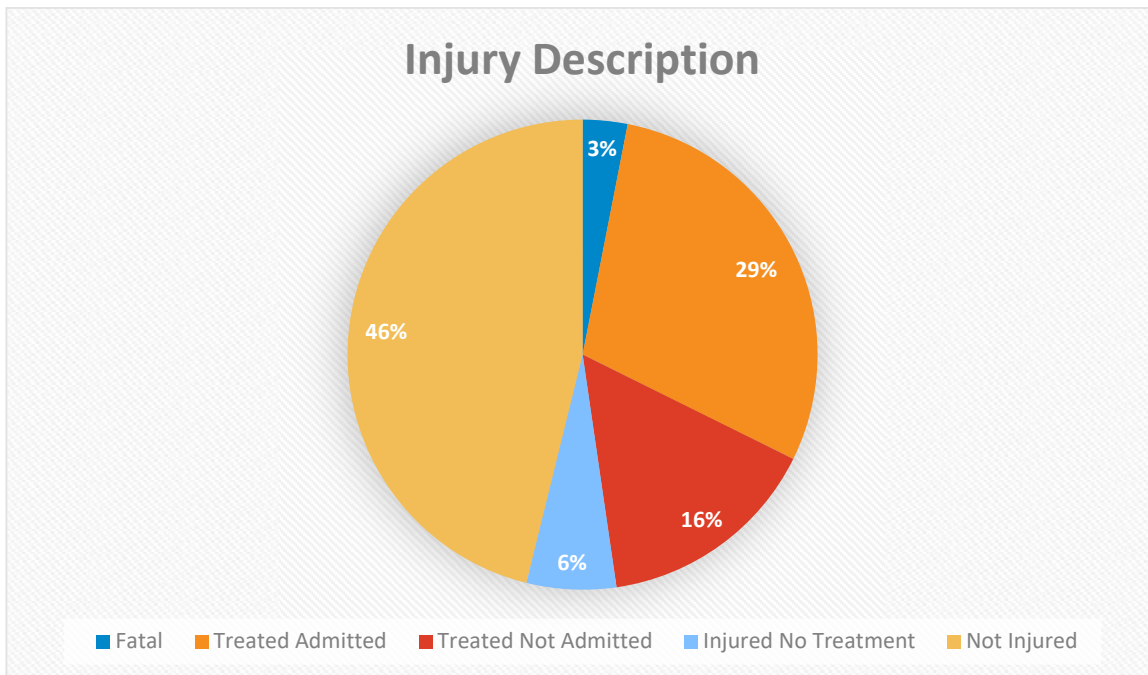


Figure 2 – Injury Description

Approximately 57% of accidents (31 of) occurred along sealed sections of road while the remainder 43% occurred on the unsealed sections. The total amount of sealed pavement between Stuart Highway and the Lucy Creek Access is 50.5% which includes 62.5% as single lane seal and 37.5% as two-lane seal. Of the 31 accidents that occurred on sealed sections of road 14 are thought to have been on the single lane seal sections, however this is difficult to quantify accurately as there have been numerous upgrades involving widening of the single lane sections over the last ten years and the timing of the upgrades is unknown.



4. PREVIOUS ROAD SAFETY AUDITS

Road safety audits (RSA's) have been completed by Scott Walter of Consone Consulting over various sections of the highway between 2009 and 2018. Most of these RSA's were Stage 4 Post Construction audits following the numerous road upgrades at various locations along the highway.

5. AUDIT FINDINGS AND RECOMMENDATIONS – STAGE 6

5.1 Risk Ranking

The tables included following have been extracted from Section 4.8 of Austroads Guide to Road Safety, Part 6. Tables 2 and 3 are used to determine the category in which the issue best fits. Using this information, the appropriate risk category has been selected from Table 4, to produce a treatment approach as documented within Table 5. This methodology assesses the level of risk based on the likely severity of the resulting crash type and the frequency of occurrence. Details of this assessment are included within Table of Audit Findings – Table 6 & 7.

Table 3 – Crash Likelihood

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 4 – Severity of Crash Type

Severity	Description	Examples
Catastrophic	Likely multiple deaths	High-speed, multi vehicle crash on a highway Car runs into crowded bus stop Bus and petrol tanker collide Collapse of a bridge tunnel
Serious	Likely death or serious injury	High or medium-speed vehicle/vehicle collision High or medium-speed collision with a fixed roadside object Pedestrian or cyclist struck by a car



Minor	Likely minor injury	Some low-speed vehicle collisions Cyclist falls from bicycle at low speed Left-turn rear-end crash in a slip lane
Limited	Likely trivial injury or property damage only	Some low-speed vehicle collisions Pedestrian walks into object (no head injury) Car reverses into post

Table 5 – The Resulting Level of Risk

	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

Table 6 – Treatment Approach

Risk	Suggested treatment approach
Intolerable	Must be corrected
High	Should be corrected or the risk significantly reduced, even if the treatment costs is high
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate but not high
Low	Should be corrected or the risk reduced, if the treatment cost is low

5.2 Audit Findings

Unless noted otherwise all the issues raised in this audit are considered to be of sufficient importance to require action. However, to assist DIPL to evaluate the relevant importance of the road safety concerns raised, the auditor has classified the recommendations using the risk assessment methodology outlined in Section 4.1 (above).

It should be noted that the opinions expressed in the following sections are those of the auditor, and the conditions described are those that were observed on-site at the time on the inspection. The reported findings represent a snapshot in time when the site inspections were completed.



5.3 General

Audit findings are included within Table 7, 8 and Appendix A and B. More detailed commentary is provided in the following section.

5.4 Traffic Control Devices

1.4.1 Line Marking

Line marking installations vary significantly at the narrowing treatments on both roads. Standard markings should be provided at each treatment in accordance with AS1742.2 as detailed within Figure 1.

1.4.2 Signage

Most floodway locations do not have depth indicators installed as detailed within Tables 6 and 7. Depth Indicators shall be used where floodwaters across the road are likely to rise to an unfordable depth. While this may be unknown at many of the noted locations they should be installed to those floodway's where this is known to occur.

1.4.3 Guide Posts

Guide posts are either missing or not installed in accordance with AS1742.2 at the narrowing treatments on both roads. Guide posts should be installed in accordance with Figure 1.

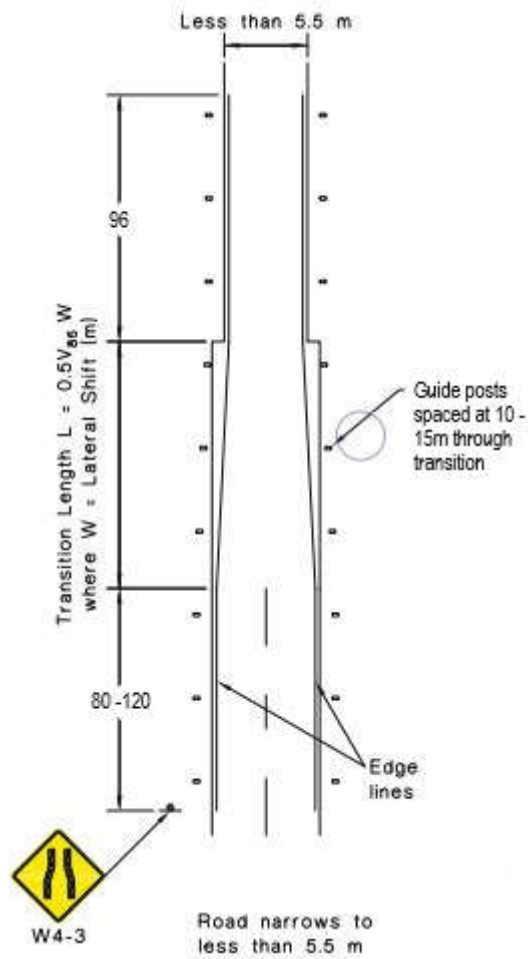


Figure 1 – Narrowing Treatment



Table 7 – Table of Audit Findings – Plenty Highway

Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
01	5.00	Floodway line marking faded	Reinstate line marking	Serious	Improbable	Medium
02	5.62	Narrowing of two-lane road to 3.8m. Treatment is not in compliance with AS1742.2	Modify treatment to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
03	9.85	Guide post missing	Install guide post	Serious	Improbable	Medium
04	12.70 – 21.54	Edge of seal frayed, drop off to shoulders. Loose material on shoulders	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
05	16.76	Guide post missing	Install guide post	Serious	Improbable	Medium
06	17.60 – 18.20	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
07	19.30 – 19.60	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
08	19.70	Guide post missing	Install guide post	Serious	Improbable	Medium
09		No floodway marker	Install depth marker	Serious	Improbable	Medium
10	21.40	End of single lane, 2 lanes approach to railway	Modify treatment on approach and departure to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
11	23.96, 25.40, 27.60, 29.59, 32.50, 33.40, 34.40, 35.80, 37.70	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
		constructed such that the level through the floodway section does not change.				
12	24.95	Guide post missing	Install guide post	Serious	Improbable	Medium
13	28.00	Guide post missing	Install guide post	Serious	Improbable	Medium
14	31.56	Edge failing in 3 locations including significant drop off	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
15	34.59	No signage at floodway	Install signage and depth markers in accordance with AS1742.2	Serious	Improbable	Medium
16	35.54	Guide post missing	Install guide post	Serious	Improbable	Medium
17	35.80	No floodway marker	Install depth marker	Serious	Improbable	Medium
18	37.75	Floodway no depth marker (deep floodway)	Install depth marker	Serious	Improbable	Medium
19	38.10 – 38.90	Large edge drop – 80mm (15pprox..)	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
20	38.95km	Road widened to 7.2m. No line marking, signage or guide posts have been installed to widening or narrowing sections	Install line marking, signs and guide posts to widening and provide narrowing treatments to comply with Figure 1	Serious	Improbable	Medium
21	39.40, 41.50, 42.10, 43.50, 44.10, 45.00, 45.40	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium
22	45.32	Intersection Bushy Park Station LHS. Sight distance 330m East, 280m West	Lower crest to improve sight distances	Serious	Occasional	High



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
23	45.70	Narrowing of two-lane road to 4m, no signage provided. Broken lane line is installed to crest.	Modify treatment to comply with Figure 1 and AS1742.2. Provide barrier line marking	Serious	Improbable	Medium
24	69.75	Defective DIP sign	Install new sign	Serious	Improbable	Medium
25	69.77	Gem Tree Park Entry. Sight Distance 270m west, 330m east	Consider moving intersection 30m east	Serious	Occasional	High
26	71.70 – 72.60	Large drop off from seal to shoulder	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
27	73.00 – 75.00	Section of large drop off from the seal to shoulder	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
28	76.80	Edge on right hand batter failing	Undertake typical edge treatment to right hand side	Serious	Occasional	High
29	77.50	Edge drop	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	Serious	Occasional	High
30	83.00 – 84.20	Two lanes, with narrowing treatments at start and end. No signage or line marking provided	Modify treatment to comply with Figure 1 and AS1742.2	Serious	Improbable	Medium
31	83.85, 89.25, 89.70, 90.40, 90.80, 91.30, 92.10, 93.00, 93.40	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Serious	Improbable	Medium
32	94.00 – 95.00	Guide posts missing	Install guide posts	Serious	Improbable	Medium



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
33	96.35	Non frangible sign in clear zone	Move sign or provide frangible sign supports	Serious	Improbable	Medium
34	96.60	2 lane x 3m, 0.5m sealed shoulders. Narrowing treatment is mostly in compliance with standard treatment. W4-11 sign is used where a divided road changes to an undivided road not where a single lane road changes to a two-lane road. Whilst this is not in compliance with Australian Standards we don't believe this to be unsafe	Install guide posts and extend line marking in compliance with Figure 1.	Serious	Improbable	Medium
35	101.03	Culvert with headwall proud	Lower headwall	Serious	Improbable	Medium
36	108.80	Non-frangible sign in clearzone	Move sign or provide frangible sign supports	Serious	Improbable	Medium
37	120.87	Floodway sign facing wrong direction	Place correctly	Serious	Improbable	Medium
38	131.45	Floodway – two signs too close	Move signs	Serious	Improbable	Medium
39	141.57	Two signs too close together	Move Signs	Serious	Improbable	Medium
40	141.75	HRM Intersection – material loose and poses a skid hazard, line marking faded	Sweep loose material, reinstate line marking	Serious	Improbable	Medium
41	146.07	Harts Range Access Intersection, line marking faded	Reinstate line marking	Serious	Improbable	Medium
42	147.60	Floodway – no stormwater tail-out likely to cause ponding	Provide outlet drain	Serious	Improbable	Medium
43	148.90	Tree in clear zone	Remove tree	Serious	Improbable	Medium
44	156.73	Tree in clear zone	Remove tree	Serious	Improbable	Medium
45	161.00	Tree in clear zone	Remove tree	Serious	Improbable	Medium
46	167.35	Sealed section approaching truck parking bay, line marking faded	Reinstate line marking	Serious	Improbable	Medium
47	169.22	Tree in clear zone	Remove tree	Serious	Improbable	Medium



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
48	170.60	RH curve – limited sight distance – realign road	Realign road and/or remove vegetation to inside of curve	Serious	Improbable	Medium
49	171.80	Dip in road – no outlet formed	Provide tail out and signage	Serious	Improbable	Medium
50	172.40 – 172.70	Sealed floodway – washouts on approach	Regrade section on approaches	Serious	Improbable	Medium
51	174.29	Mt Eaglebeak Community intersection, no signage, sight distances 170m west – 400m west	Realign road to provide minimum sight distances	Serious	Occasional	High
52	180.69	Dead tree in clear zone	Remove tree	Serious	Improbable	Medium
53	180.01 – 186.60	Offlet drains and blocks drain uphill and in most cases are in the wrong direction. Road is significantly lower than surrounding terrain. Area will be subject to inundation	Raise road and construct tail out drain to grade away from road	Serious	Improbable	Medium
54	188.08	Tree in clear zone	Remove tree	Serious	Improbable	Medium
55	189.20	Tree in clear zone	Remove tree	Serious	Improbable	Medium
56	191.50 – 194.00	Road profile lower than surrounding terrain, offlet drains run uphill and in the wrong direction. Ponding and road failure likely	Raise road cross section and construct tail out drains correctly to drain away from the road	Serious	Improbable	Medium
57	195.55	Floodway – no signage	Install signage in accordance with AS1742.2	Serious	Improbable	Medium
58	200.90	Entry to Huckitta Station – Confusing intersection layout	Realign as T junction	Serious	Improbable	Medium
59	209.07	Tree in clear zone	Remove tree	Serious	Improbable	Medium
60	211.08	Floodway – with ponding and no tail-out	Provide tail-out to floodway	Serious	Improbable	Medium
61	218.16	Floodway sign damaged	Replace sign	Serious	Improbable	Medium
62	223.14	Tree in clear zone	Remove tree	Serious	Improbable	Medium



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
63	228.86	Intersection (Jinka turn off) – poor sight distance	Realign road and/or lower crest	Serious	Improbable	Medium
64	229.09	Crest – Sight distances 115m west – 220m east	Lower crest	Serious	Occasional	High
65	240.08	Crest – Sight distances poor	Lower Crest	Serious	Occasional	High
66	240.74	Floodway – no tail out	Construct tail out	Serious	Improbable	Medium
67	247.50	Tree in clear zone	Remove tree	Serious	Improbable	Medium
68	250.79	Floodway – poor drainage	Construct tail out	Serious	Improbable	Medium
69	243.00 – 245.00	Long straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue	Serious	Improbable	Medium
70	257.43km – 271.6km	Long straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue	Serious	Improbable	Medium
71	268.25	Tree in clear zone	Remove tree	Serious	Improbable	Medium
72	272.10	Tight curve with adverse superelevation	Reprofile road to provide appropriate superelevation	Serious	Improbable	Medium
73	273.08	Plenty River floodway – floodway sign damaged	Replace sign	Serious	Improbable	Medium
74	273.20	Crest – poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
75	273.60	Tree in clear zone	Remove tree	Serious	Improbable	Medium
76	273.95	Crest – poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
77	277.92	Crest, poor sight distance	Install crest signage and/or lower crest	Serious	Occasional	High
78	278.08	Intersection Jervois Station – Sight distance 210m west – 390m east	Lower approach crest to improve sight distance	Serious	Occasional	High
79	285.03	Crest – poor sight distance	Lower approach crest to improve sight distance	Serious	Occasional	High



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
80	295.44	Very poor sight distance leaving floodway crest. Tight right-hand curve follows crest	Realignment required in conjunction with improving sight distances at Lucy Creek turn-off	Serious	Occasional	High
81	295.77	PRP Lucy Creek Station Access, sight distances 500m east – 280m west.	Realignment of intersection required in conjunction with Bonya creek floodway	Serious	Occasional	High
117	51.30	Poor sight distance, end line marking	Install double barrier lines	Serious	Improbable	Medium



Table 8 – Table of Audit Findings – Lucy Creek Access

Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
82	0.25 – 5.90	Low lying formation approx. 1m lower than existing terrain, little or no gravel to formation	Raise road or construct new section adjacent to existing. Install tail out drains to daylight	Serious	Improbable	Medium
83	5.90	Crest – Sight distance poor	Lower crest and/or install signage	Serious	Occasional	High
84	6.30	Trees in clear zone both sides	Remove trees	Serious	Improbable	Medium
85	7.72	Low point, no drainage egress, water will pond	Construct tail out and formalise floodway	Serious	Improbable	Medium
86	13.71	Low point, does not drain	Formalise drainage and tail out	Serious	Improbable	Medium
87	14.20	Low point, does not drain	Formalise drainage and tail out	Serious	Improbable	Medium
88	14.50	Crest, poor sight distance	Lower crest and/or install signage	Serious	Occasional	High
89	15.04	Small floodway, poor drainage	Formalise drainage	Serious	Improbable	Medium
90	16.90	Floodway, poor drainage	Formalise drainage	Serious	Improbable	Medium
91	18.21	Access to mine intersection, poor angle of approach, sight distances >300m	Straighten approach and formalise intersection	Serious	Improbable	Medium
92	19.50	Loose material and poor formation	Grade and re-sheet	Serious	Improbable	Medium
93	22.36	Short curve, poor sight distance	Install advisory speed signs	Serious	Improbable	Medium
94	24.94	Crest, poor sight distance and tight RH curve after crest	Realign and lower crest, install advisory speed signs	Serious	Occasional	High
95	29.10	Formation too low, drainage issue	Raise section and install drainage	Serious	Improbable	Medium
96	30.11	Poor formation poor drainage	Re-sheet section and provide tailout drains	Serious	Improbable	Medium
97	31.07	Low profile and sub-standard drainage	Raise profile and provide drainage	Serious	Improbable	Medium
98	34.19	Dip, not sign posted	Install Signage	Serious	Improbable	Medium
99	35.12	Floodway – No signage	Install signage	Serious	Improbable	Medium



Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
100	36.27	Floodway – No signage	Install signage	Serious	Improbable	Medium
101	36.51	Floodway – No signage	Install signage	Serious	Improbable	Medium
102	37.45	Floodway – No signage	Install signage	Serious	Improbable	Medium
103	42.75	Floodway, no signage sharp curve	Install advisory speed signs and/or consider realignment	Serious	Improbable	Medium
104	45.70	Low point no drainage	Install tail out	Serious	Improbable	Medium
105	69.75	Access to airstrip, no signage and tight turn. Sight distances OK	Install advisory speed signage	Serious	Improbable	Medium



Table 9 – Table of Audit Findings – Bonya Airstrip Access

Issue No.	Road Chainage (km)	Audit Findings	Recommendation	Severity	Likelihood	Priority
106	0.00	Road Single Lane track approx. 4m wide, no formal drainage or wearing course	Track to be formalised drainage formalised from airport gate to community entry	Minor	Improbable	Low
107	0.05	Very tight RHT – Poor Formation	Re-align curve	Minor	Improbable	Low
108	0.25	Multiple trees in clear zone	Remove Trees	Serious	Improbable	Low
109	0.35	Tight Reverse curves	Straighten alignment	Serious	Improbable	Low
110	0.55	Tight Reverse curve	Straighten alignment	Serious	Improbable	Low
111	0.80	Tight Reverse curve	Straighten alignment	Serious	Improbable	Low
112	0.99	Floodway – poor construction and outlet. Erosion of formation	Formalise floodway and drainage	Serious	Improbable	Low
113	1.62	Tight Reverse curve	Straighten alignment	Serious	Improbable	Low
114	2.99	Right hand bend very tight and poor sight distance	Realign with larger radius	Serious	Improbable	Low
115	3.55	Floodway – poor sight distance	Improve vertical curve from floodway to improve sight distance	Serious	Improbable	Medium
116	3.73	Sharp LHT	Re-align horizontal alignment	Serious	Improbable	Medium

6. CONCLUDING STATEMENT

Consone Consulting has reviewed the documentation listed within Section 1.5 of this report and has inspected the nominated site. The primary objective of the audit was to identify any features, deficiencies within the existing road carriageway that could be removed or altered to improve the safety of the existing installation specifically with respect to heavy vehicles under the proposed traffic generation from the Jervois mine. The recommendations noted within this report are put forward for consideration by the client and subsequently the road authority for implementation.

We note that this report has been prepared such that the client (KGL) can develop a detailed Traffic Management Plan (TMP) as part of the overall mine Management Plan (MMP) to ensure the TMP takes into account specific issues when developing operational procedures for all mine transport users in relation to safety on the proposed route. These additional reports are in progress and will be finalised once feedback is received from key stakeholders. A detailed table is provided for stakeholders to provide comments in Appendix A.



Scott Walter

Senior Road Safety Auditor

APPENDIX A SUMMARY REPORT

Summary Report

Project Title: Plenty Hwy - Stage 6 Road Safety Audit	Road Safety Audit Stage: 6	Designer: n/a
Road Safety Auditors: Scott Walter, Adrian White (Consone Consulting)		
Road Controlling Authority: (DIPL)		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
01	Floodway line marking faded	Reinstate line marking	Medium		
02	Narrowing of two-lane road to 3.8m. Treatment is not in compliance with AS1742.2	Modify treatment to comply with Figure 1 and AS1742.2	Medium		
03	Guide post missing	Install guide post	Medium		
04	Edge of seal frayed, drop off to shoulders. Loose material on shoulders	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	High		
05	Guide post missing	Install guide post	Medium		
06	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	High		
07	Right hand curve edge failing	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to	High		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
		95% MMDD and trim to level			
08	Guide post missing	Install guide post	Medium		
09	No floodway marker	Install depth marker	Medium		
10	End of single lane, 2 lanes approach to railway	Modify treatment on approach and departure to comply with Figure 1 and AS1742.2	Medium		
11	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Medium		
12	Guide post missing	Install guide post	Medium		
13	Guide post missing	Install guide post	Medium		
14	Edge failing in 3 locations including significant drop off	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	High		
15	No signage at floodway	Install signage and depth markers in accordance with AS1742.2	Medium		
16	Guide post missing	Install guide post	Medium		
17	No floodway marker	Install depth marker	Medium		
18	Floodway no depth marker (deep floodway)	Install depth marker	Medium		
19	Large edge drop – 80mm (approx.)	Undertake typical edge treatment – top up existing shoulder with imported gravel	High		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
		material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level			
20	Road widened to 7.2m. No line marking, signage or guide posts have been installed to widening or narrowing sections	Install line marking, signs and guide posts to widening and provide narrowing treatments to comply with Figure 1	Medium		
21	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Medium		
22	Intersection Bushy Park Station LHS. Sight distance 330m East, 280m West	Lower crest to improve sight distances	High		
23	Narrowing of two-lane road to 4m, no signage provided	Modify treatment to comply with Figure 1 and AS1742.2	Medium		
24	Defective DIP sign	Install new sign	Medium		
25	Gem Tree Park Entry. Sight Distance 270m west, 330m east	Consider moving intersection 30m east	High		
26	Large drop off from seal to shoulder	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	High		
27	Section of large drop off from the seal to shoulder	Undertake typical edge treatment – top up existing shoulder with	High		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
		imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level			
28	Edge on right hand batter failing	Undertake typical edge treatment to right hand side	High		
29	Edge drop	Undertake typical edge treatment – top up existing shoulder with imported gravel material and mix to 150 – 200mm x 3m width. Compact to 95% MMDD and trim to level	High		
30	Two lanes, with narrowing treatments at start and end. No signage or line marking provided	Modify treatment to comply with Figure 1 and AS1742.2	Medium		
31	No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change.	Provide depth markers to all floodway's of known unfordable depth	Medium		
32	Guide posts missing	Install guide posts	Medium		
33	Non frangible sign in clear zone	Move sign or provide frangible sign supports	Medium		
34	2 lane x 3m, 0.5m sealed shoulders. Narrowing treatment is mostly in compliance with standard treatment. W4-11 sign is used where a divided road changes to an undivided road not where a single lane road changes to a two-lane	Install guide posts and extend line marking in compliance with Figure 1.	Medium		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
	road. Whilst this is not in compliance with Australian Standards we don't believe this to be unsafe				
35	Culvert with headwall proud	Lower headwall	Medium		
36	Non-frangible sign in clearzone	Move sign or provide frangible sign supports	Medium		
37	Floodway sign facing wrong direction	Place correctly	Medium		
38	Floodway – two signs too close	Move signs	Medium		
39	Two signs too close together	Move Signs	Medium		
40	HRM Intersection – material loose and poses a skid hazard, line marking faded	Sweep loose material, reinstate line marking	Medium		
41	Harts Range Access Intersection, line marking faded	Reinstate line marking	Medium		
42	Floodway – no stormwater tail-out likely to cause ponding	Provide outlet drain	Medium		
43	Tree in clear zone	Remove tree	Medium		
44	Tree in clear zone	Remove tree	Medium		
45	Tree in clear zone	Remove tree	Medium		
46	Sealed section approaching truck parking bay, line marking faded	Reinstate line marking	Medium		
47	Tree in clear zone	Remove tree	Medium		
48	RH curve – limited sight distance – realign road	Realign road and/or remove vegetation to inside of curve	Medium		
49	Dip in road – no outlet formed	Provide tail out and signage	Medium		
50	Sealed floodway – washouts on approach	Regrade section on approaches	Medium		
51	Mt Eaglebeak Community intersection, no signage,	Realign road to provide minimum sight distances	High		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
	sight distances 170m west – 400m west				
52	Dead tree in clear zone	Remove tree	Medium		
53	Offlet drains and blocks drain uphill and in most cases are in the wrong direction. Road is significantly lower than surrounding terrain. Area will be subject to inundation	Raise road and construct tail out drain to grade away from road	Medium		
54	Tree in clear zone	Remove tree	Medium		
55	Tree in clear zone	Remove tree	Medium		
56	Road profile lower than surrounding terrain, offlet drains run uphill and in the wrong direction. Ponding and road failure likely	Raise road cross section and construct tail out drains correctly to drain away from the road	Medium		
57	Floodway – no signage	Install signage in accordance with AS1742.2	Medium		
58	Entry to Huckitta Station – Confusing intersection layout	Realign as T junction	Medium		
59	Tree in clear zone	Remove tree	Medium		
60	Floodway – with ponding and no tail-out	Provide tail-out to floodway	Medium		
61	Floodway sign damaged	Replace sign	Medium		
62	Tree in clear zone	Remove tree	Medium		
63	Intersection (Jinka turn off) – poor sight distance	Realign road and/or lower crest	Medium		
64	Crest – Sight distances 115m west – 220m east	Lower crest	High		
65	Crest – Sight distances poor	Lower Crest	High		
66	Floodway – no tail out	Construct tail out	Medium		
67	Tree in clear zone	Remove tree	Medium		
68	Floodway – poor drainage	Construct tail out	Medium		
69	Long straight road	Consider providing bends or large horizontal radius alignment to	Medium		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
		reduce driver fatigue			
70	Long straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue	Medium		
71	Tree in clear zone	Remove tree	Medium		
72	Tight curve with adverse superelevation	Reprofile road to provide appropriate superelevation	Medium		
73	Plenty River floodway – floodway sign damaged	Replace sign	Medium		
74	Crest – poor sight distance	Install crest signage and/or lower crest	High		
75	Tree in clear zone	Remove tree	Medium		
76	Crest – poor sight distance	Install crest signage and/or lower crest	High		
77	Crest, poor sight distance	Install crest signage and/or lower crest	High		
78	Intersection Jervois Station – Sight distance 210m west – 390m east	Lower approach crest to improve sight distance	High		
79	Crest – poor sight distance	Lower approach crest to improve sight distance	High		
80	Very poor sight distance leaving floodway crest. Tight right hand curve follows crest	Realignment required in conjunction with improving sight distances at Lucy Creek turn-off	High		
81	PRP Lucy Creek Station Access, sight distances 500m east – 280m west.	Realignment of intersection required in conjunction with Bonya creek floodway	High		
82	Low lying formation approx. 1m lower than existing terrain, little or no gravel to formation	Raise road or construct new section adjacent to existing. Install tail out drains to daylight	Medium		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
83	Crest – Sight distance poor	Lower crest and/or install signage	High		
84	Trees in clear zone both sides	Remove trees	Medium		
85	Low point, no drainage egress, water will pond	Construct tail out and formalise floodway	Medium		
86	Low point, does not drain	Formalise drainage and tail out	Medium		
87	Low point, does not drain	Formalise drainage and tail out	Medium		
88	Crest, poor sight distance	Lower crest and/or install signage	High		
89	Small floodway, poor drainage	Formalise drainage	Medium		
90	Floodway, poor drainage	Formalise drainage	Medium		
91	Access to mine intersection, poor angle of approach, sight distances >300m	Straighten approach and formalise intersection	Medium		
92	Loose material and poor formation	Grade and re-sheet	Medium		
93	Short curve, poor sight distance	Install advisory speed signs	Medium		
94	Crest, poor sight distance and tight RH curve after crest	Realign and lower crest, install advisory speed signs	High		
95	Formation too low, drainage issue	Raise section and install drainage	Medium		
96	Poor formation poor drainage	Re-sheet section and provide tailout drains	Medium		
97	Low profile and sub-standard drainage	Raise profile and provide drainage	Medium		
98	Dip, not sign posted	Install Signage	Medium		
99	Floodway – No signage	Install signage	Medium		
100	Floodway – No signage	Install signage	Medium		
101	Floodway – No signage	Install signage	Medium		
102	Floodway – No signage	Install signage	Medium		
103	Floodway, no signage sharp curve	Install advisory speed signs and/or	Medium		

Auditors' input				Stakeholder Response (DIPL / KGL / GWA)	
Issue No.	Audit Findings	Recommendation	Priority	Accept Yes/No	Reasons/ Comments
		consider realignment			
104	Low point no drainage	Install tail out	Medium		
105	Access to airstrip, no signage and tight turn. Sight distances OK	Install advisory speed signage	Medium		
106	Road Single Lane track approx. 4m wide, no formal drainage or wearing course	Track to be formalised drainage formalised from airport gate to community entry	Low		
107	Very tight RHT – Poor Formation	Re-align curve	Low		
108	Multiple trees in clear zone	Remove Trees	Low		
109	Tight Reverse curves	Straighten alignment	Low		
110	Tight Reverse curve	Straighten alignment	Low		
111	Tight Reverse curve	Straighten alignment	Low		
112	Floodway – poor construction and outlet. Erosion of formation	Formalise floodway and drainage	Low		
113	Tight Reverse curve	Straighten alignment	Low		
114	Right hand bend very tight and poor sight distance	Realign with larger radius	Low		
115	Floodway – poor sight distance	Improve vertical curve from floodway to improve sight distance	Medium		
116	Sharp LHT	Re-align horizontal alignment	Medium		
117	Poor sight distance, end line marking	Install double barrier lines	Medium		

APPENDIX B AUDIT DATA SHEETS

Plenty Highway – Features / Deficiencies by Running Chainage

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
0.00km	01	2 x 3m lanes, 0.5m sealed shoulder RHS, 0.8m sealed shoulder LHS	
5.00km		Floodway line marking faded	Reinstate line marking
5.60km	02	Narrowing of two-lane road to 4m	Modify treatment to comply with Figure 1
9.85km		Missing guide post	Install guide post
12.7km – 21.54		Edge of seal frayed, drop off to shoulder. Loose material on shoulder	Undertake edge treatment to protect seal and grade shoulder
16.76km		Guide post missing	Install guide post
17.6km – 18.2km		Right hand curve edge failing	Undertake edge treatment to protect seal and reduce drop to shoulder
19.3km – 19.6km		Right hand curve edge failing	Undertake edge treatment to protect seal and reduce drop to shoulder
19.7km		Guide post missing	Install guide post
20.2km		No floodway marker	Install flood depth marker
21.4km		End single lane, 2 lanes approach to railway	Provide narrowing treatment on approach and departure to comply with Figure 1

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
21.8km		Railway line, 2 lanes on approach and departure. No narrowing treatment provided on either side.	Provide narrowing treatments on approach and departure to comply with Figure 1
22.05km		1 lane x 4m width	
23.96, 25.4, 27.60, 29.59, 32.50, 33.40, 34.40, 35.80, 37.70km		No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change. This is required so that vehicles entering a floodway do not encounter any deeper waters than what is encountered on entry to the floodway check video	Provide depth markers to all floodway's of known unfordable depth
24.95km		Guide post missing	Install guide post
27.30km		Intersection, sight distances > 400m west and east	
28.00km		Guide post missing	Install guide post
31.56km	03	Edge failing in 3 locations and significant drop off	Undertake edge treatment repairs
32.75km		Floodway narrows on approach	
33.40km		Floodway narrows on approach	
34.59km		No signage at floodway	Install flood way signs and depth markers
35.54km		Guide post missing	Install guide post

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
35.80km – 36.30km		Floodway – No depth marker	Install depth marker
37.75km		Floodway no depth marker (deep floodway)	Install depth marker
38.1km – 38.9km		Large edge drop (approx. 80mm)	Undertake edge repair transition to shoulder
38.95km		Road widened to 7.2m. No line marking, signage or guide posts have been installed to widening or narrowing sections	Install line marking, signs and guide posts to widening and provide narrowing treatments to comply with Figure 1
39.40, 41.50, 42.10, 43.50, 44.10, 45.00, 45.40km		No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change. This is required so that vehicles entering a floodway do not encounter any deeper waters than what is encountered on entry to the floodway	Provide depth markers to all floodway's of known unfordable depth
45.32km		PRP – Intersection Bushy Park Station LHS. Sight distance 330m East, 280m West	Improve sight distances
45.70km		Narrowing of two-lane road to 4m, no signage provided	Provide narrowing treatment to comply with Figure 1
45.90km		Poor sight distance to crest of deep floodway. Broken line installed	Install double barrier lines

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
47.60, 49.40, 49.90, 50.20km		No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change. This is required so that vehicles entering a floodway do not encounter any deeper waters than what is encountered on entry to the floodway	Provide depth markers to all floodway's of known unfordable depth
51.30km		Narrow section begins at Mueller Creek Floodway	Provide treatment in accordance with figure 1
51.30km	04	Poor sight distance end line marking	Install double barrier lines
52.0km – 52.6km		Large drop from seal to shoulder	Install edge treatment to edge of seal
54.0km – 54.3km		Poor edge at floodway exit	Undertake edge repair
51.30km		Depth marker to floodway is not installed at the correct level	Install depth marker with the zero-mark set at the lowest pavement level
57.3km		PRP Cattle Grid	
55.4, 55.5, 55.9, 60.4, 71.0, 71.7, 74.09, 74.40, 81.70, 83.10, 85.05km		No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change. This is required so that vehicles entering a floodway do not encounter any deeper waters than what is encountered on entry to the floodway	Provide depth markers to all floodway's of known unfordable depth

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
61.10km		Crest – sight distance 370m	
62.40km		Floodway	
63.05km		Floodway	
64.20km		Floodway	
68.05km		Floodway	
69.77km		Gem Tree Park Entry. Sight Distance 270m west, 330m east	Re-measure, consider moving intersection minimum 30m to the east
69.77km		Defective DIP sign	Install new sign
71.70 – 72.60km	05	Large drop off from seal to shoulder	Install edge treatment
73km – 75km		Section of large drop off from the seal to shoulder	Install edge treatment
73.70km		Cattle grid	
76.8km		Edge on RH Batter failing	Reinstate
77.5km		Edge drop	Install edge treatment
82.25km		Cattle grid	
84.01km		PRP Delmore Downs Intersection. Sight distance > 500m	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
83.00 – 84.20km		Two lanes, with narrowing treatments at start and end. No signage provided	Provide narrowing treatments on approach and departure to comply with Figure 1
83.85, 89.25, 89.70, 90.40, 90.80, 91.30, 92.10, 93.00, 93.40km		No depth markers provided to floodway's. All floodway's have longitudinal vertical curves through the floodway sections. Floodway's should be designed and constructed such that the level through the floodway section does not change. This is required so that vehicles entering a floodway do not encounter any deeper waters than what is encountered on entry to the floodway	Provide depth markers to all floodway's of known unfordable depth
86.05km		Steep embankment – no treatment required	
87.20km		Steep embankment – no treatment required	
87.70km		Culvert, headwall proud	
88.00km		Crest, sight distance okay	
88.7km		Culvert – well clear	
93.80km		Small culvert okay	
94.04km		Intersection – Sight distances >500m	
94-95km		Guide posts missing	Install guide posts
96.35km		Non frangible sign in clear zone	Move sign or provide frangible sign supports

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
96.60km		2 lane x 3m, 0.5m sealed shoulders. Narrowing treatment is mostly in compliance with standard treatment. W4-11 sign is used where a divided road changes to an undivided road not where a single lane road changes to a two-lane road. Whilst this is not in compliance with Australian Standards we don't believe this to be unsafe	Install guide posts and extend line marking in compliance with Figure 1.
96.87km		PRP	
96.90km		Cattle grid	
97.50km		Floodway – signage compliant	
97.91km		Intersection – Sight distances > 500m	
98.45, 99.50, 102.87, 103.4, 104.65, 105.10, 105.50, 105.95, 107.25, 108.80, 110.50, 117.10, 119.52, 122.34, 123.50km		Floodway – signage compliant	
101.03km		Culvert with headwall proud	Lower headwall
101.70km		Floodway and relief culvert	
102km -103km		Reduced clear zone through cutting	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
104.00km		Floodway and PRP	
108.80km		Non-frangible sign in clearzone	Move sign or provide frangible sign supports
117.41km		Intersection Mt Riddick – Sight distances > 500m	
120.87km		Floodway sign facing wrong direction	Place correctly
124.65km		Steep embankment – 4:1 – Drop 2.2-2.5m – no treatment required	
124.83 – 125.22km		Steep Embankment – 4:1 – Drop 2m – no treatment required	
125.80 – 126.0km		Steep Embankment – 4:1 – Drop 2m – no treatment required	
126.20 – 126.70km		Steep Embankment – 4:1 – Drop 2m – no treatment required	
127.00km		Floodway and culvert	
127.83km		Floodway and culvert	
128.40km	06	Steep embankment – 4:1 – 3.5m high following horizontal curve – no treatment required	
129.40, 130.95, 131.45, 132.09, 132.99, 134.30,		Floodway, signage compliant	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
134.88, 135.23, 135.90, 136.23, 136.67, 137,20, 139.17, 139.65, 139.97, 140.40, 140.94, 141.23, 142.58, 143.65, 144.33			
131.45km		Floodway – two signs too close	Move signs
138.70km		Construction Site entry – Sight distances > 400m	
141.57km		Two signs too close together	Move Signs
141.75km		HRM Intersection – material loose and skid hazard, sight distances > 400m, line marking faded	Sweep loose material, reinstate line marking
143.42km		Intersection Harts Range Races, line marking faded, sight distances > 400m	Reinstate line marking
144.90km		Entry to Police Station – Sight distances > 300m	
146.07km		Harts Range Access Intersection, line marking faded, sight distances > 300m	Reinstate line marking
146.31km		End of seal. Gravel road, formation width varies, approx. 4m traffic lanes and 1m shoulders	
147.60km		Floodway – no tail out causing ponding	Provide outlet drain

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
148.1, 152.09, 154.33, 154.79, 155.96, 162.84km		Floodway – Reasonable condition	
148.90km		Tree in clear zone	Remove tree
156.73km		Tree in clear zone	Remove tree
159.75km		Pastoral Entry – Sight distances > 500m	
161.00km		Tree in clear zone	Remove tree
161.16km		Intersection Bins Track – Sight distances > 400m	
167.35km		Sealed section approaching truck parking bay, line marking faded	Reinstate line marking
167.40km		Entry truck parking bay	
168.04km		Exit truck parking area	
168.24km		End of seal – start of gravel road	
169.22km		Tree in clear zone	Remove tree
170.60km	07	RH curve – limited sight distance – realign road	Realign road and/or remove vegetation to inside of curve
171.80km		Dip in road – no outlet formed	Provide tail out and signage

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
172.4km – 172.7km		Sealed floodway – washouts on approach	Regrade section on approaches
174.15km		Cattle Grid	
174.29km		Mt Eaglebeak Community intersection, no signage, sight distances 170m west – 400m east	Realign road to provide minimum sight distances
177.8km		Entry to cattle yards – Sight distances > 400m	
180.69km		Dead tree in clear zone	Remove tree
180.01km – 186.60km		Offlet drains and blocks drain uphill and in most cases are in the wrong direction. Road is significantly lower than surrounding terrain. Area will be subject to inundation	Raise road and construct tail out drain to grade away from road
185.3km		Intersection – Sight distances > 500m	
185.8km		Intersection – sight distances > 500m	
186.91km		PRP cattle grid	
188.08km		Tree in clear zone	Remove tree
189.20km		Tree in clear zone	Remove tree
189.44km		Floodway – satisfactory	
192.24km		Entry Indiana – Sight Distances > 400m	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
191.50km – 194km		Road profile lower than surrounding terrain, offlet drains run uphill and in the wrong direction. Ponding and road failure likely	Raise road cross section and construct tail out drains correctly to drain away from the road
195.31km		Entry to bore access, site hidden	
195.55km		Floodway – no signage	Install signage
200.90km	08	Entry to Huckitta Station – Confusing intersection layout	Realign as T junction
201.20km		Cattle grid	
202.80km		Cattle grid	
205.60km – 206.80km		Road is lower than existing terrain, clay – loam section subject to failure/closure during wet weather	Raise section, gravel re-sheet
208.90km		Blackbird Bore Access – Sight Distances > 400m	
209.07km		Tree in clear zone	Remove tree
201.14, 210.89, 211.52, 212.24, 212.61, 213.02, 213.89, 214.15, 214.65, 214.90, 218.72, 227.47		Floodway's satisfactory	
211.08km		Floodway – with ponding and no tail-out	Provide tail-out to floodway

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
214.50km		Cattle grid	
214.00km		Formation narrows	
215km – 218km		Road is narrower and raised with batters	
218.16km		Floodway, sign damaged	Replace sign
219.84km		Cattle grid	
223.14km		Tree in clear zone	Remove tree
228.86km	09	Intersection (Jinka turn off) – poor sight distance	Realign road and/or lower crest
229.09km	10	Crest – Sight distances 115m west – 220m east	Lower crest
230.89km		Crest, sight distances okay	
232.20km		PRP Cattle Grid	
234.18km		Crest – Sight distances okay	
235.58km		Crest – Sight distances okay	
240.08km		Crest – Sight distances poor	Lower Crest
240.74km		Floodway – no tail out	Construct tail out

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
247.50km		Tree in clear zone	Remove tree
248.51km		Pastoral access – Sight distances > 400m	
250.79km		Floodway – poor drainage	Construct tail out
257.43km		PRP Cattle Grid	
243km – 255km		Straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue
257.43km - 271.6km		Straight road	Consider providing bends or large horizontal radius alignment to reduce driver fatigue
268.25km		Tree in clear zone	Remove tree
268.90km		Crest - sight distances ok	
272.10km		Tight curve with adverse superelevation	Reprofile road to provide appropriate superelevation
273.08km		Plenty River floodway – floodway sign damaged	Replace sign
273.20km	11	Crest – poor sight distance	Install signage and lower crest
273.60km	12	Tree in clear zone	Remove tree
273.95km		Crest – poor sight distance	Install crest signage and/or lower crest

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
277.52km		PRP – Cattle grid	
277.76km		Floodway Marshall River	
277.92km	13	Crest, poor sight distance	Install crest signage and/or lower crest
278.08km	14	Intersection Jervois Station – Sight distance 210m west – 390m east	Lower approach crest to improve sight distance
279km		Cattle grid	
285.03km	15	Crest – poor sight distance	Install signage and/or lower crest
293.97km		Bonya intersection – Sight distances > 400m	
295.29km		Bonya Creek Floodway	
295.44km		Very poor sight distance leaving floodway crest. Tight right hand curve follows crest	Realignment required in conjunction with improving sight distances at Lucy Creek turn-off
295.77km	16	PRP Lucy Creek Station Access, sight distances 500m east – 280m west.	Realignment of intersection required in conjunction with Bonya creek floodway

Lucy Creek Access – Features / Deficiencies by Running Chainage

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
0.00km		Start of formed gravel road	
0.25km-5.90km	17	Low lying formation approx. 1m lower than existing terrain, little or no gravel to formation	Raise road or construct new section adjacent to existing. Install tail out drains to daylight
5.90km		Crest – Sight distance poor	Lower crest and/or install signage
6.3km		Trees in clear zone both sides	Remove trees
7.72km		Low point, no drainage egress, water will pond	Construct tail out and formalise floodway
8.00km		Improved gravel formation with drainage	
13.2km		Floodway drains satisfactory	
13.71km		Low point, does not drain	Formalise drainage and tail out
14.2km		Low point does not drain	Formalise drainage and tail out
14.5km		Crest, poor sight distance	Lower crest and/or install signage
15.04km		Small floodway, poor drainage	Formalise drainage
16.90km		Floodway, poor drainage	Formalise drainage
18.21km	18	Access to mine intersection, poor angle of approach, sight distances >300m	Straighten approach and formalise intersection

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
19.50km		Loose material and poor formation	Grade and re-sheet
22.36km		Short curve, poor sight distance	Install advisory speed signs
24.94km		Crest, poor sight distance and tight RH curve after crest	Realign and lower crest, install advisory speed signs
25.96km		Floodway – Satisfactory	
29.10km		Formation too low, drainage issue	Raise section and install drainage
30.11km		Poor formation poor drainage	Re-sheet section and provide tailout drains
30.60km		Better formation and gravel	
30.85km		Floodway – satisfactory	
31.07km		Low profile and sub-standard drainage	Raise profile and provide drainage
31.79km		Floodway satisfactory	
33.33km		Floodway satisfactory	
33.59km		Cattle grid – Station entry	
34.19km		Dip, not sign posted	Install Signage
35.12km		Floodway – No signage	Install signage
36.27km		Floodway – No signage	Install signage

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
36.51km		Floodway – No signage	Install signage
37.45km		Floodway – No signage	Install signage
42.75km		Floodway, no signage sharp curve	Install advisory speed signs and/or consider realignment
43.00km		Low point no drainage	Install tail out
45.33km		Access to airstrip, no signage and tight turn. Sight distances OK	Install advisory speed signage

Bonya Airstrip – Features / Deficiencies by Running Chainage

Note Running Chainages From Airstrip Gate to Plenty Highway

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
0.00km		Airstrip Gate Road Single Lane track approx. 4m wide, no formal drainage or wearing course	Track to be formalised drainage formalised from airport gate to community entry
0.05km		Very tight RHT – Poor Formation	Re-align curve
0.25km		Multiple trees in clear zone	Remove Trees
0.35km		Tight Reverse curves	Straighten alignment
0.55km		Tight Reverse curve	Straighten alignment
0.8km		Tight Reverse curve	Straighten alignment
0.99km		Floodway – poor construction and outlet. Erosion of formation	Formalise floodway and drainage
1.62km		Tight Reverse curve	Straighten alignment
1.63km		Cattle Grid	
2.1km		Formation widens 6m	
2.3km		Formation narrows	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
2.5km		40km/hr Zone Community Entry	
2.7km		Narrow sealed road	
2.99km		Right hand bend very tight and poor sight distance	Realign with larger radius
3.17km		Intersection and give way sign	
3.42km		Cattle Grid	
3.55km		Floodway – poor sight distance	Improve vertical curve from floodway to improve sight distance
3.73km		Sharp LHT	Re-align horizontal alignment
3.92km		80km/hr Section	
3.92km – 12.08km		Formation widens to 12m carriageway with good gravel formation	
12.08km		Intersection Plenty Highway – Refer Plenty Highway audit findings	

Plenty Highway – Features / Deficiencies by Running Chainage – Reverse Run

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
296.99km		Start Reverse Run	
295.99km		Lucy Creek Access Intersection	
295.77km		Trees hinder sight distance prior to floodway	Remove trees and vegetation
294.25km		Bonya Access Road Intersection – Good Sight Distance	
295.75km		Sight distance from crest at floodway poor	Realign floodway and RHT to Lucy Creek Intersection. Lower crest
279.24km		Cattle Grid	
278.14km		Jervois Rest Stop – Sight Distance OK Remove vegetation	Remove Vegetation to improve sight distance east
278.087km		Trees in clear zone at floodway. Floodway Marker to low (Only 1.4m). Sight distance poor on exit floodway	Remove Trees, Install flood marker 3m high, lower crest western end
277.52km			
273.90km		Crest – Poor Sight Distance west. Crest Signage in place	Lower Crest
273.70km		Formation too low. Poor sight distance heading west	
272.73km		Atula Intersection. Sight Distance 170m east - > 300m west	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
272.10km		Superelevation reverse camber RH Bend	Reprofile to correct superelevation
277km – 265.78km		Poor Formation material.	Re-sheet with gravel, improve drainage
257.73km		PRP Cattle Grid	
251.70km		Floodway – OK	
248.80		Floodway – poor drainage	Improve outlet to floodway
248.51km		Pastoral Access – Sight Distance > 300m	
247.60km		Tree in clear zone	Remove Tree
240.86km		Floodway – Poor drainage	Improve outlet
244.15km		Crest – Poor sight distance, crest signage in place	Lower crest
242.22km		Floodway – ok	
240.10km		Crest – poor sight distance, signage in place	Lower crest
240.22km – 237.40km		Poor wearing surface – poor drainage	Re-sheet and improve drainage
235.70km		Crest – sight distance poor west, no signage	Lower crest and install signage
234.40km		Crest – sight distance poor west, no signage	Lower crest and install signage

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
232.20km		PRP Cattle grid	
231.20km		Crest – sight distance poor west, no signage	Lower crest and install signage
229.30km		Crest – Measured previously, signage in place	Lower Crest
228.86km		Intersection Sight Distance > 300m	
228.40km		Floodway OK	
227.65km		Floodway OK	
223.14km		Tree in clear zone	Remove Tree
222km – 222.4km		Crash Sight. Sweeping curve, appears to have recent re-sheet. No obvious issues	
214.50km		Cattle Grid	
210.00km		Poor horizontal curve	Re-align
207.90km		Crash Site. No obvious issues – likely corrugation	Undertake maintenance
204.60km		Wearing material improves to good quality gravel	
203.00km		Cattle Grid	
201.81km		Huckitta Intersection – two single entries to intersection	Review

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
201.38km		Cattle Grid	
197.50-196.50km		Poor surface material and drainage	Re-sheet and improve drainage
195.55km		Floodway – ok	
192.38		Indiana Intersection – sight distances ok	
192.38km		Poor surface material	Re-sheet
192.38km		Floodway	
186.91km		PRP	
186.91km- 186.45km		Sealed Section – Truck rest stop	
167.80km		Pastoral Access – Sight distance > 300m	
166.03km		Floodway – no signage	Install Signage
164.90km		Crash Site, RH bend, superelevation reversed, high corrugation	Re-grade to correct super and maintain
163.25km		Floodway – no Marker	Install depth marker
161.00km		Crash Site – table drain block in clear zone	Move table drain block from clear zone

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
153.90km		Crash Site (Fell off bike) Uneven surface poor sight distance	Maintain surface – improve sight distance
156.21km		Floodway – No marker	Install floodway marker
154.60km		Floodway – No marker	Install marker
151.90		PRP	
148.60km		Floodway – no marker	Install marker
148.05km		Floodway – no marker	Install marker
148.00km		Crash Site (Animal not ridden) – No obvious issues	
144.94km		Floodway – ok	
143.74km		100km speed limit	
143.13km		Floodway – ok	
142.25km		Floodway – ok	
141.73km		Floodway – ok	
141.40km		Floodway – ok	
141.03km		Floodway – ok	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
140.55km		Floodway – ok	
140.15km		Floodway – ok	
139.73km		Floodway – ok	
137.60km		Floodway – ok	
137.17km		Floodway – ok	
136.75km		Floodway – ok	
136.45km		Floodway – ok	
135.70km		Floodway – ok	
135.40km		Floodway – ok	
134.70km		Floodway – ok	
133.50km		Floodway – ok	
132.60km		Floodway – ok	
132.00km		Floodway – ok	
130.60km		Floodway – ok	
129.80km		Floodway – ok	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
127.40km		Floodway – ok	
126.91km		Floodway – ok	
126.30km		Floodway – ok	
125.21km		Culvert and floodway	
124.11km		Floodway – no signage	Install signage
122.91km		Floodway – ok	
122.33km		Floodway – ok	
119.30km		Floodway – ok	
117.65km		Floodway – ok	
116.20km		Crash site (ran off road) – No visible issues	
113.85km		Floodway – ok	
113.57km		Floodway – ok	
113.00km		Floodway – ok	
112.20km		Guide Post missing	Replace Guide post
111.57km		Floodway – ok	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
111.04km		Floodway – ok	
109.42km		Floodway – ok	
109.00 – 108.6km		Line marking faded	Reinstate line marking
107.60km		Floodway on bend	
106.40k		Floodway – ok	
106.09km		Floodway – ok	
106.09km106.29km		Line marking Faded	Re-instate line marking
105.02km		Floodway – ok	
105.02km		Crash Site – Barrier line in place with limited site distance	Review
103.93km		Floodway – ok	
103.30km		Floodway – ok	
101.69km		Floodway – ok	
100.70km		Extend barrier line to limit overtaking due to site distance	Establish Barrier line
98.93km		Floodway – ok	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
97.30km		Crash Site – Start of Single lane at cattle grid	Review
93.70km		Floodway – No marker	Install marker
90.88km		Floodway – No marker	Install marker
90.15km		Floodway – No marker	Install marker
89.98km		Floodway – No marker	Install marker
88.50km		Crest no signage	Install signage
85.55km		Floodway – No marker	Install marker
84.70km		Floodway – No marker	Install marker
84.70km-84.20km		Dual Lane	
73.22km		Floodway no Marker – Crash Site Gem Tree Entry	Refer previous notes
72.45km		Floodway no marker	Install marker
67.32km		PRP	
51.00km		Widened section. Crash Site likely before widening installed	
50.00km		Crash site – Widened section, crash likely before widening	

Road Chainage	Photo No.	Item Description / Deficiency Description	Recommendation
55.00km		Poor edge to seal in multiple locations	Undertake edge treatment or widening
39.01km		Single Lane	

APPENDIX C PHOTOS



Photo 1 – Start of Plenty Highway



Photo 2 – One lane treatment Ch. 5.60km



Photo 3 – Edge failing



Photo 4 – Poor sight distance



Photo 5 – Large drop off from seal to shoulder



Photo 7 – Trees block sight distance through horizontal curve



Photo 8 – Confusing intersection layout – Huckitta Intersection



Photo 9 – Jinka turn off intersection – poor sight distance



Photo 10 – Insufficient sight distance to crest at Ch. 229.09km



Photo 11 – Poor sight distance to crest at Ch. 273.20km



Photo 12 – Trees in clear zone



Photo 13 – Poor sight distance to crest



Photo 14 – Insufficient sight distance to Jervois intersection



Photo 15 – Poor sight distance to crest



Photo 16 – Sub-standard horizontal curve immediately before Lucy Creek Access



Photo 17 – Poor pavement with low profile and no stormwater egress



Photo 18 – Site access, poor angle of approach

APPENDIX E – APPROVED ROAD TRAIN ROUTE (NTG)

Alice Springs Road Train Route





APPENDIX F – OVERSIZE VEHICLE PERMIT

Oversize/Overmass Permit Application

Name of Owner
Owner Address
Postal Address
Telephone No Fax No Email Address

Section 1 - Vehicle Details

Registration No Make Manufacturer's GVM Manufacturer's GCM

Section 2 - Trailer Details

Registration No..... Registration No..... Registration No.....
Description 1 Description 2 Description 3
Manufacturer's ATM Manufacturer's ATM Manufacturer's ATM

Section 3 - Mass Details (Do not complete this section unless seeking Overmass Permit)

A														
B														
C	>	><	><	><	><	><	><	><	><	><	><	><	><	<
D														
E														

A = Gross Weight per Axle Group B = Tyres per Axle C = Distance Between Axle Groups D = Tyre Size E = Dolly/Low Loader Spread

Section 4 - Load Details (Overall dimensions including vehicle/load)

Widthm. Heightm. Lengthm.
Rear Overhang (from centre rear axle group)m. Rear Projection (from rear of vehicle/trailer)m.
Period/Trips Required..... For Transport of (Indivisible Load)
Commencement Date/...../..... Time Expiry Date/...../..... Time
From To
Via
.....
.....

Privacy Statement: The Registrar of Motor Vehicles is required to collect information for Registrations, Licenses and Permits under section 92 of the *NT Motor Vehicles Act*. The Registrar adheres to the Department's Privacy Statement and the *Information Act*. Further information on privacy can be found at www.transport.nt.gov.au

Conditions: I, the undersigned, being the owner/owner's Agent of the vehicle(s) described above, do hereby apply for a permit to travel over the roads referred to herein, and understand that if such a permit is granted, it may be suspended without notice should the condition of the road deteriorate or for any other reason.

- It is the responsibility of the applicant to fill out all the information required, including a detailed route map and traffic management plan if required.
- It is the responsibility of the applicant to apply for a permit in sufficient time to allow it to be produced. A minimum of 24 hours notice is required for all permits, longer is required for width or height 5.0 metres or greater (see page 2).
- The exemption granted by this permit shall be NULL and VOID where there has been a failure on the part of the owner or other persons applying for this permit to disclose a material fact, or where there has been any misrepresentation of any material fact on the basis of which this exemption has been granted.
- It is the applicant's responsibility to advise all relevant authorities, in the event of a cancellation of the move.
- If any breach of the permit conditions occurs, the same will be declared NULL and VOID and immediately CANCELLED.

Signature Owners/Owner's Agent Date/...../.....

Method of Payment

Cash/Credit Card Number

Account Number..... Name on Card..... Expiry...../...../..... Insurance (Interstate Vehicles) YES / NO

REPLY FAX NUMBER: (08) 8951 5181

REPLY EMAIL: mvrpermits@nt.gov.au

START TIME:.....

Applicant Name..... Phone..... Fax.....
 Load..... Width..... Height..... Length
 From..... To..... Date of Move/...../.....
 Route.....

Note: It is the applicant's responsibility to seek any authorisations required.

☐ **TELSTRA** HEIGHT 5.0m and OVER - 7 DAYS PRIOR NOTICE

Applications are to be made direct to Telstra

Email High.Loads.Telstra@team.telstra.com

Fax (07) 3013 2607

Existing Telstra Permit Number (if applicable)

HLHBT -

Expiry Date

/ /

☐ **POWERWATER** HEIGHT 5.0m and OVER - 7 DAYS PRIOR NOTICE, 7.0m and OVER - 10 DAYS PRIOR NOTICE

Area / Phone / Email

- ☐ **Darwin** (08) 8995 5852
Proximitypermits.PWC@powerwater.com.au
☐ **Katherine** (08) 8973 9505
Proximitypermits.PWC@powerwater.com.au
☐ **Tennant Creek** (08) 8962 4762
Proximitypermits.Southern@powerwater.com.au
☐ **Alice Springs** (08) 8951 7234
Proximitypermits.Southern@powerwater.com.au

OFFICIAL USE

MOVE APPROVED

☐

NOT APPROVED

☐

Escort Required

☐

Escort Not Required

☐

Reason for non-approval – please provide at bottom of page

Signature.....Date / /

Full Name (Print)

☐ **DoI ROAD PROJECTS** HEIGHT 5.0m and OVER or WIDTH 7.0m* and OVER - 7 DAYS PRIOR NOTICE

Email: roadsdarwin.ntg@nt.gov.au

Phone

Fax

All Areas

(08) 8999 4699

(08) 8999 4682

Note: If Overmass, please fax/email both sides of this application (pages 1 and 2)

***DoI approval required if width greater than 4.0m and route includes Tiger Brennan Dve between Berrimah and Woolner**

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Observer Required

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Observer Not Required

☐

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☐ **NT POLICE** WIDTH 7.5m and OVER – Minimum 28 DAYS PRIOR NOTICE

Email: wideloadescorts.pfes@pfes.nt.gov.au

Phone

Fax

- ☐ **Darwin** (08) 8948 9111 (08) 8948 9134
☐ **Katherine** (08) 8973 8054 (08) 8972 2612
☐ **Tennant Creek** (08) 8962 0944 (08) 8962 4455
☐ **Alice Springs** (08) 8951 8879 (08) 8951 8877

OFFICIAL USE Police ID #

Police Assistance / Escort

☐

No Police Assistance

☐

Full Trip

☐

Metropolitan Area

☐

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☐ **COUNCILS** WIDTH 6.0m and OVER (Council Owned Roads Only) - Minimum 7 DAYS PRIOR NOTICE

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Fax

- ☐ **Darwin (Width 5.0m)** (08) 8930 0597 (08) 8981 8415
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☐ **Litchfield** (08) 8983 0600 (08) 8983 1165
☐ **Katherine** (08) 8972 5500 (08) 8971 0305
☐ **Barkly(Tennant Creek)** (08) 8962 0000 (08) 8962 1801
☐ **Alice Springs** (08) 8950 0519 (08) 8953 0558

OFFICIAL USE

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Reason for non-approval – please provide at bottom of page

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Full Name (Print)

☐ **BUILDING CERTIFIER**

Certifier Full Name (Print)

Certifier Registration #

CERTIFIER USE

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Permit Issued

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Permit Not Issued

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Reason for non-approval – please provide at bottom of page

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Reason for non-approval:



APPENDIX G – RESPONSE TO EIS COMMENTS SUMMARY



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

Stakeholder - CLC				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility
During both construction and operation phases of the project the company intends to use the Plenty Highway and Lucy Creek Road for access to the project area. The unsealed part of the Highway is the only route between Harts Range and Bonya. This section is also used for travel to communities across the Queensland border. Native title holders are concerned about traffic safety given the increase of heavy vehicles and the current condition of the road. The EIS (C-12 table 5.1) identifies that traffic volumes are slightly larger in the months December through to February than for the rest of the year. There may be increased traffic to communities to see family and participate in important cultural activities during the same time period. Due to the dire temperatures of this season the CLC recommends the risk mitigation strategy for the peak period be reviewed.	The supplement highlights the revised traffic figures for both construction and operations. NTG supplied traffic count data for the years 2017 and 2018 conclude that the months November to February experience significantly less traffic volumes than other times of the year. Road Safety Audit and road condition assessment were undertaken. Journey Management Plans highlight areas of concern. Lucy Creek Intersection is proposed to be upgraded and speed restrictions on areas of concern will be implemented. Road Safety seminars to be conducted with both communities and the public. Recommended areas of road upgrade identified and KGL are discussing acceleration of re-sheet program and re-sealing program. Emergency Response procedures will drastically reduce response times for the public using the road	Sections 6.1, 6.2, 6.3, 7.1, 7.2, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3, 9.4, 9.5,, 10.3 & 10.4	Final TMP to be developed. Journey Management Plan to be prepared by Qube. Generic JMP to be utilised by all KGL contractors. Intersection upgrades to be designed and built	
KGL Resources has not suggested any upgrades of the Lucy Creek / Plenty Highway access intersection. The company plans for triple and quad road trains to be used for transport and expect that these will use the full width of the Plenty Highway on left-in and right-out turning. The CLC recommends the company provide clarification on the sight conditions at the intersection and any measures that are proposed to alert approaching drivers.	All intersections along the proposed route have been assessed along the Plenty Highway and Lucy Creek Roads during the Road Safety Audit. This includes major intersections at the Lucy Creek mine access, Lucy Creek / Plenty Highway and the Plenty Highway and Stuart Highway intersections. Subsequent to the RSA concept layouts have been prepared for these intersections with swept path analysis completed which demonstrates triple road trains staying within lanes at the Plenty Hwy / Stuart hwy intersection and very minor crossover at the Lucy Ck / Plenty Highway intersection	Sections 6.5, 6.6, SK001, SK002, SK003, SK004 & SK005	Design and documentation of proposed upgrades. Approval in principal to be obtained from DIPL	Consone / KGL
The EIS states that mine operations will be scheduled for 47 weeks per year. KGL Resources should clarify when the Project will be operating so that local Aboriginal people can have better understanding of the operation.	Program of 47 weeks is an estimate only for provision of wet weather and possible closure of Plenty Highway to ensure damage to the road is minimised. Transportation of annual production will be completed in 47 weeks however the periods of transportation will be defined by rain events which will differ from year to year	Sections 5.2, 6.3	Nil	
The EIS (C-3) states that traffic for the Plenty Highway – unsealed section west of Huckitta station is expected to increase by 30% and traffic for the part of the Plenty Highway – between Huckitta Station and Lucy Creek Access will be close to double. Both of these sections were identified to have Crash Scores significantly higher than average. The CLC recommends that KGL Resources raise with the Northern Territory Government that the upgrade of the Plenty Highway needs to be kept high priority beyond the current planning up to year 2021. It is understood that KGL Resources wishes to commence construction of the mine before completion of the current schedule. The CLC recommends that the benefits of sealing the Plenty Highway between Harts Range and the Lucy Creek Intersection are viewed from the Project economics and the safety for workers in general including those from neighbouring communities.	A Road Safety audit and condition assessment has been undertaken along these sections. Recommendations from the audit and the TMP is for KGL to work with NT Government to investigate options for acceleration of re-sheeting program and sealing and widening of the single lane sections. A prioritisation of future works based on condition and road safety has been included in the supplement	Sections 6.2, 6.3, 8.1, 8.2, 8.3, 9.3, 9.4, 9.5	Further consultation with DIPL and review of recommended upgrade program	KGL
Native title holders are worried that the increased use of heavy traffic will deteriorate the road quality. The CLC recommends that constructive discussions between KGL Resources, Government and local Aboriginal contractors should be held to guarantee regular and targeted maintenance of the Plenty Highway.	The increase in traffic has been reviewed and new figures are included in the report. The current maintenance regime has been reviewed with DIPL and recommendations provided based on both road safety and road condition.	Sections 6.3, 8.3, 9.2	Increased maintenance grading, maintain current program for minor works to single seal edge treatment. Restrict use of the road by heavy vehicles in wet weather	KGL, DIPL
NT EPA				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility
Include Lucy Creek Access Road 194 on maps e.g. Figure 2-1 (only provided in additional regional features map and in Traffic and Transport Impact Assessment). Identify if borrow pits for access road construction materials will be located within the proposed disturbance footprint/clearing area and assess the potential environmental impact. This should include a map of their location, information about extent of clearing required and rehabilitation.	KGL are still in the process of assessing gravel requirements required for road construction. There are likely sources within the mine lease. An option being explored is to produce road base material from existing road through crushing and screening on-site material. Additional information will be provided in the design phase and mine management plan	Section 4.5	Investigation into local materials, design geotechnical investigation	KGL
Department of Tourism and Culture				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

The Traffic Management Plan and the Draft EIS do not provide information on the cumulative safety risks to travellers on the Plenty Highway from the interaction between the increased traffic on the Plenty Highway due to large mining vehicles and the proposed road works to upgrade the Highway. The impact of increased numbers of trucks on the overall road condition and other road users is also of interest, as well as impacts of increased dust from mine traffic on tourist locations such as Gemtree Caravan Park.	RSA and road condition assessment have been conducted. Draft TMP prepared with recommendations for best practice for road safety. Recommendations for increased road maintenance, prioritisation of upgrade works, intersection upgrades and speed restrictions in areas of concern. Revised AADT numbers provided based on additional traffic count data. Restrictions to be put in place with regard to wet weather. Safety reviewed with respect to emergency response and restrictions to operations through journey management plan	Sections 6.3, 6.5, 7.1, 7.2, 8.1, 8.2, 8.3, 9.3, 9.4, 9.5, 10.1, 10.2 & 10.3	Final TMP to be prepared and liaison with DIPL with regard to maintenance and upgrades	KGL
Department of Infrastructure Planning and Logistics - Transport Civil Services				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility
The Traffic Impact Assessment (TIA) in its current form, does not adequately address the impacts of the project on traffic and infrastructure. There does not appear to be a Traffic Management Plan for construction or operation. This hampers and limits this Departments ability to adequately assess the risks.	Revised figures for TIA have been included. RSA completed and road condition assessment completed. Presentation on Traffic Management for the mine presented and provided. Traffic Management Plan Development Section outlines proposed TMP. Risk assessment undertaken with transport company and KGL. Mitigation measures prepared and included in Draft TMP	Sections 7.1, 10.1, 10.2 & 10.3	Final TMP to be prepared with Mine Management Plan. Review with DIPL	KGL / DIPL
The proponent is required to submit its Traffic Impact Assessment (TIA) and a Traffic Management Plan (TMP) in its EIS, in accordance with Part 12 AUSTROADS, Guide to Traffic Management. This is mandatory to ensure the road authority can measure the proponent’s acknowledgement of the risks associated with project impacts on NTG Roads, infrastructure and road safety. The TIA is to include details on access, vehicle types, volumes of existing vehicles and increased traffic and other relevant matters, including a risk assessment to reflect how all roads and infrastructure will be affected. This includes impacts on commercial enterprises and tourist attractions and infrastructure with assumptions reflective of existing Department Policy and Guidelines and Australian Standards.	TIA has been revised and draft TMP developed with outline of all aspect of TMP development. Final TMP will be supplied on completion of design and Mine Management Plans. Risk assessment undertaken, RSA complete and road condition assessment provided. Revised figures for traffic generation including vehicle types, numbers and scheduling provided with details of journey management. Transport companies procedures to minimise effects outlined and contractual arrangements.	Sections 6.2, 6.3, 7.1, 8.1, 8.2, 8.3, 10.1, 10.2 & 10.3	Final TMP and review of JMP by DIPL	KGL / DIPL
The concerns with the underlying assumptions that have been applied throughout the TIA include, but are not limited to:				
• Both Plenty Highway/ Lucy Creek Access & Lucy Creek Access/Mine site Access intersection swept paths for triple road trains has been done with the “Due to very low traffic volumes at the intersection, it is expected that road trains would use the full width of the Plenty Highway & Lucy Creek Access when turning.”. This proposal is not safe due to the high speed environment.	Swept paths provided within the EIS supplement. Mine vehicles will operate at restricted speeds and assessment of intersections along the alignment conducted for light and heavy vehicles at the operating speeds (90 km/h heavy vehicles and 110 km/h light vehicles)	SK001 & SK002	Review DIPL / Design to be completed	KGL / DIPL
• Swept Path diagrams at the Stuart Highway/ Plenty Highway intersection for Triple road train need to be provided.	Provided and assessment undertaken. Triple road train movements are contained within single lanes for all movements	SK001 & SK002	Review DIPL / Design to be completed	KGL / DIPL
• Two accesses proposed to the site from Lucy Creek Access Road. Road Agency Approval process applies for access and road construction. Location of access will need to be assessed for safety and design criteria.	One access only to be utilised for mine and one access for accommodation village. Details provided	SK005 and Figure 2	Review DIPL / Design to be completed	KGL / DIPL
• Requirement of acceleration lane to the Stuart Highway (road trains turning from Plenty Highway) is not discussed in the report. This needs detailed consideration and discussion between the proponent and the Department.	Assessment undertaken and provided	Section 6.5	Review DIPL / Design to be completed	KGL / DIPL
• Risks to increased tourist and local traffic in the dry season for recreational activities are not identified, nor adequately addressed.	Risk assessment undertaken in conjunction with transport companies, JMP details provided and review of emergency procedures undertaken with NTPFES	Section 7.1, 7.2, 10.3	Review DIPL / Design to be completed	KGL / DIPL
Northern Territory Police Fire and Emergency Services				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility
The remote location of the operations (outside of our ERA) means that neither the Northern Territory (NT) Emergency Service or NT Fire and Rescue Service have an ability to respond to an emergency in a timely manner.	KGL have outlined equipment and personnel to supplement NTPFES resources in the region and proposed Emergency Response Plan and Procedures. Discussions will be ongoing to develop a solution that is appropriate to all from a safety and legal point of view	Section 10.3	Formal agreement to be established	KGL/NTPFES
The impact assessment is acknowledged – risk levels and residual impact rating applicable to: 1. Worker Code of Behaviour; 2. Road safety initiatives; 3. Road safety public awareness campaign; 4. Traffic Management Plan (TMP); 5. Provision of alternative transport arrangements to and from site; and 6. Workplace health and safety procedures. Further information is requested in relation to 2, 3 and 4 to assess the suitability of same. It is noted the existence of Traffic and Transport Impact Assessment study, actual TMP would be beneficial to determine suitability of mitigations and operationalisation of plans/activities arising from findings in study.	Road safety initiatives including risk assessment, Journey Management Plan, outline of best practice procedures and equipment all provided. Road safety public awareness plans by Qube provided. Outline of TMP development provided and draft TMP outline provided. Policies and procedures for safety outlined and contractual obligations	Sections 7.1, 7.2, 8.1, 8.2, 8.3, 10.1, 10.2 & 10.3		



KGL RESOURCES JERVOIS MINE – EIS SUPPLEMENT - TRAFFIC

In relation to issues of stress on existing road network it is noted in the Traffic and Transport Impact Assessment c-2 at page 13 that the proposed development is expected to generate 22 trips per day during construction and 33 trips per day during operation. Road trains are expected to account for up to eight double road train trips during construction and 20 trips during operation. Haulage is expected to be 150,000 tonnes of material per annum. This traffic flow is of concern particularly in relation to the attributing impacts on road conditions/surface in inclement weather and the resulting serviceability and safety of the road which will still serve as a significant local and tourist arterial road from the NT to Queensland. The recommendation that the proposed development contribute towards the cost of maintenance on the Stuart and Plenty Highway based on increase Equivalent Standard Axles loading associated with the proposed mine is noted. As we are unable to locate any specifics on this commitment, it is difficult to determine the suitability of same and whether this recommendation will sufficiently address the concern noted. Further information in relation to this matter is requested, in particular scope and schedule of works for upgrades to assess compounding impacts for area. Ongoing communication with the NTPFES around upgrades to ensure priority is given to areas considered high risk areas.	Revised transport figures have been developed and provided. RSA and road condition assessment provided including recommendation prioritisation of re-sheeting, maintenance and future upgrades for further discussion with DIPL. Recommendation provided to investigate acceleration of re-sheeting and upgrades provided. Intersection upgrades recommended. Final scheduling of upgrades are the responsibility of DIPL. Discussions will be ongoing between KGL and various Government Departments relating to any maintenance / upgrade contributions	Sections 6.3, 7.1, 9.2, 9.3, 9.4, 10.1, 10.2 & 10.3	Review maintenance and upgrade program by DIPL and negotiations with KGL to be undertaken	KGL / DIPL
It is noted reference to fly-in-fly-out (FIFO) service – FIFO service typically impacts policing services, similar FIFO models throughout the NT place significant stress on policing services policing the night time entertainment precincts i.e. Darwin during down time while FIFO are in transit from Darwin to their respective residential jurisdictions. Advice regarding application of same is necessity to inform consideration as to the suitability of existing policing footprint in Alice Springs to police the resulting night time pressures particularly in licensed establishments. Note compounding effect of four other unidentified projects occurring in the region at the same time.	Not applicable to Transport Supplement		Nil	
Tourism Central Australia				
Comments to EIS	Response From KGL	Relevant Sections of Supplement	Outstanding Actions	Responsibility
The Plenty Highway is frequented by tourists and freight vehicles and already places stress on the current infrastructure. Additional heavy weight vehicles will lead to faster degradation of the road and will result in unsafe conditions. Does KGL have any intentions of sealing the Plenty Highway to the Northern Territory border, or maintaining the formed earth road?	Assessment of road safety and condition prepared. Ongoing sealing program is being funded by both NT and Aus. Governments. Review and recommendation for prioritisation of maintenance and upgrades completed. Restrictions for wet weather is recommended and will be implemented. Best practice in transportation procedures and policies implemented. KGL do not plan to seal the public road and do not have any operational routes between site and the NT border	Sections 9.2, 9.3, 9.4,	Ongoing discussion with DIPL regarding maintenance and upgrade priorities	KGL / DIPL



APPENDIX H – DRAFT TRAFFIC MANAGEMENT PLAN

JERVOIS PROJECT TRAFFIC MANAGEMENT PLAN

JULY 12

**CONSONE CONSULTING PTY LTD
CLIENT: KGL RESOURCES**





Document History

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Revision A
Status: 2 – 12/07/2019



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DRAFT



1 INTRODUCTION

KGL Resources Pty Ltd (KGL) propose to develop new operations at the Jervois Mine site in the Anayte region of the Northern Territory.

The Traffic Management Plan describes procedures and protocols for site access, traffic routing and management, and company policy with respect to vehicle and employee transportation during the Jervois Mine construction and operations, and forms part of the overall Mine Management Plan (MMP) for the mine authorised by KGL.

Public, employee and contractor safety is the primary goal of KGL and this plan. KGL recognizes that the project traffic generation external to the site along the Plenty and Stuart Highways is on public roads and propose the development of strict policies and procedures that are to be adopted to ensure minimisation of disruption to the public and ensure safety of KGL employees, contractors and the public. The safety of tourists, who may lack local familiarity, are a special consideration.

External road construction and maintenance requirements are currently being developed in conjunction with the Department of Infrastructure Planning and Logistics (DIPL). Internal road layouts and design are currently being developed and will form an integral part of the final TMP.

As part of the approval process KGL have developed a Supplement to the Environmental Impact Statement (EIS), this Supplement provides a detailed outline of traffic volumes for both construction and operations. Section 10 of the Traffic Supplement outlines the premise of the development of the TMP and methodology of how the TMP has been developed. (Noting that the TMP is still in draft and will be finalised as part of the mine design).

This document is the first draft revision of the plan and has been prepared to support the Supplement to the EIS. The document describes the following:

- The consultation undertaken during preparation of this document.
- The legal and other requirements associated with management of traffic-related issues.
- Roles and responsibilities.
- Site access and traffic routes
- Traffic generation for both construction and operations
- Traffic management measures that would be implemented during the construction and life of the Project.
- Contractual obligations of employees and contractors – specifically those utilising the Stuart and Plenty Highways
- Risk Management
- Incident reporting.
- Competence training and awareness and inductions.
- Document review.



2 STAKEHOLDER ENAGEMENT

2.1 General Stakeholder Engagement

Consone Consulting's team have undertaken individual consultation sessions with Key Stakeholders and in conjunction KGL and QUBE (preferred transportation for concentrate) provided a detailed presentation of Road Safety Audit (RSA) for the Plenty Highway findings, proposed transportation procedures and proposed operational procedures for transportation to and from the mine. Consultations undertaken are summarised in the following table

2.2 Central Land Council – Indigenous Communities

The Central Land Council raised a number of concerns that local indigenous communities have raised with respect to the increase in traffic and other additional aspects of the proposed mine development and operations; these are summarized following with responses that the KGL team have provided the CLC.

Item Raised CLC	KGL Response
Operational Times (47 Weeks)	KGL explained that there are no specific times listed for their operations with 47 weeks of transportation of product estimated per year which was adopted post review of possible road closures due to inclement weather. Accordingly, the periods of inactivity will vary from year to year based on weather events. Contractual terms with the transportation provider are being negotiated on a 47-week program and this has been adopted in calculation of estimated traffic volumes.
Concern raised that there may be multiple road trains congesting the road and making it difficult for road users to overtake	QUBE highlighted that vehicles will be staged to a maximum of one road train per hour in each direction. Three vehicles would utilise the road per day with 2 return trips (for product only). This equates to a total of 12 trips per day meaning vehicles can be staged to a maximum of four hours apart in each direction. For construction and transportation



Item Raised CLC	KGL Response
	of consumables the same restrictions will apply.
Concern raised regarding Lucy Creek Intersection	KGL have advised that the intersection will be upgraded and likely sealed.
Concerns regarding Road Safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to CLC and accepted as being industry best practice. KGL indicated that all staff and contractors will contractually required to implement safety measures such as a generic journey management plan included in the traffic management plan
Concerns over number of vehicles	Revised numbers presented and accepted
CLC highlighted the desire to see the full section of gravel sealed	Consone noted that they will be working with government to highlight deficiencies in the network – including safety concerns raised with NT Government regarding single lane seal sections. It was accepted that there are budgetary restrictions and a focus should be made on upgrading the sections that will provide the best benefit. Furthermore, it is noted that an additional 26km of unsealed road is currently programmed for design or construction with the expectation that construction for these sections will be completed prior to the operational phase of the project. This will result in a total of approx. 60% sealed road between the mine site and the Stuart Hwy at the time of commencement of operations.



Item Raised CLC	KGL Response
Concern raised regarding alcohol and drivers under the influence	KGL have confirmed previous advice that the mine will be a dry site – alcohol free
Safety Concerns	KGL and Qube provided a presentation on best practice. In addition, Qube have indicated that they and KGL are happy to provide educational presentations and information sessions to road users and local communities.

2.3 Department of Infrastructure Planning and Logistics

Consultation with DIPL involved meetings with both the Darwin based representatives that manage the road network across the territory and the local Alice Springs representatives that are responsible for maintenance and upgrades to the road network, specifically the Plenty Highway and Lucy Creek Access. The Darwin team's main concerns were around the appropriate upgrades to intersections and safety in general and also requested the development of the TMP. Consultation with the Alice Springs team was centred around current upgrade works for planning and ongoing maintenance.

Item Raised DIPL	KGL Response
DIPL AS – Concerns with heavy vehicles utilising new sections in the first months after a new seal has been placed and oxidation is not at a level to stop stripping of the stone (They noted these issues on the Tanami Road upgrades previously)	KGL indicated options would be explored such as maintaining detours for a period (though this is problematic with dust and traffic control). Another solution was to have temporary speed restrictions added to the journey management plans and TMP limiting the speed of heavy vehicles for a period post construction of the new seal
TMP Required	Agreed and a draft TMP (Subject to final design) is included in the supplement
Concern raised regarding Lucy Creek Intersection	KGL advised intersection will be upgraded and likely sealed. Consone noted appropriate



Item Raised DIPL	KGL Response
	assumptions would be included in this report and conceptual drawings have been provided
Concerns regarding road safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to DIPL and accepted as being industry best practice. KGL indicated that all staff and contractors will contractually be required to implement safety measures. In addition, Qube have indicated that they and KGL are happy to provide educational presentation and information sessions to road users and local communities such as a generic journey management plan included in the traffic management plan.
Updated traffic counts	Consone requested and these were received for the Plenty Hwy traffic count station closest the Stuart Hwy.

2.4 Police Fire and Emergency Services

Consultations were undertaken with the local Harts Range police officers and the regional command.

Item Raised PFES	KGL Response
Raised concern around ability of emergency services to respond	KGL and Qube highlighted the staggering of vehicles and that all vehicles would be equipped with satellite communications which would reduce any likely delays in reporting of incidents. In addition, KGL highlighted that the mine will have medical facilities, firefighting facilities and trained staff available 24/7. This will dramatically improve emergency response times from that currently experienced. It was



Item Raised PFES	KGL Response
	noted that due to insurances requirements KGL would only act on the request of PFES.
Concern on Road Condition	KGL indicated the TMP will have restrictions both on weight and wet weather operations – essentially KGL will work with PFES and DIPL in managing operations in wet weather
Concern raised regarding Lucy Creek Intersection	KGL advised intersection will be upgraded and likely sealed. Consone noted appropriate assumptions would be included and conceptual design included in this report
Concerns regarding road safety	Qube highlighted all safety requirements for vehicles and drivers. Presentation of all safety aspects was provided to DIPL and accepted as being industry best practice. KGL indicated that all staff and contractors will contractually be required to implement safety measures. In addition, Qube have indicated that they and KGL are happy to provide educational presentation and information sessions to road users and local communities such as a generic journey management plan included in the traffic management plan.

2.5 KGL

KGL have indicated they are happy to engage with the community to provide information sessions on a regular basis. Consultations with the Bonya Community are exploring the development of a road maintenance team from the community to undertake road maintenance in the region with KGL supporting this strategy.

2.6 Lucy Creek Station / Jervois Station

KGL have ongoing consultation with both the stations owners and are working to develop joint water supplies, road material supply and road maintenance.



3 LEGAL AND OTHER RESPONSIBILITIES

It is noted that this draft document has been prepared to support the Supplement to the EIS. As such no conditions for approval have been received at this stage. The following table outlines anticipated conditions of approval with respect to traffic. These requirements will be revised, and omissions included on receipt of approvals and development of the overall MMP.

- Intersection upgrades to be undertaken in accordance with the Traffic Supplement
- Monitoring and recording of concentrate transportation including reporting of product transported on a quarterly basis
- Details of approved transportation routes
- Procedures and requirements for transportation of oversized vehicles
- Provision and maintenance of Traffic Management Plan including:
 - Statutory requirements
 - Performance criteria
 - Program to monitor and report on incidents, complaints, non-compliance and improvement measures
 - Details of roles and responsibilities
 - Protocols for periodic review of the overall plan



4 ROLES AND RESPONSIBILITIES

ROLES	RESPONSIBILITIES
General Manager	Must ensure adequate resources are available to enable implementation of the plan
Mining Manager	Accountable for the overall environmental performance of the project including the outcomes of this plan
Mine OH&S Supervisor	Ensure implementation of the plan. Ensure employees and contractors are competent through training and awareness programs

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5 SITE ACCESS AND TRAFFIC ROUTES

5.1 External Traffic Routes

The proposed transport routes for construction and operations will include the following:

5.1.1 Route 1: Accommodation Village/Operations to Airstrip

The airstrip is located approximately 20km due north of the mine site. Access to the strip is via a 27km road trip along the Lucy Creek Access (Road 194). The route from site to the Lucy Creek Airstrip is shown following:

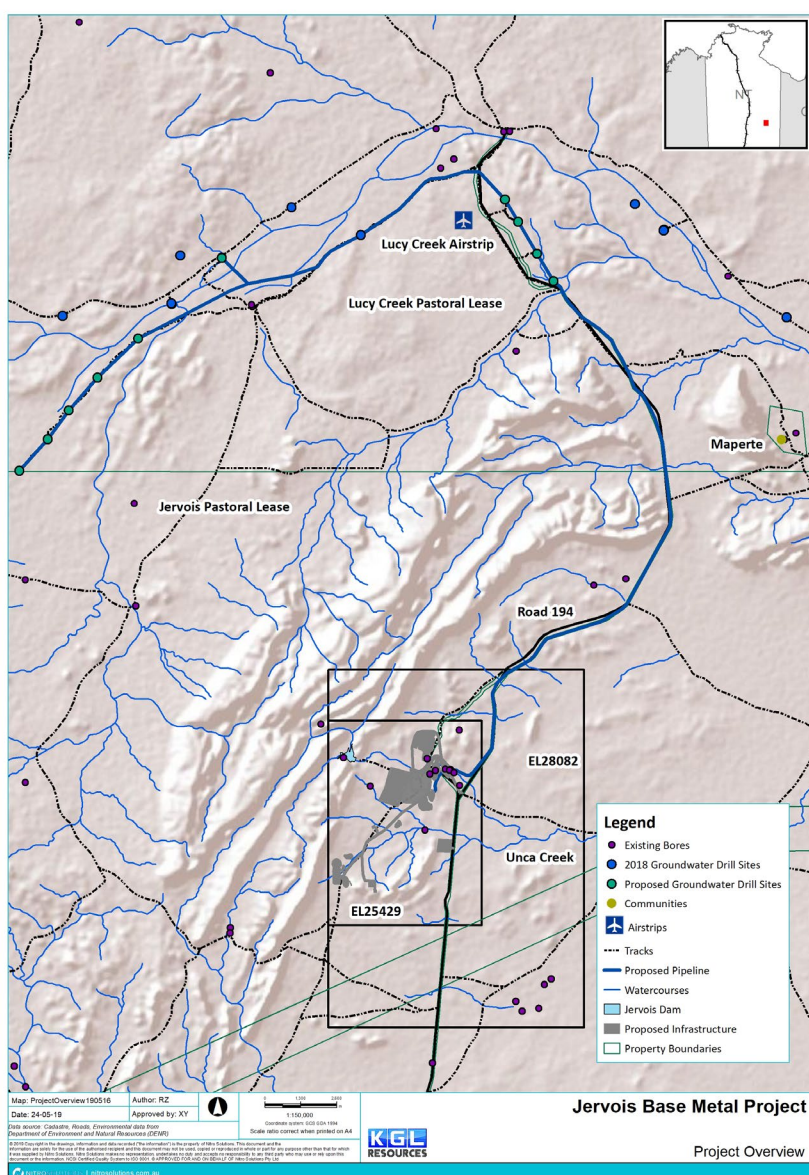


Figure 1 – Mine Access and Access to Lucy Creek Airstrip



5.1.2 Route 2: Accommodation Village to Mine Site

The proposed accommodation village will be located approximately 2.5km south of the mine site. Access to the mine site is via the Lucy Creek Access (Road 194) to its proposed intersection with the new camp access road. Refer Figure 2 for Location of Accommodation Village.

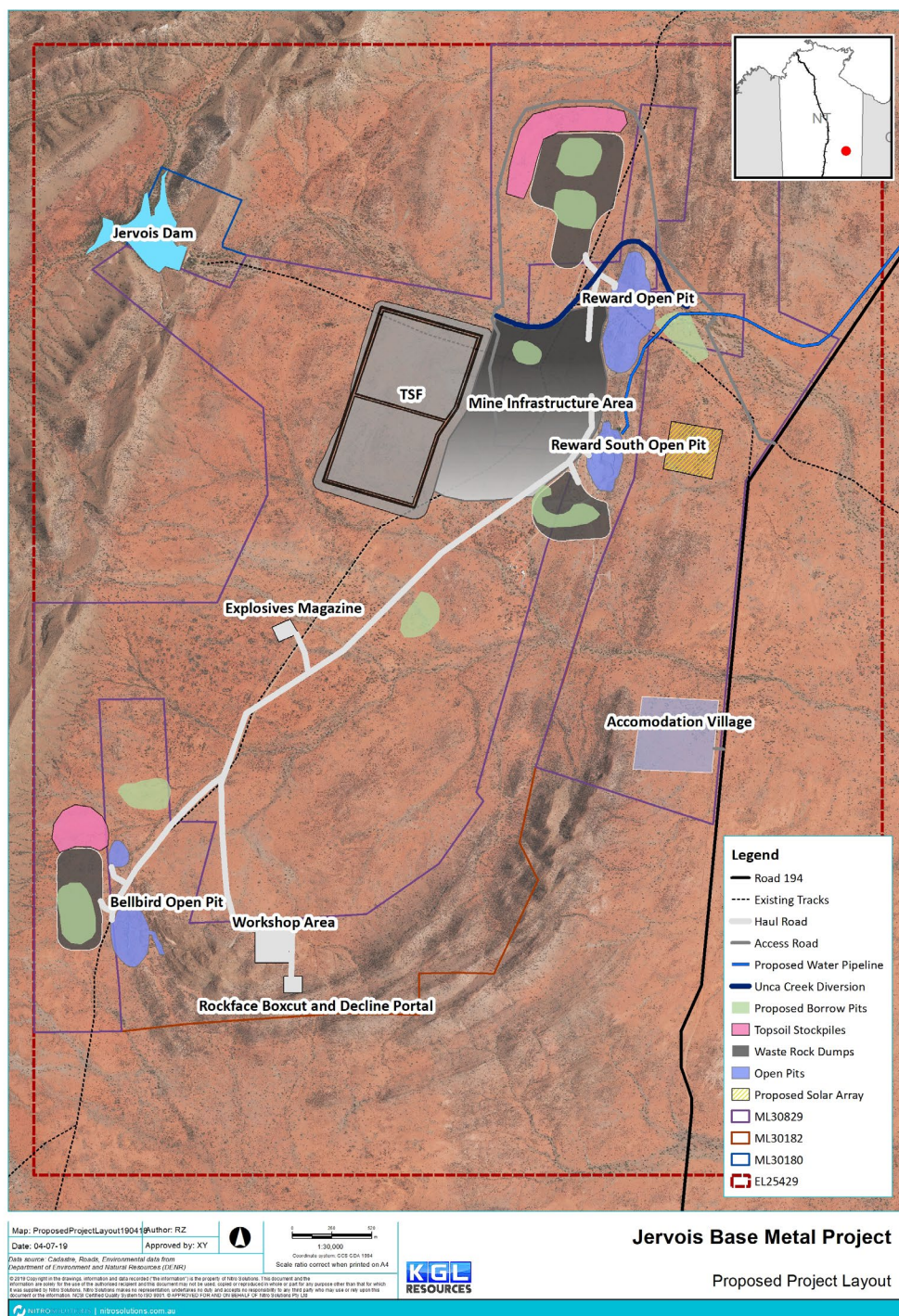


Figure 2 – Proposed Project Layout – Location Accommodation Village



5.1.3 Route 3: Alice Springs to Mine Site

The main transportation route is from the mine site to the rail storage facility in Alice Springs. This includes a leg which runs along the site access road before turning south onto Lucy Creek Access (Road 194). The route then travels in a southerly direction for a distance of 18.2km where it intersects with the Plenty Highway. Vehicles will then travel west along the Plenty Highway until meeting the intersection with the Stuart Highway, approximately 296km from the Lucy Creek Access turnoff. The final leg of the route encompasses travelling 67km south along the Stuart Highway before turning onto Smith Street and travelling a short distance to the railway yard. Movements upon entry to the Alice Springs township to the rail facility follow the NT Government approved Road Train Route – A copy of this is included in the Traffic Supplement.

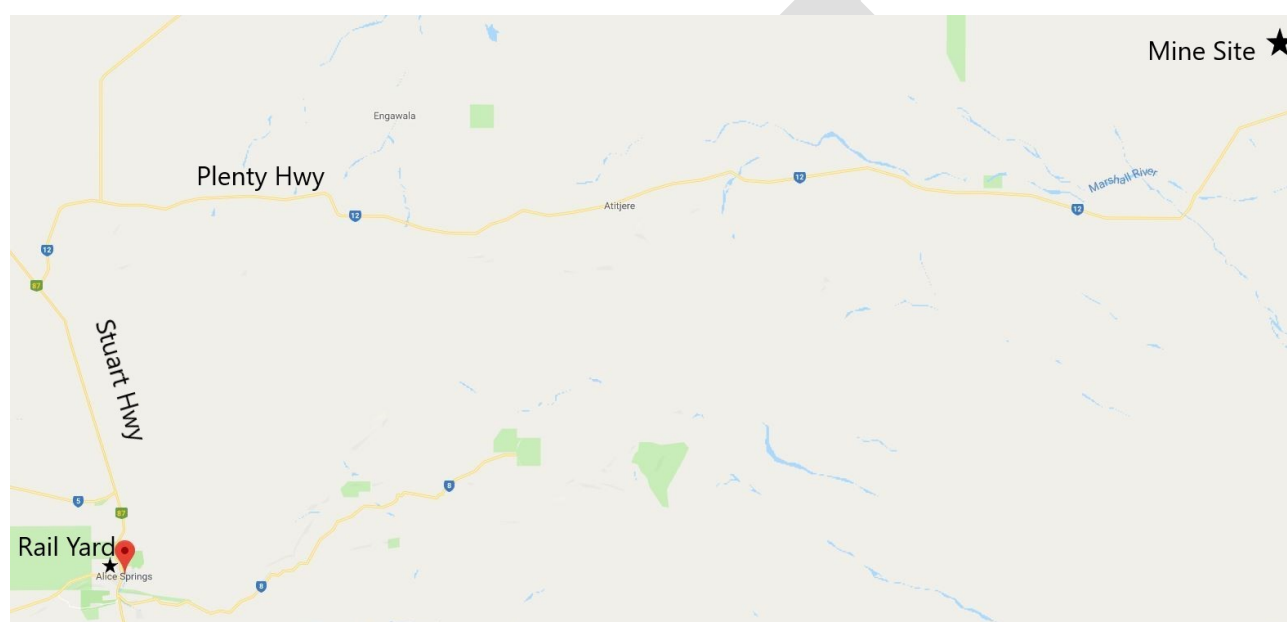


Figure 3 – Concentrate Transport Route

‘Image Landsat / Copernicus © 2018 Google’

5.2 Internal Road Layout

The internal road layouts are shown in Figure 2 – Proposed Project Layout



6 TRAFFIC GENERATION

6.1 Construction Traffic Generation

Estimates of construction traffic have been prepared by KGL by undertaking consultation with tenderers for the various components of the construction of the mine. These consultations have been undertaken with the suppliers / contractors for the following work packages:

- Process Plant and Infrastructure
- Mining Contractor
- Power Station
- Accommodation Village
- KGL Personnel and Equipment
- Fuel Supply
- Allowance for Miscellaneous Transport

A detailed program for each work package has been prepared and estimated vehicle trips over the 63-week construction period have been prepared from this. Suppliers / contractors were also requested to break down the type and size of vehicles into the following categories:

- Light Vehicle
- Semi-trailer truck
- Double Trailer Road-Train
- Triple Trailer Road-Train
- Oversize Load / Low Loader (No Pilot)
- Oversize Load / Low Loader (Pilot)
- Oversize Load / Low Loader (Police Escort)

The overall program and estimate of vehicles per trip on a weekly basis over the period of construction is nominated and this is included in the Supplement. A summary of the estimates is included in the following table.

Table 1 - Summary of Construction Traffic

Type of Vehicle	Return Trips Construction	Average V/Wk	Peak V/Wk	Peak V/Day	Length Peak (wk)	Period Peak
Light Vehicle	676	10.7	29	4.1	5	W55-W59
Semi-trailer truck	68	1.1	12	1.7	3	W57-W59
Double trailer road train	287	4.6	15	2.1	5	W46-W51
Triple trailer road train	6	0.1	3	0.4	2	W54-W55
Oversize Load/ Low Loader (No Pilot)	206	3.3	20	2.9	9	W3-W9
Oversize Load (Requiring Pilot)	50	0.8	8	1.1	2	W58-W59
Oversize Load (Requiring Police Escort)	24	0.4	7	1.0	2	W58-W59
Total Vehicles	1317	20.9	34-61	5-9	12	W47-W59



From the above table and review of the overall program it is clear that whilst the average of vehicles movements is relatively low (20 per week) there is a peak period of construction of approximately 12 weeks (Process Plant and Infrastructure) where the average number is 75% - 300% higher and there are other periods where the level of traffic is significantly lower. KGL are currently working with suppliers and contractors to ascertain if these vehicle movements can be spread out over an extended period. This is specifically the case for oversized vehicles where staggering of trips will reduce the impact to other traffic users.

6.1.1 Traffic Generation Operations

Mining operations are expected to ramp up early 2021 with nameplate capacity occurring in the second half of 2021. At this stage the mine site will be operational 24 hours a day, seven days a week with estimated production and transportation of 150 000 tonnes of product annually. The mine is expected to be operational for up to 52 weeks a year with transport of product occurring over 47 weeks annually. Transportation times are based on production estimates and historical climate data and subject to change dependent on weather events and production scenarios.

Operational traffic generation is summarised in the following Table - noting that these are a total of all movements i.e. in each direction.

Table 2 - Summary of Traffic Generation

USE	VEHICLE TYPE	VPW	VPD
Operations Phase			
Output - Concentrates	Triple Road Train	84	12
Input - Diesel	Double Road Train	16	2
Input - Consumables Other	Double Road Train	6	1
Transport Operations, Admin & Contractors Staff	40-Seater Road Coach	2	1
Transport Management	Light Vehicle	6	1
Transport Contractors	Light Vehicle	12	1
Operations Phase Total		126	18



7 TRAFFIC MANAGEMENT MEASURES

7.1 Journey Management Plans

All Qube cyclic transport routes across Australia have a safety management system that includes a journey management plan. This plan includes a detailed assessment of the transport route specifically centred around road safety and interaction with other road users. An example of a Journey Management Plan (JMP) has been provided in the Traffic Supplement. Qube propose to develop a JMP specific to the Jervois project and this will be developed taking into account the issues raised in the Traffic Supplement. This will be used as the basis of a generic JMP being developed as part of the final Traffic Management Plan.

It is anticipated that the JMP will include the following:

- Details of the proposed route
- Pre-start checklist for drivers in both directions
- Areas of concern for road safety as highlighted in the RSA
- Speed restriction zones including those specific to KGL personnel and contractors highlighted in Table Speed Restrictions
- Areas of concern with pavement wearing coarse especially in wet weather
- Emergency procedures
- Emergency Contact Details
- Procedures around dealing with oncoming traffic
- Location of all intersections and relevant point on the proposed route

7.2 Safety Policies

Qube have a number of overriding policies around road safety that KGL intend to replicate for all KGL operations relative to the operations at Jervois including:

- Zero tolerance to illicit drugs and alcohol – Qube drivers have instant dismissal for registration with any level of illicit drugs or alcohol within driver's bloodstream
- Instant dismissal for drivers who make hand contact with mobile phone
- Implementation of induction procedures to educate operators on all safety policies

7.3 Driver Education Seminars

Qube have had significant success previously with information and training sessions with regard to road safety and heavy vehicles. These sessions are undertaken at rest stops for caravan users in communities and schools to make people aware how to interact with road trains. Qube propose to undertake such seminars in Alice Springs, Gem Tree Park and at the communities of Bonya and Harts Range.



7.4 Specific Operational Requirements

7.4.1 Emergency Response Requirements

The NTPFES have indicated in the responses to the EIS that there are limited resources in the region to respond to emergencies along the Plenty Highway and Lucy Creek Access in a timely manner. KGL are preparing an Emergency Response Plan, this will be a formal controlled document as part of the Mine Management Plan and will cover operations other than traffic incidents such as establishment of a mine rescue team to be located in the vicinity of the administration area on the mine. Key aspects of the Emergency Response Plan are outlined following.

7.4.1.1 Emergency Response - Physical Infrastructure

As part of the Emergency Response Plan significant physical infrastructure will be developed at the mine early in the construction phase. This will include the following physical infrastructure:

- Mine Clinic – A fully equipped clinic will be established at the mine staffed by qualified paramedics; these staff will be contactable 24/7 on all days of operation of the mine. The clinic will be located at the administration area of the accommodation village.
- Ambulance building – A full equipped ambulance will be situated adjacent the clinic
- Firefighting Equipment – A fully equipped fire fighting vehicle with appropriately trained mine personnel
- Airstrip Upgrade – Either of the Bonya Community or the Lucy Creek Station airstrips is to be upgraded to enable FIFO operations from Alice Springs. As part of any upgrade the airstrips will be upgraded to enable night-time operations for the Royal Flying Doctor Service
- Mine Recovery Unit Infrastructure – Within the mine industrial area there will be an area for the storage of Emergency Mine Recovery unit equipment. This will include recovery vehicle and equipment. This will be staffed by appropriately trained mine staff.
- It will be a contractual requirement for all staff and contractors utilising the route to site to only utilise vehicles that are equipped with GPS tracking equipment, satellite communications, and first aid equipment.

7.4.1.2 Emergency Response Policies and Procedures

As part of consultation process KGL have undertaken several meetings with both the Regional Management of NTPFES and the local command at Harts Range. From these discussions an informal agreement has been reached that KGL would provide a supplement for regional emergency services through the facilities established at the mine. A specific requirement (for KGL Insurance) for KGL to provide additional emergency services to the region is that they would not provide services unless specifically requested by NTPFES. It is anticipated that a formal agreement be established with the following procedural requirements:



In the Event of Incident Reported to Police by the Public

Should an incident be reported to NTPFES by the public in the region of the Jervois mine Police may choose to contact KGL for assistance. In this event the contact for KGL will be the Mine OH&S Supervisor or in their absence the Mine Manager. Police may indicate the type and extent of assistance required and KGL would confirm availability and where appropriate mobilise personnel and equipment accordingly until such time as NTPFES can replace KGL personnel on-site. KGL may have the ability to mobilise the following (though this will need to be confirmed by KGL at the time of request – KGL do not guarantee availability)

- Ambulance and paramedic
- Mine rescue team in the event of trapped persons in vehicles
- Fire Services vehicle in the event of spilt fuel and/or fire
- Traffic control vehicles at appropriate locations to ensure other road users are aware of an incident and to prevent subsequent accidents occurring

In this event it is not anticipated that KGL will be required to contact pastoralist(s) or communities as this role will be undertaken by NTPFES.

Should medivac be required and requested by NTPFES, KGL will ensure airstrip is operational for RFDS.

In the Event of Incident being discovered or Involve KGL Personnel or Contractors

Should a traffic incident involve or be discovered by KGL staff or a KGL contractor, contact will be made with police and the Mine OH&S Supervisor (or Mine Manager should the Mine OH&S Supervisor not be available). Mine Management will contact the Harts Range Police in the first instance and procedures as listed above will be implemented.

7.4.2 Wet Weather Restrictions

In the event of moderate level of rainfall in the region (defined by the presence of standing water) KGL contractors and staff will be restricted from using heavy vehicles on the Lucy Creek Access Road and the Plenty Highway until such time as the routes are inspected and cleared for use by either the NTPFES or DIPL. It is expected that in the case of major rainfall events this will be for an extended period of time to enable maintenance plant to undertake repairs to the roads. It is likely that roads will be closed to the public by NTG during these events.

KGL in preparing the EIS have taken this into account for estimation of production and planning for deliveries and transportation of product to Alice Springs. Construction and mining operations are estimated to occur for 47 weeks each year, with an estimated 5 weeks of the year having access to the site being restricted.



7.4.3 Vehicle Speed Restrictions

KGL resources have implemented strict guidelines with respect to road safety for personnel and contractors utilising roads as part of the operations for the mine. This applies to speed of vehicles operating both internally within the mine and operating to and from the site. Speed restrictions will form part of the traffic management plan and are introduced to improve both safety to the public and those associated with the mine.

External Speed Restrictions

Speed restrictions are to be implemented for all KGL staff and contractors, these will apply to all roads being utilised to and from the site in accordance with the following table:

Table 3 – Operating Speed Restrictions

Road Section	Speed Restrictions		
	Public Vehicle	Heavy Vehicle	Light Vehicle
Whittacker St (Rail Yard to Smith St)	50km/hr	50km/hr	50km/hr
Smith St (Whittaker St to Stuart Highway)	50km/hr	50km/hr	50km/hr
Stuart Highway (Smith St to Dixon Rd)	60km/hr	60km/hr	60km/hr
Stuart Highway (Dixon Rd to Ch. 7.0)	70km/hr	70km/hr	70km/hr
Stuart Highway (Ch. 7.0 to 10.0)	80km/hr	80km/hr	80km/hr
Stuart Highway (Ch. 10.0 to 12.0)	100km/hr	90km/hr	100km/hr
Stuart Highway (Ch. 12.0 to 30.0)	110km/hr	90km/hr	110km/hr
Stuart Highway (Ch. 30.0 to – Ch. Plenty Highway)	130km/hr	90km/hr	130km/hr
Plenty Highway Ch. 0.00 to Ch. 295.77 - Lucy Creek Access	110km/hr	90km/hr	110km/hr
Lucy Creek Access Road	110km/hr	90km/hr	90km/hr

Additional restrictions to speed for KGL staff and contractors operating heavy vehicles along the Plenty Highway and the Lucy Creek Access Road are to be implemented at sections where the sight distances do not meet the required level. This occurs at certain intersections and at locations such as crests and horizontal curves. At these locations the speed will be limited to 80km/hr for 500m in both directions of the location. The nominated chainages that restriction occur are as follows:

Plenty Highway

- Ch 45.90km – Crest with poor Sight Distance
- Ch 51.30km – Crest with limited Sight Distance
- Ch 170.60km – Horizontal curve with limited Sight Distance
- Ch 174.20km – Mt Eaglebeak Intersection, insufficient Sight Distance
- Ch 229.09km – Crest with limited Sight Distance
- Ch 240.08km – Crest with limited Sight Distance



- Ch 273.20km – Crest with limited Sight Distance
- Ch 273.95km – Crest with limited Sight Distance
- Ch 277.92km – Crest with limited Sight Distance
- Ch 278.08km – Jervois Intersection, insufficient Sight Distance
- Ch 285.03km – Crest with limited Sight Distance
- Ch 295.44km – Crest with limited Sight Distance
- Ch 295.60km – Horizontal curve with sub-standard radius
- Ch 295.77km – The Lucy Creek Access Road and Plenty Highway Intersection

Lucy Creek Access

- Ch 5.90km – Crest with limited Sight Distance
- Ch 14.50km – Crest with limited Sight Distance
- Ch 18.21km – Horizontal curve with sub-standard radius

All restrictions to speed are to be included in the Journey Management Plans required for KGL staff, contractors and transportation companies. Refer Section 10 of the Traffic Supplement for details of the implementation of Journey Management Plans and Section 10 for contractual requirements. Modification to the Journey Management Plan and removal of restrictions will occur after defects have been rectified.

Internal Mine Roads Speed Restrictions

Internal roads within the mine site for operations will have posted speed limits and operational requirements to increase safety within the mine. The internal road layout for the mine is shown in Figure 2. These will typically be as follows:

- Internal Access Road to mine 60km/hr (Lucy Creek Road to Mine Infrastructure Area)
- Internal Haul Roads 60km/hr all vehicles (Reward Pit, Explosive Magazine Access, Bellbird Open Pit, Southern Workshop, Rockface decline portal, Reward South)
- A restriction to 20km/hr with 100m of specific mine infrastructure will apply including the southern workshop area, mine Infrastructure area, administration area and explosive magazine
- With regard to light vehicles utilising internal haul roads, access will be restricted to mine department management and mine department service light vehicles operating in areas where the mine haulage and operating equipment operate. To do so those personnel will undergo an additional level of training/induction specifically targeted at protocols for interacting with different equipment, as will be the case for operating light vehicles in the underground areas.

7.4.4 Oversized Vehicles

As listed in the traffic generation summary for the construction of the site it is anticipated that there will be a requirement for oversized vehicles to transport equipment to the site. Oversized Vehicles will require a Permit from the Northern Territory Government Department of Transport in accordance with the document “Permit Guidelines for Oversize and Overmass Vehicles – Version 6 February 2018” from



the Vehicles Standards Section. Permit applications are to be made to the Department of Transport on the appropriate application form and payment of the nominated permit fee. A copy of the Guideline is included in Supplement

The following table highlights the type and number of oversize vehicles predicted over the estimated 64-week construction program.

Table 4 – Oversize Vehicles

Vehicle Type	Total No Over 64 Weeks	Weekly Peak Over Period	Period That Peak Occurs
Oversize Load / Low Loader (No Pilot) ****	195	20	5
Oversize Load / Low Loader (Requiring Pilot)	50	10	1
Oversize Load / Low Loader (Requiring Police)	24	8	1

**** Note: Peak demand for oversized vehicle is for initial transportation for village construction and may be mobilised from Queensland. All other oversized vehicles are mobilised from South Australia via Alice Springs via a combination of rail and road.

7.4.5 Staggering of Heavy Vehicles Movements

During both the construction phase and the operations phase there will be a requirement to stage/stagger heavy vehicles movements to and from the site. This will require careful planning across the various different transport operators. Staggering vehicles will be required to ensure that disruption to public traffic through delays behind heavy vehicles by managing the distance between each heavy vehicle on the route. Thus, ensuring maximum passing opportunities.

Peak periods for oversize vehicles during construction are shown in the previous section (also in Appendix A of the Traffic Supplement) and total a maximum of 3-4 oversized vehicles a day over a period of 5 weeks. It is proposed that these be staggered with a period of three hours minimum between each vehicle.

Construction Peaks Heavy Vehicles

Analysis of the construction traffic generation was completed in section 6 and a detailed program and assessment is tabulated in the appendices of the Supplement. This showed a peak in heavy vehicle traffic between weeks 47 to week 59. It is anticipated that the peaks shown will be smoothed slightly to have a peak of heavy vehicles per week being in the order of 20 – 25 with approximately 50% being



over-sized vehicles. It will be policy of KGL that no more than 6 heavy vehicle movements are allowed each way per day.

It will be a requirement that these heavy vehicle movement be staggered at a minimum of 1.5 hours between each movement and that these movements occur only in daylight hours

Construction Peaks – Operational Phase

Construction peaks for the operational phase are simpler to predict with the operations being cyclic in nature. The estimated transportation of concentrate by Qube is 3 vehicles operating in two shifts per day. This equates to 6 vehicle movements in each direction for 47 weeks of the year. Qube Journey Management Plan will have scheduled times for each shift and each trip. Whilst the JMP is still being developed it is the intention that Qube vehicles will operate on a minimum 3-hour stagger in each direction.

The Qube timetable for vehicle movements will be distributed to other transportation contractors such that those contractors can schedule trips to ensure a 1.5-hour stagger between all heavy vehicles. Thus, an overall schedule of daily movements in each week will be developed and this schedule will be distributed to all companies and reviewed regularly by the KGL Mine OH&S Supervisor. Audits will be undertaken of the schedule as part of the audit process in the TMP.

7.4.6 Induction of Drivers and Pilots

All staff working for KGL or any of the transportation companies will be required to undergo a detailed induction course that will outline the following to any proposed driver or pilot:

- Overview of JMP
- Safety rules and procedures
- Requirement for mandatory drug and alcohol testing
- Internal mine safety requirements
- Emergency response procedures
- Speed restrictions and monitoring
- KGL internal policies and requirements



8 CONTRACTUAL REQUIREMENTS – TRANSPORT COMPANIES

All companies that will be involved in transporting materials to or from the mine will have specific contractual requirements to comply with as part of their contract. This will include but not be limited to the following:

- Strict compliance with zero drug and alcohol policy
- Strict compliance with speed restrictions outlined in the final TMP
- Induction of all personnel
- Vehicle safety requirements and equipment
- Requirement for compliance with generic JMP or operate under an approved KGL JMP
- Requirements for staggering of heavy vehicle movements and record keeping
- Incident reporting and corrective measures

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9 INCIDENT REPORTING

In the event of a traffic accident, incident or reported near miss or complaint in relation to a breach of the Driver's Code of Conduct, KGL- will initiate an investigation. The investigation will seek to determine:

- What occurred at the time of the incident;
- The root cause of the incident;
- Any contributing factors which led to the incident
- Whether appropriate controls were implemented to prevent the incident.

Corrective and/or preventative actions will be assigned to relevant responsibilities as a result of the investigation. Actions will be communicated through planning meetings and toolbox talks. If required, the Driver's Code of Conduct will be amended, and all drivers required to review the amended code. Outstanding actions will be monitored for their effectiveness upon completion.

All reports associated with complaints or incidents will be provided to DIPL and other agencies as required and will be retained for a period of no less than four years.

10 COMPETENCE TRAINING AND AWARENESS

All personnel shall undergo traffic awareness training. Traffic awareness training shall be a component of the competency-based site induction program. The following areas shall be covered in the induction:

- Driver's Code of Conduct.
- Operating hours for all vehicles.
- Approved routes for heavy vehicle site access.
- Speed limits on public and Project Site roads.
- Use of Journey Management Plans
- Incident response and reporting procedures in the event of a traffic accident or near miss.
- Expectations of behaviour on public roads.
- Contact phone number in the event of a complaint.

The Mine OH&S Supervisor shall be responsible for ensuring the appropriate Traffic Awareness training is included in the induction.



11 Document review.

11.1 Management and Auditing of TMP

The management of the KGL Traffic Management Plan for both construction and operational phases will be the responsibility of the Mine OH&S Supervisor and approval of the TMP will be the responsibility of the General Manager.

An audit of the TMP will be undertaken at minimum 6 monthly interval. The audit will review the following as a minimum

- Incident reporting including near misses
- Safety improvement measures to be implemented
- Programmed scheduling against actual trips undertaken
- Future programmed schedule
- Road condition update
- Programmed road upgrades
- Update to JMP where applicable