J Revised Road Impact Assessment

Report

Road Impact Assessment Kevin's Corner Coal Project (Mine)

12 JUNE 2012

Prepared for

Hancock Galilee Pty Ltd (HGPL)

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42626920

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Executive Summary

Hancock Galilee Pty Ltd is proposing to develop the Kevin's Corner Coal Project, a 30 Mtpa capacity open cut and underground thermal coal mine. The coal mine will be supported by privately owned and operated rail and port infrastructure facilities.

At the Project site the coal will be mined, washed and conveyed to a train load-out facility where it will be transported by rail approximately 495km to the east coast of Australia to the port facility of Abbot Point for export. The rail line from Kevin's Corner will join with the proposed rail line from the adjacent Alpha Coal Project.

Consultation with Barcaldine Regional Council and with the Department of Transport and Main Roads (DTMR) has taken place throughout the development of this study.

The traffic and transport assessment has determined that the impact of Project related traffic upon the performance of the major road network and associated intersections is insignificant and requires minimal mitigation measures.

Alternative methods of transport to the site are proposed as part of the Project. An on-site airfield and on-site accommodation facility within the Mine Lease Area will be constructed. Only a small proportion of employees will either drive or bus to and from the site from regional centres, such as Alpha, Barcaldine, Emerald and Clermont. The on-site accommodation facility is intended to be used by all personnel during their consecutive working days.

Consequently, the number of trips generated by the movement of employees during both the construction and operational phases of the Project will be significantly reduced thereby also reducing the impact of employee related transport on the public road network.

Increased traffic volumes arising from construction and operations activity will however have some direct impacts upon the design life and on-going maintenance of roads in the immediate vicinity of the Project site, including Clermont-Alpha Road, Jericho-Degulla Road and Degulla Road.

It should be noted that for purposes of this assessment the southern boundary of the Kevin's Corner site (i.e. southern access point) intersects Jericho-Degulla Road. However, upon completion of both the Kevin's Corner and Alpha Coal projects, access from the public road network to both sites will be via Degulla Road due to the closure of sections of the public road network and the construction of roads to bypass the site.

A summary of the recommended mitigation measures based on this traffic and transport assessment is provided in Table 1.

Executive Summary

Table 1 Summary of Recommended Mitigation Measures

Prior to Construction Phase Commencing	During Construction Phase	During Operational Phase
• Develop and complete an approved RUMP • Complete Construction Traffic Management Plans and Logistics Management Plans (if required as a result of the RUMP outcomes) • Undertake stakeholder consultation in relation to design and construction of bypass roads • Finalise on-site parking and circulation design • Finalise infrastructure / maintenance agreements with BRC for Degulla Road and Jericho-Degulla Road • Finalise infrastructure / maintenance agreements with DTMR for Clermont-Alpha Road • Develop and submit logistics plans for OD deliveries • Conduct detailed baseline pavement assessment for Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields)	• Upgrade Clermont-Alpha Road to a two-lane, all-weather surface between Hobartville Road and Degulla Road • Upgrade Degulla Road and Jericho-Degulla Road to a two-lane, all-weather surface between Clermont-Alpha Road and the Project site • Construct site access intersection(s) • Construct bypass roads • Upgrade the Clermont-Alpha Road / Degulla Road intersection • Perform regular pavement inspections along Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields) • Undertake maintenance works where required due to degradation of road infrastructure from Project vehicles	• Perform regular pavement inspections along Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields) • Undertake maintenance works where required due to degradation of road infrastructure from Project vehicles

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Introduction

1.1 Project Background

Hancock Galilee Pty Ltd (HGPL) (the Proponent) is proposing to develop the Kevin's Corner Coal Project, a 30 Mtpa capacity open cut and underground thermal coal mine. The coal mine will be supported by privately owned and operated rail and port infrastructure facilities. At the Project site the coal will be mined, washed and conveyed to a train load-out facility where it will be transported by rail approximately 495 kilometres (km) to the east coast of Australia to the port facility of Abbot Point for export. The rail line from Kevin's Corner will join with the proposed rail line from the adjacent Alpha Coal Project.

URS has been engaged by HGPL to prepare a Road Impact Assessment (RIA) for the proposed Project planned for the Alpha region in Central Queensland. This study assesses both the construction and ongoing operational phases of the development.

This RIA will form part of a wider Environmental Impact Statement (EIS) to be prepared and referred to the Queensland Government required under the '*State Development and Public Works Organisation Act 1971* (SDPWO Act)' and also under the '*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)'.

This RIA has been prepared to evaluate the traffic impacts of the proposed Project on the existing road network and focuses on the preferred routes to the Project site. Appropriate mitigation measures for potential impacts have been identified.

In order to understand the proposed Project, a site inspection was undertaken of the existing road network and data has been sourced on-site and from the Queensland Department of Transport and Main Roads (DTMR). Information regarding the Project has been sourced from HGPL.

1.2 Government Guidelines

The DTMR has published the 'Guidelines for Assessment of Road Impacts of Developments' (2006), which is a document used to provide industry and developers with advice on information that DTMR may require to assist the approval processes of government and reduce project delay.

Whilst not mandatory, these Guidelines provide a basis for the assessment of impacts and have been used where relevant to assist in the production of this report.

1.3 Report Scope

This report evaluates the traffic impacts of the proposed Project on the existing road network and recommends appropriate mitigation measures for any critical impacts identified. The following tasks have been completed as part of this assessment:

- A site inspection of the road network between Mackay and the Project site, between Emerald and the Project site, as well as the local road network surrounding the Project site;
- Review of existing traffic volume data provided by DTMR for the roads identified as part of potential transport routes for the development;
- Undertake turning movement traffic count surveys where existing data at intersections was insufficient;
- Report on historic crash statistics on the relevant road network;
- Identification of school bus routes where these coincide with routes used by construction and operational traffic;

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- Collation of projected traffic generation data provided by HGPL and assignment of this traffic data to potential transport routes;
- Estimation of future background traffic growth on the relevant road network without influence from the Project;
- Estimation of future traffic demand on the relevant road network including both background traffic and generated traffic from the Project;
- Assessment of the future road network performance and pavement design life for scenarios with and without the Project to evaluate impacts of the Project; and
- Identification of possible mitigation measures to address critical impacts on the road network and pavement due to increased traffic demand resulting from the Project.

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Proposed Project Profile

This section outlines the information reviewed and assumptions made in the preparation of the RIA. Information has been provided by HGPL, DTMR and other sources and relates to the construction and operational phases of the Project.

2.1 Location and General Details

The Kevin's Corner Coal Project is located in Central Queensland approximately 70km by road north of Alpha, 130km south-west of Clermont and 360km south-west of Mackay (refer Figure 2-1). A new partly open cut and underground thermal coal mine 37,381Ha in size, the Project is located within MLA 70425 which is a combination of MDL 333 and a portion of EPC 1210. The Project is proposed to produce up to 30 million tonnes per annum (Mtpa) of thermal coal for the export market. The scheduled life of mine is 30 years with sufficient Joint Ore Reserves Committee (JORC) compliant resources to potentially extend the Project life beyond 30 years.

A location map of the mining lease area, including the surrounding State and Local road network, is provided in Figure 2-1

The 30Mtpa open-cut and underground thermal coal mine with associated infrastructure and utilities will utilise the rail and port facilities provided by the prospective neighbouring Alpha Coal Project.

Two coal seams (C + D) will be targeted for recovery during the mining operation. Draglines, shovels and trucks will be used to expose these seams in the opencut for the duration of the mine life. Truck and shovel mining methods and conveyors will be used to extract the coal and deliver it to the coal preparation plant prior to being transported by rail at the on-site rail load out facility. Longwall operations will primarily work in the lower of the seams recovering coal and transporting it by conveyor to the CPP.

Processed coal will then be transported by rail shared with the adjacent Alpha Coal Project to a terminal at Abbot Point.

An airport is proposed to be constructed as part of the Project within the MLA boundary to transport the majority of employees in and out of the site. For the purposes of this RIA in developing a 'worst-case scenario', it is assumed that the airport will be used to only transport passengers and not mine-related equipment or materials.

The Project site infrastructure will include, but is not limited to, the items listed in Table 2-1.

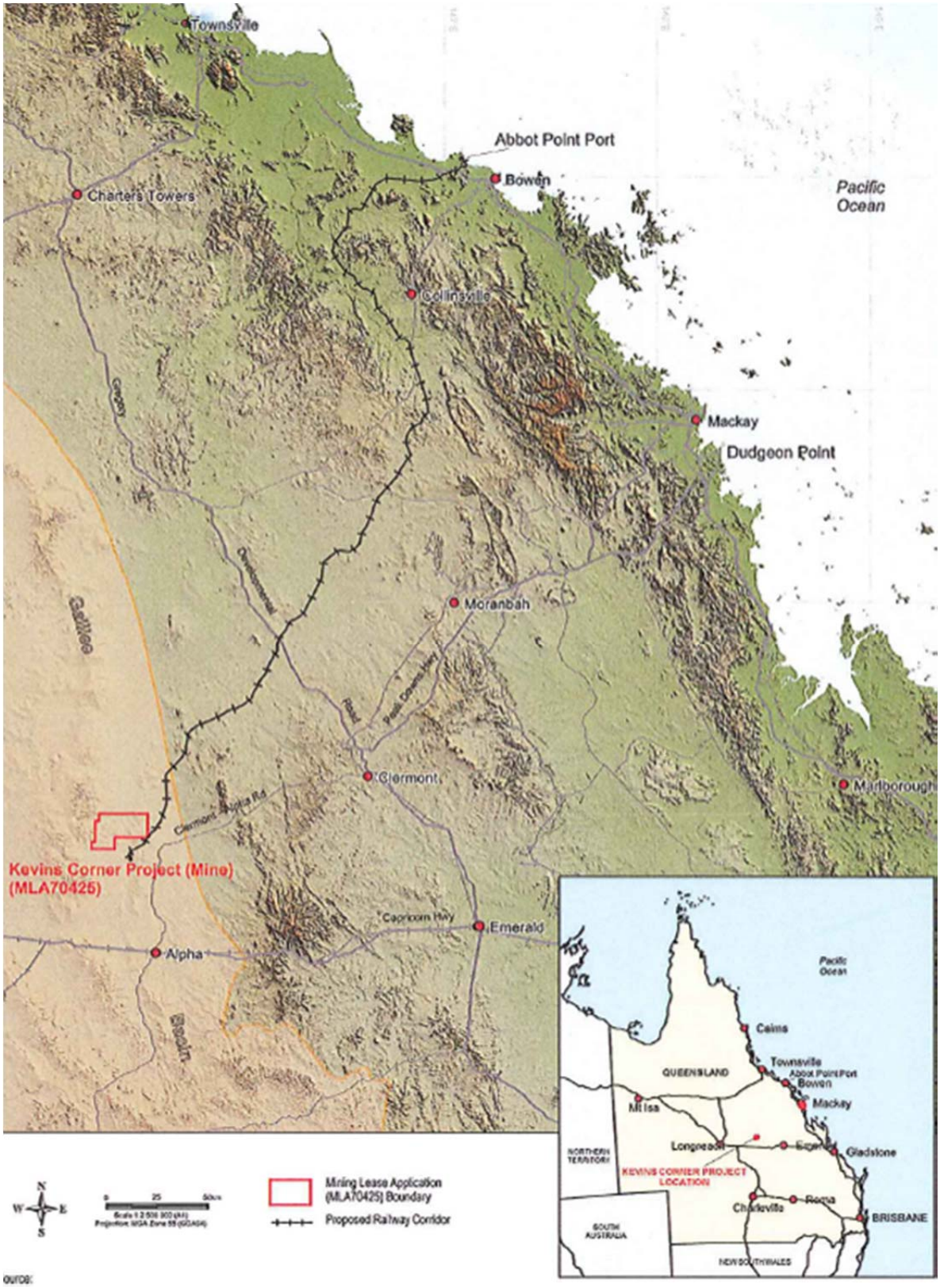
2 Proposed Project Profile

Table 2-1 Site Infrastructure Description

Infrastructure Type	Infrastructure Items
Heavy structures	Heavy equipment workshop; electrical workshop; field maintenance workshop; tyre change/repair workshop; heavy vehicle wash down facility; refuelling and lubrication facility; light vehicle wash; warehouse.
Other buildings	Main administration and technical services office; muster and mine operations building; amenities building; security; training/induction facilities; services workshops.
Miscellaneous structures	Covered car parks; water treatment plant shed; hazardous materials storage; where required explosives magazine and storage.
Fuel/Lubricants/Air	Main tank farm and lubrication storage; light vehicle fuelling station; air compressor and reticulation.
Civil	Public access areas; public entry road; car parks; secure areas; road/paved areas; mine infrastructure area light vehicle network; mine infrastructure area heavy vehicle access road; hardstands; machine assembly areas; on-site light industrial area; airport.
Site water	Industrial effluent; oily water sources; wash down sources; treatment reuse/disposal; industrial area storm water collection, treatment, reuse and disposal; site drainage plan.
Raw water	Raw water storage/reticulation, potable water treatment, storage and reticulation; fire systems storage tanks, pumping system and reticulation.
Power	Site power supply; site substation; reticulation; lighting.
Communications	Main control; reticulation; towers for wireless communications.

2 Proposed Project Profile

Figure 2-1 Project Site Location



2.2 Transport Infrastructure

2.2.1.1 Jericho-Degulla Road

As part of the Project, it is proposed that the existing Jericho-Degulla Road within the mining lease area will be closed to public traffic. A bypass road around the active mining areas of the site will be constructed to facilitate traffic flow around the Project site, linking Jericho-Degulla Road to Cudmore National Park to the north.

2.2.1.2 Hobartville Road

It is unlikely that construction and operational traffic generated from the proposed Project site will require the use of Hobartville Road, therefore responsibility for the upgrade of this section of road should remain with its original contributor.

2.2.1.3 Clermont-Alpha Road

A site visit revealed that roadworks are currently underway which include:

- Improvements to the Clermont-Alpha Road / Hobartville Road intersection; and
- Provision of a four metre wide passing opportunity between Hobartville Road and the township of Alpha.

It is understood that the proposed traffic from the Alpha Coal Mine will use this section of Clermont-Alpha Road between Hobartville Road and Alpha.

It should be noted that as part of the Alpha EIS, recommendations suggest that the section of Clermont-Alpha Road between Hobartville Road and Degulla Road be upgraded to cater for two-way traffic generated from the proposed development. Ongoing shoulder maintenance of the road between Alpha and Hobartville Road for the duration of the haulage period will occur.

2.2.1.4 Degulla Road

As part of the Alpha EIS, recommendations suggest that the section of Degulla Road between Clermont-Alpha Road and the site access to Alpha Coal Mine be upgraded to cater for the traffic generated from the proposed development. These upgrades are to cater for two-way vehicular traffic.

There is no report of improvements to the section of Degulla Road between the proposed Alpha Coal Mine site access and Jericho-Degulla Road.

2.3 Timelines

The Project will occur in two phases; construction and operation. The initial construction phase is expected to occur over 24 months, with ongoing construction activities continuing over the following six years until ramp-up is complete. The operational phase of the Project is expected to begin in 2015 and continues to 2044. Note that construction of the Coal Preparation Plant continues in the early stages of operation to build up to 30 Mtpa capacity.

This study assesses both the construction and operational phases of the Project.

2.4 Employment and Hours of Operation

It is expected that the construction phase of the Project will, at its peak, consist of a workforce of approximately 1,412 personnel in 2014 (Source: HGPL, March 2012). Hours of operation for the construction phase will be during daylight hours, seven days a week with potential night works as required for specialist activities.

It is envisaged that operational personnel will peak during 2019 for operational-only employees. However, in 2017 there will be an overlap between construction and operational phases of the Project resulting in a total on-site workforce of 1,600 personnel that is greater than that estimated in 2019 (Source: HGPL, March 2012). For this reason 2017 has been selected for the assessment as it produces the 'worst case' scenario. While there will still be some construction personnel on-site in 2017, it is referenced throughout this document as the 'peak operational phase'.

These peak employee figures are used in this report to provide a 'worst case' assessment of impacts.

2.5 Origin of Inputs and Destination of Outputs

The origin of inputs for both the construction and operational phases of the Project is important in assessing the impacts of transport on the road network. The origins nominated for relevant components of the Project at the time of the assessment are identified in Table 2-2.

Table 2-2 Origin of Project Inputs

Input	Origin (assumptions only)	Remarks
Employees	88.5% National 1.0% Alpha 3.1% Barcaldine Council Area 3.8% Emerald 3.8% Clermont	National employees will Fly-In-Fly-Out to Kevin's Corner Airport Remainder of employees to be sourced within region
Construction Equipment	53.9% Brisbane 46.1% Mackay	Containerised cargo through Brisbane Break bulk cargo through Mackay
General Construction Materials	76.7% Mackay 17.7% Brisbane 5.5% Gladstone	Origin of general construction materials assumed to be from these three port regions These include consumable, diesel, lube and mining equipment.
Waste	100% Emerald	Transported to an existing sewage treatment works at Emerald.

At present it is considered that construction equipment brought in by ship will be delivered to the Ports of Brisbane and Mackay to receive containerised shipments wherever possible.

To relieve traffic congestion on local roads HGPL are investigating the possible use of the rail line into Alpha to move freight via trains and then trucked onto site. For the purpose of this assessment it has been developed assuming that all freight will be moved via road for the total journey as a worst case scenario. If the movement of freight to site via rail to Alpha, is in the future deemed a feasible option, additional studies will be undertaken to assess any potential impacts.

The other major output of the Project will be waste materials. During early works only, solid waste will be delivered to the Barcaldine Regional Council (BRC) landfill on Landsborough Highway until on-site facilities are established. The number of vehicles generated to transport this waste material to the BRC landfill will be insignificant and temporary (i.e. less than six total trips per day) and as such

2 Proposed Project Profile

impact to the Landsborough Highway created by waste delivery vehicles during these early works is considered insignificant and therefore has not been considered in this RIA.

During the construction phase, solid waste will be disposed to an on-site landfill.

For the purposes of the RIA, during all phases of the Project, sewage sludge has been assumed to be transported to an existing sewage treatment works at Emerald. Hazardous materials and recovered materials will also be transported to Emerald for treatment.

Further information on waste can be found in the Kevin's Corner Project Interim Waste Management Plan (Appendix T4.01).

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Existing Conditions

3.1 Existing Road Network

An outline of relevant information on road conditions in the vicinity of the Project site investigation area is presented in this section.

URS is aware that route survey reports have been provided to the Proponent for transporting oversized cargo to the local area by transport logistics company DHL. These reports have been reviewed by URS, with roads outlined by the report included in this investigation; however no comment is made on the accuracy of the DHL reports.

URS undertook two site visits to the regional and local areas surrounding the Project site between 20-21 July 2010 (dry conditions) and 1-2 March 2011 (wet conditions).

An overview of the State and Local road network can be found in Figure 3-1.

3 Existing Conditions

Figure 3-1 Summary of State and Local Road Network

3 Existing Conditions

3.1.1 Regional Road Network

The central region of Queensland is serviced by a network of highways that provide connections to Rockhampton to the east, Mackay and Townsville to the north-east, Brisbane to the south-east, New South Wales to the south and Mount Isa to the west. A map of the State and Local road network has been provided in Figure 3-1 and defines the respective road authorities.

Advice from BRC and DTMR recommends that the most appropriate and efficient routes from potential ports to the local project area for haulage routes follow:

- From north-eastern ports (i.e. Mackay);
  - Travel to Clermont via the Peak Downs Highway (SR70) then onto Emerald and Alpha via the Gregory Highway (A7) and Capricorn Highway (A4) respectively
- From eastern ports (i.e. Gladstone);
  - Travel to Alpha along the Bruce Highway and Capricorn Highway via Rockhampton
- From southern ports (i.e. Brisbane)
  - Travel to Emerald via the Warrego Highway, Carnarvon Highway, Dawson Highway and Gregory Highway to Emerald, and then continue onto Alpha via the Capricorn Highway

Once at Alpha all routes will then continue north along Clermont-Alpha Road and will turn left into Degulla Road to access the Project site via Degulla Road continuing into Jericho-Degulla Road.

These regional roads are managed by DTMR and BRC. A description of the relevant State and Local roads is provided in the following subsections.

3.1.1.1 Peak Downs Highway (State Route 70)

The Peak Downs Highway (State Route 70) links Mackay on the central east coast of Queensland to Clermont in a northeast/southwest direction. It is a two lane, two-way sealed road with a 100 kilometre per hour (km/h) speed limit which is reduced to 80km/h or 60km/h where the road passes through communities.

The Highway is maintained and managed by DTMR and currently provides access from Mackay to a growing number of coal mine sites located in the region. A number of localised upgrades of the road have occurred due to these coal mine projects and the road is frequently used by both Commercial Vehicles (CV) and Over Dimensioned Vehicles (OD).

The current condition of the highway varies due to the localised upgrades at mine site access points. In these areas, the highway is in good-excellent condition, with sealed shoulders, line markings and additional lanes provided to separate turning movements and street lighting provided at intersections. Grade separations have been provided over mining infrastructure and rail lines. However, the road midblocks between these mine access points is generally in poor-good condition with unsealed shoulders and visible patching and rutting on the road surface. However line marking is mainly present (although only a centreline is provided in the narrower sections).

There are a number of floodways along Peak Downs Highway which are clearly marked and have depth indicators provided.

Intermittent, single direction overtaking lanes are provided for approximately 100km outside of Mackay.

3 Existing Conditions

Approximately 33km from Mackay the highway crosses the Eton Range, where it is subject to a 12% grade with a number of curves for a length of 3km. The speed limit here is reduced to 60 km/h and safety run-out bays are provided for CVs.

On approach to Mackay the highway passes through the townships of Eton and Walkerston with reduced speed limits, shopping districts abutting the highway, 40 km/h school zones and increased pedestrian and cyclist activities.

The Peak Downs Highway is suitable for use as a transport route for the Kevin's Corner Coal Project Figure 3-2 shows a typical cross section of the Peak Downs Highway.

Figure 3-2 Peak Downs Highway - Typical Cross Section

3.1.1.2 Gregory Highway (A7)

The Gregory Highway (A7) runs in a north/south direction through central eastern Queensland, connecting Springsure in the south to Clermont in the north. Extending from the Gregory Highway (north of Clermont) is the Gregory Developmental Road, connecting to Einasleigh. The Gregory Highway connects to the Capricorn Highway at Emerald with a seagull-type intersection. Gregory Highway is a two lane, two-way sealed road with a 100km/h speed limit which is reduced to 80km/h or 60km/h where the road passes through communities. The Highway is maintained and managed by DTMR and is frequently used by both CV and ODs.

The current condition of the highway is generally good, with varied width of sealed shoulders from 0-1.5m, line markings and wide road reservations. Some visible patching and rutting on the road surface reduces the road condition to poor in a number of sites.

There are a number of floodways along the length of the highway, which are clearly marked and have depth indicators provided.

3 Existing Conditions

Gregory Highway provides access to private properties on either side of the road reservation, as well as access to the local road network through unsignalised minor intersections. There are rail crossings as well as a signed stock crossing between Emerald and Clermont.

The road passes through a number of communities, notably Clermont, Capella and Emerald. Speed limits are reduced to 60km/h in these areas due to the residential, commercial and increased pedestrian activities.

The Gregory Highway is suitable for use as a haulage route for the Kevin's Corner Coal Project site. Figure 3-3 shows a typical cross section of the Gregory Highway.

Figure 3-3 Gregory Highway - Typical Cross Section

3.1.1.3 Capricorn Highway

The Capricorn Highway is the main east-west highway linking Rockhampton to Emerald, and further west to Barcaldine via Alpha. It is a heavily trafficked CV route, with a speed limit of 100km/h. The Capricorn Highway is mainly one lane in each direction with sealed shoulders in some areas and overtaking lanes at various locations. Generally, the road surface is adequate and there are no obvious issues for CV access.

The Capricorn Highway is suitable for use as a haulage route for the Kevin's Corner Coal Project site. Figure 3-4 shows a typical cross section of the Capricorn Highway.

3 Existing Conditions

Figure 3-4 Capricorn Highway - Typical Cross Section

3.1.1.4 Clermont-Alpha Road

The Clermont-Alpha Road provides a north-south route connecting the Capricorn Highway at Alpha in the south to the Gregory Highway at Clermont in the north.

The road is a single carriageway, single lane road with a varying seal width of approximately 3.5m to 4.5m for 37km north of its intersection with the Capricorn Highway. The seal is in average condition with some potholes and rutting evident. Unformed grassed shoulders extend from the edge of the seal to create a wide road reservation. There is insufficient width on the seal for two vehicles to pass in opposing directions and the grassed shoulders need to be used in this instance. For approximately 3km the seal widens to a two lane width to enable two-way traffic. There are no line markings on the seal.

Approximately 37km north of its intersection with the Capricorn Highway the carriageway becomes a formed, unsealed road approximately 8m-10m in width, providing two lanes to accommodate two-way traffic; however there is no delineation of lanes. This unsealed carriageway was in good condition at the time of the site inspection. The unsealed carriageway cross-section is inconsistent across its length, with intermittent narrowings and some small sealed sections primarily across floodways and creeks.

The road returns to a two-way, two lane sealed carriageway for approximately 7km on the approach into Clermont from the west.

3 Existing Conditions

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. Although a majority of the land is fenced, there are sections which are open to stock, horses and also native wildlife.

A number of floodways and cattle grids exist along the route as well as a low lying lagoon area to the west, approximately 42km north of Alpha.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area. Existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Note that upgrades are proposed to parts of this road as part of the Alpha Coal Project; however, the road will be assessed in its current condition.

Figure 3-5 to Figure 3-8 shows a typical cross section of Clermont-Alpha Road.

Figure 3-5 Clermont-Alpha Road - Single Lane Section North of Alpha

3 Existing Conditions

Figure 3-6 Clermont-Alpha Road - Typical Unsealed Cross-Section

Figure 3-7 Clermont-Alpha Road - Narrow and Sealed Floodway Crossing

Figure 3-8 Clermont-Alpha Road - Sealed Section West of Clermont

3.1.1.5 Flinders Highway (A6) – Townsville to Charters Towers

The Flinders Highway is the main east-west highway linking Townsville and Charters Towers and continues further west to its terminus at Cloncurry. The section between Townsville and Charters Towers has one lane in each direction with sealed shoulders (although sometimes narrow) along most of its length with centre and edge line marking provided. There are no apparent issues for CV access.

3.1.1.6 Gregory Developmental Road (A7) – Charters Towers to Clermont

The Gregory Development Road is a north-south route linking Conjuboy in the north with Clermont to the south. The section between Charters Towers and Clermont forms part of the A7 road link and provides an alternate, inland route to the A1 in central Queensland. One lane is provided in each direction, centre and edge line marking is provided and it is sealed between Charters Towers and Clermont. There are no apparent issues for the use of this road by CVs.

This section of the Gregory Development Road between Charters Towers and Clermont is classified as a State Strategic Road.

3.1.1.7 Dawson Highway (A7) – Rolleston to Springsure

The Dawson Highway is an east-west link connecting Springsure in the west with Gladstone in the east and is an alternate route to the Capricorn Highway. The section between Rolleston and Springsure connects the Gregory Highway and Carnarvon Highway which further connects into the Warrego Highway with a direct link to southeast Queensland.

It has one lane in each direction with centre linemarking, however sealed shoulders and edge linemarkings are not provided continuously for the full length of this section (particularly the southern half). This section of the Dawson Highway is considered suitable for access by CVs.

The section of Dawson Highway between Rolleston and Springsure is classified as a State Strategic Road.

3.1.1.8 Carnarvon Highway (A55) – Rolleston to Roma

The Carnarvon Highway is a north-south route linking Rolleston in the north with Mungindi in the south at the Queensland/New South Wales border. The section between Rolleston and Roma is a sealed road and has one lane in each direction. Centre and edge linemarking is provided along the majority of this section however there are some lengths where linemarking is limited to centre linemarking. Shoulder condition adjacent to the carriageway varies from non-existent to unsealed to narrow sealed. Carnarvon Highway is suitable for use by CVs.

The section of Carnarvon Highway between Rolleston and Roma is classified as a State Strategic Road.

3.1.1.9 Warrego Highway (A2) – Metropolitan Brisbane to Roma

The Warrego Highway is an east-west route linking Brisbane and southeast Queensland in the east with Charleville to the west. The road configuration varies along the section between metropolitan Brisbane and Roma due to the different land uses along this section of road (i.e. rural in the west through to urban in the east). The rural sections of this length of Warrego Highway have one lane in each direction with varied shoulder construction from non-existent to unsealed to sealed. In urbanised areas, particularly between Toowoomba and its eastern terminus at the Ipswich Motorway in metropolitan Brisbane, two lanes are provided in both directions and are separated by a median and sealed shoulders.

Immediately east of the Toowoomba township the highway crosses the Toowoomba Range, which results in a 10% grade with a number of curves for a length of 4km. The speed limit here is reduced and safety run-out bays are provided for CV.

The section of Warrego Highway between metropolitan Brisbane and Roma is suitable for use by CVs (although care should be taken when crossing the Toowoomba Range) and is part of the State Road Network.

3.1.2 Local Road Network

The Project site is surrounded by a network of local roads, which are primarily unsealed local access roads.

Local road conditions are managed by the BRC. In general, all local roads are within rural private property areas and do not have speed limit signs, unless otherwise specified.

3.1.2.1 Hobartville Road

Hobartville Road is a formed, unsealed road connecting with Clermont-Alpha Road and accesses the privately owned Hobartville Station and then running north directly through the Project site.

3 Existing Conditions

The carriageway was initially a single lane formed road in a wide reservation; however recent grading activities have provided a formed roadway wide enough to accommodate two-way traffic in most areas. The surface condition is poor-average with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues. The road reservation is approximately 10m wide with very little vegetation.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6m to 4m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area. Existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Note that upgrades are proposed to this road as part of the Alpha Coal project; however, the road will be assessed in its current condition. Regardless, it is not envisaged that traffic from the Project will require the use of Hobartville Road.

Figure 3-9 shows a typical cross section of Hobartville Road.

Figure 3-9 Hobartville Road - Typical Cross Section

3.1.2.2 Degulla Road

Degulla Road is a formed, unsealed east-west road connecting Jericho-Degulla Road in the west to Clermont-Alpha Road in the east.

The carriageway is a single lane formed road in a wide reservation with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues. The road reservation is approximately 10m wide with very little vegetation.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6m to 4m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; however, it is unsuitable from a road safety perspective to be used as a thoroughfare by a large volume of commercial vehicles on a regular basis. Furthermore, existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Figure 3-10 shows a typical cross section of Degulla Road.

Figure 3-10 Degulla Road - Typical Cross Section

3.1.2.3 Jericho – Degulla Road

Jericho-Degulla Road is a formed, unsealed north-south road connecting Hobartville Road and Degulla Road to the south with Cudmore Reserve to the north.

The carriageway is a two-way formed road in a wide reservation with less formed shoulders and in other areas the road is single track with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6m to 4m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area. Cattle grids, old bridges and low capacity culverts would restrict the size and weight of over dimensional vehicles able to access the area.

Figure 3-11 and Figure 3-12 shows the typical cross sections of Jericho-Degulla Road.

Figure 3-11 Jericho-Degulla Road – Typical Cross Section

Figure 3-12 Jericho-Degulla Road – Typical Cross Section

3.2 School Bus Routes, Public Transport Services and Stock Routes

There are currently a number of existing designated routes in the study area utilised by public transport, school buses, haulage and stock.

3.2.1 School Bus Routes

School bus routes currently exist along the Capricorn Highway, Gregory Highway, Peak Downs Highway and Clermont-Alpha Road. Typical school bus route operation times vary within the ranges of 7.00am to 8.30am and 2.30pm to 4.30pm, depending on the proximity and starting time of local schools. School bus route operators and local school principals should be contacted as part of any road use management plan to determine any curfews or additional mitigation requirements such as improving safety of school children alighting and disembarking from buses and for the interaction of haulage vehicles and school bus operations. The proposed HGPL operations will implement such measures during haulage.

A summary of the school bus services currently operating along Clermont-Alpha Road, Capricorn Highway (Barcaldine to Emerald), Gregory Highway (Emerald to Clermont) and Peak Downs Highway (Gregory Highway to Walkerstone) are provided in Table 3-1 and Figure 3-13. These road sections are utilised by most vehicle movements generated by the Project described in Section 4.

It should be noted that bus services east of Emerald (via the Capricorn Highway and Bruce Highway to Gladstone) and south of Springsure (via the Dawson Highway, Carnarvon Highway and Warrego Highway to Brisbane) have not been included.

3 Existing Conditions

These road sections cover a significant distance from Emerald to Gladstone and Brisbane. As indicated in Section 4 of this document, these routes are being utilised only during the construction phase of the Project by a handful of vehicles per day. However, the full length of the Peak Downs Highway has been included in Table 3-1 and Figure 3-13 which will accommodate all OD movements and the vast majority of CV trips during both the construction and operational phases of the Project. Refer to Section 4.4 for more detail relating to haulage routes during the construction and operational phases of the Project.

Table 3-1 School Bus Routes along Road Sections on Regional and Local Road Network

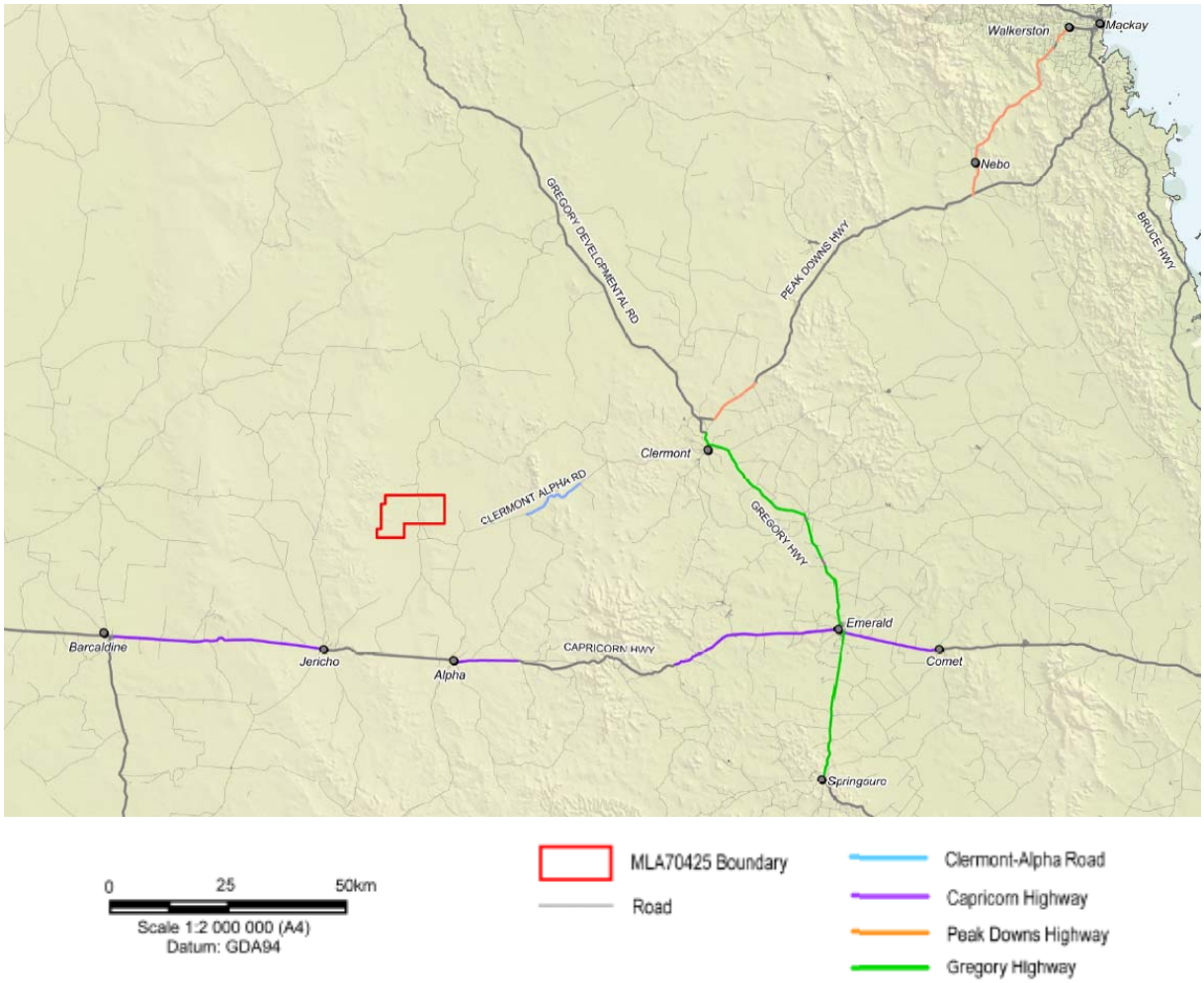
Highway Utilised by School Bus Route	Length of Highway Utilised	School(s) Serviced	Service Number
Clermont-Alpha Rd	Mistake Creek to Craven Rd	Mistake Creek State School (SS)	P1429
Capricorn Hwy	Barcaldine to Jericho	Jericho SS Barcaldine SS St Joseph's Catholic Primary School	P825
	Alpha to Beaufort Rd	Alpha SS	P1113
	Willows Rd to Anakie	Anakie SS	P954
	Anakie to Emerald	Emerald State High School (SHS) Denison SS	P994
	Anakie to Emerald	Emerald SHS	S368
	Emerald to Weemah	Emerald SS Emerald SHS	P1431
	Emerald to Comet	Emerald SS Emerald SHS	P814
Gregory Highway	Clermont to Peak Downs Hwy	Clermont SS Clermont SHSl	P706
	Clermont to Cheeseborough Lagoon	Clermont SS Clermont SHS	P1482
	Capella to Amah Rd	Capella SS Capella SHS	P325
	Capella to Retro Nanya Rd	Capella SS Capella SHS	P708

3 Existing Conditions

Highway Utilised by School Bus Route	Length of Highway Utilised	School(s) Serviced	Service Number
	Emerald to Gordon Rd	Emerald North SS Emerald North Special School Emerald SS	P1519
	Emerald to Springsure	Emerald SHS Springsure SS	P751
Peak Downs Highway	Gregory Hwy to Russell Park Rd	Clermont SSl Clermont SHS	P706
	Airstrip Rd to Cockenzie Rd	Nebo SS	P1676
	Nebo to Suttor Development Rd	Nebo SS	P1744
	Nebo to Mirani-Eton Rd	Nebo SS Mirani SS Mirani SHS	S812
	Blue Mountain Rd to Eton	Eton SS	P1456
	Eton to North Eton Rd	Eton SS Eton Nth SS Marian SS Mirani SHS Mirani SS	S64
	Eton to John Temple Dve	Eton SS	S523
	Walkerston to Caseys Rd	Walkerston SS St John's Catholic School	P1566

3 Existing Conditions

Figure 3-13 School Bus Routes on Road Sections Used By Project Vehicles



3.2.2 Public Transport Services

A number of long-distance regional bus services operate throughout rural Queensland and eight of these routes operate along the same State Controlled Roads as identified in Section 3.1.1. These public transport services operate on an intermittent basis generally at or below one service per day (with the exception of the Mt Isa – Brisbane Greyhound service). It is therefore considered that interaction of construction and operational vehicles with these services will be minimal.

3 Existing Conditions

Table 3-2 Summary of Existing Public Transport Services

Route (bus operator)		Direction	Direction	Section of Route Overlapping Proposed Vehicles Routes of Project
		Northbound or Westbound	Southbound or Eastbound	
Mt Isa – Brisbane (Greyhound)	Between Mt Isa and Brisbane	1 daily service	1 daily service	Roma – Brisbane
	Between Charleville and Brisbane	1 daily service	1 daily service	
	Between Chinchilla and Brisbane	1 Friday service only	-	
	Between Dalby and Brisbane	1 daily service except Friday	1 daily service	
Emerald – Mackay (Paradise Coaches)		1 daily service	1 daily service	Full distance of route
Longreach – Emerald (Paradise Coaches)		2 weekly services – Tues and Sat	2 weekly services – Wed and Sun	Barcaldine – Emerald
Cunnamulla – Toowoomba (Greyhound)		3 weekly services – Sun, Wed and Fri	3 weekly services – Mon, Thurs and Sat	Dalby – Toowoomba
Toowoomba – Rockhampton (Greyhound)		3 weekly services – Mon, Wed and Fri	3 weekly services – Tues, Thurs and Sun	Toowoomba – Miles

3.2.3 Stock Routes

The use of stock routes in rural areas can create safety concerns for freight haulage routes. A road use management plan should consider the interaction between stock and freight routes and implement risk management procedures as necessary, such as increased signage and communications with land owners on locations of stock.

Stock routes U291 running north-south beside Hobartville Road towards Forrester Station and U301 running east-west parallel with Degulla Road are currently classed as unused.

Stock route M304 that runs beside Clermont-Alpha Road is still in use.

A meeting was held with relevant land holders to discuss the relocation of stock routes. It was agreed that the proposed relocation of stock routes needed some minor adjustments. A revised stock route relocation plan will be discussed with the land holders. The selected stock route relocation plan will be included as part of the RUMP to ensure that appropriate mitigation measures are in place to minimise impacts.

3.3 Existing Road Crash Data

Road crash data has been analysed for key routes that will be used by Project related traffic. Crash data was provided by DTMR for the period of 30 July 2005 to 29 July 2010 and detailed locations of

3 Existing Conditions

the crashes are shown in Figure 3-14. A summary of crash data is provided in Table 3-3, whilst further discussion for individual road sections is provided in the following paragraphs.

Figure 3-14 Location of Crashes

Further analysis of trends across each road section is detailed in Table 3-3 below.

Table 3-3 Crash Data - Overall Summary

Road Section	Fatality		Other Injury		Property Damage		Total
	No.	% of Total	No.	% of Total	No.	% of Total	
Capricorn Highway							
16A Rockhampton – Duaringa	13	7%	97	55%	68	38%	178
16B Duaringa – Emerald	1	1%	75	52%	68	47%	144
16C Emerald - Alpha	1	2%	30	61%	18	37%	49
16D Alpha - Barcaldine	0	0%	6	55%	5	45%	11
Total Capricorn Hwy	15	4%	208	54%	159	42%	382
Peak Downs Highway							
33A Clermont- Nebo	6	7%	57	67%	22	26%	85
33B Nebo - Mackay	6	3%	99	50%	93	47%	198
Total Peak Downs Hwy	12	4%	156	55%	115	41%	283
Gregory Highway							
27B Emerald - Clermont	4	4%	46	48%	46	48%	96
Total Gregory Highway	4	4%	46	48%	46	48%	96
Clermont-Alpha Road							
Clermont-Alpha Road	0	0%	5	56%	4	44%	9
Total Clermont-Alpha Road	0	0%	5	56%	4	44%	9

3.3.1.1 Capricorn Highway (Rockhampton to Duaringa)

This section of road shows general trends consistent with rural highways. 53% of incidents were single vehicle crashes and 78% of the crashes occurred at midblock locations. There were no evident trends as to weekday or weekend incidents; however 19% occurred between the hours of 6pm and 6am. 16% of incidents involved a commercial vehicle.

3.3.1.2 Capricorn Highway (Duaringa to Emerald)

This section of road shows general trends consistent with rural highways. The most common types of crashes are rear end in the same lane and single vehicles running off the carriageway. 78% of the crashes occurred at midblock locations and 29% of all crashes occurred between the hours of 6pm and 6am. 19% of incidents involved a commercial vehicle.

3.3.1.3 Capricorn Highway (Emerald to Alpha)

This section of road shows general trends consistent with rural highways. The most common types of crashes were single vehicles running off the carriageway (55%). 80% of the crashes occurred at midblock locations and 20% of all crashes occurred between the hours of 6pm and 6am. 24% of incidents involved a commercial vehicle. This section of road showed a bias towards crashes occurring on a Friday at twice the rate of any other day of the week.

3.3.1.4 Capricorn Highway (Alpha to Barcaldine)

This section of road shows general trends consistent with rural highways. Almost all crashes were single vehicle crashes, with the most common type classified as running off the carriageway (55%). 75% of the crashes occurred at midblock locations and 27% of all crashes occurred between the hours of 6pm and 6am. 18% of incidents involved a commercial vehicle.

3.3.1.5 Peak Downs Highway (Clermont to Nebo)

This section of road shows general trends consistent with rural highways. A large majority of crashes were single vehicle crashes (65%) with the most common type classified as running off the carriageway on a straight or curve (43% of total crashes). 82% of all crashes occurred at midblock locations and 36% of all crashes occurred between the hours of 6pm and 6am.

3.3.1.6 Peak Downs Highway (Nebo to Mackay)

This section of road shows general trends consistent with rural highways. A large majority of crashes were single vehicle crashes or vehicles travelling in the same direction (i.e. rear-end) – 39% and 24% respectively. The most common crash type was running off the carriageway on a straight or curve (28%). 76% of all crashes occurred at midblock locations and 29% of all crashes occurred between the hours of 6pm and 6am. It should be noted that a total of 17 'Through Right' collisions (DCA 104) were recorded at the Peak Downs Highway / Horse and Jockey Road intersection in Mackay.

3.3.1.7 Gregory Highway (Emerald to Clermont)

This section of road shows general trends consistent with rural highways which run through rural residential areas. There was an approximately even spread of crashes between midblock and intersection locations, reflecting the major rural towns located on the Gregory Highway.

The most common type of crash is classified as an intersection crash with vehicles from adjacent approaches performing right turn movements. There was no significant trend between single or multiple vehicle crashes. 25% of all crashes occurred between the hours of 6pm and 6am and 12% of incidents involved a commercial vehicle.

3.3.1.8 Clermont-Alpha Road

The low crash numbers on the Clermont-Alpha Road reflects the overall low traffic volumes which utilise this road. From the data available, it is evident that Wednesday has a significantly higher proportion of crashes than any other day of the week. The majority of crashes occur during daylight hours and the most common type of crash is classified as a single vehicle out of control on the carriageway. These trends are reflective of the low usage of this road and the surrounding land use patterns.

The overall pattern of crashes on the road network generally reflects trends associated with a normal rural environment, i.e. single vehicle crashes in midblock locations between residential centres, with higher proportion of intersection crashes in residential areas.

It should be noted that the *Galilee Basin Economic and Social Impact Study Report – Transport* (Economic Associates, 2010) has identified that a time-series analysis of major highway sections in the Galilee Basin (including the highways surrounding this Project) has determined that there is no correlation between the recent increase in mining activity and any upward trends in the number of road crashes.

3.4 Scheduled Road Improvement Projects

The DTMR outlines proposed road improvement projects in the publication *'Roads Implementation Program 2009-2010 to 2013-2014'.* This document has been reviewed to identify any road improvement projects scheduled to occur on the roads proposed to be used for the Project. A summary of proposed works is provided in Table 3-4. Note that the proposed works may not occur over the entire length of road and may be limited to specific locations. Works outlined for 2009-2010 may have already occurred at the time of writing this report.

Table 3-4 Scheduled Road Improvement Projects

Road	Proposed Works	Indicative Timing
Capricorn Highway		
Alpha - Barcaldine	Realignment	2009-2010
Emerald - Alpha	Seal shoulders	2009-2011
Duaringa – Emerald	Construct auxiliary lane – Comet River Road	2009-2011
	Miscellaneous works	2009-2010
	Improve drainage	2011-Future
	Seal shoulders	2011-Future
	Rehabilitate and widen	2009-2014
Rockhampton - Duaringa	Construct auxiliary lane	2009-2010
	Construct overtaking lane	2010-2014
Clermont-Alpha Road		
Native Companion Creek	Construction of bridge and approaches	2011-2014
Selected sections	Minor regrade	2009-2014
Peak Downs Highway		
Clermont - Nebo	Intersection improvements	2009-2011
	Driver fatigue management improvements	2009-2011
	Miscellaneous works	2009-2010
	Reconstruction of pavement	2009-2014
	Rehabilitate and widen	2011-Future
	Construct additional lanes	2009-2010
	Widen pavement	2009-2014
	Creek bridges – concept planning	2009-2011
Nebo – Mackay	Eton Range minor realignment	2010-2011
	Construct overtaking lanes	2009-Future
	Upgrade Sandy Creek bridge	2011-2014
	Replace guardrail	2009-2010
	Intersection improvements	2009-2010
	Widen pavement	Future
	Walkerston and Eton Range concept planning	2009-2011
Gregory Highway		
Emerald - Clermont	Install traffic signals – Emerald	2009-2014

Upgrades proposed to surrounding roads as part of the Alpha Coal project are outlined in Section 2.2 of this report.

3.5 Consultation Summary

A representative from URS met with BRC at the Alpha Office on 20 July 2010. The following items were discussed.

- A number of old bridges on Clermont-Alpha Road may not suit OD vehicles.
- Unsealed roads have a number of issues for use by CV, primarily dust production and flooding.
- There are no planned road upgrades in Alpha and town planning is at the stage of determining where they can expand the town. There are a number of potential land development sites, but no decisions have been made.

On 10 March 2011 a telephone conference meeting was held with BRC to establish a more recent view on the proposed Project. The following was discussed:

- The proposed redirected Jericho-Degulla Road will still be classified as a ‘rural standard road’ according to BRC.

3 Existing Conditions

- Jericho-Degulla Road and Degulla Road will still be maintained by BRC, however any road upgrade costs as a result of increased traffic volumes related to the proposed Project will be the responsibility of the HGPL;
- Prior to the operation of the proposed Project, BRC will inspect and approve the proposed re-aligned Jericho-Degulla Road;
- The proposed re-alignment of Jericho-Degulla Road should be designed to Queensland Main Roads Specifications. HGPL should plan in advance and ideally construct the road during the Dry season weather conditions; and
- There are a number of creek crossings that need to be accounted for as part of the proposed re-alignment and existing bridges are not designed to carry heavy equipment.

A meeting was held with DTMR on 22nd December 2011, as well as on January 25th 2012 when the draft report was reviewed in detail in light of comments received from DTMR. Further consultation with DTMR was subsequently undertaken to obtain relevant data, including crash data and bus routes. Issues and actions identified during the above referred two meetings have been addressed and incorporated into this report.

Ongoing consultation with other relevant stakeholders has also been undertaken throughout the development of this RIA. All comments received through this wider stakeholder consultation process have been considered and incorporated into this report, where appropriate.

4

Traffic Volumes

This section provides existing traffic volumes and forecasts of future traffic volumes during the construction and operational phases of the Project.

4.1 Existing Traffic Volumes

Annual Average Daily Traffic (AADT) is a simple measure of transport demand obtained by counting the number of axles passing a given point on the road. AADT data was obtained from DTMR (refer Table 4-1) for mid-blocks on the arterial roads surrounding the site and is for two-way traffic. Such information is not available for Jericho-Degulla Road; however an estimate of volumes for this road is provided based on on-site observations.

The larger links between major centres are broken down into road segments by DTMR for analysis purposes. The highest volumes along these segments have been used.

Table 4-1 2010 Annual Average Daily Traffic Volumes (AADT)

Road	Link	AADT (Total Vehicles)	% Commercial Vehicles
Jericho-Degulla Rd	Full length	20[1]	30[1]
Clermont Alpha Rd	Alpha-Hobartville	88	26
	Hobartville-Mistake Ck	21	31
	Mistake Ck-Clermont	81	24
Capricorn Hwy	Jericho-Alpha	350	25
	Alpha-Gemfields	524	23
	Gemfields-Emerald	1263	22
	Emerald-Rockhampton	3374	16
Gregory Hwy	Emerald-Capella	2288	18
	Capella-Clermont	1119	24
Peak Downs Hwy	Clermont-Peak Downs	612	21
	Peak Downs-Nebo	3435	14
	Nebo-Mackay	3893	16

[1] Volume data not available, figure based on on-site observations

A diagrammatical format of these AADT volumes is shown in Figure 4-1.

4.2 Traffic Volume Assessment Scenarios

The Proponent has supplied information to URS regarding the expected road network traffic volumes generated by the construction and operational phases of the Project. As the traffic volumes and patterns vary over the construction and operational phases of the Project (including variations over the life of the mine) different scenarios have been assessed to identify the worst case scenario for traffic impacts. Table 4-2 shows the years that have been assessed.

4 Traffic Volumes

Table 4-2 Traffic Volume Assessment Years

Assessment Year	Traffic Pattern
2014	Peak traffic volume during construction phase
2017	Peak equipment deliveries during operational phase
2022	10 year post operation design horizon
2030	Additional assessment year during operation for comparison purposes
2041	Additional assessment year during operation for comparison purposes

All roads have been assessed against their existing condition as of the site inspections undertaken and the 2010 AADT data supplied by DTMR.

4.3 Historic Traffic Growth and Future Background Volumes

4.3.1 Historic Traffic Growth

In order to determine the future background traffic volumes (expected volumes across the road network without the Project), the existing traffic volumes have been projected forward using historical growth rates. Historical growth rate figures have been provided by DTMR. These rates however vary significantly across the assessment area and some gaps in the data are evident.

Predicted future growth rate data for the region was unavailable, therefore an estimate of background traffic growth rates has been made based on relevant available data and an understanding of rural road networks.

Available historic growth rates and the adopted growth rates for analysis purposes are provided in Table 4-3

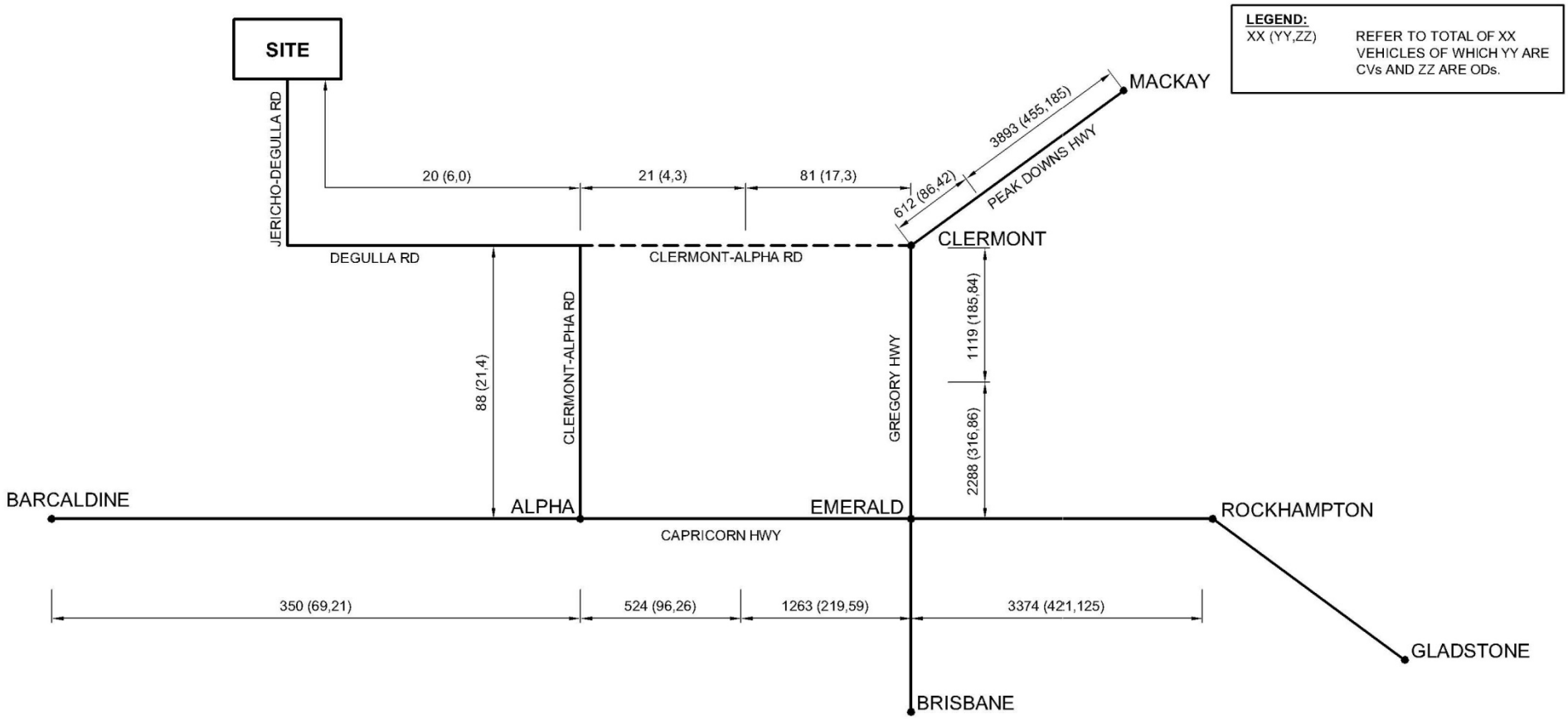
4.3.2 Future Background Volumes

Figure 4-1 illustrates the existing AADT traffic volumes in 2010 along the surrounding road network. These AADT values are based on data provided by DTMR.

Figures 4-2 and 4-3 project the 2010 volumes through to 2014 and 2017 respectively based on the growth projections outlined in Table 4-3. These two figures represent the expected background traffic growth only and do not include any vehicles generated by the Project.

4 Traffic Volumes

Figure 4-1 2010 AADT Background Traffic Volumes (two-way)



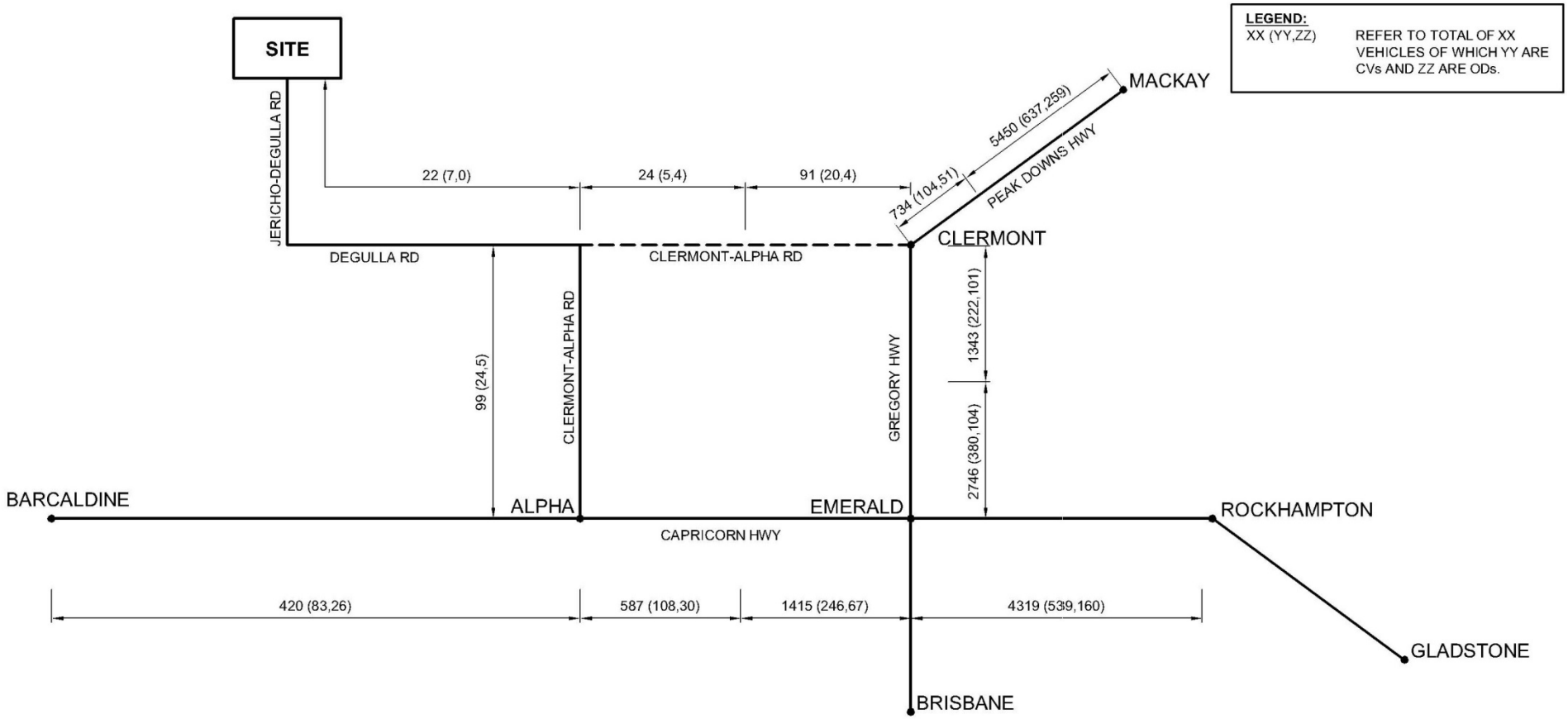
4 Traffic Volumes

Table 4-3 Historical Traffic Growth Rates and Projected Traffic Volumes

Road	Link	Historic Annual Growth Rate Range (%)	Adopted Annual Growth Rate 2010-2020	Adopted Annual Growth Rate 2021-2042	Background Traffic Volumes (AADT)					
					2010	2014	2017	2022	2030	2041
Degulla Road (Inc Jericho-Degulla Road)	Clermont-Alpha Rd to Site	N/A	3%	3%	20	22	25	29	37	51
Clermont Alpha Rd	Alpha- Hobartville Rd	N/A	3%	3%	88	99	109	126	159	221
	Hobartville to Mistake Ck	N/A	3%	3%	21	24	26	30	38	53
	Mistake Ck-Clermont	N/A	3%	3%	81	91	100	116	147	203
Capricorn Hwy	Jericho-Alpha	1.5 to 6.5	5%	3%	350	420	497	605	767	1,061
	Alpha-Gemfields	-4 to 9.5	3%	3%	524	587	647	748	947	1,311
	Gemfields-Emerald	-4 to 9.5	3%	3%	1,263	1,415	1,560	1,801	2,282	3,158
	Emerald-Rockhampton	4 to 12	7%	5%	3,374	4,319	5490	7,318	10,812	18,491
Gregory Hwy	Emerald-Capella	-11 to 8	5%	3%	2,288	2,746	3249	3,954	5,009	6,934
	Capella-Clermont	-11 to 8	5%	3%	1,119	1,343	1589	1,934	2,450	3,391
Peak Downs Hwy	Clermont-Peak Downs	N/A	5%	3%	612	734	869	1,058	1,340	1,855
	Peak Downs-Nebo	3 to 17	10%	5%	3,435	4,809	6,801	9,823	14,513	24,822
	Nebo-Mackay	3 to 17	10%	5%	3,893	5,450	7,708	11,133	16,448	28,132

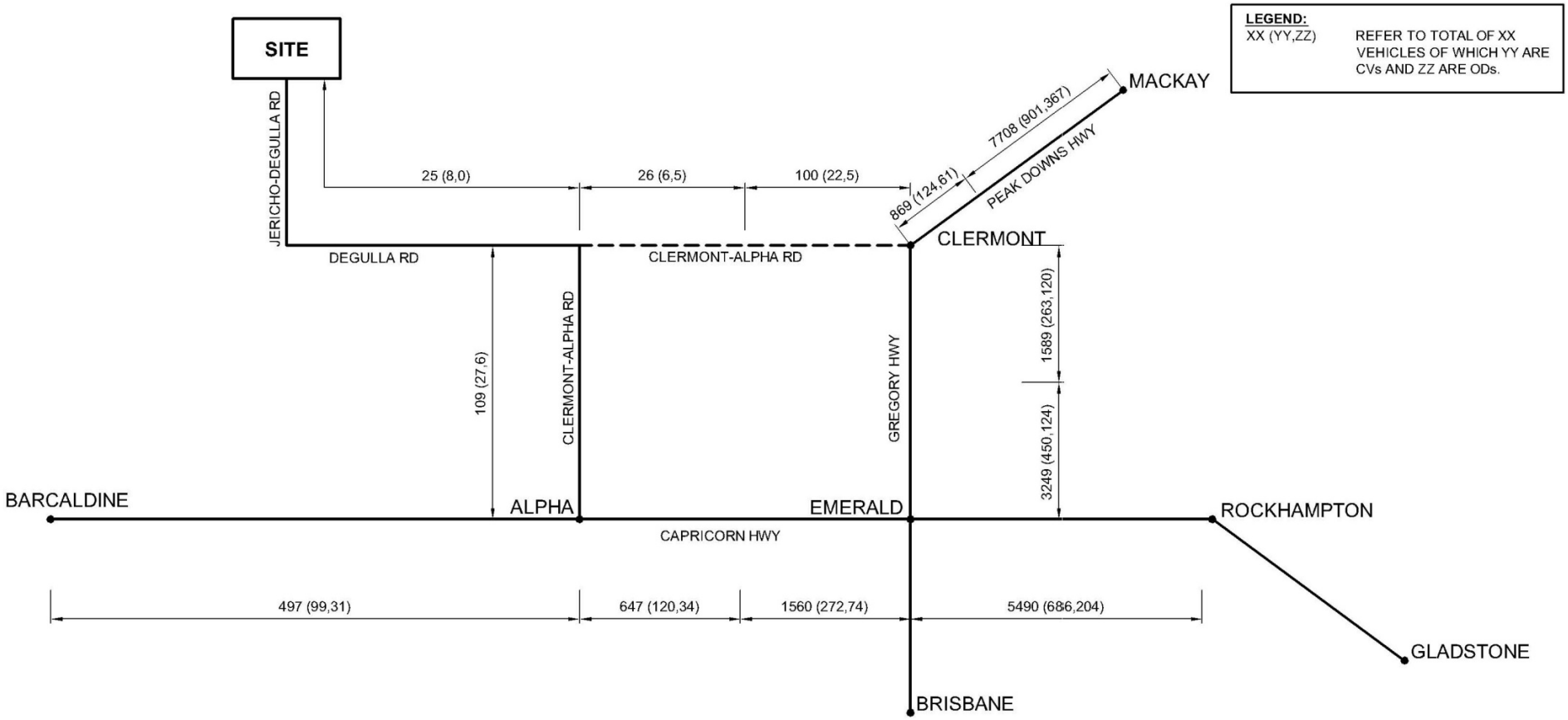
4 Traffic Volumes

Figure 4-2 2014 AADT Background Traffic Volumes (two-way)



4 Traffic Volumes

Figure 4-3 2017 AADT Background Traffic Volumes (two-way)



4.4 Traffic Generation of Project

4.4.1 Construction Phase

4.4.1.1 Approach and Assumptions

The Proponent has provided data showing the predicted traffic generated as a result of the construction of the Project. The data is based on the current status of the design and has originated from a number of different technical analyses. As such, it has had to be consolidated and summarised to provide equivalent yearly and peak daily traffic volumes. This has been incorporated into this assessment as outlined below.

Personnel numbers, mode of transport and origin data has been provided by the Proponent and is based on the majority (up to 89%) of the construction workforce utilising a Fly-In-Fly-Out (FIFO) method of transport. A minority of the workforce will drive or bus to and from the site from surrounding areas such as Alpha, Clermont, Barcaldine or Emerald.

It is expected that the Project will operate 24 hours a day, 7 days a week where daily shift periods are expected to be 12 hours in length. Personnel will be rostered on for 14 consecutive days followed by 7 consecutive days off (i.e. a '14-on/7-off' roster). All personnel (FIFO, BIBO and DIDO) will arrive at the site at the commencement of their rostered days on and will leave at the completion of their 14th day.

It has been assumed that employees driving to and from Alpha, as well as those from nearby regional centres driving to the accommodation facilities will be in single occupancy vehicles. This assumption is considered to produce the worst case scenario for traffic assessment.

The Proponent's estimates that peak construction personnel numbers will be in 2014 with a total of 1,412 people required on-site.

No allowance has been made for transport movements from the accommodation facilities to the work area or to Kevin's Corner airport as all of these movements will occur within the Project area and will have no effect on the public road network.

Delivery of materials, equipment and consumables is assumed to occur 7 days a week, over a 10 hour period. Therefore the number of deliveries occurring during each of the peak hour periods is 10% of the daily total (i.e. total deliveries per day divided by 10 hours equals 10% per hour). Initial advice provided by the Proponent estimates that 11% of all vehicle movements on the public road network generated by the Project during the construction phase will consist of over-dimensional vehicles.

Waste is assumed to be disposed to the on-site landfill wherever possible; however some waste (hazardous and recyclable) will need to be removed from site to a treatment site in Emerald. During all phases of the Project, sewage sludge will be transported to an existing sewage treatment works at Emerald. During early works only, solid waste will be delivered to the BRC landfill along the Landsborough Highway prior to completion of the on-site facility. Further information on waste is available in the Interim Waste Management Plan (Appendix T4.01).

A summary of the traffic volumes generated by construction activity as outlined in the provided data is shown in Table 4-4. Vehicles have been classified according to the AustRoads *Vehicle Classification*

System which defines 12 classes to distinguish between the lengths (and size) of short, medium, long, medium combination and long combination vehicles. For the purposes of this assessment, Light Vehicles (LV) represent classes 1 to 3, Commercial Vehicles (CV) represent classes 4 to 10, and Over-Dimensional (OD) Vehicles represent classes 11, 12 and above.

It should be noted that these are annual volumes that have been calculated using the total estimated number of traffic movements during the peak of construction, extrapolated to a peak daily value. For the purposes of this analysis, peak activities during the construction phase are anticipated to be in 2014.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task.

4.4.2 Operational Phase

4.4.2.1 Approach and Assumptions

The Proponent has provided estimates of the predicted traffic generated as a result of the operational phase of the Project. The data provided has originated from a number of different technical analyses and hence has had to be consolidated and summarised to provide equivalent yearly and daily traffic volumes. This has been incorporated into this assessment as outlined below.

It is envisaged that operational personnel will peak during year 2019 for operational-only employees. However in 2017, there will be an overlap between the construction and operational phases of the Project resulting in a total on-site workforce of 1,600 personnel. For this reason 2017 has been assessed as the peak operational phase of the Project (despite some construction employees still being on-site).

From the collation of this data, it is apparent that within the 10 year design horizon required by the DTMR guidelines, the worst case scenario for traffic impact occurs in 2017 and hence this year has been used for further analysis to assess the worst case impacts on the road network.

A summary of the traffic volumes generated by operational activity as outlined in the provided data is shown in Table 4-5. Vehicles have been classified according to the AustRoads *Vehicle Classification System* which defines 12 classes to distinguish between the lengths (and size) of short, medium, long, medium combination and long combination vehicles. For the purposes of this assessment, Light Vehicles (LV) represent classes 1 to 3, Commercial Vehicles (CV) represent classes 4 to 10, and Over-Dimensional (OD) Vehicles represent classes 11, 12 and above.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task.

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Table 4-4 Traffic Volumes Generated by Project during Peak Construction Period (2014)

	Category	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) Per Year on Public Roads	Total Peak Trips per Day on Public Roads
1. Personnel							
1.1	FIFO	Bus (Class 3 or 4)	Kevin's Corner Airfield	Accommodation	1,250 people (32 bus loads)	0 (FIFO via on-site airfield)	0 (FIFO via on-site airfield)
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	12 people	832	12
1.3	BIBO	Bus (Class 3 or 4)	Barcaldine Council	Accommodation	29 people (1 bus load)	70	2
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	15 people	520	15
1.5	BIBO	Bus (Class 3 or 4)	Emerald	Accommodation	35 people (1 bus load)	70	2
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	18 people	624	18
1.7	BIBO	Bus (Class 3 or 4)	Clermont	Accommodation	35 people (1 bus load)	70	2
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	18 people	624	18
2. Equipment							
2.1	Accommodation Buildings	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	1,400	4
22	Construction Equipment	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	116	2
2.3	Construction Equipment	Over-Dimensional	Mackay	Project Site	Truck loads	24	2
2.3 a	Over-Dimensional Escort	LV (Class 1)	Mackay	Project Site	2 escort vehicles / OD vehicle (NB: 33% require escort)	16	2
2.4	Equipment Packages	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	1,200	4

4 Traffic Volumes

	Category	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) Per Year on Public Roads	Total Peak Trips per Day on Public Roads
2.5	Equipment Packages	Over-Dimensional	Mackay	Project Site	Truck loads	1,220	4
2.5a	Over-Dimensional Escort	LV (Class 1)	Mackay	Project Site	2 escort vehicles / OD vehicle (NB: 33% require escort)	814	2
2.6	Overland Conveyors	Over-Dimensional	Mackay	Project Site	Truck loads	150	2
2.6a	Over-Dimensional Escort	LV (Class 1)	Mackay	Project Site	2 escort vehicles / OD vehicle (NB: 33% require escort)	100	2
3. Materials							
3.1	Construction materials	Standard Semi (Class 8)	Brisbane	Project Site	7,437 tonnes	744	4
3.2	Construction materials	Standard Semi (Class 8)	Gladstone	Project Site	2,316 tonnes	232	2
3.3	Construction materials	Standard Semi (Class 8)	Mackay	Project Site	4,272 tonnes	428	2
3.4	Consumables - Diesel	57kL tanker (Class 10)	Mackay	Project Site	78,216 kL	2,746	8
3.5	Lubricant	20 t capacity (Class 4 or 5)	Mackay	Project Site	428,300 L	44	2
4. Waste							
4.1	Non-landfill waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	1,284 tonnes	130	2
4.2	Lubricant waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	3,842 tonnes	386	2
					Total LV trips	3,530	69
					Total CV trips	7,636 (includes 210 for BIBO)	38 (includes 6 for BIBO)
					Total OD trips	1.394	8

4 Traffic Volumes

Table 4-5 Traffic Volumes Generated by Project during Peak Operational Period (2017)

	Category	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) per year	Total Trips per Day During Peak Operational Phase
1. Personnel							
1.1	FIFO	Bus (Class 3 or 4)	Kevin's Corner Airfield	Accommodation	1,600 people (40 bus loads)	0 (FIFO via on-site airfield)	0 (FIFO via on-site airfield)
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	5 people	520	5
1.3	BIBO	Bus (Class 3 or 4)	Barcaldine Council	Accommodation	15 people (1 bus load)	104	2
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	8 people	832	8
1.5	BIBO	Bus (Class 3 or 4)	Emerald	Accommodation	18 people (1 bus load)	104	2
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	9 people	936	9
1.7	BIBO	Bus (Class 3 or 4)	Clermont	Accommodation	18 people (1 bus load)	104	2
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	9 people	936	9
2. Equipment							
2.1	Replacement equipment	Standard Semi (Class 8)	Mackay	Project Site	8,412 tonnes	842	4
2.2	Replacement equipment (Over dimensional)	Standard Semi (Class 8)	Mackay	Project Site	1,348 tonnes	54	2
2.2a	Over-Dimensional Escort	LV (Class 1)	Mackay	Project Site	2 escort vehicles / OD vehicle (NB: 33% require escort)	36	2
3. Materials							
3.1	General consumables	CV (Class 3, 4 or 5)	Mackay	Project Site	24,718 tonnes	2,472	8
3.2	Fuel	57kL Tanker (Class 10)	Mackay	Project Site	45,857 kL	1,610	6

4 Traffic Volumes

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) per year	Total Trips per Day During Peak Operational Phase
3.3	Lube	20t Capacity (Class 4 or 5)	Mackay	Project Site	572 kL	58	2
4. Waste							
4.1	Non landfill waste	20t Capacity (Class 4 or 5)	Project Site	Emerald	5,214 tonnes	522	2
4.2	Lube Waste	20t Capacity (Class 4 or 5)	Project Site	Emerald	481 tonnes	50	2
					Total LV trips	3,260	33
					Total CV trips	5,866 (includes 312 for BIBO)	30 (includes 6 for BIBO)
					Total OD trips	54	2

4.4.3 Route Assignment

For the impact assessment, it is assumed that all generated traffic will use the existing road network.

A number of factors will influence the decision of which roads will be utilised to access the Project site. Major considerations include:

- Road assessment, monitoring, maintenance and upgrade requirements;
- Travel time;
- Road safety; and
- Council and DTMR approval requirements.

It is assumed that all materials and equipment will be delivered to site via major highways to the local area. Within the local area, routes will be based on the most direct link available as travel time is most often the predominant factor influencing transportation of bulk cargo.

The road network proposed to be utilised by Project traffic has been confirmed and agreed with by DTMR during the consultation process of this impact assessment and is detailed in following paragraphs.

4.4.3.1 Mackay to Site

All vehicle trips originating from Mackay will follow the Peak Downs Highway to Clermont, then the Gregory Highway to Emerald. From Emerald they will continue west along the Capricorn Highway to Clermont-Alpha Road. Following the Clermont-Alpha Road, they will then turn left onto Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

4.4.3.2 Clermont to Site

CVs will follow the same route as detailed in Section 4.4.3.1 from Clermont (i.e. via the Gregory Highway, Capricorn Highway, Clermont-Alpha Road, Degulla Road and Jericho-Degulla Road).

LVs accessing the site from Clermont (i.e. DIDO vehicles) can utilise the section of Clermont-Alpha Road between Degulla Road and Clermont to access the site. However the condition of this road section is unsuitable for CVs and ODs.

4.4.3.3 Gladstone and Rockhampton to Site

From Gladstone, traffic will follow the Bruce Highway to Rockhampton. At Rockhampton, traffic will follow the Capricorn Highway west to Alpha. Vehicles will then follow the Clermont-Alpha Road north from Alpha and access the site from Degulla Road leading into Jericho-Degulla Road to access the site via the access road.

4.4.3.4 Emerald to Site

All vehicles from Emerald (CVs and LVs) will follow the Capricorn Highway to Alpha, continue into Clermont-Alpha Road and access the site via Degulla Road and Jericho-Degulla Road.

4.4.3.5 Brisbane to Site

Traffic originating in Brisbane will follow the Warrego Highway to Roma where it will turn north into the Carnarvon Highway and continue to Rolleston. At Rolleston, traffic will follow the Dawson Highway

into the Gregory Highway towards Emerald where they will continue west along the Capricorn Highway to Clermont Alpha Road. Travelling north along Clermont Alpha Road, they will then turn left onto Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

4.4.3.6 Barcaldine to Site

All personnel residing to the west within Barcaldine Regional Council are anticipated to filter onto the Capricorn Highway and then follow the highway east towards Alpha then north along Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road.

4.4.3.7 Alpha to Site

All personnel residing in Alpha will access the site via Clermont-Alpha Road, Degulla Road and Jericho-Degulla Road.

A summary of routes used by Project related traffic is illustrated in Figure 4-4.

4 Traffic Volumes

Figure 4-4 Public Road Network Utilised by Project Related Traffic

4 Traffic Volumes

It should be noted that vehicle trips may be generated throughout the construction and/or operational phase of the Project from other locations across Australia due to specialised equipment or material requirements. However, there will only be a handful of trips per occasion and on an ad-hoc basis. Therefore, these trips are not considered in this assessment given that their timing is unknown at this stage and will be negligible when compared to the trip generation estimates outlined in Tables 4-4 and 4-5.

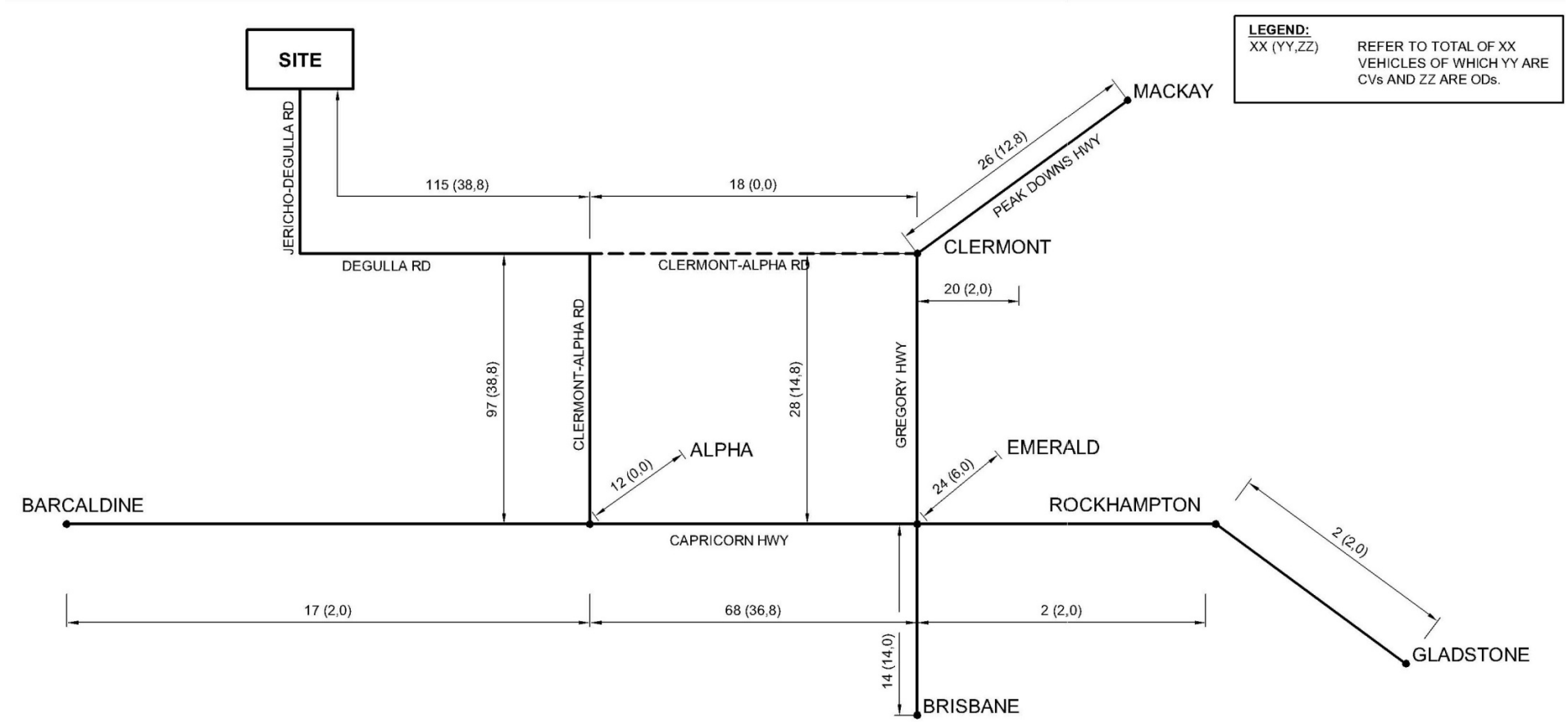
4.4.4 Distribution of Project Traffic

Figures 4-5 and 4-6 illustrate the vehicles generated by the Project during its peak construction (2014) and operational (2017) phases respectively based on the route assignments outlined in Section 4.4.3. It should be noted that the values in these two figures only illustrate the daily traffic flows of Project vehicles as specified in Tables 4-4 and 4-5 (i.e. no background traffic is included).

Refer to Section 6 which combines the traffic volumes in 2014 and 2017 (background and Project traffic). Furthermore, the total estimated traffic flows are then analysed to determine the extent of impact created by the Project on the operational performance of the road network.

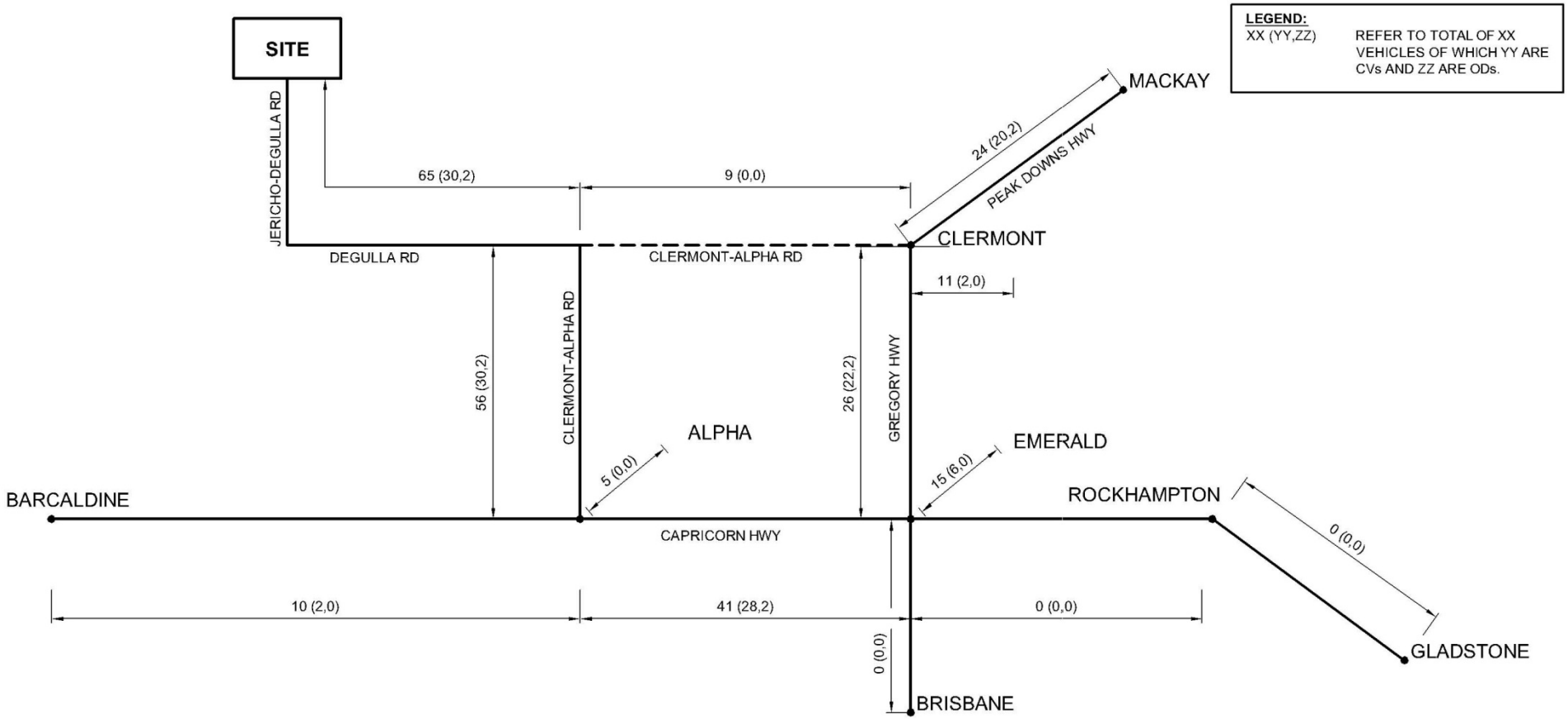
4 Traffic Volumes

Figure 4-4 2014 Daily Project Generated Traffic (two-way)



4 Traffic Volumes

Figure 4-5 2017 Daily Project Generated Traffic (two-way)



4.5 Future Traffic Volumes

The total volume of traffic in the network in future assessment scenarios is determined by combining the future background traffic volume 'future year' with the Project's generated traffic together for the selected 'assessment year', i.e.

2014 Future Year + 2014 Project Year = 2014 Assessment Year

As noted previously, the worst case scenario within the 10 year design horizon occurs at 2014 during the construction period and 2017 for the operational period. Both years have been assessed given the different vehicle routes and volumes required between the construction and operational phases.

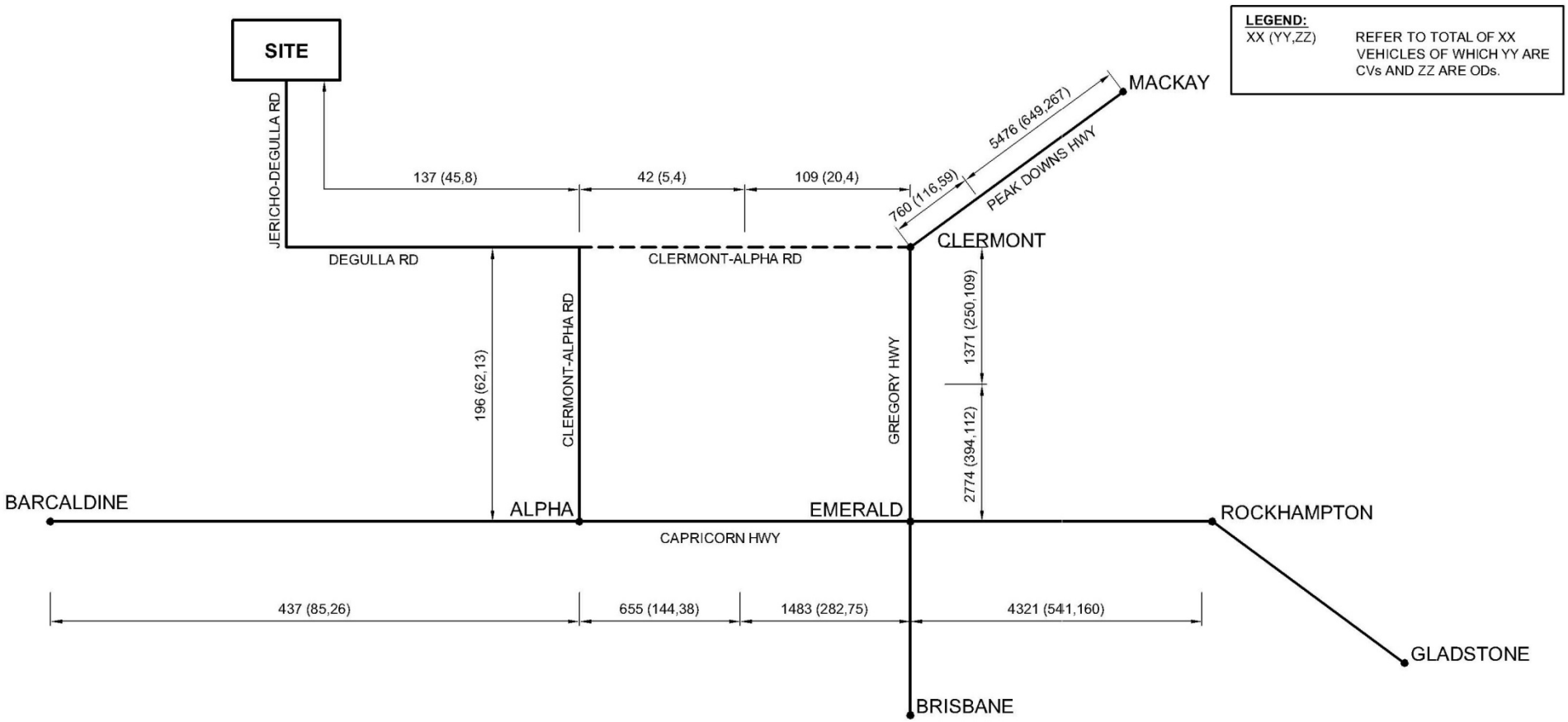
Figure 4-7 outlines the total future traffic volumes with Project development for 2014 (construction phase) and Figure 4-8 summarises the percentage increase caused by the generated traffic after assignment to the designated transport routes.

Figure 4-9 outlines the total future traffic volumes with Project development for 2017 (operational phase) and Figure 4-10 summarises percentage increase caused by the generated traffic after assignment to the designated transport routes.

In order to understand the impact proportion traffic generated from the Project will have on the 'background' traffic network, the 'assessment' year has been compared against the 'background' year as a percentage.

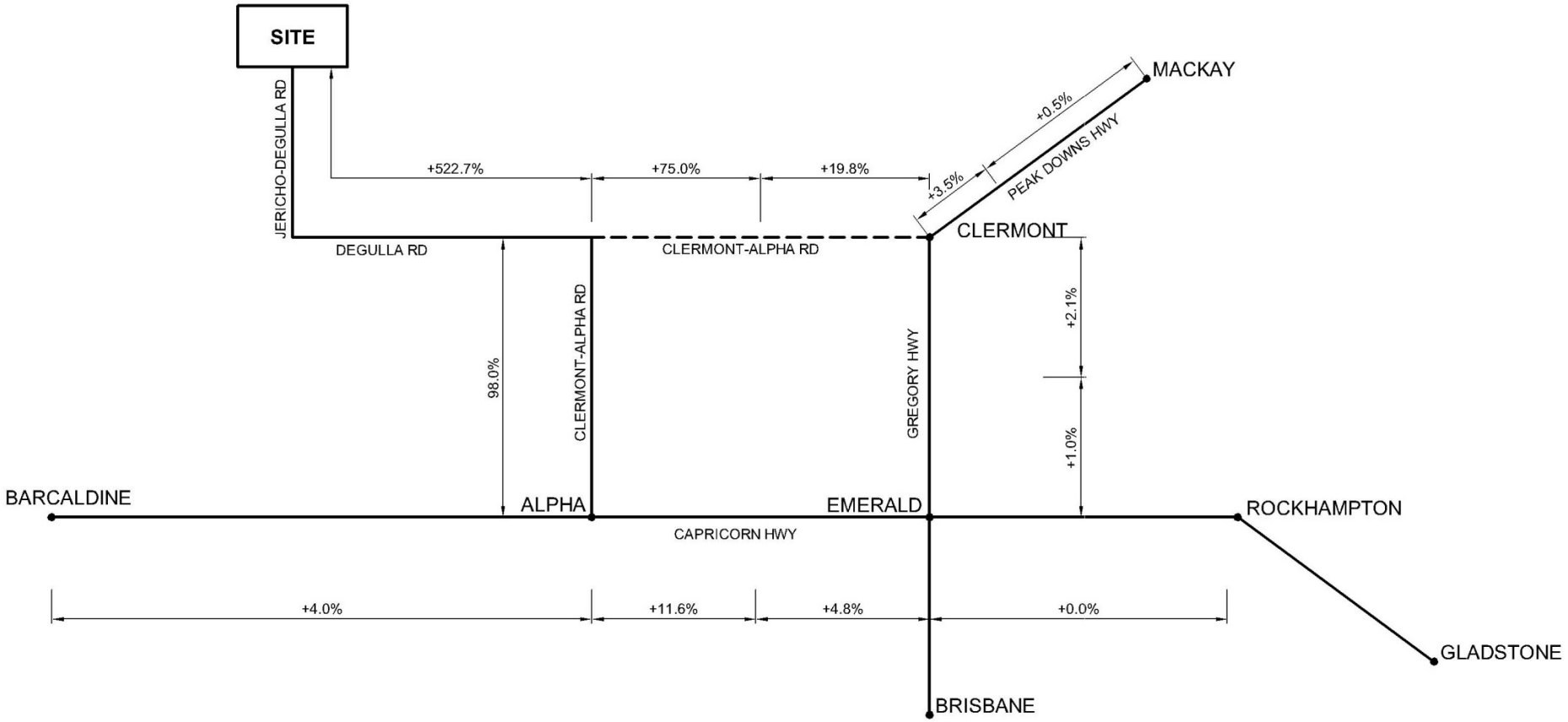
4 Traffic Volumes

Figure 4-6 Total Daily Traffic in 2014 (two-way) - 2014 AADT Background and 2014 Project Generated Volumes



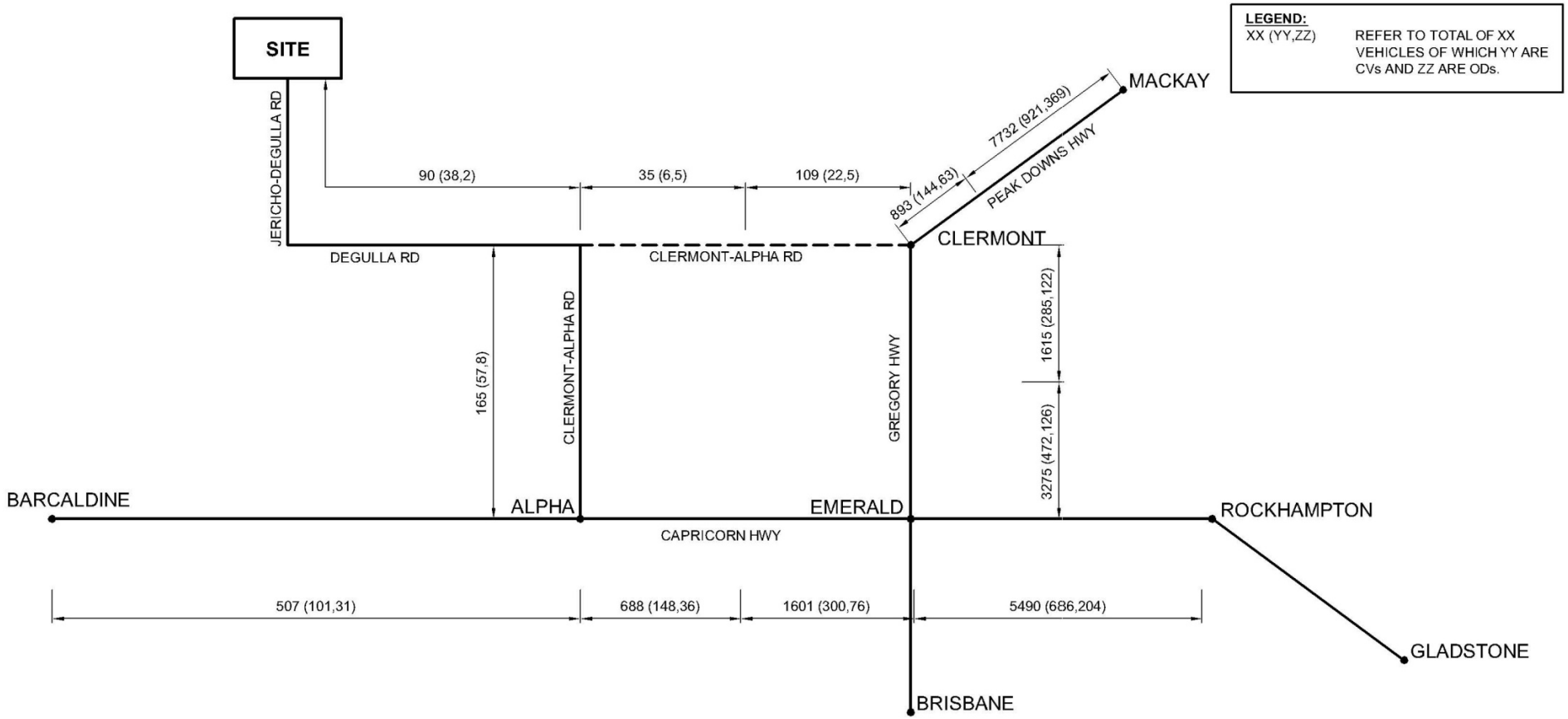
4 Traffic Volumes

Figure 4-7 Percentage Increase in Traffic Volumes Due to Project Vehicles in 2014



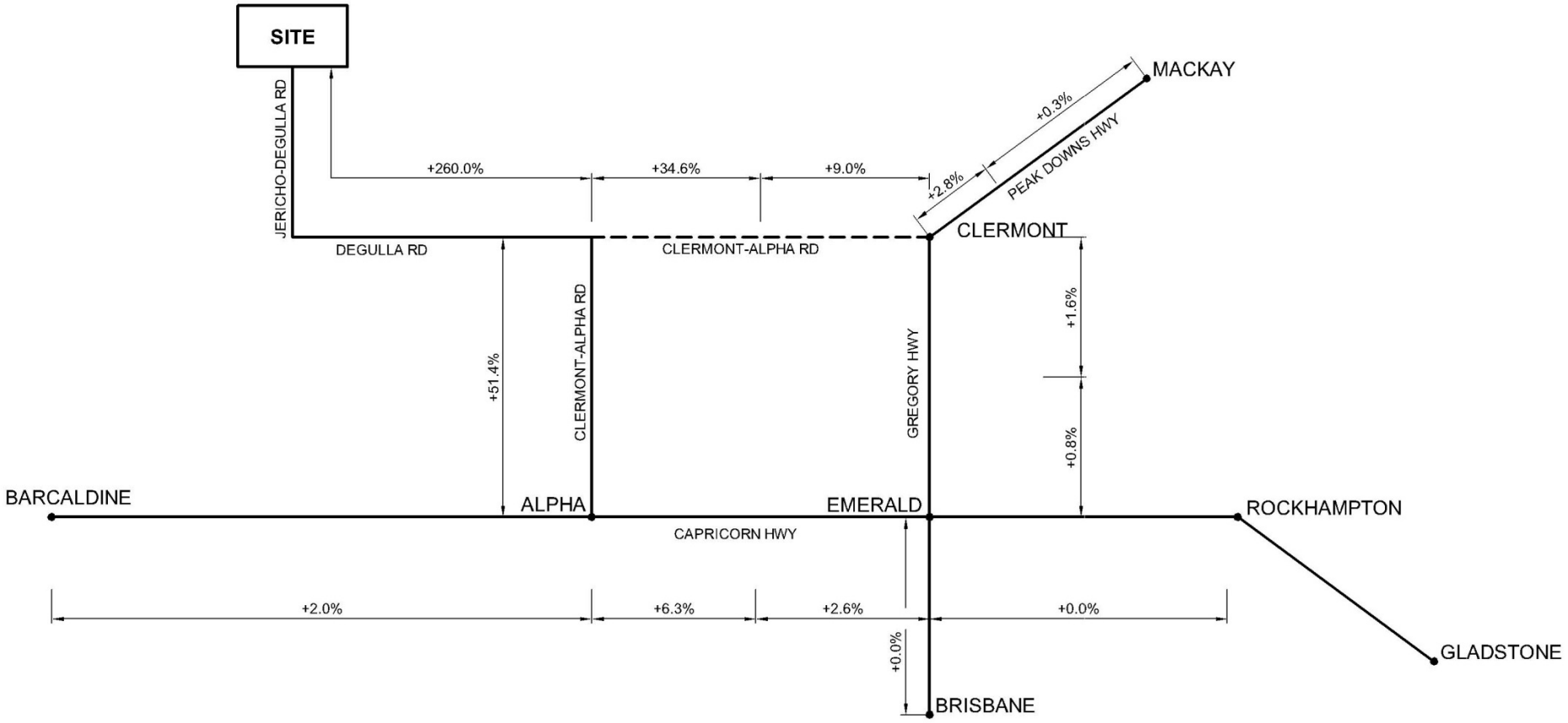
4 Traffic Volumes

Figure 4-8 Total Daily Traffic in 2017 (two-way) - 2017 AADT Background and 2017 Project Generated Volumes



4 Traffic Volumes

Figure 4-9 Percentage Increase in Traffic Volumes Due to Project Vehicles in 2017



5

Pavement Impact Assessment

An initial assessment has been conducted to identify impacts that the Project will have on the pavement design life of affected roads. This section details this assessment and its findings.

5.1 Assessment Methodology, Scope and Assumptions

The DTMR 'Guidelines for the Assessment of Road Impacts of Development' (GARID) specifies that a pavement impact assessment should be completed when evaluating the full impact a development may have on the surrounding state controlled road (SCR) network. As per the GARID, the Central West Region DTMR office was contacted for guidance regarding the appropriate scope of the pavement assessment.

Information provided for the DTMR road assets includes:

- Pavement design life;
- Pavement age and width data;
- Maintenance costs;
- Proposed upgrades (based on the Queensland Transport and Roads Investment Program (QTRIP)); and
- 2010 AADT values.

A site inspection was undertaken between the 1st and 3rd of March, 2011.

Barcaldine Regional Council was contacted regarding Hobartville and Degulla Roads. Barcaldine Regional Council advised that neither road is a high priority for Council; Degulla Road is classified as a category 2 road and it consists of naturally formed earth with gravel overlay in sections of approximately 50mm depth. Maintenance for the road is generally $30,000 a year.

The underlying purpose of the pavement assessment is to assist DTMR to maintain the SCR network in a safe and functional condition and to determine if the impact of the development requires the Proponent to contribute towards any unplanned upgrades or maintenance, or to accelerate the progress of any DTMR planned future works.

Only pavement impacts directly attributable to the Project are required to be assessed in this process. All roads have been assessed against their existing condition as of March 2011.

5.2 Project Profile and Future Traffic Volumes

Reference should be made to Sections 4 and 6 of this report for details of traffic volumes and the Project profile used in this assessment.

The GARID provides a set of "Underlying Principles" which includes at Principle 3 a comment that an increase in traffic on SCRs of less than 5% is deemed insignificant unless the increase actually provides a significant impact on an aspect of road performance.

Sections of SCR's with a traffic impact of more than 5% are:

- Clermont-Alpha Road (Alpha to Degulla Road);
- Clermont-Alpha Road (Degulla Road to Clermont); and
- Capricorn Highway (Alpha to Gemfields).

These road sections are considered further in the following paragraphs.

Jericho-Degulla Road and Degulla Road are not considered SCR assets as they are maintained by Barcaldine Regional Council. However, due to the increase in traffic volume and distribution they have been included in the analysis.

5.3 Impact Assessment and Estimated Contribution Requirements

5.3.1 Clermont-Alpha Road (180km)

A section of Clermont-Alpha Road, directly to the west of Clermont is sealed two lanes, with the following 180km to Alpha varying from single lane sealed to gravel pavements with some bridges and concrete floodways.

The existing condition of this road, as provided by DTMR, shows that the pavement is an average of 14 years old, with a maximum of 29 years and a minimum of less than 1 year old. The design life for pavement in the Central West Region is 10 years for both rehabilitation and construction works. The width is reported to be an average of 8.2m, with a maximum of 11.6m and minimum of 3.7m.

There are few planned and future upgrades of Clermont-Alpha Road. The Roads Alliance 'Addendum to the Queensland Transport and Roads Investment Program 2010-2011 to 2013-2014' (Transport and Main Roads, November 2010) includes the following upgrades:

- Project Number 16/552/13; Sections 79.00 to 83.00km; Indicative total cost $497,000; full Queensland Government contribution; approved for the 2011-2012 financial year; to undertake minor regrade.
- Project Number 16/552/14; Sections 75.00 to 79.00km; Indicative total cost $526,000; full Queensland Government contribution; indicated to be in the 2012-2013 financial year; to undertake minor regrade.
- Project Number 16/552/16; Sections 35.00 to 38.00km; Indicative total cost $604,000; full Queensland Government contribution; indicated to be in the 2013-2014 financial year; to undertake minor regrade.
- Project Number 16/552/17; the Belyando River; indicative total cost of $10,200,000; full Queensland Government contribution; $772,000 approved for the period to June 2012, remainder to be confirmed; to undertake a replacement of the bridge/s.

Maintenance for Clermont-Alpha Road is undertaken by maintenance providers under a Road Maintenance Performance Contract to the Queensland DTMR. Maintenance costs are $2,116.72/km per annum.

5.3.1.1 Between Degulla Road and Clermont Township (120km)

The existing condition of Clermont-Alpha Road between Degulla Road and the township of Clermont is highly variable:

- The pavement ages range from 1 year to over 45 years old;
- Pavement widths vary from one trafficable lane to three trafficable lanes; and
- Pavement surfaces are asphalt, concrete, formed gravel, and natural surfaces (light gravel or sand).

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The Proponent has advised that no commercial vehicles (CV's) will use Clermont-Alpha Road between Clermont and Degulla Road. A marginal increase in light vehicles is expected, however this is not considered significant.

A summary of the AADT and CV distribution for Clermont-Alpha Road (between Clermont and Degulla Road) is provided in Table 5-1.

Table 5-1 Clermont-Alpha Road (between Clermont and Degulla Rd) - AADT and CV Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	81	24%		0%	81	20	24%
2014	91	24%	18[1]	0%	109	22	20%
2017+	100	24%	9[2]	0%	109	24	22%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only – considered consistent after 2017.

Sections of **Clermont-Alpha Road that are sealed** (approximately 21km) are generally in a very good to excellent condition with pavement ages between 2 and 10 years. Given the marginal contribution of vehicles to this road segment, it is recommended that only routine maintenance will be required.

There are a number of sealed areas that at the time of the site visits require attention *as soon as possible* as they present a potential risk to existing users. These are not the responsibility of the Proponent and include the following:

- The causeway over Back Creek can flow very fast when the water is over 200mm deep. This causes a safety concern for existing road users, one local saying that she's seen vehicles being moved in the direction of flow at about 200mm depth. This causeway should be raised to provide safe access.
- The causeway over an un-signed creek approximately 25km west of Clermont has a significant hole on the south side. This is a significant safety concern given that it is very difficult to see if there is water over the causeway. This should be repaired as soon as possible.
- All culverts should be cleared of silt for them to be effective. The culverts were found to be in good condition, though most were filled with a significant amount of silt.

Sections of **Clermont-Alpha Road that are formed gravel** (approximately 30km) are in variable condition. These sections are between 3 and 10 years old, with a design life of 10 years. These sections showed some signs of pot holing, though likely due to the previous wet season. These sections should be maintained as soon as possible to extend their remaining life. If pot holes are filled, the marginal increase in light vehicles is unlikely to significantly affect these sections of the road.

Given the marginal contribution of vehicles to this road segment it is recommended that only routine maintenance will be required.

Sections of the **Clermont-Alpha Road that are natural surface** (approximately 69km) are also in variable condition. The age of the natural surface road is reported to be between 20 and 45 years. The condition of the naturally surfaced road is dependent upon the natural base:

- Approximately 8km is light gravel / sand over hard pack / rock – generally in good condition;

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- Approximately 41km is light gravel over a sandy base – in sound condition prior to rain, poor condition after rain; and
- Approximately 20km is sand over a sandy base – in sound condition prior to rain, very poor condition after rain.

During the site visit along the Clermont-Alpha Road rain swept through the area. Following an unloaded road train, the condition of the road became extremely slippery. The road train got bogged approximately 90km west of Clermont. Due to the marginal increase in light vehicles using this road segment, no work or maintenance is recommended on behalf of the Proponent.

Figure 5-1 On-site Observations for Clermont-Alpha Road (between Clermont and Degulla Rd)

The fast-flowing Back Creek after approx. 30mm rain

Unknown causeway with significant hole requiring immediate attention.

Gravel section in good condition

Gravel section requiring maintenance

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Light gravel over sandy base after rain and one light vehicle

Light gravel over sandy base after rain and one road train

One lane bridge over Native Companion Creek

Light gravel over sandy base after rain and one road train

5.3.1.2 Between Degulla Road and Hobartville Road (30km)

The existing condition of Clermont-Alpha Road between Degulla Road and Hobartville Road is generally suitable for vehicles. Approximately 13km is gravel, 2.5km is sealed, and the rest is natural surface. There are however isolated locations of softness around culverts and low spots.

The sealed sections are predominantly 1.5 lanes wide. This is sufficient for the existing traffic uses as there are significant hard shoulders through this section. The age of the pavement is mostly 3 to 5 years old, though the natural surface is at least 20 years old.

There is a culvert crossing approximately 15km north of Hobartville Road which is showing signs of degradation (refer Figure 5-2). This point is likely to degrade swiftly, potentially creating a significant hole in the carriageway. It should be repaired as soon as possible, though is not the responsibility of the Proponent. Other culvert crossings and floodways along this section are in reasonable condition.

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A summary of the AADT and CV distribution for Clermont-Alpha Road (between Degulla Road and Hobartville Road) is provided in Table 5-2.

Table 5-2 Clermont-Alpha Road (between Degulla Rd and Hobartville Rd) - AADT and CV Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	26%			88	23	26%
2014	99	26%	97[1]	47%	196	73	37%
2017+	109	26%	56[2]	57%	165	61	37%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only – considered consistent after 2017.

Given the increase in traffic, particularly commercial vehicles, it is recommended that this road segment be upgraded to a 2 lane all-weather surface.

Figure 5-2 On-site Observations for Clermont-Alpha Road (between Degulla Rd and Hobartville Rd)

Single Lane section of Clermont-Alpha Road between Degulla Road and Hobartville Road

Floodway approx. 15km north of Hobartville Road requiring maintenance

5.3.1.3 Between Hobartville Road and Alpha (30km)

The Clermont-Alpha Road between Alpha and Hobartville Road is predominantly sealed. There is an approximately 4m section of surface degradation about 11km north of Alpha which will require maintenance within the 2011 Dry season to ensure it doesn't degrade further through the next Wet season. This is an existing condition that should be maintained by DTMR.

A summary of the AADT and CV distribution for Clermont-Alpha Road (between Hobartville Road and Alpha) is provided in Table 5-3.

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Table 5-3 Clermont-Alpha Road (between Hobartville Rd and Alpha) - AADT and CV Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	26%			88	23	26%
2014	99	26%	97[1]	47%	196	73	37%
2017+	109	26%	56[2]	57%	165	61	37%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only – considered consistent after 2017.

This short north-south section of the Clermont-Alpha Road will take most of the mine traffic and all of the commercial vehicles related to the mine. Throughout the construction and operational phases of the Project there will be an expected increase in the proportion of commercial vehicles by 11%.

Given the existing condition of the road, it is recommended that no additional works are required for the implementation of the Project. However anecdotal evidence suggests that this road segment regularly floods during the Wet season. This is an existing condition of the road network, regardless of the Project, and therefore upgrades should be considered by DTMR.

5.3.2 Jericho – Degulla Road and Degulla Road

Degulla Road is a Barcaldine Regional Council road asset. It is classified as a category 2 road as it is a thoroughfare between Alpha and Degulla. The maintenance budget for the 2010 / 2011 year is in the order of $30,000.

Jericho-Degulla Road is a lesser classified road and is considered a 'Rural Standard Road' providing a link between Degulla and Cudmore Reserve. The condition of the road is suitable for traffic with adequate creek crossings and even ground surface.

A site visit revealed that little traffic currently uses both of these roads, though traffic counts were not provided by Barcaldine Regional Council. An estimate of 20 vehicles per day has been assumed for Degulla Road between its intersection with Clermont–Alpha Road and Degulla on the basis of traffic noted during the site inspection. A robust commercial vehicle contribution of 30% has been assumed.

A summary of the AADT and CV distribution for Jericho-Degulla Road and Degulla Road is provided in Table 5-4.

Table 5-4 Jericho-Degulla Road and Degulla Road - AADT and CV Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	20	30%			20	6	30%
2014	22	30%	115[1]	40%	137	53	80%
2017+	25	30%	65[2]	49%	90	40	44%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only – considered consistent after 2017.

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It can be seen from Table 4-5 that there is a significant increase in the number of vehicles using both Jericho-Degulla Road and Degulla Road, during both construction and operation of the Project. The added vehicles are both commercial and light vehicles.

It is recommended that both Jericho-Degulla Road and Degulla Road be upgraded to an all-weather surface between Clermont-Alpha Road and the Project site.

Figure 5-3 Indicative Road Condition of Degulla Road (left) and Jericho-Degulla Road (right)

5.3.3 Capricorn Highway (Alpha to Gemfields)

Almost all nominated routes on the public road network during the construction and operational phases of the Project will incorporate one section of the Capricorn Highway (with the exception of the Clermont DIDO movements). The section of the Capricorn Highway between Alpha and Emerald in particular will experience a large proportion of all Project generated traffic. The current AADT volumes for the Capricorn Highway between Alpha and Emerald have been provided by DTMR with two midblock AADT volumes being referenced – firstly for traffic between Alpha and Gemfields and secondly for traffic between Gemfields and Emerald. The section of highway between Alpha and Gemfields is to be further analysed in this Pavement Impact Assessment due to the increase in vehicle numbers (based on Project vehicles) exceeding the 5% threshold criteria. All existing volumes along the remaining sections of the Capricorn Highway increase by less than 5% with the inclusion of Project vehicles.

There is one itemised upgrade to this section of the Capricorn Highway identified in the QTRIP and relates to the sealing of the shoulders at Mamboo siding (east of Craven Road). Indicative cost for these works is $2,217,000 and completion will be during the 2010/2011 financial year.

The Capricorn Highway between Alpha and Gemfields is considered a ‘State Strategic Road’ and the complete highway extends from Rockhampton in the east to Longreach in the west. The road is in reasonable condition with a fully sealed surface providing one lane in each direction. Linemarking varies between centre linemarking only and centre and edge linemarkings. Roadside shoulders also vary between non-existent through to narrow and sealed.

A summary of the AADT and CV distribution for the Capricorn Highway (between Alpha and Gemfields) is provided in Table 5-5.

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Table 5-5 Capricorn Highway (Alpha to Gemfields) - AADT and CV Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	524	23%			524	121	23%
2014	587	23%	68[1]	65%	655	180	27%
2017+	647	23%	41[2]	73%	688	179	26%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only – considered consistent after 2017.

Given the existing good condition of the road, it is recommended that no additional works are required for the implementation of the Project. However, given the increase in vehicle numbers it is recommended that route inspections are performed by the Proponent. An inspection and/or dilapidation survey prior to the construction phase commencing should be undertaken to form baseline conditions of the pavement. Follow-up inspections (i.e. monthly/quarterly) can then determine whether Project vehicles are further exacerbating the degradation of the pavement.

5.4 Summary of Recommended Works

The following is a summary of the conclusions drawn from the pavement impact assessment:

- Clermont-Alpha Road between Alpha and Hobartville Road
  - No works recommended as a result of the Project.
- Clermont-Alpha Road between Hobartville Road and Degulla Road.
  - Upgrade of road segment to a consistent two-lane all-weather surface.
- Clermont-Alpha Road between Degulla Road and Clermont
  - No reconstruction/upgrade works recommended as a result of the Project (i.e. attributable to Project vehicles).
  - Undertake routine maintenance along sealed and formed gravel sections.
- Jericho-Degulla and Degulla Road
  - Upgrade to an all-weather surface between Clermont-Alpha Road and the Project site;
  - Upgrade of intersection of Clermont-Alpha Road and Degulla Road;
  - Upgrade of intersection of Jericho-Degulla/ Degulla Road and Hobartville Road.
- Capricorn Highway (Alpha to Gemfields)
  - No works recommended as a result of the Project.
  - Baseline pavement assessment and ongoing inspections should be undertaken by the Proponent.

Works identified above are recommended to be considered in conjunction with the neighbouring Alpha Coal project upgrades (including proposed bypasses and road closures).

5.5 Further Investigation and Current Agreements

Further investigation is recommended for the following segments:

- The Clermont-Alpha Road between Hobartville Road and Alpha is subject to flooding. This is an existing condition that the Proponent should investigate prior to committing all commercial vehicles to use this road segment.

The existing condition of Clermont-Alpha Road between Clermont and Degulla Road should be investigated by DTMR. This is not considered to be the responsibility of the Proponent given the insignificant increase in light vehicles due to the Project.

6

Road Network Performance

This section analyses the road network from a traffic performance perspective at both midblock (road links) and intersection locations.

6.1 Network Assessment Required

DTMR's 'Guidelines for the Assessment of Road Impacts of Developments' states that:

'…traffic operation impacts need to be considered for any State Controlled Roads where the construction or operational traffic generated by a proposed development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements.'

Based on the figures previously shown in Figures 4-8 and 4-10, justification for selecting the scope of assessment is as follows:

Road Midblocks Included in Assessment

- Degulla Road and Jericho-Degulla Road – Not a state controlled road, however included in assessment based on increased Project related traffic being above 5% threshold;
- Clermont-Alpha Road – Above 5% threshold criteria; and
- Capricorn Highway (Alpha to Gemfields section) – Above 5% threshold criteria.

Intersections Included in Assessment

The following intersections have been assessed based on the increased vehicle numbers and/or requested by DTMR to be investigated:

- Intersection of Clermont-Alpha Road and Capricorn Highway – Above 5% criteria threshold;
- Intersection of Capricorn Highway and Gregory Highway (within Emerald township) – Assessment requested from DTMR; and
- Intersection of Capricorn Highway and Gregory Highway (east of Emerald) –Assessment requested from DTMR.

Road Midblocks Not Included in Assessment

- Capricorn Highway (west of Alpha and east of Gemfields) – below 5% threshold criteria;
- Gregory Highway – below 5% threshold criteria; and
- Peak Downs Highway – below 5% threshold criteria.

Based on previous discussions, assessment has taken place for the 2014 construction phase and 2017 operational phase scenarios. These present the worst case scenarios and are therefore considered to be robust assessment in determining traffic impacts during these peak phases.

6.2 Road Links Assessment

6.2.1 Analysis Method and Required Performance Criteria

In accordance with the DTMR guidelines, road links were assessed based on a measure of Level of Service (LOS).

6 Road Network Performance

LOS is an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

In general there are six levels of service, designated from A to F, with LOS A representing free flowing traffic with no delays and LOS F being congested with no flow and major delays. A LOS up to LOS C is generally considered acceptable in road design.

The DTMR guidelines require that a minimum standard of LOS C is maintained, but LOS D may be acceptable under certain conditions. In general, remedial measures are sought to maintain existing LOS on rural roads.

The assessment of LOS for the road network in question has been completed using the methodology detailed in the AustRoads 'Guide to Traffic Engineering Practice Part 2 – Roadway Capacity'.

6.2.2 Assumptions and Analysis

Whilst the methodology used is suitable for the Capricorn Highway and results in no impact on LOS for the 2014 and 2017 'With Project' scenarios, there is little information available to provide standard guidelines for the assessment on narrow or unpaved rural roads such as Jericho - Degulla Road and Clermont-Alpha Road.

Therefore, the following methodology has been adopted from the guidelines for use in assessing these two roads.

For a standard two lane, two-way rural road, the appropriate threshold for LOS A is 2,000 AADT on level terrain. Using a factor of 0.5 to account for unpaved roads and an additional 0.5 factor for single lane roads, the resulting threshold for LOS A would be 500 AADT. Additionally, if the terrain is classified as 'rolling' the resulting threshold for LOS A would be 225 AADT. The maximum AADT value on these unpaved or narrow rural roads in the assessment is less than 200 and hence all can be classified as having a LOS A.

Table 6-1 and Table 6-2 summarise the assessment of the road links during the 2014 and 2017 assessment years respectively.

6.2.3 Summary of Road Link Impact Assessment

The analysis shows that the additional average daily traffic generated by the Project using peak transport estimates is minimal in comparison to the capacity of the road network. Therefore, the Project will not have a significant impact on the road link performance based on a LOS measurement.

Whilst from a road network performance perspective, there are no significant impacts created by the Project, additional considerations such as safety, pavement design life and road use management may be relevant in the overall impact of the Project and are discussed in Section 7-1.

6 Road Network Performance

Table 6-1 Road Link Assessment - Level of Service (LOS) during Construction Phase (2014)

Road Segment	K Factor		Existing 2010		Projected 2014			
	Surveyed	Assumed	AADT	LOS	Without Project		With Project	
					AADT	LOS	AADT	LOS
Degulla Road								
Clermont-Alpha Road to Site	-	0.12	20[1]	A	22	A	137	A
Clermont-Alpha Road								
Alpha to Degulla Road	-	0.12	88	A	99	A	196	A
Degulla Road to Mistake Creek	-	0.12	21	A	24	A	42	A
Mistake Creek to Clermont	-	0.12	81	A	91	A	109	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	587	A	655	A

Note: K Factor is the ratio of the AADT volume to the design hourly peak volume. Typical K factors for rural roads range from 0.10 to 0.15.

[1] No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on site observations

Table 6-2 Road Link Assessment - Level of Service (LOS) during Operational Phase (2017)

Road Segment	K Factor		Existing 2010		Projected 2017			
	Surveyed	Assumed	AADT	LOS	Without Project		With Project	
					AADT	LOS	AADT	LOS
Degulla Road								
Clermont Alpha Road to Site	-	0.12	20[1]	A	25	A	90	A
Clermont-Alpha Road								
Alpha to Mistake Creek	-	0.12	88	A	109	A	165	A
Degulla Road – Mistake Creek	-	0.12	21	A	26	A	35	A
Mistake Creek to Clermont	-	0.12	81	A	100	A	109	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	647	A	688	A

Note: K Factor is the ratio of the AADT volume to the design hourly peak volume. Typical K factors for rural roads range from 0.10 to 0.15.

[1] No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on site observations

6.3 Intersection Assessment

6.3.1 Analysis Method and Required Performance Criteria

The DTMR guidelines state that intersections should be assessed against the performance criteria of Degree of Saturation (DOS). For unsignalised intersections, the key indicator of DOS is the utilisation ratio of individual turning movements within the intersection. Utilisation ratio is expressed as demand volume/capacity ratio for entering movements.

The DTMR guidelines suggest that the minimum required utilisation ratio or DOS for unsignalised intersections is 0.8. Above this value, the intersection is considered to be nearing its practical capacity and upgrade works may be required. At near capacity users are likely to encounter increased delays and queues.

The computer program Signalised & Unsignalised Intersection Design and Research Aid (SIDRA) Intersection version 5.0 is a commonly used intersection analysis software package, which uses traffic volumes, intersection geometry and intersection control (e.g. signals, roundabouts etc) to determine intersection operational performance. It has been developed to assist in determining the performance of intersections based on algorithms and technical analysis techniques.

The SIDRA modelling package was used to analyse the existing turning movement counts collected in March 2012 against the future performance of the road network during the peak construction and operational phases (2014 and 2017 respectively). The DOS for each approach of the intersections has been used as a guide to determine the baseline characteristics of the existing performance of the intersections. This information can then be used as a comparison with the anticipated construction vehicle movements to determine the traffic impact of the development. SIDRA modelling outputs can be provided upon request.

It should be noted that the worst case results for DOS may come from different movements or movements in which traffic volumes have not been increased by the Project in the same model. This is due to the interaction between traffic volumes, movement priorities and geometric layouts of each intersection.

6.3.2 Intersections Analysed and Assumptions

The following three intersections were analysed using SIDRA based on the 5% threshold criteria and/or as requested to be investigated by DTMR:

- Intersection of Clermont-Alpha Road and Capricorn Highway – unsignalised 4-way intersection;
- Intersection of Capricorn Highway and Gregory Highway (within Emerald township) – unsignalised t-intersection; and
- Intersection of Capricorn Highway and Gregory Highway (east of Emerald) – unsignalised t-intersection.

A new intersection will need to be constructed to access the Project site from Jericho - Degulla Road. This new intersection has not been modelled due to the extremely low volume of existing traffic on these roads and the fact that the intersection will be designed to required standards to minimise impact on the existing road network.

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Traffic Volumes

Existing classified turning movement volume data was collected over a 12-hour period on Thursday, 1 March 2012 between 7:00am and 7:00pm. The following peak hours were identified for each of the three sites based on this turning movement data:

- Clermont-Alpha Road / Capricorn Highway intersection – 8:15am to 9:15am (AM Peak) and 4:15pm to 5:15pm (PM Peak);
- Capricorn Highway / Gregory Highway intersection (within Emerald township) – 8:00am to 9:00am (AM Peak) and 4:30pm to 5:30pm (PM Peak); and
- Capricorn Highway / Gregory Highway intersection (east of Emerald) – 7:45am to 8:45am (AM Peak) and 4:30pm to 5:30pm (PM Peak).

The percentage of CV's and observed queue lengths for each leg were also collected.

These peak hours and their respective peak hour volumes have been used in the analysis for the existing performance levels.

To reiterate, years 2014 and 2017 scenarios have been assessed as traffic patterns differ between the construction and operational phases. These two scenarios represent the worst case for both phases.

For the 2014 and 2017 future year background traffic volumes scenario, the collected 2012 existing turning movement volumes were extrapolated using the proposed growth rates as illustrated in Table 4-3. CV percentages remain the same as the existing conditions.

These volumes were then added to traffic generated by the Project, based on the traffic distribution outlined in Section 4 and the following assumptions:

- All CV deliveries are expected to occur over a 10 hour period each day and therefore, 10% of the total two-way daily volume of CV trips will occur in any one hour period, including each peak hour period;
- One-way DIDO trips between the mine Accommodation facilities and Alpha, Clermont, Emerald and Barcaldine will occur during the peak hour; and
- The scheduling of shift changeover is currently not known. Therefore each peak hour has been assessed under two sub-scenarios whereby (1) all DIDO personnel will be arriving at the site (i.e. 'inbound'), and (2) all DIDO personnel will be driving home from the site (i.e. 'outbound').
    - Figures 6-1 to 6-4 illustrate the peak hour traffic volume and direction of travel for Project vehicles for the inbound and outbound sub-scenarios during the AM and PM peak hour respectively.

6 Road Network Performance

Figure 6-1 2014 Project Generated Traffic during Peak Hour (inbound scenario for personnel)

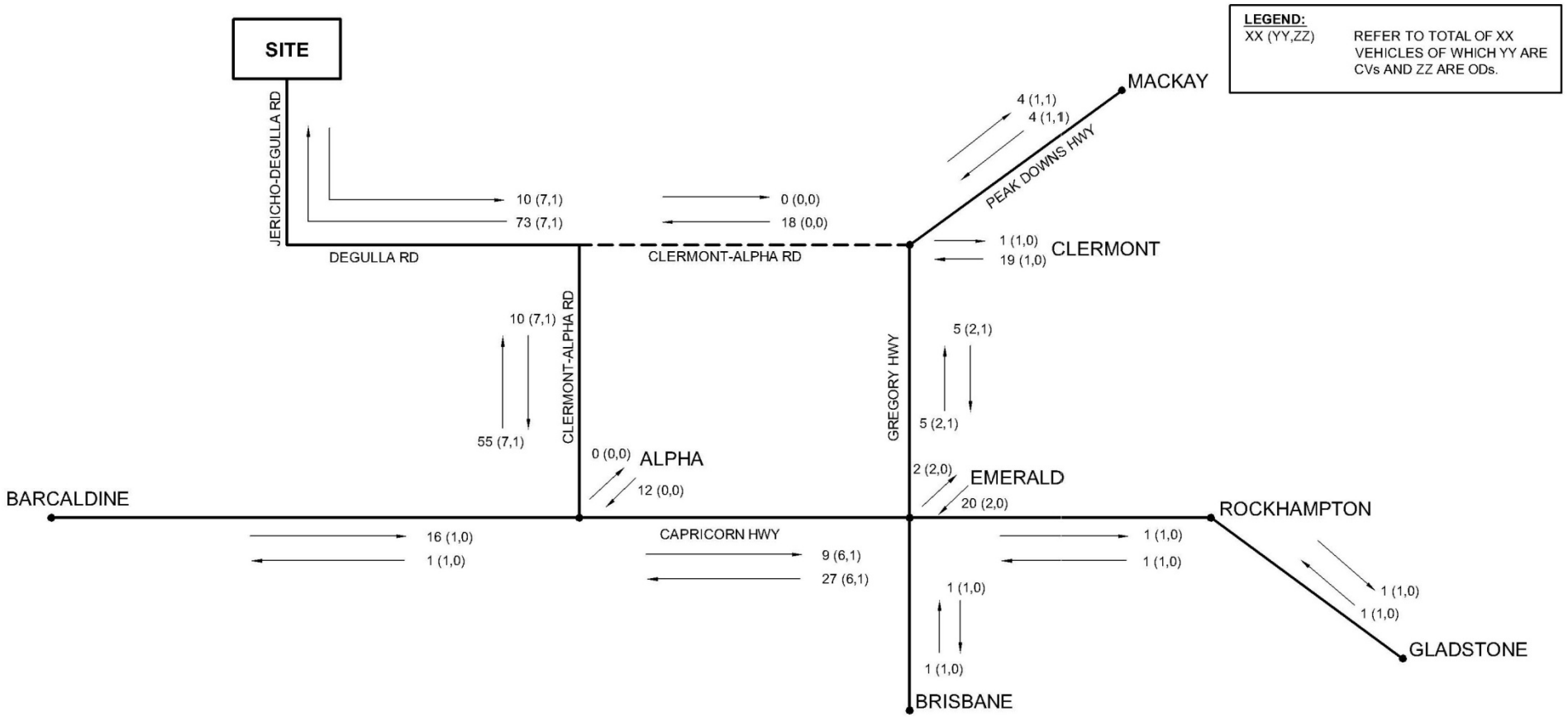

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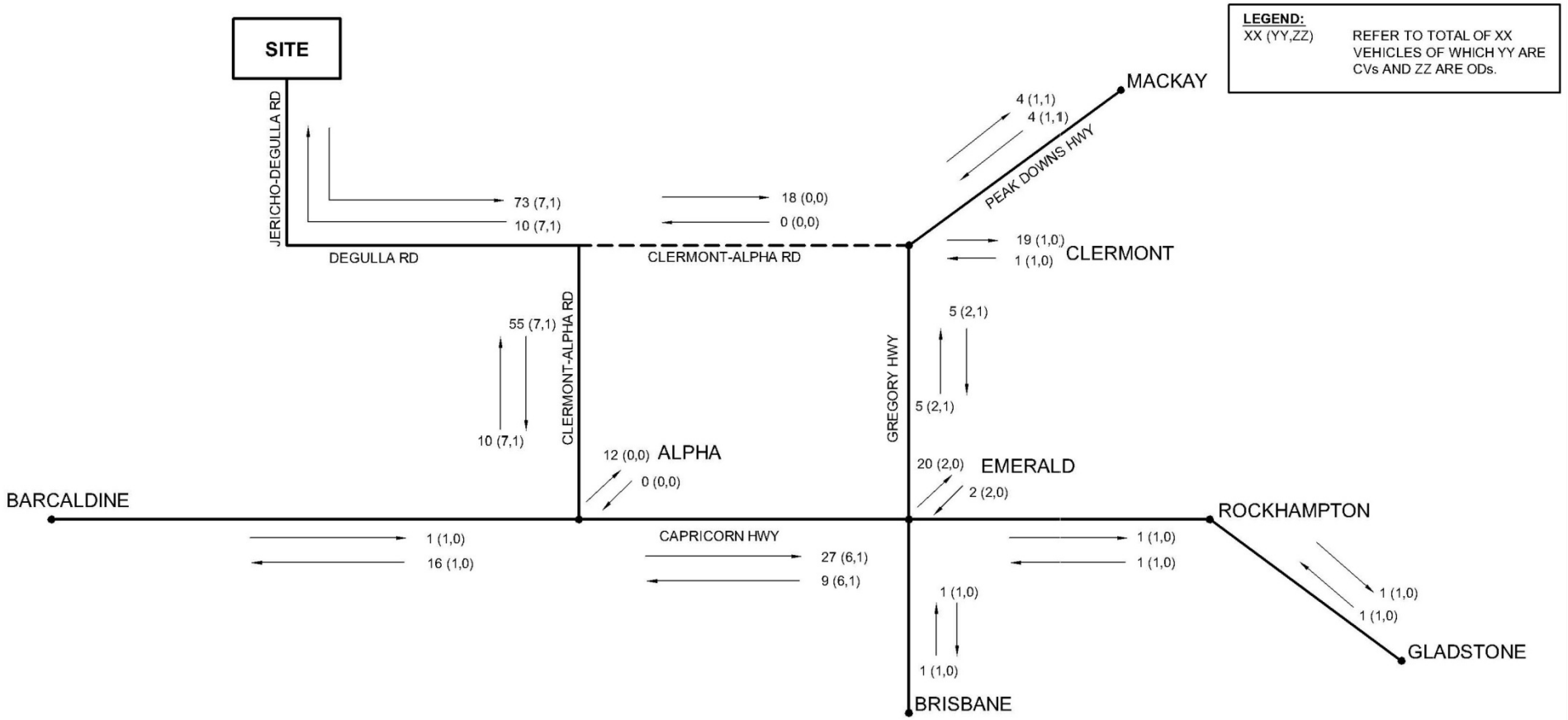
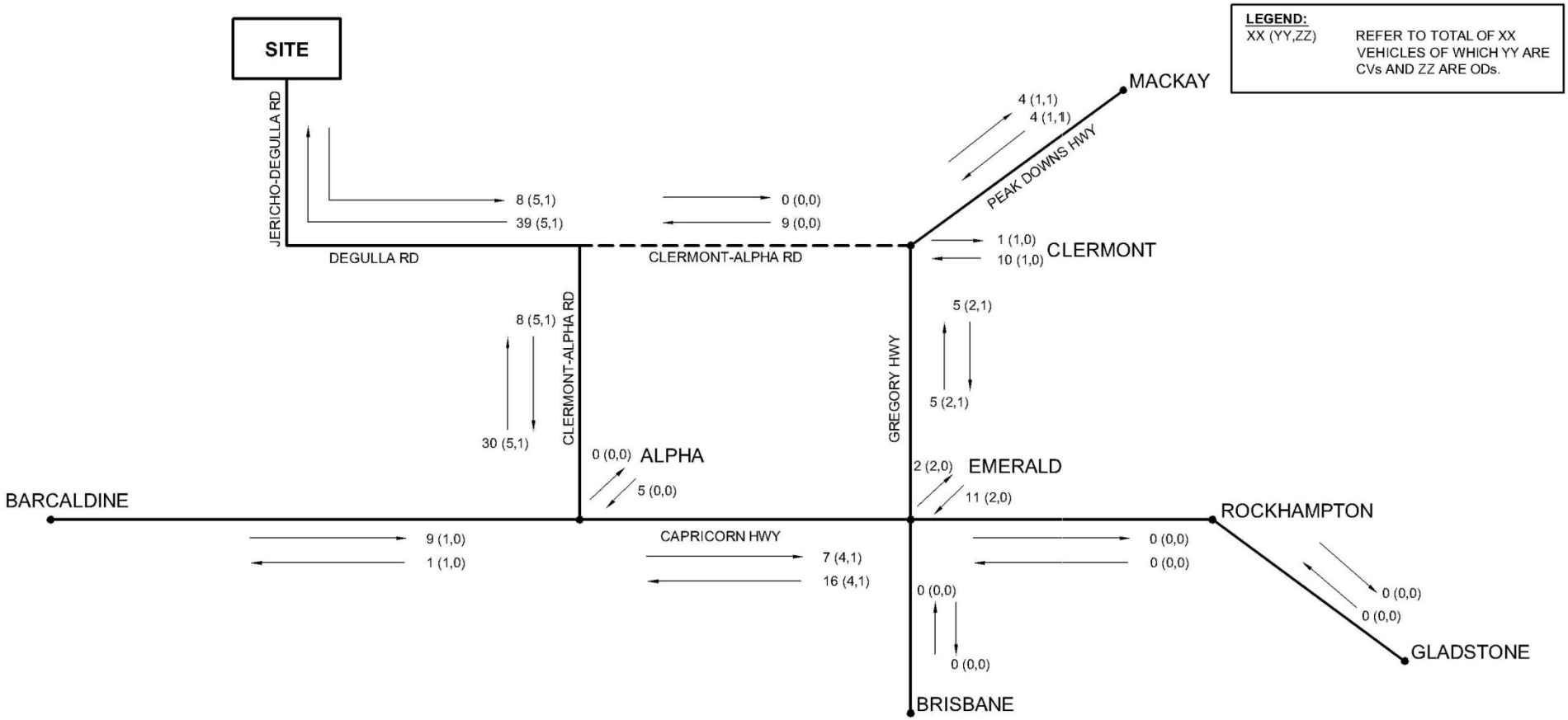
Figure 6-2 2014 Project Generated Traffic during Peak Hour (outbound scenario for personnel)



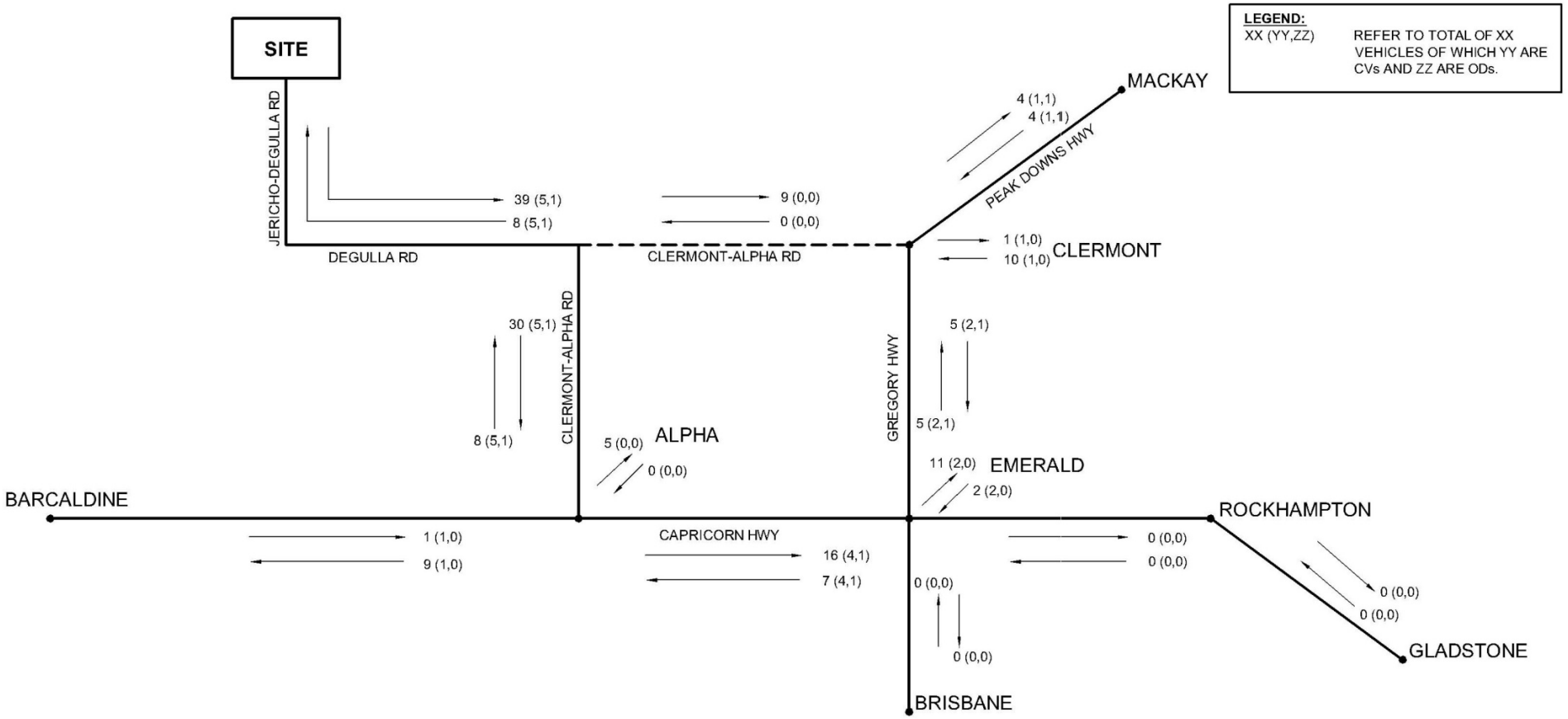
6 Road Network Performance

Figure 6-3 2017 Project Generated Traffic during Peak Hour (inbound scenario for personnel)



6 Road Network Performance

Figure 6-4 2017 Project Generated Traffic during Peak Hour (outbound scenario for personnel)



6.3.3 Capricorn Highway and Clermont-Alpha Road Intersection, Alpha

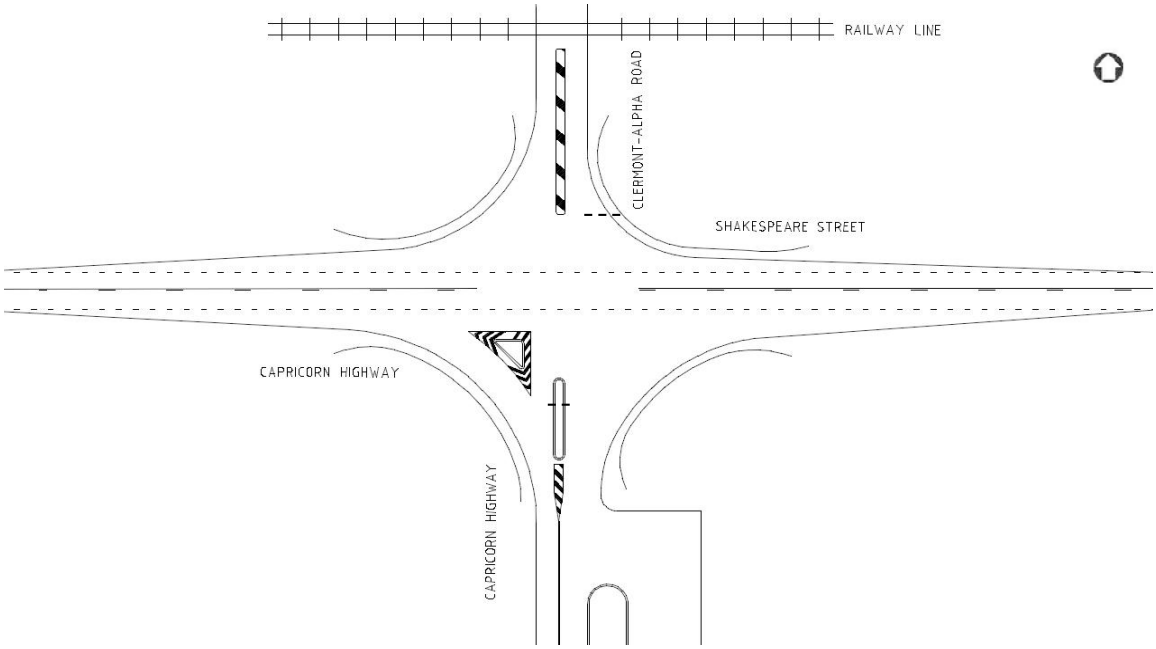
To assist in modelling this intersection DTMR provided intersection layout plans, which show the geometric layout of the intersection. Geometry for the intersection was also sourced from publicly available aerial photographs.

The intersection is classified as an unsignalised 4-way, give way intersection, with the major road running in an east-west direction. Traffic entering the main road from the northern and southern legs is controlled by give-way signs. A left-turn slip lane controlled by a give-way sign has been constructed for northbound traffic approaching this intersection (i.e. continuation of the Capricorn Highway). No other slip lanes have been constructed for the approach to the opposing leg.

However the approach has a wide splay to accommodate the turning movement of larger vehicles and can therefore easily accommodate a dedicated, but informal, left-turn lane for smaller vehicles.

An at-grade railway crossing is located in close proximity and intersects Clermont-Alpha Road approximately 40m north of the intersection. The level crossing is controlled by warning lights, signage and linemarking only – no boomgates have been installed.

Figure 6-5 Capricorn Highway and Clermont-Alpha Road Intersection Layout



6.3.4 Capricorn Highway and Gregory Highway (North) Intersection (within Emerald township), Emerald

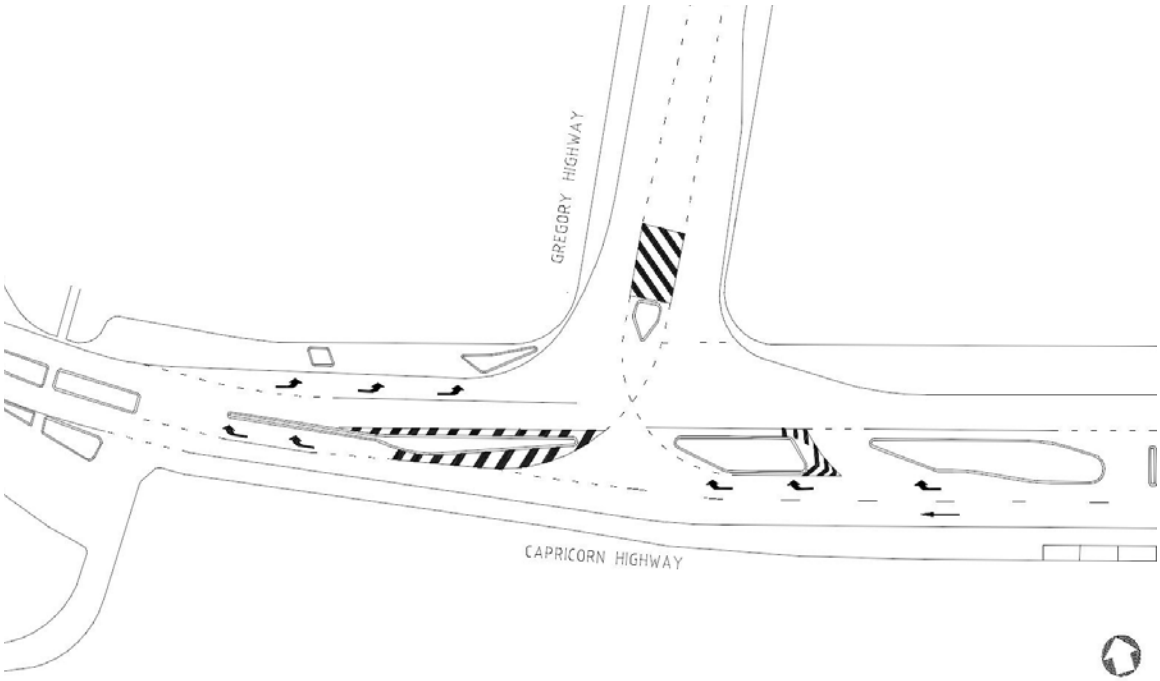
Geometry for this intersection was sourced from publicly available aerial photographs in addition to onsite observations. The intersection is classified as an unsignalised T-intersection, with the major road running in an east-west direction. Traffic entering the main road from the northern leg is controlled by a give-way arrangement.

A raised median is constructed along the Capricorn Highway and accommodates a dedicated right-turn lane for westbound traffic. In addition, a dedicated left-turn lane is provided for eastbound traffic.

The northern approach is a wide single shared turning lane, however on-site observations have indicated that this is utilised by left and right turning movements.

It should be noted that the Gregory Highway is a continuous north-south route; however it has an extended left-right dogleg movement. This movement utilises approximately 1.5km of the Capricorn Highway and as such these two intersections are considered individually in this analysis.

Figure 6-6 Capricorn Highway and Gregory Highway (North) Intersection Layout



6.3.5 Capricorn Highway and Gregory Highway (South) Intersection (east of Emerald), Emerald

Geometry for this intersection was sourced from publicly available aerial photographs in addition to onsite observations. The intersection is classified as an unsignalised T-intersection, with the major road running in an east-west direction. Traffic entering the main road from the southern leg is controlled by a give-way sign.

A raised median is constructed for the western approach and accommodates a dedicated right-turn lane for eastbound traffic. In addition, a painted median and a dedicated left-turn lane is provided for westbound traffic. The southern approach is a wide single shared turning lane, however on-site observations have indicated that this is utilised by left and right turning movements.

An at-grade railway crossing is located in close proximity and intersects the Gregory Highway approximately 20m south of the intersection. The level crossing is controlled by warning lights, signage and linemarking only – no boomgates have been installed.

As noted previously, the Gregory Highway is a continuous north-south route; however it has an extended left-right dogleg movement. This movement utilises approximately 1.5km of the Capricorn Highway and as such these two intersections are considered individually in this analysis.

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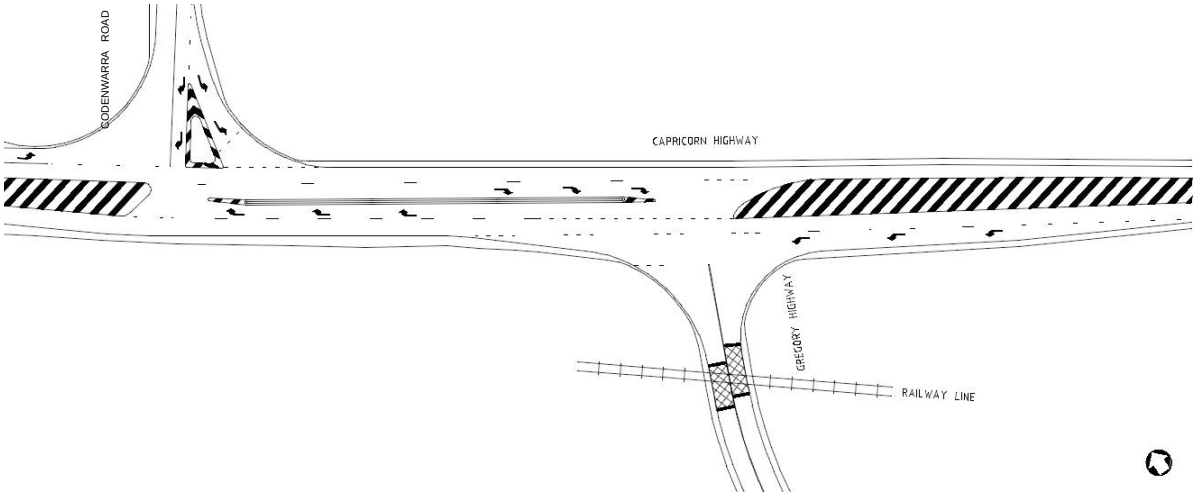
Figure 6-7 Capricorn Highway and Gregory Highway (South) Intersection Layout



6.3.6 Scenarios Assessed

A total of seven scenarios have been assessed for 2012, 2014 and 2017. This includes two sub-scenarios that determine whether personnel travelling to (inbound) or from (outbound) the site in the particular peak hour have an impact on intersection performance. One-hour peak hours (AM and PM) have been determined based on the turning movement counts collected in March 2012.

2012 Existing Traffic

This scenario assesses the existing turning movement volumes collected from the on-site counts in March 2012. The results demonstrate current operational performance prior to the Project commencing.

2014 Background Projected Traffic

Traffic count data collected in 2012 has been projected to 2014 based on the growth rates outlined in Table 4-3. This scenario does not include any traffic generated by the Project and determines future operational performance.

2014 Total Traffic – Inbound

This scenario adds the estimated vehicles generated by the Project during the peak construction phase (2014) to the '2014 Background Projected Traffic' which determines the incremental impact that Project traffic will have on the operational performance above the background traffic volumes in 2014.

Scheduling for the changeover of personnel at the Accommodation facilities is yet to be determined. Therefore this sub-scenario assumes that all DIDO personnel will be driving to the site from their local township for both the nominated AM and PM peak hour at each intersection. In addition, all BIBO movements (including return trips) are assumed to occur during the nominated peak hours. While the DIDO and BIBO movements may not occur in one particular hour during this phase of the Project, this assumption will ensure that the 'worst case' scenario is considered.

All remaining two-way movements (i.e. CVs, ODs) will operate as normal – i.e. 10% of all trips during each peak hour.

2014 Total Traffic – Outbound

This scenario is identical to the '2014 Total Traffic – Inbound' scenario except that all DIDO personnel are assumed to be driving away from the site to their local township during both peak periods.

2017 Background Projected Traffic

Traffic count data collected in 2012 has been projected to 2017 based on the growth rates outlined in Table 4-3. This scenario does not include any traffic generated by the Project and determines future operational performance.

2017 Total Traffic – Inbound

This scenario adds estimated vehicles generated by the Project during the peak operational phase (2017) to the '2017 Background Projected Traffic' which determines the incremental impact that Project traffic will have on the operational performance above the background traffic volumes in 2017.

Scheduling for the changeover of personnel at the Accommodation facilities is yet to be determined. Therefore this sub-scenario assumes that all DIDO personnel will be driving to the site from their local township for both the nominated AM and PM peak hour at each intersection. In addition, all BIBO movements (including return trips) are assumed to occur during the nominated peak hours. While the DIDO and BIBO movements may not occur in one particular hour during this phase of the Project, this assumption will ensure that the 'worst case' scenario is considered.

All remaining two-way movements (i.e. CVs, ODs) will operate as normal – i.e. 10% of all trips during each peak hour.

2017 Total Traffic – Outbound

This scenario is identical to the '2017 Total Traffic – Inbound' scenario except that all DIDO personnel are assumed to be driving away from the site to their local township during both peak periods.

6.3.7 Results for the Capricorn Highway and Clermont-Alpha Road Intersection

SIDRA has been used to analyse the operational performance for the Capricorn Highway / Clermont-Alpha Road intersection to determine the impact of vehicles generated by the Project. Table 6-3 outlines the results for existing traffic in 2012 and project background traffic in 2014 and 2017.

As illustrated in Table 6-3, the operational performance of the intersection would be well within the 0.80 threshold criteria set by DTMR. It can therefore be concluded that background traffic growth can be adequately accommodated by the current configuration of the intersection through to 2017 and beyond.

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Table 6-3 Existing and Project Background SIDRA Results - Capricorn Highway / Clermont-Alpha Road Intersection

	Scenario	Measure	Value	Critical Movement
AM Peak Hour	2012 Existing	DOS	0.03	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	
	2014 Projected Background	DOS	0.03	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	
	2017 Projected Background	DOS	0.04	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	Eastbound through movement into Shakespeare St and right turn into Capricorn Hwy
PM Peak Hour	2012 Existing	DOS	0.02	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	
	2014 Projected Background	DOS	0.02	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	
	2017 Projected Background	DOS	0.03	Northbound through movement into Clermont-Alpha Road and right turn into Shakespeare St
		95th Percentile Queue	No more than 1 car	

Tables 6-4 and 6-5 detail the incremental impact that the Project may have during the peak construction (2014) and operational (2017) phases of the Project. Both the inbound and outbound scenarios have been assessed for the 'Total Traffic' scenarios to determine whether the directionality of the DIDO trips has any impact on the operational performance of the intersection.

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As illustrated in the following two tables, the inclusion of Project vehicles into the 2014 and 2017 scenarios has a negligible effect on the operational performance of the intersection. The DOS is under 0.10 which is well within the 0.80 threshold criteria. Furthermore, there is no expected increase in queue lengths for any approach to the intersection during the construction and operational phases of the Project. These results demonstrate that this intersection should be operating freely with minimal queuing during the construction and operational phases of the Project through to 2017 and beyond.

Table 6-4 SIDRA Result Comparison for 2014 Scenarios - Capricorn Highway / Clermont-Alpha Road Intersection

Scenario		AM Peak Hour		PM Peak Hour	
		DOS	95th Percentile Queue	DOS	95th Percentile Queue
2014 Projected Background	**Value**	0.03	No more than 1 car	0.02	No more than 1 car
	Critical Movement	Northbound through movement and right turn		Northbound through movement and right turn	
2014 Total Traffic – Inbound	**Value**	0.07	No more than 1 car	0.06	No more than 1 car
	Critical Movement	Northbound through movement and right turn		Northbound through movement and right turn	
2014 Total Traffic – Outbound	**Value**	0.08	No more than 1 car	0.07	No more than 1 car
	Critical Movement	Southbound through movement and right turn		Southbound through movement and right turn	
Maximum Incremental Increase from Project		+0.05	0m	+0.05	0m
Notes		Negligible increase	No increase	Negligible increase	No increase

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Table 6-5 SIDRA Result Comparison for 2017 Scenarios - Capricorn Highway / Clermont-Alpha Road Intersection

Scenario		AM Peak Hour		PM Peak Hour	
		DOS	95th Percentile Queue	DOS	95th Percentile Queue
2017 Projected Background	Value	0.04	No more than 1 car	0.03	No more than 1 car
	Critical Movement	Northbound through movement and right turn	Eastbound through movement and right turn	Northbound through movement and right turn	
2017 Total Traffic – Inbound	Value	0.06	No more than 1 car	0.05	No more than 1 car
	Critical Movement	Northbound through movement and right turn		Northbound through movement and right turn	
2017 Total Traffic – Outbound	Value	0.06	No more than 1 car	0.05	No more than 1 car
	Critical Movement	Southbound through movement and right turn		Southbound through movement and right turn	
Maximum Incremental Increase from Project		+0.02	0m	+0.02	0m
Notes		Negligible increase	No increase	Negligible increase	No increase

6.3.8 Results for the Capricorn Highway and Gregory Highway (North) Intersection

SIDRA has been used to analyse the operational performance for the Capricorn Highway / Gregory Highway (North) intersection to determine the impact of Project related vehicles. Table 6-6 outlines the results for the existing traffic in 2012 and the projected background traffic in 2014 and 2017.

The operational performance of this intersection during the AM Peak Hour is well within the 0.80 threshold criteria set by DTMR through to 2017 and beyond. However during the PM Peak Hour the DOS approaches the 0.80 threshold in 2014 (DOS of 0.76) and by 2017 has exceeded this with a DOS of 0.93. The resultant effect is an increase in queuing and congested traffic conditions for vehicles utilising this intersection during the PM Peak Hour.

6 Road Network Performance

Table 6-6 Existing and Projected Background SIDRA Results - Capricorn Highway / Gregory Highway (North) Intersection

	Scenario	Measure	Value	Critical Movement
AM Peak Hour	2012 Existing	DOS	0.38	Southbound left turn into Capricorn Hwy
		95th Percentile Queue	20m	Westbound right turn into Gregory Hwy
	2014 Projected Background	DOS	0.45	Westbound right turn into Gregory Hwy
		95th Percentile Queue	27m	
	2017 Projected Background	DOS	0.58	Westbound right turn into Gregory Hwy
		95th Percentile Queue	42m	
PM Peak Hour	2012 Existing	DOS	0.67	Southbound left turn into Capricorn Hwy
		95th Percentile Queue	55m	
	2014 Projected Background	DOS	0.76	Southbound left turn into Capricorn Hwy
		95th Percentile Queue	76m	
	2017 Projected Background	DOS	0.93	Southbound left turn into Capricorn Hwy
		95th Percentile Queue	127m	

Tables 6-7 and 6-8 illustrate the operational performance of this intersection with the inclusion of Project related traffic in 2014 and 2017 respectively. As previously indicated, the DOS for the 2017 PM Peak Hour for the projected background traffic is 0.93 (exceeding the DTMR threshold of 0.80) with a subsequent 95th Percentile Queue Length of 127m. Reference to Table 6-8 will demonstrate that Project vehicles only increase this DOS by +0.01 (i.e. negligible) and the queue lengths remain unchanged. Therefore, the deterioration in the operational performance of the intersection during the PM Peak Hour is not attributable to the Project and alleviating mitigation measures are not the responsibility of the Proponent.

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The remaining peak hour assessment (2014 AM, 2014 PM and 2017 AM) remain within the 0.80 threshold and are therefore considered to be operating appropriately under the DTMR guidelines.

Table 6-7 SIDRA Result Comparison for 2014 Scenarios - Capricorn Highway / Gregory Highway (North) Intersection

Scenario		AM Peak Hour		PM Peak Hour	
		DOS	95th Percentile Queue	DOS	95th Percentile Queue
2014 Projected Background	Value	0.45	27m	0.67	55m
	Critical Movement	Westbound right turn		Southbound left turn	
2014 Total Traffic – Inbound	Value	0.54	28m	0.77	78m
	Critical Movement	Southbound right turn	Westbound right turn	Southbound left turn	
2014 Total Traffic – Outbound	Value	0.48	29m	0.78	80m
	Critical Movement	Southbound right turn	Westbound right turn	Southbound left turn	
Maximum Incremental Increase from Project		+0.03	+2m	+0.11	25m
Notes		Negligible increase	Negligible increase	DOS remains below 0.80 threshold	Negligible increase

Table 6-8 SIDRA Result Comparison for 2017 Scenarios - Capricorn Highway / Gregory Highway (North) Intersection

Scenario		AM Peak Hour		PM Peak Hour	
		DOS	**95th Percentile Queue**	**DOS**	**95th Percentile Queue**
2017 Projected Background	**Value**	0.58	42m	0.93	127m
	Critical Movement	Westbound right turn		Southbound left turn	
2017 Total Traffic – Inbound	**Value**	0.75	43m	0.94	127m
	Critical Movement	Southbound right turn	Westbound right turn	Southbound left turn	
2017 Total Traffic – Outbound	**Value**	0.72	44m	0.94	127m
	Critical Movement	Southbound right turn	Westbound right turn	Southbound left turn	
Maximum Incremental Increase from Project		+0.17	+2m	+0.01	0m
Notes		DOS remains below 0.80 threshold	Negligible increase	0.80 threshold reached due to Projected Background traffic	No increase – performance of critical movement not impacted by Project traffic

6.3.9 Results for the Capricorn Highway and Gregory Highway (South) Intersection

SIDRA has been used to analyse the operational performance for the Capricorn Highway / Gregory Highway (South) intersection to determine the impact of Project related vehicles. Table 6-9 outlines the results for the existing traffic in 2012 and the projected background traffic in 2014 and 2017.

As illustrated in Table 6-9, the operational performance of the intersection is well within the 0.80 threshold criteria set by DTMR. It can therefore be concluded that background traffic growth can be adequately accommodated by the current configuration of the intersection through to 2017 and beyond.

6 Road Network Performance

Table 6-9 Existing and Projected Background SIDRA Results - Capricorn Highway / Gregory Highway (South) Intersection

	Scenario	Measure	Value	Critical Movement
AM Peak Hour	2012 Existing	DOS	0.27	Northbound left turn into Capricorn Hwy
		95th Percentile Queue	8m	Eastbound right turn into Gregory Hwy
	2014 Projected Background	DOS	0.28	Northbound left turn into Capricorn Hwy
		95th Percentile Queue	9m	Eastbound right turn into Gregory Hwy
	2017 Projected Background	DOS	0.34	Northbound left turn into Capricorn Hwy
		95th Percentile Queue	10m	Eastbound right turn into Gregory Hwy
PM Peak Hour	2012 Existing	DOS	0.40	Eastbound right turn into Gregory Hwy
		95th Percentile Queue	20m	
	2014 Projected Background	DOS	0.42	Eastbound right turn into Gregory Hwy
		95th Percentile Queue	22m	
	2017 Projected Background	DOS	0.46	Eastbound right turn into Gregory Hwy
		95th Percentile Queue	25m	

Table 6-10 assesses the incremental impact that the Project may have during the peak construction phase of the Project (2014).

It should be noted that no Project traffic will utilise this intersection during its peak operational phase and therefore will have no incremental impact on the intersection. An assessment for 2017 has therefore not been undertaken.

6 Road Network Performance

As illustrated in Table 6-10, the inclusion of Project traffic into the 2014 scenario has no impact on the operational performance of the intersection. The DOS remains unchanged and is well within the 0.80 threshold criteria while queue lengths remain constant.

These results demonstrate that this intersection should operate freely with minimal queuing during the construction phase of the Project through to 2014 and beyond.

Table 6-10 SIDRA Result Comparison for 2014 Scenarios - Capricorn Highway / Gregory Highway (South) Intersection

Scenario		AM Peak Hour		PM Peak Hour	
		DOS	95th Percentile Queue	DOS	95th Percentile Queue
2014 Projected Background	**Value**	0.28	9m	0.42	22m
	Critical Movement	Northbound left turn	Eastbound right turn	Eastbound right turn	
2014 Total Traffic – Inbound	**Value**	0.28	9m	0.42	22m
	Critical Movement	Northbound left turn	Eastbound right turn	Eastbound right turn	
2014 Total Traffic – Outbound	**Value**	0.28	9m	0.42	22m
	Critical Movement	Northbound left turn	Eastbound right turn	Eastbound right turn	
Maximum Incremental Increase from Project		+0.00	0m	+0.00	0m
Notes		No increase	No increase	No increase	No increase

6.3.10 Summary of Intersection Impact Assessment

The analysis shows that the additional peak hourly traffic generated by the Project using peak vehicle estimates does not produce any significant incremental impacts on the performance of the three nominated intersections. The Capricorn Highway / Clermont-Alpha Road and Capricorn Highway / Gregory Highway (South) intersections are operating well below the 0.80 DOS threshold throughout the analysed construction and operational phase scenarios and there is therefore no significant deterioration in the performance of these intersections by the Project related vehicles.

The Capricorn Highway / Gregory Highway (North) intersection is however expected to reach the 0.80 DOS threshold capacity between 2014 and 2017. This is due to the projected background traffic growth in the region regardless of the inclusion of vehicles generated by the Project.

6 Road Network Performance

Further analysis of the 2017 scenarios indicates that vehicles generated by the Project have minimal impact to the critical movements causing the poor operational performance of the intersection. As such, mitigation measures required to improve the operational performance of the Capricorn Highway / Gregory Highway (North) intersection are not the responsibility of the Proponent.

Whilst from an intersection performance perspective, there are no significant incremental impacts created by the Project, additional considerations such as safety and road use management may be relevant in the overall impact of the Project as described in Section 7-1.

7

Road Use Considerations

This section summarises a number of transport management issues that need to be considered as planning and implementation of the Project proceeds.

7.1 Road Use Management

Transport to and from the Project site has the potential to impact on the community and appropriate road use management should be in place to manage and mitigate potential impacts. An indicative structure of the Road-Use Management Plan is provided in Section 8.1.4.

7.2 Planning

Extraction of coal in the Galilee Basin by this and other new mines will generate additional regional development, to support the mining activities. Planning for long-term traffic growth in the vicinity of the Project site and the broader access routes has been taken into account in the traffic analysis as described in Section 1.3of the EIS Transport Report.

7.3 Noise

Traffic generates noise and therefore additional traffic generated by the proposed mine development will create additional traffic noise both at the Project site and along the roads used to travel to the site. The impacts of traffic-generated noise are assessed within Volume 2, Appendix H of this SEIS and discussed in Section 15 of the EIS.

7.4 Dust

Dust generation by vehicles on the Project site or travelling/delivering to the site should be mitigated to the extent that is feasible as it impacts on nearby homesteads and has the potential to cause a safety issue for sight distances due to obscuration – particularly on unsealed roads. Air quality impacts, including dust, are assessed within Volume 1, Section 13 of the EIS and Volume 2, Appendix G of this SEIS. Appropriate mitigation measures form part of the EMP as outlined in Volume 2, Appendix T1 of this SEIS.

7.5 Flood Control

The impacts of road infrastructure within the mining lease area on surface water flow regimes are covered in Volume 2, Appendix T3 and discussed in Volume 1, Section 11 of the EIS. It should be noted that flooding is an occasional event and may close sections of roads and lead to damage of roads.

7.6 Roadworks in Road Reserve

It is possible that there will be requirements for works in road reserves along the access routes to the development site (e.g. to accommodate over dimensional loads – see Section 7.9). Appropriate work plans which should cover the relevant permits required for such works and management of associated issues such as land disturbance, drainage impacts and impact on structures will be prepared forrequired approvals.

7.7 On-site Parking, Circulation and Vehicle Separation

Access to the Project site will be required from existing roads and it is assumed that some form of control/security gating will be installed at the entrance to the site. The configuration of the access must take into account the volume and swept path of vehicles that access and egress the site – particularly with regards to the large proportion of commercial vehicles.

The internal road layout within the site should take into consideration that a large number of commercial vehicle and bus movements (to and from the on-site airport) will occur within the site. A continuous circulating internal road layout could be employed in order to reduce the likelihood of commercial vehicles being required to perform reversing or turning movements. Continuous circulation may include providing a one-way direction at all times or allowing ample space for large vehicles to safely perform a u-turn movement (without the need to do three-point turns).

Commercial vehicles will generally be performing through movements within the site whereby they will be delivering or picking up certain materials and continuing onto their destination. Buses and cars, on the other hand, will mainly be used for personnel travel and will be situated at the site for extended durations. The mix of vehicles increases the safety risk of circulating traffic within the site and it is therefore suggested that commercial vehicle through movements be separated from bus and car movements to reduce the possibility for vehicle interactions. Once buses and cars have parked within the site, they will generate pedestrians. The safety and circulation of pedestrians within the site must also be taken into consideration and, where possible, conflict points should be avoided or appropriately managed (i.e. adequate visibility at pedestrian crossing locations).

Parking within the site should be designed to provide adequate spaces for cars, buses and commercial vehicles.

Articulated trucks and buses (not including road trains) have a swept path with a 26 m radius and this should be considered when designing 90 degree parking bays. This need for safe turning areas can be minimised by using 45 degree angle parking bays for large vehicles.

It is assumed that parking provision will be required for only a small proportion of commercial vehicles, as the majority will be completing round trips, with loading and unloading occurring on-site before moving to their next location. Commercial vehicles should be accommodated within an off-site depot outside working hours and for maintenance purposes. This will ensure space on site is used efficiently.

Similarly, bus parking needs can be minimised by providing a circulation route within the site to drop off and pick up employees. Buses can then be stored at a dedicated facility until required. These needs may be filled through the use of a subcontract whereby buses can be provided as needed and then used for other purposes when not required. The provision of a number of bus stops within the site will also minimise pedestrian movements required to increase safety.

Provision will also be needed for some visitor car parking near the main site office.

A general guide for car parking space is 25 m^2 per car which allows safe circulation space. Commercial vehicle and bus parking area can vary according to configurations, but as a guide should be in the order of 170 – 250 m^2 per vehicle.

The design of car parking facilities should consider the Australian Standards for Parking Facilities:

- AS 2890.1:2004 Parking facilities Part 1: Off-street car parking; and
- AS 2890.2:2002 Parking facilities Part 2: Off-street commercial vehicle facilities.

7.8 Transportation of Dangerous Goods and Hazardous Materials

DTMR is the relevant approval and management body for the transportation of dangerous goods and hazardous materials throughout Queensland and requires certain permits and conditions to be met for the transportation of these goods on the SCR network.

The legislative provisions for the transport of dangerous goods by road in Queensland are detailed in the Transport Operations (Road Use Management) Act 1995 and the Transport Operations (Road Use Management-Dangerous Goods) Regulation 2008.

Particular vehicle and driver licenses, placards, safety equipment, documentation and incident response plans are required for the transportation of dangerous goods and must be approved prior to transportation under 'The Australian Dangerous Goods Code 7th edition'.

The current Australian Dangerous Goods (ADG) Code (7th Edition) for road and rail is implemented by State and Territory legislation. It lists all provisions applicable to the transport of dangerous goods including:

- Classification;
- Packaging and performance testing;
- Use of bulk containers, freight containers and unit loads;
- Marking and placarding;
- Vehicle requirements;
- Segregation and stowage;
- Transfer of bulk dangerous goods;
- Documentation;
- Safety equipment, procedures during transport;
- Emergencies; and
- A dangerous goods list with United Nations (UN) dangerous goods identification numbers.

The classification of goods as 'dangerous' is specified in the Code and this document outlines which goods must be included under the permits and condition requirements. Goods may be classified due to properties such as:

- Combustion;
- Toxicity;
- Corrosiveness;
- Ability to cause harm to the environment;
- Displacement of oxygen;
- Temperature or pressure hazards; and
- Adverse reactions with other materials.

It is likely that the Proponent will be required to transport dangerous goods and hazardous materials to and from the Project site. Details of these materials have not been confirmed at this stage, however general mine related materials may include but are not limited to:

- Fuel;
- Explosives; and
- Hazardous waste materials.

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The Road-Use Management Plan will describe the types of dangerous goods to be transported (by classification), their use and purpose, and an estimate of the quantities of dangerous goods to be transported. In addition, management and mitigation measures will be outlined and protocols will be defined should a coal (or other) product spill occur. Other items such as vehicle and driver licensing, vehicle placarding, handling and storage requirements will also be addressed. Table 7-1 provides an indicative list of dangerous goods and hazardous substances that will be transported for the Project.

Table 7-1 Indicative List of Dangerous Goods and Hazardous Substances

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
Diesel fuel	3 (Class C1)*	N/A	N/A	1202	III	Fuel for mobile equipment
Lubrication oils (hydraulic oil)	3 (Class C2)**	N/A	N/A	N/A	N/A	Lubricate plant and equipment
Ammonium nitrate/fuel oil (ANFO)	1.1D	N/A	N/A	0082	N/A	Blasting explosive
Caustic soda (sodium hydroxide)	8	50	50	1823	II	Concrete degreasing agent
Flotation agents (MIBC- methyl isobutyl carbinol)	3	99.5	99.5	2053	III	CHPP
Anionic flocculants (acrylamide / acrylate copolymer)	N/A	99.5	10	N/A	N/A	CHPP
Cationic flocculant (polydimethyl diyl ammonia chloride)	N/A	40	40	N/A	N/A	CHPP
Sodium Hypochlorite	8	12	12	1791	II or III	Water Treatment Plant Sewage Treatment Plant
Sodium Hydroxide	8	10	10	1824	II or III	Water Treatment Plant Sewage Treatment Plant
Aluminium Sulphate	N/A	40	40	N/A	N/A	Water Treatment Plant Sewage Treatment Plant
Citric acid	N/A	95	95	N/A	N/A	Water Treatment Plant
Powdered activated carbon	N/A	100	100	N/A	N/A	Water Treatment Plant
Powdered polymer (cationic polyacrylamide	N/A	100	100	N/A	N/A	Water Treatment Plant

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
Lime (calcium oxide)	8	100	100	1910	III	Water Treatment Plant
Solvents (e.g. acetone)	3	99.5	99.5	1090	II	Workshop degreasing agent
Sulphuric acid	8	15-51%	15-51%	2796	II	Batteries
Paints	3	N/A	N/A	1263	III	Paint

* *Class C1—a combustible liquid that has a flashpoint of 150°C or less.*

** *Class C2—a combustible liquid that has a flashpoint exceeding 150°C.*

7.9 Over Dimensional Vehicles

The transport operator for the proposed development, DHL, has undertaken planning for over dimensional (OD) vehicles, addressing the following:

- Swept path envelope for OD vehicles (DHL Drawing Numbers AU-TR-D-01 to AU-TR-D-05 - Turning Radius Structural Steel, representing different module types) – see Appendix A; and
- Specific constraints along the access routes to the mine site.

OD vehicles require State Government permits to operate and there are specific regulations for pilots, escorts and police escorts, as follows:

- Vehicles less than 3.5m wide - do not require escort;
- Vehicles 3.5m to 4.5m wide - one pilot vehicle;
- Vehicles 4.5m to 5.5m wide - one escort and one pilot vehicle (Depending on the route these vehicles may require Police involvement, which is decided by the Police when a permit is submitted as part of the approval process); and
- Vehicles greater than 5.5m wide - two escorts and two pilot vehicles plus mandatory Police escort(s).

References to the appropriate legislation and regulations for OD vehicles can be found in Section 8.1.4.

Logistics plans will need to be submitted for individual components (i.e. each separate vehicle) as well as the entire program of planned movements.

Permit applications must include, but are not limited to individual axle loads, gross mass and vehicle configuration. For over dimension loads, route selection, potential traffic conflicts and proposed traffic management must also be provided in order to be assessed.

Typically site-specific issues that may need to be addressed when planning the routes for OD vehicles include:

- Some overhead transmission lines may require lifting. A site investigation should be conducted along the proposed OD route to determine whether low lying transmission lines pose a hazard;
- Some traffic signals may need to be laid down in order to allow for adequate movement of OD vehicles;
- Rail crossings can have width issues for OD vehicles;

- Bridges and culverts can have width or load constraints;
- Cattle grates can also have width and load constraints;
- Formed roads and verges at intersections can be insufficient for the swept path of the OD vehicles;
- Overhead or roadside objects (e.g. trees, fences, signs, etc) may sit within the swept path and overall horizontal and vertical vehicle envelope and would need to be removed, pruned or laid down; and
- Town or road movement curfews may also apply that restrict oversize movements.

These issues need to be identified and addressed in the Road-Use Management Plan.

Conceptual swept paths for a vehicle illustrating the maximum permissible vehicle envelope for the various transport routes are provided in Appendix A. It should be noted that the final selection of the OD vehicles has not yet occurred and will be determined by the haulage contactor following completion of the RIA. The swept paths in Appendix A are therefore a 'worst-case' scenario and a more accurate swept path analysis can be undertaken once the configuration (axles, loadings, height, width, length etc.) of the various OD vehicles used for the Project are finalised.

7.10 Railway Crossing

Queensland Rail was consulted with regard to railway crossing #639 on Clermont Alpha Road just north of the Capricorn Highway in Alpha. It was agreed with Queensland Rail that a desk based assessment of the railway crossing would be undertaken by them. The assessment, which is contained in Appendix B, analyses the interaction and potential impacts that mine traffic may have on this railway crossing, detailing observations, proposals and comments.

8

Impact Mitigation

This section outlines the recommended mitigation measures for impacts on the existing road network created by the Project.

8.1 Recommended Mitigation Measures and Works Required

8.1.1 Public Road Closures and Associated Bypass Works

As part of the site layout, the Proponent is proposing to close a section of Jericho-Degulla Road and construct bypasses to the east and north of the mining lease area from the Clermont-Alpha Road and Degulla Roads. As these works affect the existing road network, and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs.

These road closures and bypasses will be required to be designed and constructed to the Queensland Government Main Roads 'Road Planning and Design' manual.

It is possible that the Proponent may enter into an agreement with the BRC regarding the delivery of these works, or may engage consultants and contractors directly to facilitate appropriate timing of the works.

Regardless of the delivery method, communication and consultation with all relevant stakeholders is essential to ensure these works meet required standards and are consistent with both State and Council planning.

The timing of these works will be incorporated into the construction period of the Project and hence agreements between parties should occur prior to construction commencing.

8.1.2 Site Access Intersections

In order to access the Project site from the existing road network a new intersection will need to be constructed at the southern entry to the site along Jericho-Degulla Road as part of the new bypass arrangements. As these works affect the existing road network and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs.

Whilst the permanent site access intersections will be integrated with the public road works, temporary site access intersections may need to be constructed during the construction period.

These intersections will be required to be designed and constructed to the Queensland Government Main Roads 'Road Planning and Design' manual.

8.1.3 Employee Transport Systems

As discussed previously in this report, the Proponent is proposing to use mainly a FIFO system in conjunction with an on-site accommodation village and on-site aerodrome to minimise the impact of employee transport on the road network. A minority of personnel will utilise a DIDO and BIBO system from nearby regional centres. By utilising these systems, the number of light vehicles and therefore a large volume of potentially generated traffic is reduced. The Proponent will implement these systems as part of its Road-Use Management Plan and Health and Safety plans to minimise transport impacts on the road network and enhance personal safety.

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Although this assessment focuses on road-based transport impacts, it should be noted that the commencement of FIFO services will require certification from CASA where aircraft proposed to transport workers are more than 30 seats.

A specially equipped vehicle provided by the proponent will be available to assist employees or visitors with disabilities to and from the on-site airfield or site entrance, to the location in question within the Project site.

8.1.4 Road-Use Management Plan

As discussed in Section 7 of this report, it is recommended that the Proponent prepare a Road-Use Management Plan (RUMP) in order to manage the risks and impacts of any transport related issues. At this stage of the Project, the full details of the Road-Use Management Plan are unknown, and will evolve as the mine design and operation details are finalised. However, an indicative outline of the components to the Road-Use Management Plan are as follows:

- Summary of the project traffic generation;
- Summary of the RIA findings;
- Outline management and mitigation measures;
  - A strategy to manage road usage by construction vehicles
  - Confirm escort arrangement requirements
  - Outline permit condition requirements for OD vehicles
  - Define measures for vehicle movements (particularly ODs during and following wet weather periods)
  - Vehicle interaction with public transport and school bus routes
  - Detail how the use of defined transport routes will be ensured throughout the project
  - Provide any hours of operation restrictions and/or roads to be avoided by construction and operational vehicles
  - Mitigation measures for local towns – particularly within Alpha (due to increased activity from Project related people using town facilities)
  - Determine how livestock will be managed on local roads where cattle grids are removed and there is no existing fencing (e.g. Degulla Road) and how livestock deliveries will be maintained
  - Consider alternate transport options
- Reference appropriate Acts and Regulations in relation to the safe movement of Project-related vehicles;
  - *Traffic Regulation 1962*
  - *Transport Operations (Road Use Management) Act 1995*
  - *Transport Operations (Road Use Management - Accreditation And Other Provisions) Regulation 2005*
  - *Transport Operations (Road Use Management - Mass, Dimensions And Loading) Regulation 2005*
- Detail safe driver behaviour and fatigue management protocols;
  - Detail suitable rest areas along haulage routes
- Detail road maintenance and/or road upgrade requirements;
  - To cater for extra traffic generated in the construction and operational phases of Project

  - Conduct a detailed baseline assessment prior to construction activities commencing
  - Define an inspection program
  - Detail any contributions plan required from relevant stakeholders
- Liaise with relevant stakeholders; and
  - DTMR
  - Local Councils
  - Emergency Services
  - Queensland Police Service (in particular 'Regional Traffic Coordinator' for escort arrangement protocols)
  - School Bus Operators
- Define community engagement strategies.

In developing the RUMP the Proponent will consider the information available as part of the Mackay region Rest Area Stopping Place [RASP] Project.

8.1.5 Road Maintenance Program

As outlined in Section 5 of this report, the Project may have an impact on the pavement design life of Jericho-Degulla Road, Degulla Road and Clermont-Alpha Roads. In order to mitigate these impacts, the following measures are recommended:

- An agreement between the Proponent and BRC for the diversion and ongoing maintenance of a section of Jehricho-Degulla Road and Degulla Road for a 10 year mitigation period, in conjunction with other Proponents;
- Discussion with BRC regarding the road upgrade works required for traffic impacting sections of Jericho-Degulla Road and Degulla Road (between Clermont-Alpha Road and the Project site access point) as recommended by the pavement impact assessment in Section 5; and
- Discussion with DTMR and BRC regarding an infrastructure agreement for a proportion of the ongoing maintenance costs of the impacted sections of Jericho-Degulla Road, Degulla Road and Clermont-Alpha Road.

A number of factors will influence the size of the contribution to be provided by the Proponent. Factors may include contributions required by other developments in the area and the incremental requirements over the existing DTMR and Council maintenance schedules.

The road maintenance program may differ between the construction and operational phases of the project to reflect the shorter time and more intense activity of construction versus the sustained use of the road network over the operational phase.

It should be noted that a routine inspection program is also recommended for the Capricorn Highway (between Alpha and Gemfields) as detailed in Section 5.3.3.

8.1.6 Capacity Upgrades for Over Dimensional Vehicles

At the time of this assessment, specific details regarding the number, size and/or mass of OD vehicles required for the Project have not been finalised. However indicative swept paths for the maximum permissible vehicle envelope for each route are included in Appendix A. It is anticipated that a

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proportion of freight will fall into this category. Mitigation measures recommended to manage these vehicle impacts on the road network include:

- Planning of required freight movements to utilise non OD vehicles where possible;
- Planning freight movements to utilise OD vehicles which do not exceed the existing available envelope dimensions;
- Following required planning, permit applications and escort requirements as specified by DTMR; and
- For any OD vehicle requirements that do not fit the existing envelope dimensions and are not outlined in DTMR's 2 year infrastructure plans, required upgrade works may be the responsibility of the Proponent. For those upgrades which are already proposed in DTMR's 2 year infrastructure plan, a bring it forward contribution may be applicable.

Implementation of these mitigation measures will be refined and outlined in the RUMP as the details of specific freight requirements of the Project are finalised.

9

Conclusion

The proposed Kevin's Corner Coal Project will generate additional traffic volumes on the existing road network in central eastern Queensland. The impact of this additional traffic volume on the performance of the road network, the pavement design life and other safety concerns has been assessed by this RIA.

9.1 Traffic Generation

The peak construction phase is expected to occur in 2014 with a workforce of 1,412 personnel on-site. In 2014 the Project is estimated to generate up to 69 light vehicle, 38 commercial vehicle and 8 over-dimensional vehicle trips per day.

The peak operational-only workforce is expected to occur in 2019; however in 2017 there will be an overlap between the construction and operational phases of the Project. Based on a worst case scenario, 2017 has been selected to be analysed as the peak operational year as there will be approximately 1,600 personnel on-site. In 2017 the Project is estimated to generate up to 33 light vehicle, 30 commercial vehicle and 2 over-dimensional vehicle trips per day.

9.2 Background Traffic

The existing road network surrounding the Project site is expected to experience general traffic growth over the life of the project. Projected growth rates have been used in this assessment to simulate this background traffic growth on the existing road network. These growth rates account for general growth and small development activity in the region, but do not include any significant effects by other potential large developments which may occur during the mine life period. These effects will be included in the cumulative impact assessment.

9.3 Road Network Performance Impacts

The road network performance impacts caused by the Kevin's Corner Coal Project have been assessed in accordance with the DTMR *'Guidelines for the Assessment of Road Impacts of Developments*'. From this assessment, it is considered that the impact of the Project on the performance of both road links and intersections are not significant and most do not require mitigation by the Proponent. Road upgrades and maintenance works are outlined in the recommended mitigation measures summarised in Section 9.5.

9.4 Pavement Impacts

The road network performance impacts caused by the Project have been assessed in accordance with the DTMR *'Guidelines for the Assessment of Road Impacts of Developments'*.

The assessment shows that the Project will have an impact on the pavement design life and ongoing maintenance of Clermont-Alpha Road, Degulla Road and Jericho-Degulla Road.

Refer to Section 9.5 for further detail of the recommended mitigation measured.

9.5 Recommended Mitigation Measures

Following the road network performance, pavement design life and general safety assessment, the following mitigation measures in Table 9-1 are recommended for the Proponent's consideration in the ongoing development of the Project.

9 Conclusion

It should be noted that these recommended mitigation measures may change due to the influence of the cumulative impacts of other proposed developments in the surrounding region.

Table 9-1 Summary of Recommended Mitigation Measures

Prior to Construction Phase Commencing	During Construction Phase	During Operational Phase
• Develop and complete an approved RUMP • Complete Construction Traffic Management Plans and Logistics Management Plans (if required as a result of the RUMP outcomes) • Undertake stakeholder consultation in relation to design and construction of bypass roads • Finalise on-site parking and circulation design • Finalise infrastructure / maintenance agreements with BRC for Degulla Road and Jericho-Degulla Road • Finalise infrastructure / maintenance agreements with DTMR for Clermont-Alpha Road • Develop and submit logistics plans for OD deliveries • Conduct detailed baseline pavement assessment for Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields)	• Upgrade Clermont-Alpha Road to a two-lane, all-weather surface between Hobartville Road and Degulla Road • Upgrade Degulla Road and Jericho-Degulla Road to a two-lane, all-weather surface between Clermont-Alpha Road and the Project site • Construct site access intersection(s) • Construct bypass roads • Upgrade the Clermont-Alpha Road / Degulla Road intersection • Perform regular pavement inspections along Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields) • Undertake maintenance works where required due to degradation of road infrastructure from Project vehicles	• Perform regular pavement inspections along Degulla Road, Jericho-Degulla Road, Clermont-Alpha Road and Capricorn Highway (Alpha to Gemfields) • Undertake maintenance works where required due to degradation of road infrastructure from Project vehicles

10

Glossary

Commercial Vehicles – a vehicle above 10 tonne gross vehicle mass.

Delay – the additional travel time experienced by a vehicle at an intersection.

Degree of Saturation (DOS) – the ratio of arrival (demand) flow rate to capacity during a given flow period.

Intersection - a place at which two roads meet or cross.

Level of Service (LOS) – an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

Midblock - the section of a road between intersections.

RUMP – Road-use Management Plan.

Seagull Intersection - a T-intersection where the right turn out of the side road gives way to oncoming traffic from the right and is provided with an acceleration lane in the median to merge into the traffic stream approaching from the left.

T-Intersection – an intersection where two roads meet (whether or not at right angles) and one of the roads ends.

References

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Transport Operations (Road Use Management) Act 1995. Commonwealth Government

Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008. Commonwealth Government

12

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Hancock Galilee Pty Ltd and only those third parties who have been authorised in writing by URS to rely on the report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 6 August 2010.

Where this Report indicates that information has been provided to URS by third parties, URS has made no independent verification of this information except as expressly stated in the Report. URS assumes no liability for any inaccuracies in or omissions to that information.

This report was prepared between 1 February 2011 and 6 April 2012 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

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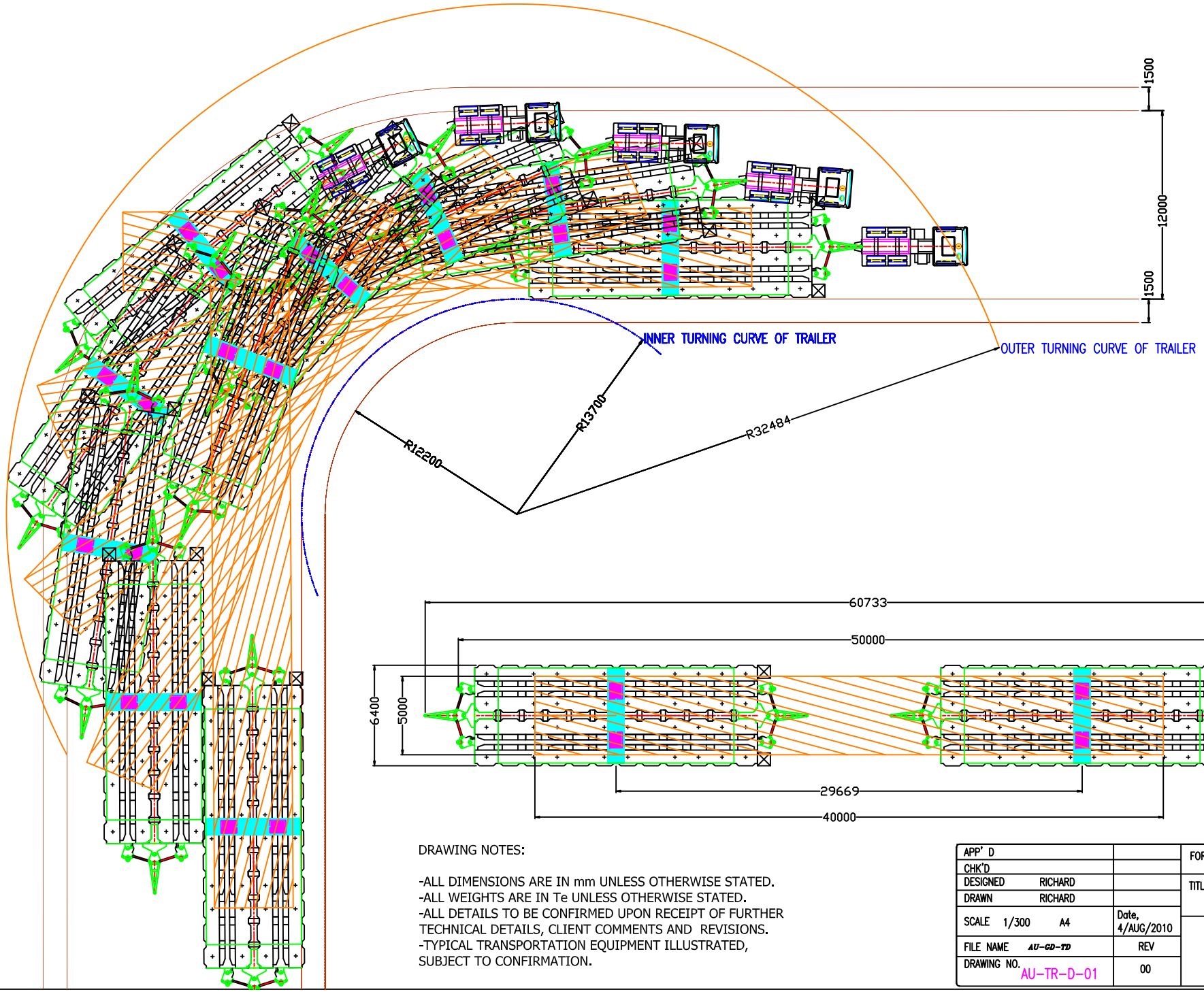
Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.

A

Appendix A Over Dimensional Vehicle Swept Paths (provided by DHL)

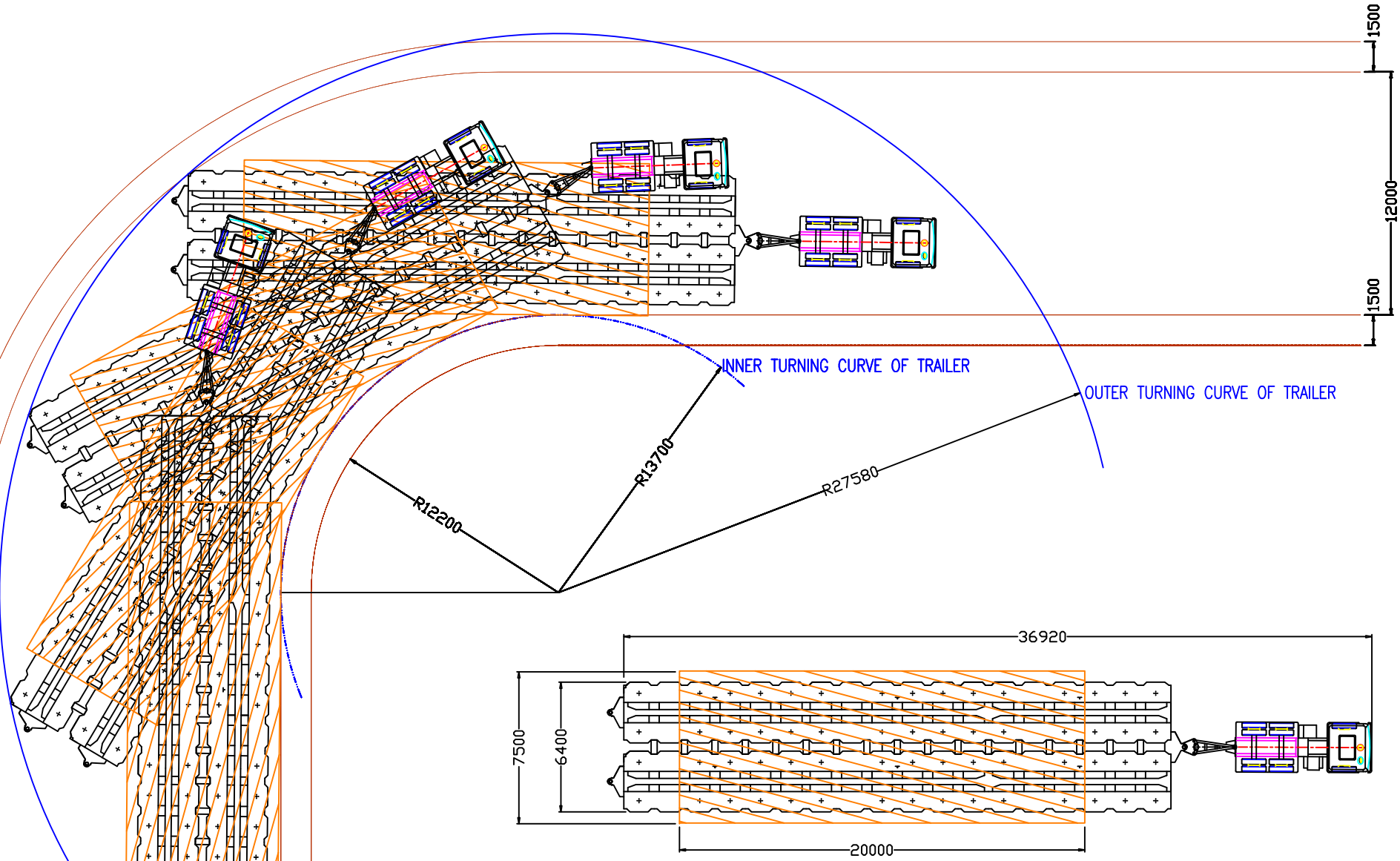


DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
-ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP'D			FOR: ALPHA COAL PROJECT
CHK'D			
DESIGNED	RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 40ML x 5.0MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-01	00	

DHL GLOBAL FORWARDING



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APP'D			FOR: ALPHA COAL PROJECT
CHK'D			
DESIGNED	RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 27ML x 7.5MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-05	00	

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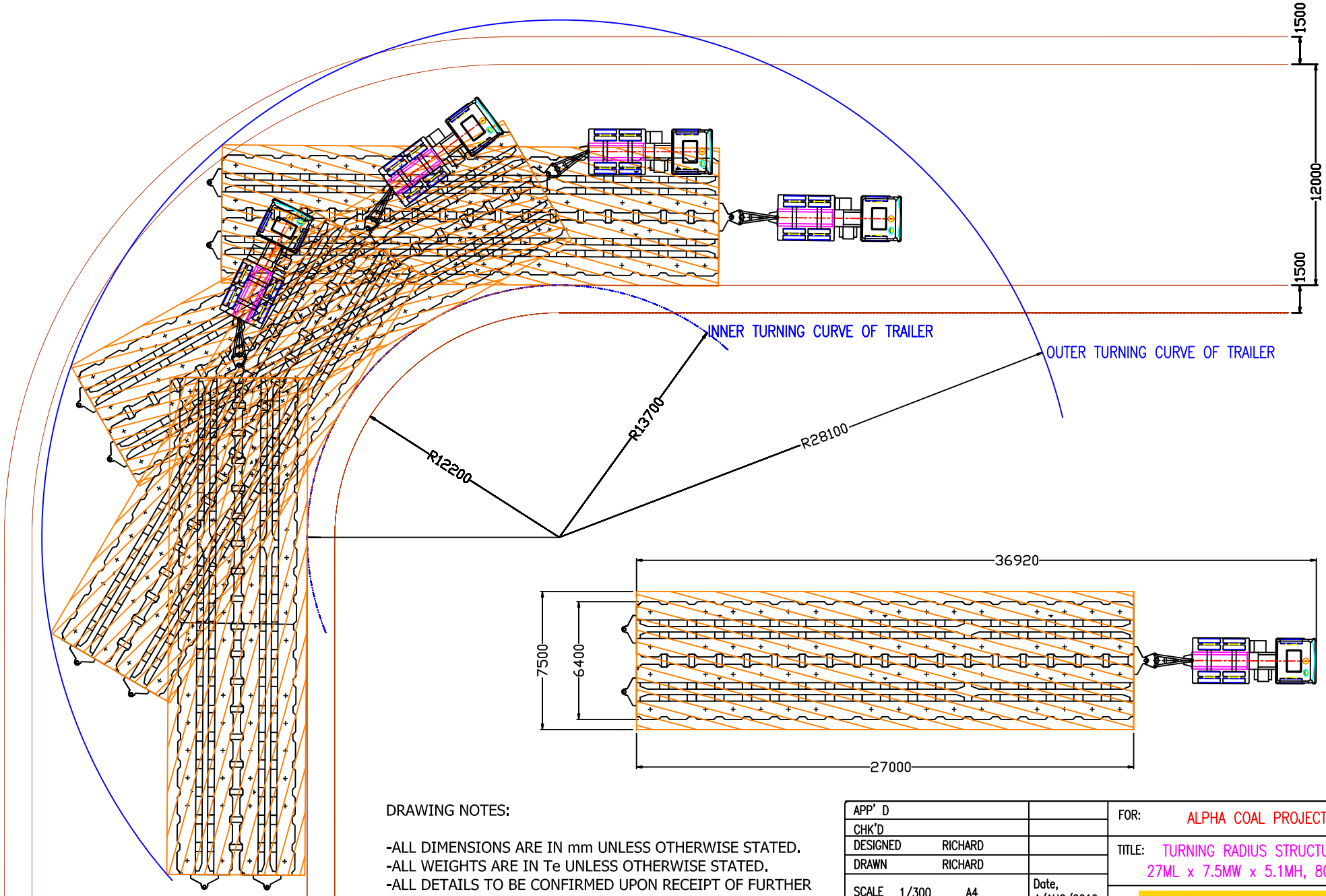

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APP'D			FOR: ALPHA COAL PROJECT
CHK'D			
DESIGNED	RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 27ML x 7.5MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-04	00	

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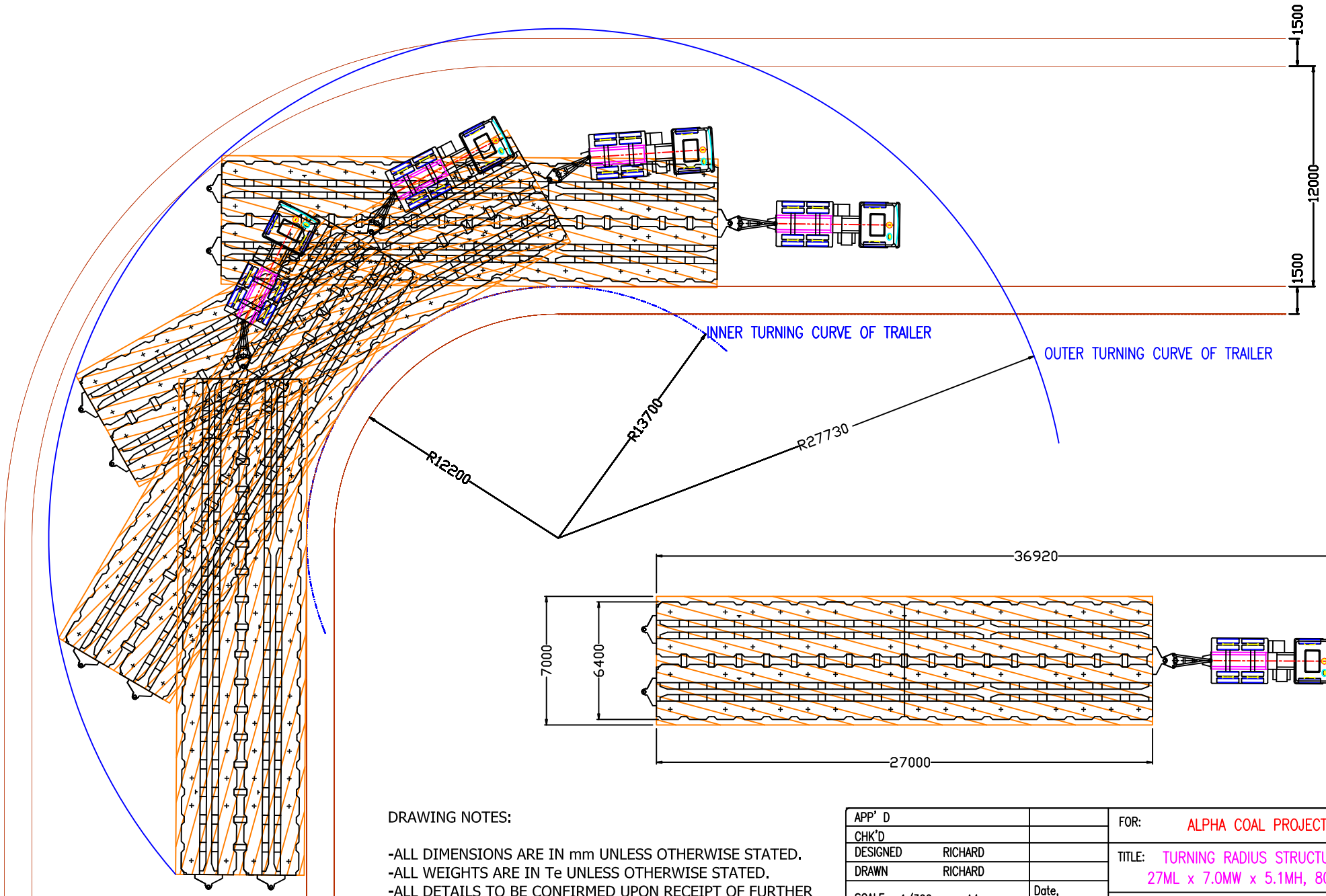

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APP'D			FOR: ALPHA COAL PROJECT
CHK'D			
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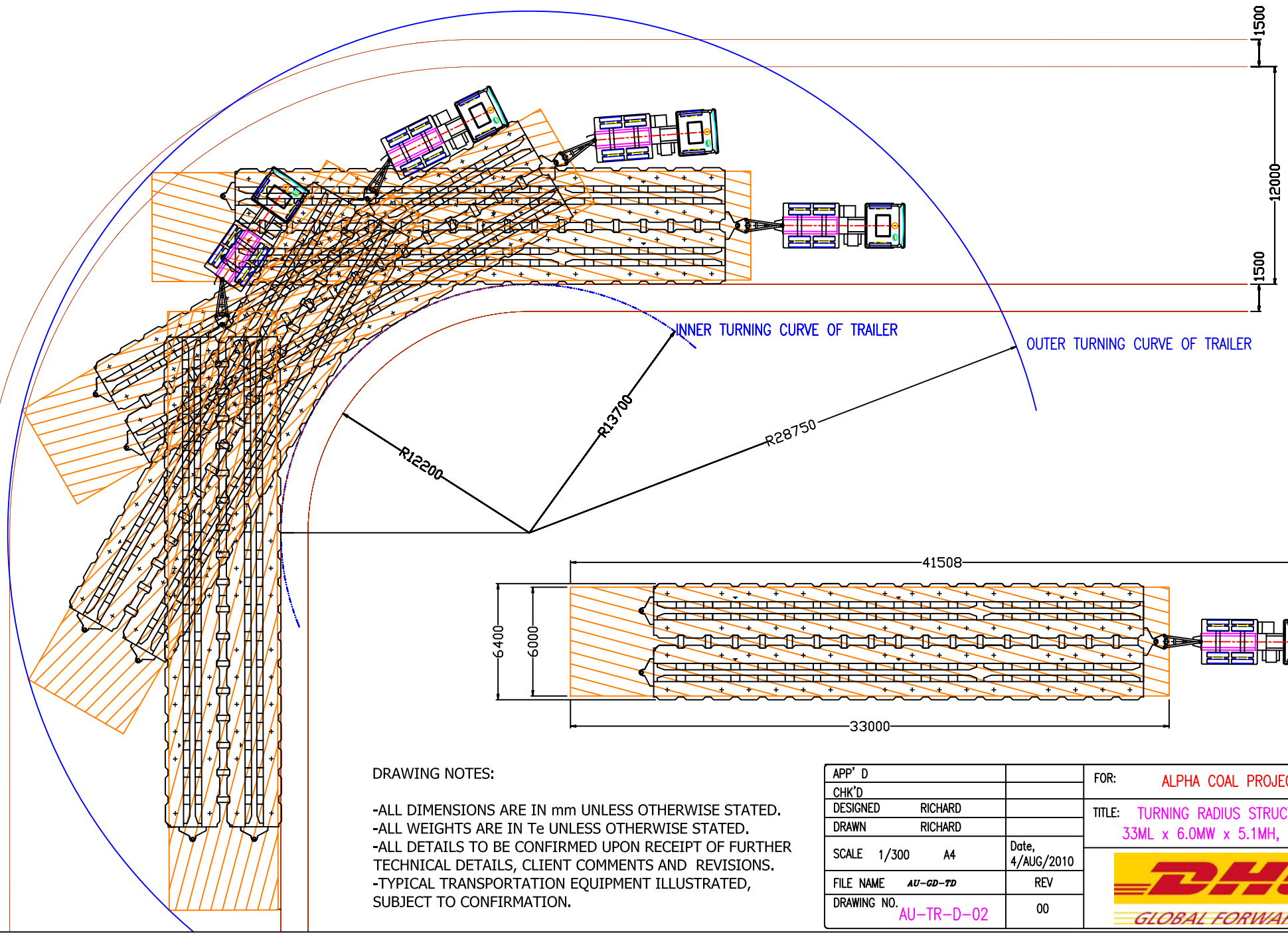
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-03	00	

DHL GLOBAL FORWARDING



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APP'D			FOR: ALPHA COAL PROJECT
CHK'D			
DESIGNED	RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 33ML x 6.0MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-02	00	

DHL GLOBAL FORWARDING

B

Appendix B Road Rail Crossing Safety Assessment

Kevin's Corner Road Rail Crossing Safety Assessment

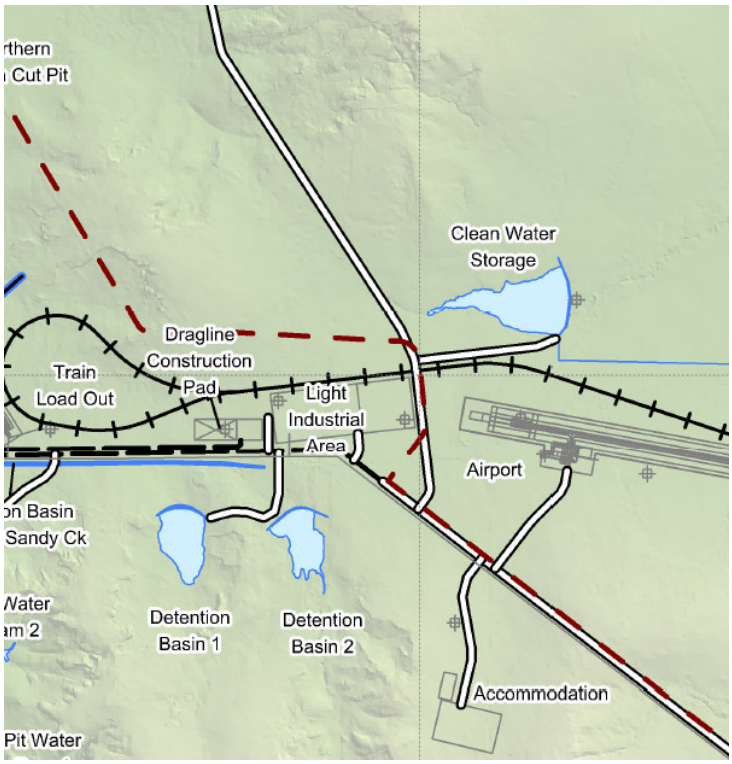
1.1 Introduction

It is understood that as part of the Kevin's Corner Coal Project, a proposed access road will intersect with a new freight line leading to/ from the proposed train load out facility within the mine lease area.

It is envisaged that the conflict point is to be by way of a railway crossing. The following paragraphs provide a review of potential road safety issues that need to be considered at the proposed railway crossing and detail what would be required as part of the design process.

Figure 1-1 was provided in order to undertake this review and shows the proposed road crossing the railway perpendicularly. Another road, which provides access to the Clean Water Storage area, intersects this road immediately to the north of the proposed railway crossing.

Figure 1-1 Location Plan



1.2 Traffic volumes

It is understood that expected road and rail traffic volumes likely to use the railway crossing will be as detailed as below:

	Average/ day (each way)	Average/ week (each way)
Train (2,600m)	3	21
Light Vehicles	12	84
Heavy Vehicles	1	4

1.3 Sight Distance

The sight visibility on approach to the level crossing from the north and south will require to be in accordance with 'Transport and Main Roads' (TMR) or AustRoads standards. This is to ensure traffic will have sufficient visibility to stop when the railway crossing is in operation.

If possible, the railway crossing should not be located on a crest or depression, as forward visibility to the crossing may be restricted.

In order to assess whether proposed forward visibility is adequate, road design speeds, as well as horizontal and vertical alignment data will be needed. Provision of adequate sight distance along the railway from the traffic stop line will also be required.

Figure 1-1 shows the rail crossing perpendicular (90 degrees) with the access road. It is recommended that the angle of conflict be kept to 90 degrees throughout the design process to minimise driver head movements on the approach to the crossing, as well as at the crossing.

1.4 Signs & line markings

Signs and line markings should be to TMR or AustRoads standards to ensure approaching vehicular traffic is aware of the railway crossing on approach, as well as to safely manage traffic required to stop at the crossing.

1.5 Street lighting

Due to expected low traffic volumes and the rural location of the railway crossing, it is unlikely that street lighting will be required in the vicinity of the crossing; however lighting requirements should however be assessed in accordance with TMR and AustRoads standards.

1.6 Pedestrian and Cycling Provisions

Pedestrian and bicycle movements is this area would be unlikely to occur, therefore it is unlikely that specific provision for non-motorised road users will be required, however this should be confirmed with the local authority as part of the design process.

1.7 Access road to Water Storage Area

Design drawings will need to highlight arrangements where the proposed road intersects the access road leading to the Water Storage Area, together with signing and line marking layouts. This would be to ensure that road users are made aware of potential hazards, i.e. intersection arrangements, railway crossing etc.

1.8 Queuing

Adequate vehicle storage at the railway crossing will be required on the road in order for vehicles to wait safely without impeding other traffic i.e. blocking other accesses. A rudimentary analysis using Signalised and Unsignalised Intersection Design and Research Aid (SIDRA) could be undertaken to determine vehicle queuing at the level crossing during operation.

1.9 Crossing Facility Type

Although traffic volumes using the proposed road route are low, the level of control at the railway crossing needs to be investigated i.e. flashing signals, barriers etc. This should be determined from the TMR or AustRoads standards.

1.10 Road Safety Audit

As part of all road design procedures in accordance with AustRoads standards, a road safety audit at 'feasibility stage' and 'detailed design' stage should be undertaken.

1.11 Conclusion

It is recommended that a more detailed assessment be undertaken for which the following information would be required:

- Design speed of road;
- Detailed horizontal alignment of road and railway;
- Detailed vertical alignment of road and railway;
- Signs and lines layout; and
- Relevant design drawings.

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