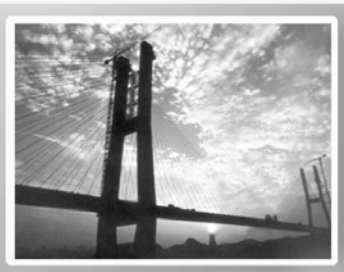



Transport Assessment

South Galilee Coal Project

8 March 2012

Halcrow

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Transport Assessment

South Galilee Coal Project – Environmental Impact Statement

Contents Amendment Record

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1. Introduction

1.1 Background

Halcrow Pacific Pty Ltd (Halcrow) was commissioned by Mining &Energy Technical Services Pty Ltd (MET Serve) on behalf of AMCI (Alpha) Pty Ltd (AMCI) to undertake a Transport Assessment for the proposed South Galilee Coal Project (SGCP) ('the Project'). This Transport Assessment forms part of the overarching Environmental Impact Statement (EIS) and identifies Project generated impacts on the existing transport network, during both construction and operational phases.

The Project involves the development of a new open-cut and underground coal mine on Mining Lease Application (MLA) 70453 near Alpha in the Galilee Basin. The Project is located immediately south-west of the township of Alpha, which is approximately 170 km west of Emerald and 450 km west of Rockhampton (see **Figure 1-1**).

1.2 Study Objectives

The objectives of the Transport Assessment were to:

- prepare a baseline assessment of existing conditions on components of the transport network which are anticipated to be impacted by the Project;
- describe the proposed transport task for the SGCP in relation to projected light and heavy vehicle traffic generation during both construction and operational phases of the Project;
- identify and assess the potential transport impacts of the Project on critical components of identified haul routes. This will include an evaluation of the cumulative impact of development; and
- recommend mitigation and traffic management strategies (where required) to reduce identified traffic and transport impacts to acceptable performance levels.

1.3 Information and Supporting Documentation

As required by the Project's Final Terms of Reference (TOR), this Transport Assessment has been conducted in accordance with the Queensland Department of Transport and Main Roads (DTMR) *Guidelines for Assessment of Road Impacts of Developments (GARID)* (DTMR, 2006). Additionally, this Transport Assessment has been prepared with due consideration of the following reference resources:

- *Road Planning and Design Manual(RPDM)* (DTMR, 2006);
- *Assessment of Road Impacts of Development Proposals – Notes for Contribution Calculations* (DTMR (Central District), 2008);
- *Road Implementation Program 2009-10 to 2013-14* (DTMR, 2009); and
- *Guide to Traffic Management Part 3: Traffic Studies and Analysis* (Austroads, 2009).

A glossary of terms used in this Transport Assessment is provided in **Appendix A**.

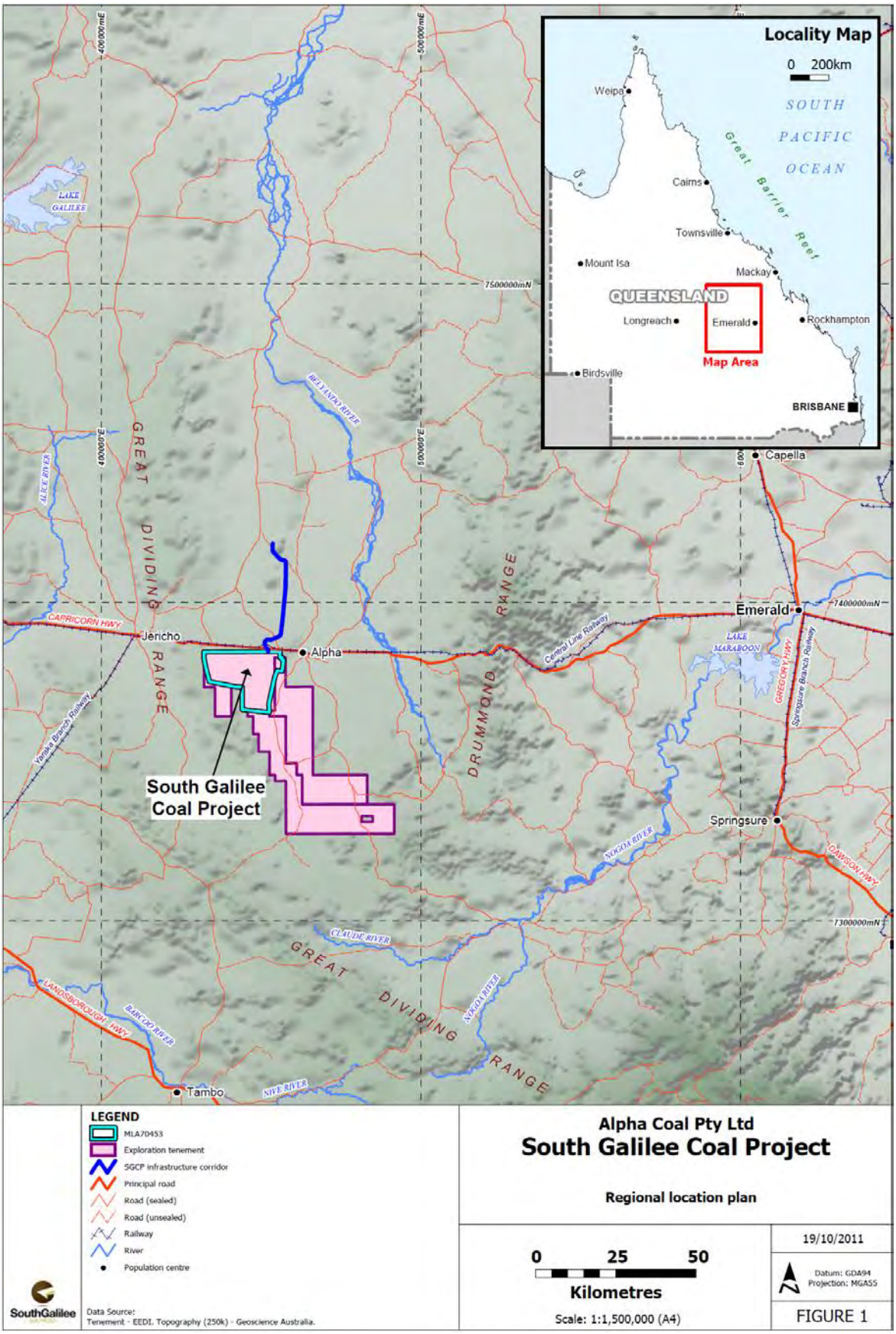


Figure 1-1 SGCP Locality Map

1.4 Study Methodology

An outline of the study methodology used to undertake the Transport Assessment is presented in **Table 1-1**. As indicated in **Section 1.3**, the methodology followed the process detailed within DTMR's*GARID*.

Table 1-1 Study Methodology

Task	Description
Site Investigation	Halcrow conducted a site inspection of the Alpha site and the surrounding road network on Tuesday 2nd August 2011.
Consultation	The following authorities were contacted as part of this study: • DTMR; • Queensland Rail (QR); and • Barcaldine Regional Council (BRC).
Data Collection and Collation	Data that has been input into the analyses are listed below: • timelines for each phase of construction and operation (provided by AMCI); • anticipated location for each traffic generating component of the Project (provided by AMCI); • expected employee and visitor requirements during each phase of construction and operation (provided by AMCI); • assumed employee shift times (provided by AMCI); • expected number of heavy vehicle movements to and from the site by times of day and vehicle type (provided by AMCI); • likely origins and destinations for construction materials (provided by AMCI); • likely modes of transport used during the construction and operational phases (provided by AMCI); • existing road network details such as network geometry, existing road hierarchy and posted speed limits (provided by DTMR and collected during site inspection); • future road network provision (provided by DTMR and BRC); • tube count data, along with associated historical growth rates and roughness data (provided by DTMR); • intersection count data at the Capricorn Highway / Clermont-Alpha Road / Shakespeare junction in Alpha (surveys undertaken by AusTraffic); • existing capacity and provisions for air and port travel and future upgrades proposed; and • existing pavement condition data (provided by DTMR).
Traffic Generation and Assignment	Determination of anticipated vehicle movements was undertaken through the following: • consultation with AMCI regarding project specific details as outlined above (see data collection and collation); • conversion of these development details into peak hour flows for the intersection impact assessment; • conversion of these development details into daily flows for the link assessment; and • conversion of these development details into annual traffic flows for the Pavement Impact Assessment (PIA). Due to the lack of relevant standard trip generation rates from DTMR's *RPDM* or any other reference resource, trip generation was calculated through first principles and the knowledge of employee / heavy vehicle

Task	Description
	movements for different periods of the day. Traffic was distributed onto the road network based on origin / destination information and haul route data provided by AMCI.
Traffic Impact Assessment	The impact analysis presented in this report is based upon the principles defined within *GARID*. In particular, the following reference holds the general directive as to how assessment of impacts is considered: *"In general, Main Roads considers a development's road impacts to be insignificant if the development generates an increase in traffic on State-controlled roads (SCR) of no more than 5% of existing levels… Traffic operation impacts need to be considered for any section of a SCR where the construction or operational traffic generated by the development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements"* 'With' and 'without project' traffic conditions were assessed and the percentage increase attributable to the Project was observed to determine whether the triggers of *GARID* were met. Percentage increases were also considered in conjunction with absolute volumes to determine the likely level of impact. Based on the directional distribution of traffic and heavy vehicles generated by the site and the haulage routes, the links and intersections that are expected to carry the majority of traffic were assessed.
Pavement Impact Assessment	The PIA was conducted in accordance with the procedures outlined in the DTMR *Assessment of Road Impacts of Development Proposals– Notes for Contribution Calculations*. The PIA was undertaken for the majority road sections which form part of the proposed haulage routes for the Project. It should be noted that road sections were excluded where the analysis provided a strong indication that the remaining sections of the proposed haulage route will not have a significant impact by the mine.
Impact Management and Mitigation	Based on the outcomes of the intersection and link impact analysis, alternative intersection / link forms and associated traffic management strategies were recommended for the Project. These have been based on DTMR requirements, with due consideration of both operational and safety characteristics. Any proposed treatments also consider future infrastructure provision within the region.

1.5 Scope of this Report

ThisTransport Assessment is provided through the following chapters:

- **Chapter 2** describes the development proposal in terms of its site location, proposed access locations, proposed haul routes and expected traffic generation;
- **Chapter 3** describes the existing conditions in the vicinity of the Project;
- **Chapter 4** forecasts the future conditions and traffic flows of the surrounding road and rail network as well as identifying proposed airport and port upgrades;
- **Chapter 5** assesses the potential traffic impacts of the proposed Project and outlines the required impact mitigation measures for the external road

network where development generated traffic is predicted to result in considerable impact;

- **Chapter 6** assesses other potential Project impacts on the rail network, airport and ports; and
- **Chapter 7** presents the study conclusions.

2. Development Proposal

2.1 Site Description

The SGCP is a new coal mine proposed to be located within MLA 70453. It is located within the BRC Local Government Area, approximately 9km west of the township of Alpha and 170km west of Emerald.

The Project will include both open cut and underground mining operations.

2.2 Project Timing

Construction of the SGCP is anticipated to commence in 2013. The SGCP operations phase will commence in 2015 and the Project execution will involve a staged ramp-up to the maximum production level of 17million tonnes per annum (Mtpa), as outlined below:

- Stage 1 (commencing in 2015) – up to 5Mtpa, open cut mining;
- Stage 2 (commencing in 2017) – up to 10Mtpa, open cut and underground mining; and
- Stage 3 (commencing in 2019) – up to 17Mtpa, open cut and underground mining.

The timing considered for this assessment is as follows:

- 2013 – Year 1 of construction;
- 2014 – Year 2 of construction (peak construction period);
- 2016 – Stage 1 operations;
- 2019 – First year of Stage 3operations; and
- 2029 – 10 year design horizon from commencement of Stage 3 operations.

These years represent the expected periods of critical traffic generation, along with an effective 10 year design horizon as required by DTMR's *GARID*.

2.3 Site Access

The SGCP is proposed to be accessed by a sealed Mine Access Road that connects to the external road network at the Capricorn Highway. The proposed Capricorn Highway / SGCP Mine Access Road intersection will be a priority controlled three-way T-intersection located approximately 5km to the north-east of the site, and 8.8km west of Alpha.

2.4 Proposed Haul Routes

Construction and operational inputs are proposed to be sourced from the following:

- 50% from Brisbane;
- 30% from Gladstone; and
- 20% from Mackay.

In addition, there will be significant haul movements to and from the on-site cutting and borrow pit and the quarry located immediately to the south-east of the site. Haulage will be via a combination of internal haul roads and a section of the Capricorn Highway west of Alpha. These movements will also be required for the construction of the required rail and road facilities.

The mine input delivery haul routes to and from the SGCP are as follows:

- **Brisbane to SGCP:** Port of Brisbane Motorway→Gateway Motorway → Logan Motorway → Ipswich Motorway →Warrego Highway→Carnarvon Highway→Dawson Highway →Gregory Highway→Capricorn Highway.
- **Gladstone to SGCP:** Gladstone-Mount Larcom Road→Bruce Highway→Capricorn Highway.
- **Mackay to SGCP:** Peak Downs Highway→Clermont-Alpha Road→Capricorn Highway.
- **Quarry to infrastructure corridor:** Capricorn Highway.

It should be noted that with regards to the Brisbane to SGCP route, only the roads between Carnarvon Highway and Capricorn Highway were assessed in this study. The road sections between the Port of Brisbane Motorway and Carnarvon Highway were excluded due to the analysis providing a clear indication that mine input deliveries are not expected to create a significant impact on this portion of the proposed haulage route.

In addition, for the Gladstone to SGCP route and the Mackay to SGCP route, the Gladstone-Mount Larcom Road and Peak Downs Highway sections were excluded from the analysis for the same reasons mentioned above.

The analysis outlining the proposed haulage route link impacts is presented in **Section 5.2.1** of the report.

The abovementioned haul routes are illustrated in **Figure 2-1** below.

A number of hazardous and oversized loads will be transported to site during construction and operational phases. The likelihood and nature of any spills during transport and the proposed incident management is discussed in the Hazard and Risk section of the SGCP EIS.

2.5 Proposed Haulage Activity

The proposed haulage activities for the construction and operational phases are shown in **Table** 2-1 and **Table 2-2** respectively.

The haulage of coal to the Coal Handling and Preparation Plan (CHPP) will be via an internal network of haul roads and conveyors, and will therefore not impact any State-controlled Roads. Once coal has been processed at the CHPP, it will be conveyed and stockpiled for off-site transport via the proposed rail network to the Abbot Point Coal Terminal (APCT).

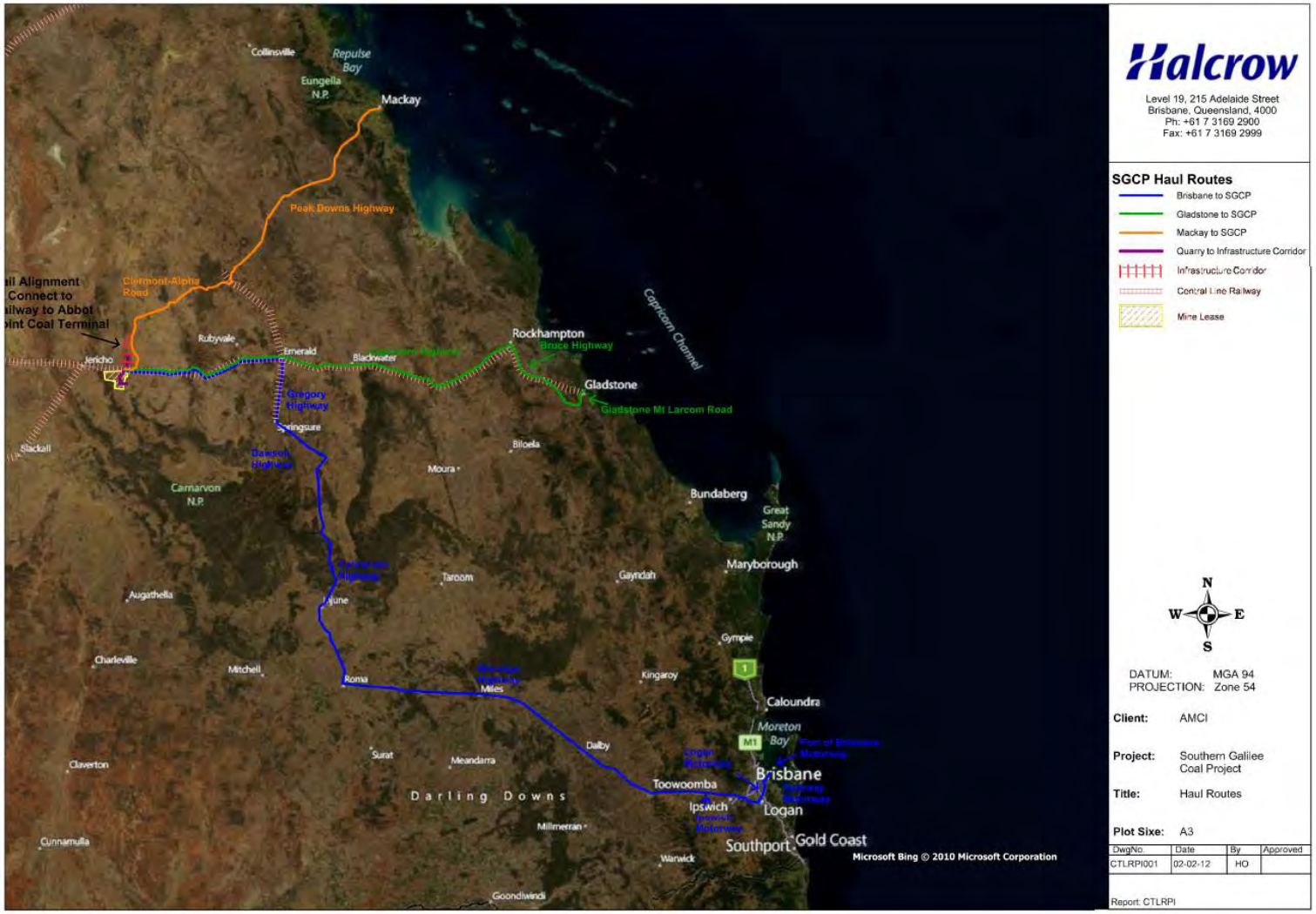


Figure 2-1 Proposed SGCP Haul Routes

Table 2-1 Heavy Vehicle Movement Description – Construction Phase

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6	Movement 7	Movement 8	Movement 9	Movement 10	Movement 11
Haulage Description	1100 OC equipment supply	1600 Haul Roads	2100 UG equipment supply	3100 OC ROM Receival	3200 UG ROM Coal Conveyors	3300 UG ROM Coal Stockyard	3400 Crushing / Sizing	3400 Crushing / Sizing	4100 Raw Coal Conveyors	4100 Raw Coal Conveyors	4200 Raw Coal Stockyard
Austroads Vehicle Class	5% Class 5 8% Class 9 70% Class 10 15% Class 11	11% Class 5 11% Class 9 66% Class 10 10% Class 11	5% Class 5 8% Class 9 70% Class 10 15% Class 11	16% Class 5 16% Class 9 36% Class 10 16% Class 11	17% Class 5 17% Class 9 33% Class 10 17% Class 11	11% Class 5 11% Class 9 65% Class 10 11% Class 11	16% Class 5 16% Class 9 38% Class 10 16% Class 11	16% Class 5 16% Class 9 38% Class 10 16% Class 11	14% Class 5 14% Class 9 47% Class 10 14% Class 11	14% Class 5 14% Class 9 47% Class 10 14% Class 11	11% Class 5 11% Class 9 64% Class 10 11% Class 11
Description of goods & material to be transported	Dragline, drill, excavator, grader, dump truck, dozer, water truck, wheel dozer and back hoe	Imported gravel	Underground transport requirements including conveyers, development, longwall and mobile equipment	Open cut run-of-mine (ROM)receival of concrete, steel, electrical supply, mechanical plant, and transformers	Underground ROM coal conveyer requirements including concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Underground ROM coal stockyard requirements including concrete, electrical and imported gravel materials	Piping materials	Piping materials	Tripper and piping materials	Tripper and piping materials	Imported gravel materials
Quantity of goods to be transported	A total of 189truck deliveries	A total of 174,548T of gravel and 770 truck deliveries	A total of 1242 truck deliveries	A total of 67 truck deliveries	A total of 1477T and 54 truck deliveries	A total of 216,428T and 981 truck deliveries	A total of 2840T and 40 truck deliveries	A total of 1630T and 23 truck deliveries	A total of 7295T and 52 truck deliveries	A total of 7202T and 52 truck deliveries	A total of 44636T and 208 truck deliveries
Origin & Destination of goods	Brisbane 50% Gladstone 30% Mackay 20%	Gravel Site	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 3% Gladstone1% Mackay 1% Gravel Site 95%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%
Is the product hazardous or oversized?	Approx. 36% oversized	Approx. 1% oversized	Approx. 2% oversized	Approx. 15% oversized	Approx. 17% oversized	Approx. 2% oversized	Approx. 15% oversized	Approx. 13% oversized	Approx. 10% oversized	Approx. 10% oversized	Approx. 3% oversized
Duration of haul movement	Estimate average delivery of 2 trucks per week from Q1 2013 to Q4 2015 (28% in 2013 18% in 2014 54% in 2015)	Estimated average delivery of 10 trucks per week from Q3 2013 to Q1 2015	Estimated average delivery of 5 trucks per week from Q1 2016 to Q4 2020 (46% in 2016 6% in 2017 7% in 2018 20% in 2019 21% in 2020)	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 2 trucks per week from Q1 2016 to Q3 2016	Estimated average delivery of 25 trucks per week from Q1 2016 to Q4 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q1 2016 to Q4 2016	Estimated average delivery of 1 truck per week from Q3 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q3 2015 to Q3 2016	Estimated average delivery of 8 trucks per week from Q1 to Q3 2014

	Movement 12	Movement 13	Movement 14	Movement 15	Movement 16	Movement 17	Movement 18	Movement 19	Movement 20	Movement 21	Movement 22
Haulage Description	4200 Raw Coal Stockyard	4300 Coal Preparation Plant Feed	4300 Coal Preparation Plant Feed	4400 Coal Preparation Plant	4400 Coal Preparation Plant	4500 Product Coal Conveyors	4500 Product Coal Conveyors	4600 Product Coal Stockyard	4600 Product Coal Stockyard	4700 Rejects Handling	4700 Rejects Handling
Austroads Vehicle Class	11% Class 5 11% Class 9 64% Class 10 11% Class 11	14% Class 5 14% Class 9 45% Class 10 14% Class 11	14% Class 5 14% Class 9 45% Class 10 14% Class 11	16% Class 5 16% Class 9 35% Class 10 16% Class 11	16% Class 5 16% Class 9 35% Class 10 16% Class 11	16% Class 5 16% Class 9 38% Class 10 16% Class 11	16% Class 5 16% Class 9 38% Class 10 16% Class 11	12% Class 5 12% Class 9 62% Class 10 12% Class 11	12% Class 5 12% Class 9 62% Class 10 12% Class 11	15% Class 5 15% Class 9 43% Class 10 15% Class 11	15% Class 5 15% Class 9 43% Class 10 15% Class 11
Description of goods & material to be transported	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials
Quantity of goods to be transported	A total of 44636T and 208 truck deliveries	A total of 5659T and 43 truck deliveries	A total of 4393T and 34 truck deliveries	A total of 1307T and 22 truck deliveries	A total of 1307T and 22 truck deliveries	A total of 3424T and 43 truck deliveries	A total of 2115T and 26 truck deliveries	A total of 63,129T and 295 truck deliveries	A total of 3729T and 17 truck deliveries	A total of 7936T and 63 truck deliveries	A total of 1327T and 11 truck deliveries
Origin & Destination of goods	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane4% Gladstone 2% Mackay 1% Gravel Site 93%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%
Is the product hazardous or oversized?	Approx. 3% oversized	Approx. 12% oversized	Approx. 12% oversized	Approx. 32% oversized	Approx. 32% oversized	Approx. 14% oversized	Approx. 15% oversized	Approx. 3% oversized	Approx. 6% oversized	Approx. 13% oversized	Approx. 9% oversized
Duration of haul movement	Estimated average delivery of 8 trucks per week from Q4 2015 to Q2 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q1 to Q4 2016	Estimated average delivery of 1 truck per week from Q1 to Q4 2014	Estimated average delivery of 1 truck per week from Q4 to 2015 to Q3 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q4 2015 to Q3 2016	Estimated average delivery of 11 trucks per week from Q4 2013 to Q1 2014	Estimated average delivery of 1 truck per week from Q2to Q3 2016	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 2 trucks per month from Q1 to Q3 2016

	Movement 23	Movement 24	Movement 25	Movement 26	Movement 27	Movement 28	Movement 29	Movement 30	Movement 31	Movement 32	Movement 33
Haulage Description	4800 Train Load Out	5100 Bulk Earthworks	5200 Roads	5300 Water & Sewerage Systems	5400 Rail	5500 Power Distribution	5600 MIA Facilities 1	5700 MIA Facilities 2	5800 Other Infrastructure	5900 Camps / Accommodation	7400 Compressed Air / Reagents / Fuel & Lubes
Austroads Vehicle Class	15% Class 5 15% Class 9 41% Class 10 15% Class 11	11% Class 5 11% Class 9 65% Class 10 11% Class 11	11% Class 5 11% Class 9 66% Class 10 11% Class 11	11% Class 5 11% Class 9 65% Class 10 11% Class 11	11% Class 5 11% Class 9 62% Class 10 11% Class 11	18% Class 5 18% Class 9 27% Class 10 18% Class 11	14% Class 5 14% Class 9 50% Class 10 14% Class 11	15% Class 5 15% Class 9 41% Class 10 15% Class 11	17% Class 5 17% Class 9 33% Class 10 17% Class 11	13% Class 5 13% Class 9 50% Class 10 13% Class 11	17% Class 5 17% Class 9 33% Class 10 17% Class 11
Description of goods & material to be transported	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Steel and imported gravel materials	Imported gravel materials	Concrete, steel, mechanical plant, electrical, piping and clay materials	Concrete, steel, electrical and imported gravel materials	Concrete and steel materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete and steel materials	Concrete, steel and piping materials	Building steel, concrete slab and electrical supply materials	Mechanical plant (pumps/motors) materials
Quantity of goods to be transported	A total of 6426T and 66 truck deliveries	A total of 38,076T and 176 truck deliveries	A total of 256,002T and 1126 truck deliveries	A total 216938T and 996 truck deliveries	A total of 30,355T and 149 truck deliveries	A total of 33T and 11 truck deliveries	A total of 35,761T and 187 truck deliveries	A total of 3827T and 46 truck deliveries	A total of 1081T and 54 truck deliveries	A total of 3174T and 24 truck deliveries	A total of 100T and 6 truck deliveries
Origin & Destination of goods	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 1% Gravel Site 99%	Gravel Site 100%	Brisbane 3% Gladstone1% Mackay 1% Clay Site 95%	Brisbane 4% Gladstone 2% Mackay 1% Gravel Site 93%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%
Is the product hazardous or oversized?	Approx. 14% oversized	Approx. 2% oversized	Approx. 1% oversized	Approx. 2% oversized	Approx. 3% oversized	Approx. 18% oversized	Approx. 7% oversized	Approx. 13% oversized	Approx. 17% oversized	Approx. 13% oversized	Approx. 17% oversized
Duration of haul movement	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 7 trucks per week from Q3 2012 to Q1 2013	Estimated average delivery of 29 trucks per week from Q3 2012 to Q2 2013	Estimated average delivery of 10 trucks per week from Q3 2012 to Q3 2014	Estimated average delivery of 6 trucks per week from Q3 2013 to Q4 2013	Estimated average delivery of 1 truck per month from Q3 2013 to Q3 2014	Estimated average delivery of 5 trucks per week from Q2 2013 to Q1 2014	Estimated average delivery of 2 trucks per week from Q1 to Q3 2014	Estimated average delivery of 4 trucks per week in Q3 2014	Estimated average delivery of 1 truck per fortnight from Q1 to Q3 2013	Estimated average delivery of 1 truck per fortnight from Q2 to Q3 2014

Table 2-2 Heavy Vehicle Movement Description – Operations Phase

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6	Movement 7	Movement 8	Movement 9	Movement 10	Movement 11	Movement 12
Haulage Description	Oils	Solvents	Magnetite	Flocculants	HANFO	Emulsion Explosives	Water Treatment Chemicals	Heavy Vehicle Tyres	General Consumables	UG Mining General Consumables	UG Mining Stone Dust	UG Mining Concrete
Austroads Vehicle Class	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10	10% Class 5 50% Class 9 40% Class 10
Description of goods & material to be transported	Oils	Chemicals	Bulk concentrate of magnetite	Chemicals	Explosive mixture of heavy ammonium nitrate and heating oils	Explosives	Chemicals	Tyres for mine site heavy vehicles	General Consumables	Underground mining general consumables	Underground mining stone dust	Underground mining concrete
Quantity of goods to be transported	18 trucks delivering 574T of oil per year	4 trucks delivering 30T of solvents per year	171 trucks delivering 9500T of magnetite per year	5 trucks delivering 101T of flocculants per year	12 trucks delivering 1800T of HANFO per year	6 trucks delivering 900T of emulsion explosives per year	4 trucks delivering 5T of water treatment chemicals per year	12 trucks delivering 360T of tyres per year	28 trucks delivering 850T of general consumables per year	17 trucks delivering 480T of UG mining general consumables per year	29 trucks delivering 4600T of UG mining stone dust per year	10 trucks delivering 1200T of UG mining concrete per year
Origin & Destination of goods	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%	Brisbane 50% Gladstone 30% Mackay 20%
Is the product hazardous?	No	Hazardous	No	No	Hazardous	Hazardous	Hazardous	No	No	No	No	No
Duration of haul movement	Estimated average delivery of 3 trucks per 2 months	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 4 trucks per week	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 1 truck per month	Estimated average delivery of 1 truckper 2 months	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 1 truck per month	Estimated average delivery of 1 truck per fortnight	Estimated average delivery of 4 trucks per quarter	Estimated average delivery of 1 truck per fortnight	Estimated average delivery of 1 truck per month

2.6 Traffic Generation

2.6.1 Workforce Trips

The traffic generation of workforce related journey to and from work trips is dependent on a number of factors, these being:

- number of staff required for each shift;
- number of shifts per day; and
- mode of travel to work (e.g.bus or private car trips).

For the purposes of this assessment, the following assumptions of workforce requirements and typical shift times have been considered. Workforce requirements and shift schedules will be the subject of further detailed project planning. Information supplied by MET Serve is presented in **Table 2-3** below.

Consultation with QPS and DTMR indicates that the driving distance to work should be minimised as far as practicable to minimise potential road safety and driver fatigue impacts. In addition to the SGCP being a FIFO operation, the journey to work trips have been limited to 20 minutes (effectively from within Alpha and the immediate surrounds).

Table 2-3 Anticipated Employee Requirements

	Personnel				
	Construction Period		Operational Period*		
	2013	2014	2016	2019	2029
Total Employee Requirements (peak)	1,600	1,600	507	1,288	1,288
Total Fly-in/Fly-out Employees (FIFO)	1,592	1,592	504	1,282	1,282
Total Alpha-based Employees	8	8	3	6	6
Number of Employees per Shift(typical average)	711	711	225	573	573
Number of Shifts per Day	2	2	2	2	2
Anticipated Shift Times	Day Shift: 6:00 - 18:00 Night Shift: 18:00 – 6:00				
Residence of Employees	SGCP Accommodation Village and Alpha				
Mode of Travel to Work • SGCP Accommodation Village	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus
• Alpha	Private Vehicle	Private Vehicle	Private Vehicle	Private Vehicle	Private Vehicle

* On-going construction activities associated with the staged operational ramp-up will mean there is some overlap in construction and operations. However, as the majority of construction is anticipated to be undertaken during the two year construction period 2013 to 2014, construction and operational transport were considered discretely for the purposes of this assessment.

The SGCP accommodation village will be located on site and employees will be transported from the village to the work site via the SGCP internal road network. Consequently, there will be no external road network traffic impacts of employee movements who reside at the SGCP accommodation village. The movement of shuttle buses to transport employees to and from the accommodation village at the start and end of each major shift rotation have, however, been assessed.

With regards to estimating the daily traffic generation of small number of employees based in Alpha, the following conservative assumptions have been made:

- all non-FIFO employees will reside in the township of Alpha and travel to the SGCP using the Capricorn Highway;
- vehicle occupancy will be 1.2 persons per vehicle;
- two vehicle trips are made per day (i.e. to and from SGCP work site); and
- 100% of township based employees work at the SGCP every day.

When considering trip generation for the construction and operational phases, the following movements should be taken into account:

- Morning Peak Period – Employee OUT movement for night shift + employee IN movement for day shift.
- Evening Peak Period – Employee OUT movement for day shift + employee IN movement for night shift.
- Daily – Sum of morning and afternoon peak movements.

With regards to FIFO personnel, the construction and operational workforce will be transported to and from the Alpha Aerodrome via 50 seat shuttle buses along the Capricorn Highway. Personnel are expected to be based on a FIFO schedule as follows:

- construction (e.g. 2013/2014) - 21 days on and 7 days off; and
- operations (e.g. 2014, 2016, 2019, 2029) - 7 days on and 7 days off.

Based on the assumptions above, the estimated daily traffic generation from Alpha-based personnel and the FIFO airport bus trips to the SGCP is presented in **Table 2-4**.

Table 2-4 Estimated External Road Network Personnel Traffic Generation

Year	Personnel Base		Vehicle Trip Ends		Shift End Personnel*	Daily Bus Trip Ends	Total Daily Vehicle Trip Ends
	Accommodation Village	Alpha	Peak	Daily			
2013	1,592	8	7	14	64	4	18
2014	1,592	8	7	14	64	4	18
2016	504	3	3	6	20	2	8
2019	1,282	6	5	10	51	4	14
2029	1,282	6	5	10	51	4	14

* Based on assumed 4% of total camp-based personnel movement at shift end.

2.6.2 Heavy Vehicle Movements

Based on the information provided in **Section 2.4**, the number of expected annual truck deliveries required for each phase of construction and operation can be calculated. **Table 2-5** details the anticipated heavy vehicle generation used in the Transport Assessment.

Table 2-5 Annual Heavy Vehicle Generation

Movement Description	No. Deliveries				
	2013	2014	2016	2019	2029
Construction					
OC equipment supply	53	33	-	-	-
Haul Roads	257	513	-	-	-
UG equipment supply	-	-	574	253	-
OC ROM Receival	-	67	-	-	-
UG ROM Coal Conveyors	-	-	54	-	-
UG ROM Coal Stockyard	-	-	981	-	-
Crushing / Sizing	4	36	23	-	-
Raw Coal Conveyors	17	35	34	-	-
Raw Coal Stockyard	-	208	138	-	-
Coal Preparation Plant Feed	5	39	34	-	-
Coal Preparation Plant	-	22	19	-	-
Product Coal Conveyors	5	38	23	-	-
Product Coal Stockyard	147	147	17	-	-
Rejects Handling	-	63	11	-	-
Train Load Out	-	66	-	-	-
Bulk Earthworks	59	-	-	-	-

Movement Description	No. Deliveries				
	2013	2014	2016	2019	2029
Roads	626	-	-	-	-
Water & Sewerage Systems	498	332	-	-	-
Rail	149	-	-	-	-
Power Distribution	4	7	-	-	-
MIA Facilities 1	166	21	-	-	-
MIA Facilities 2	-	46	-	-	-
Other Infrastructure	-	54	-	-	-
Camps / Accommodation	24	-	-	-	-
Compressed Air / Reagents / Fuel & Lubes	-	6	-	-	-
Operation					
Oils	-	-	18	18	18
Solvents	-	-	4	4	4
Magnetite	-	-	171	171	171
Flocculants	-	-	5	5	5
HANFO	-	-	12	12	12
Emulsion explosives	-	-	6	6	6
Water treatment chemicals	-	-	4	4	4
Heavy vehicle tyres	-	-	12	12	12
General consumables	-	-	28	28	28
UG mining general consumables	-	-	17	17	17
UG mining stone dust	-	-	29	29	29
UG mining concrete	-	-	10	10	10
Total Annual Truck Deliveries	**2,014**	**1,733**	**2,224**	**569**	**316**
Total Annual Truck Trip Ends (i.e. Sum of IN:OUT movements)	**4,028**	**3,466**	**4,448**	**1,138**	**632**

Link and intersection analyses are conducted using peak and daily trip generation. **Table 2-6** details the process which was applied to convert the information provided by MET Serve in **Section 2.4** (see **Table 2-1** and **Table 2-2**) into peak and daily breakdowns.

The trip generation by trip purpose, shown in **Table 2-6**, is disaggregated by the number of weekly deliveries by each yearly quarter. For example, delivery of magnetite is anticipated to be delivered four times per week for the whole of years of 2016, 2019 and 2029. Delivery of the water and sewerage systems will occur in the whole of 2013 and Q1 to Q3 of 2014, with the frequency of deliveries being ten per week.

Note that the number of truck deliveries presented in **Table 2-6** is taken to be the maximum number of deliveries per week based on the addition of deliveries within each quarter. Therefore, the total weekly truck deliveries represents the critical week for each assessment year.

Table 2-6 Heavy Vehicle Generation - Peak and Daily Movements

	Trip Generation				
	2013	**2014**	**2016**	**2019**	**2029**
Construction					
OC equipment supply	1/wk (Q1,Q4) & 2/wk (Q2-Q3)	1/wk (Q2-Q3)	-	-	-
Haul Roads	10/wk (Q3-Q4)	10/wk (Q1-Q4)	-	-	-
UG equipment supply	-	-	10/wk (Q1,Q4) & 20/wk (Q2-Q3)	2/wk (Q1-Q2) & 10/wk (Q3-Q4)	-
OC ROM Receival	-	3/wk (Q1-Q3)	-	-	-
UG ROM Coal Conveyors	-	-	2/wk (Q1-Q3)	-	-
UG ROM Coal Stockyard	-	-	25/wk(Q 1-Q4)	-	-
Crushing / Sizing	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q4)	-	-
Raw Coal Conveyors	1/wk (Q3-Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q3)	-	-
Raw Coal Stockyard	-	8/wk(Q1 -Q3)	8/wk(Q1 -Q2)		
Coal Preparation Plant Feed	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q4)	-	-
Coal Preparation Plant	-	1/wk (Q1-Q4)	1/wk (Q1-Q3)	-	-
Product Coal Conveyors	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q3)	-	-
Product Coal Stockyard	11/wk (Q4)	11/wk (Q1)	1/wk (Q2-Q3)	-	-
Rejects Handling	-	3/wk (Q1-Q3)	2/mth (Q1-Q3)	-	-
Train Load Out	-	3/wk (Q1-Q3)	-	-	-
Bulk Earthworks	7/wk(Q1)	-	-	-	-
Roads	29/wk (Q1-Q2)	-	-	-	-
Water & Sewerage Systems	10/wk (Q1-Q4)	10/wk (Q1-Q3)	-	-	-
Rail	6/wk (Q3-Q4)	-	-	-	-
Power Distribution	1/mth	1/mth	-	-	-

	Trip Generation				
	2013	**2014**	**2016**	**2019**	**2029**
	(Q3-Q4)	(Q1-Q3)			
MIA Facilities 1	5/wk (Q2-Q4)	5/wk (Q1)	-	-	-
MIA Facilities 2	-	2/wk (Q1-Q3)	-	-	-
Other Infrastructure	-	4/wk (Q2-Q3)	-	-	-
Camps / Accommodation	2/mth (Q1-Q3)	-	-	-	-
Compressed Air / Reagents / Fuel & Lubes	-	2/mth (Q2-Q3)	-	-	-
Operation					
Oils	-	-	5/qtr (Q1-Q4)	5/qtr (Q1-Q4)	5/qtr (Q1-Q4)
Solvents	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
Magnetite	-	-	4/wk (Q1-Q4)	4/wk (Q1-Q4)	4/wk (Q1-Q4)
Flocculants	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
HANFO	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
Emulsion explosives	-	-	2/qtr (Q1-Q4)	2/qtr (Q1-Q4)	2/qtr (Q1-Q4)
Water treatment chemicals	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
Heavy vehicle tyres	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
General consumables	-	-	2/mth (Q1-Q4)	2/mth (Q1-Q4)	2/mth (Q1-Q4)
UG mining general consumables	-	-	4/qtr (Q1-Q4)	4/qtr (Q1-Q4)	4/qtr (Q1-Q4)
UG mining stone dust	-	-	2/mth (Q1-Q4)	2/mth (Q1-Q4)	2/mth (Q1-Q4)
UG mining concrete	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
Total Weekly Truck Deliveries*	**84**	**66**	**69**	**17**	**7**
Average No. Truck Deliveries per day (Assumes 7 day working week)	**12**	**9**	**10**	**2**	**1**
Peak Period Generation (To be conservative, assumes that each trip end coincides with the commuter peak)	**12**	**9**	**10**	**2**	**1**
Daily Generation (Sum of IN:OUT movements)	**24**	**18**	**20**	**4**	**2**

**Total weekly truck deliveries taken to be the critical week for the year based on the identified yearly quarters.*

2.6.3 Visitor Movements

The traffic generation of visitor related journey to and from the mine site is expected to be made up of a range of visitors, including company representatives, trainers, sales representatives.

Based on previous project experience, a volume of approximately 20 visitors per day is considered an adequate assumption for the SGCP mine site. It has been assumed that the majority of visitors will visit the mine during the day shift, arriving in the morning peak and leaving in the evening peak. Approximately 50% of visitors will fly in via the Alpha Aerodrome and arrive at the mine via the bus provided for staff. The visitors are not expected to generate additional bus movements to the mine site. The remaining 50% of visitors will drive from surrounding mines or major towns using small private vehicles with average vehicle occupancy of 1.2.

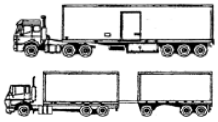
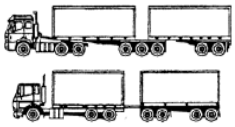
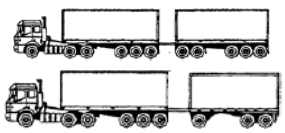
Visitors are expected to generate a daily total of 18 vehicle trip ends, made up of 9 vehicle trips into the mine in the morning peak hour and 9 vehicle trips out of the mine in the evening peak period.

2.7 Equivalent Standard Axles Generation

The Equivalent Standard Axles (ESA's) generated by the Project are summarised in **Table 2-8**.

The annual ESAs generated by the proposal are calculated by multiplying the annual truck trip ends with the appropriate ESA conversion factor, detailed in **Table 2-8**:

Table 2-7 ESA Conversion Factors*

AUSTROADS Vehicle Classification		ESA conversion factor	
		Unloaded Vehicle	Loaded Vehicle
Class 5		0.50	4.40
Class 9		0.51	4.93
Class 10		0.53	6.30
Class 11		0.55	8.34
Class 12		0.58	11.75

*These factors have been supplied by DTMR.

These ESA's are based on the assumption that all trips to the site are loaded, while all trips exiting the site are unloaded. The calculations have been undertaken using the split in vehicle

classification and traffic distribution as specified by AMCI. The inbound values given in **Table 2-8** are for trips towards the site and the outbound values for trips travelling away from the site. These ESA's are inclusive of both construction and operation generated trips. As stated in **Section 2.4**, only those routes on which the ESA's generated by the Project are significant have been demonstrated in **Table 2-8**.

Table 2-8 ESA's Generated by the Project

Road	Road Section	2014		2016		2019		2029	
		In	Out	In	Out	In	Out	In	Out
Capricorn Highway	Site to Clermont-Alpha Road	5,134	408	8,001	673	3,361	298	1,714	163
	Clermont-Alpha Road to Gregory Highway (Emerald)	4,107	326	6,401	538	2,689	238	1,371	131
	Gregory Highway (Emerald) to Rockhampton	1,540	122	2,400	202	1,008	89	514	49
Clermont - Alpha Road	Alpha to Mackay	1,027	81	1,600	135	627	60	343	33
Gregory Highway	Capricorn Highway (Emerald) to Dawson Highway (Springsure)	2,567	204	4,000	336	1,681	149	857	82
Dawson Highway	Gregory Highway (Springsure) to Carnarvon Highway	2,567	204	4,000	336	1,681	149	857	82
Carnarvon Highway	Dawson Highway to Warrego Highway	2,567	204	4,000	336	1,681	149	857	82
Bruce Highway	Capricorn Highway (Rockhampton) to Gladstone	1,540	122	2,400	202	1,008	89	514	49

2.8 Rail Movements Generation

AMCI have indicated that as a part of the SGCP rail spur alignment, the following rail transport related infrastructure will be required:

- construction of an underpass at the Capricorn Highway; and
- construction of a rail bridge over the Central Line Railway (single span bridge).

The rail movements generated by the Project are summarised in **Table 2-9**. These movements are inclusive of both construction and operation generated trips.

Table 2-9 Project Generated Rail Movements

	Maximum Train Movements Generated per Week			
	2013/2014 (Construction)	**2016 (Operation and Construction)**	**2019 (First year of Stage 3 Operations)**	**2029 (Future Year Operations)**
Material Supplies to SGCP via Central Line Railway	9	-	-	-
Material Supplies to SGCP via Galilee Basin Common User Rail Line	-	<1	<1	<1
Product Coal from SGCP to APCT via Galilee Basin Common User Rail Line*	-	5	14	14

* Volumes provided by AMCI

2.9 Cumulative Impact of Development

A number of other 'significant' projects are currently progressing through the EIS planning process. These projects are located to the north of the proposed SGCP and the information available for each project has been used to assess the cumulative impacts on the road, rail and air movements and port activity. These projects include:

- Alpha Coal Project;
- Galilee Coal Project (also known as China First Coal Project);
- Kevin's Corner;
- Galilee Basin Power Station;
- Carmichael Coal Mine and Railway.

A brief summary of these projects is described in **Table 2-10**.

Table 2-10 Other Significant Projects

Project	Proponent	Description	EIS Status*
Alpha Coal Project	Hancock Prospecting Pty Ltd	Open-cut coal mine, railway line and port infrastructure. Proposed yield of 30 Mtpa with opportunity for expansion.	Addendum to Supplementary EIS currently being assessed.
Galilee Coal Project	Waratah Coal Pty Ltd	Open-cut and underground coal	EIS and submissions being assessed.

		mine, railway line and port facility. Proposed yield of 40 Mtpa with further opportunity for expansion.	
Kevin's Corner	Hancock Galilee Pty Ltd (a subsidiary of Hancock Prospecting Pty Ltd)	Combined open-cut and underground coal mine with an ultimate capacity of 30 Mtpa.	EIS and submissions being assessed.
Galilee Power Station	Galilee Power (a subsidiary of Waratah Coal Pty Ltd)	900MW coal fired power station incorporating clean-coal low-emission technology and carbon capture and storage	Draft ToR release for public consultation delayed at the proponent's request.
Carmichael Coal Mine and Railway	Adani Mining Pty Ltd	Open cut and underground coal mine and railway line with a yield of 60 Mtpa.	EIS being prepared by proponent.

* EIS status as provided on Office of the Coordinator-General's website on 13 January 2011.

For the purposes of this assessment, the available traffic generation data for the Alpha Coal Project and Galilee Coal Project have been included in the cumulative traffic impact assessment provided in **Section 7.6** of the report. A summary of the estimated cumulative traffic generation from these projects is presented in **Table 2-11**.

Table 2-11 Cumulative Daily Traffic Generation of Other Significant Projects

Road	Section	Alpha Coal Project (vpd)	Galilee Coal Project		Kevin's Corner (vpd)
			Construction Phase (vpd)	Operations Phase (vpd)	
Clermont-Alpha Road	Alpha to Hobartville Road	59	73	45	14
	Hobartville Road to Clermont	3	73	45	14
Capricorn Highway	Jericho to Alpha	4	1,160	720	4
	Alpha to Emerald	36	435	270	44
	Emerald to Rockhampton	0	435	270	18

It should be noted that the available Alpha Coal Project traffic generation information only covered the operations phase in 2017. Consequently, the analysis in **Section 5.2.1** assumes the traffic volumes occur in each of the assessment years.

The Galilee Coal Project traffic generation data is provided for construction (2011-2014) and, operational phases. Consequently, the analysis in **Section 5.2.1** assumes that the Galilee Coal Project construction phase occurs in the assessment years of 2013 and 2014, while the operations phase occurs in the assessment years of 2016, 2019 and 2029.

3. Existing Conditions

3.1 Road Network

As described in **Section 2.4**, this study only assesses the roads between Carnarvon Highway and Capricorn Highway for the Brisbane to SGCP route. In addition, for the Gladstone to SGCP route, the Gladstone-Mount Larcom Road section was excluded from the analysis.

3.1.1 Capricorn Highway

The Capricorn Highway is a State-controlled road connecting Rockhampton in the east with Barcaldine in the west. The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100km/hr except through townships.

The draft Queensland Infrastructure Plan for Central Queensland specifies small projects to be undertaken on the Capricorn Highway, involving an upgrade to an industrial access road at Gracemere, west of Rockhampton, and the construction of a new overtaking lane east of Barcaldine. It is not expected that these works will have an impact on the Project's use of the Capricorn Highway. Some sections of the Capricorn Highway are currently degraded, however, this is expected to be improved with the planned restoration works as a part of the Natural Disaster Relief and Recovery Arrangements (NDRRA).

3.1.2 Clermont-Alpha Road

The Clermont-Alpha Road is a State-controlled road connecting Alpha to Clermont. The road is fully sealed, however the shoulders are unsealed. The road has a speed limit of up to 100km/hr.

There are no proposed works specified for the Clermont-Alpha Road in the draft Queensland Infrastructure Plan for Central Queensland. Some sections of Clermont-Alpha Road are currently degraded; however, this is expected to be improved with the planned restoration works as a part of the Natural Disaster Relief and Recovery Arrangements (NDRRA).

3.1.3 Gregory Highway

The Gregory Highway is a State-controlled road connecting Springsure (south of Emerald) to Clermont to the north where a connection to the Peak Downs Highway is provided. The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100km/hr except through townships.

There are no proposed works specified for the Gregory Highway in the draft Queensland Infrastructure Plan for Central Queensland.

3.1.4 Dawson Highway

The Dawson Highway is a State-controlled road connecting Springsure in the west with Gladstone in the east. The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100km/hr except through townships.

The draft Queensland Infrastructure Plan for Central Queensland specifies that a Calliope Range deviation will be undertaken on the Dawson Highway.

3.1.5 Carnarvon Highway

The Carnarvon Highway is a State-controlled road connecting Rolleston to the north of Roma with Moree to the south (in New South Wales). The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100km/hr except through townships.

The draft Queensland Infrastructure Plan specifies that from Mungindi (on the Queensland / New South Wales border) to Rolleston, there is a proposal to widen some sections of the Carnarvon Highway.

3.1.6 Bruce Highway

The Bruce Highway is a part of the Australian National Highway and connects Brisbane to Cairns in far north Queensland. It is a sealed, two-way road with a maximum posted speed limit of 110 km/hr. Overtaking lanes are provided along the route.

The draft Queensland Infrastructure Plan for Central Queensland specifies small projects planned for the Bruce Highway, involving intersection upgrades and restoration works as a part of the NDRRA. It is not expected that these works will have an impact on the Project's use of the Bruce Highway.

3.1.7 Peak Downs Highway

The Peak Downs Highway is a State-controlled road connecting Clermont to the west with Mackay to the east. The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100km/hr except through townships.

The draft Queensland Infrastructure Plan specifies that from Nebo to Mackay on the Peak Downs Highway, there is a proposal to bypass the township of Walkerston. In addition, there are proposals to implement road and safety related upgrades to the Peak Downs Highway for the Eton Range, City Gates to Mackay Eungella Road, and Walkerston Bypass sections.

3.2 Existing Load Limits and Heavy Vehicle Restrictions

3.2.1 Capricorn Highway

Type 1 and 2 road trains are permitted on the Capricorn Highway west of Alpha. Type 2 Road Trains, however, are not permitted on the Capricorn Highway east of Alpha.

B-Doubles (23 metre and 25 metre long) are permitted on the Capricorn Highway.

3.2.2 Clermont-Alpha Road

Type 1 and 2 road trains and B-Doubles (23 metre and 25 metre long) are permitted on the Clermont-Alpha Road.

3.2.3 Gregory Highway

Type 1 and 2 road trains are permitted on the Gregory Highway north of Clermont. Type 2 Road Trains, however, are not permitted on the Gregory Highway South of Clermont.

B-Doubles (23 metre and 25 metre long) are permitted on the Gregory Highway.

3.2.4 Dawson Highway

Type 1 road trains and B-Doubles(23 metre and 25 metre long) are permitted on the Dawson Highway.

3.2.5 Carnarvon Highway

Type 1 road trains and B-Doubles (23 metre and 25 metre long) are permitted on the Carnarvon Highway.

3.2.6 Bruce Highway

Road trains are not permitted on the Bruce Highway. B-Doubles (23 metre and 25 metre long) are permitted on the Bruce Highway.

3.2.7 Peak Downs Highway

Type 1 road trains are permitted on the Peak Downs Highway east of the Gregory Highway (near Clermont). However, road trains are not permitted on the Peak Downs Highway east of Hazeldean.

B-Doubles (23 metre and 25 metre long) are permitted on the Peak Downs Highway.

3.3 Existing Public Transport Routes

There is currently no public transport provided in the vicinity of the SGCP. Potential impacts of the SGCP on public transport are therefore not considered further.

3.4 Existing Traffic Flows

3.4.1 Link Volumes

Link volumes were obtained from DTMR for the links on which the majority of heavy and light vehicles are expected to travel. The 2010 AADT for the affected links is summarised in **Table 3-1** below. Volumes for the Bruce Highway and Peak Downs Highway

Table 3-1 State-Controlled Roads – 2010 AADT Segment Reports

Site Description	Start Chainage (km)	End Chainage (km)	AADT (2-Way)	%CV
16D: Capricorn Highway (West to East)				
SGCP to Infrastructure Corridor	8.8	7.3	377	25%
Infrastructure Corridor to Clermont-Alpha Rd	7.3	0	377	25%
16C: Capricorn Highway (West to East)				
Clermont-Alpha Rd to Willows Gemfields Rd	167.9	70.8	403	23%
Willows Gemfields Rd to Anakie-Sapphire Rd	70.8	43.3	524	23%
Anakie-Sapphire Rd to Tyson Rd	43.3	2.2	1,263	16%
Tyson Rd to Selma Rd	2.2	1.1	2,745	13%
Selma Rd to Gregory Hwy	1.1	0	7,769	10%
16B: Capricorn Highway (West to East)				
Gregory Hwy to Ensham Rd	159.6	128.0	3,396	17%
Ensham Rd to Blackwater-Cooroorah Rd	128.0	86.2	2,316	22%
Blackwater-Cooroorah Rd to Arthur St	86.2	83.9	3,959	17%
Arthur St to Fitzroy Development Rd	83.9	36.4	2,786	26%

Site Description	Start Chainage (km)	End Chainage (km)	AADT (2-Way)	%CV
Fitzroy Development Rd to Duaringa Connection Rd	36.4	0	2,935	19%
16ACapricorn Highway (West to East)				
Start Point to Duaringa Connection Rd	106.4	73.4	2,892	22%
Leichhardt Hwy to End Point	73.4	51.6	3,216	21%
Powerstation Rd to Leichhardt Hwy	51.6	17.9	4,253	16%
Kabra Rd to Powerstation Rd	17.9	13.4	4,891	22%
Kabra RdGavial-Gracemere Rd to	13.4	5.7	15,741	11%
Gavial-Gracemere Rd to Bruce Hwy	5.7	0	23,132	11%
552: Clermont-Alpha Road (South to North)				
Capricorn Hwy to Hobartville	178.5	148.6	88	25%
Hobartville to Pioneer-Clydevale Rd	148.6	44.4	21	14%
Pioneer-Clydevale Rd to Start Point	44.4	3.0	81	14%
End Point to Clermont Connection	3.0	0	472	15%
27A: Gregory Highway (North to South)				
Capricorn Hwy to Mayfair Dr	0.0	0.6	6392	7%
Mayfair Dr to Airport Turn Off	0.6	44.7	3020	22%
Airport Turn Off to Glenorina Rd	44.7	62.1	1298	19%
Glenoria Rd to HV Bypass	62.1	63.5	1039	18%
HV Bypass to Springsure Start Point	63.5	65.7	1423	7%
46D: Dawson Highway (North to South)				
Springsure End Point to Comet St	0.0	0.7	1404	19%
Comet St to Wealwandeangie Rd	0.7	34.8	1541	35%
Wealwandangie Rd to Gap Ln	34.8	68.5	1027	28%
Gap Ln to Orion 10 Chn	68.5	70.4	658	22%
Orion 10 Chn to Injune Turn Off	70.4	71.0	597	18%
Injune Turn Off to Start Point	71.0	71.1	631	6%
24E: Carnarvon Highway (North to South)				
Dawson Hwy to Wyseby Rd	172.3	111.2	407	35%
Wyseby Rd to Maranoa Council Bdy	111.2	68.5	357	32%
Maranoa Council Bdy to Start Point	68.5	0.0	367	29%
24D: Carnarvon Highway (North to South)				
Start Point to Roma Taroom Rd	90.4	17.6	643	26%
Roma Taroom Rd to Start Point	17.6	3.3	1421	15%
Start Point to Bowen St	3.3	0.0	2128	17%

3.4.2 Intersection Volumes

A peak hour intersection survey was undertaken for the Capricorn Highway / Clermont-Alpha Road / Shakespeare Street intersection within the township of Alpha.

Peak hour traffic surveys were undertaken by AusTraffic on Tuesday 2nd August 2011 during the morning period of 5:30 AM to 8:30 AM and the evening period of 3:00 PM to 6:00PM. The raw data is supplied in **Appendix B**.

Based on the survey data, the identified peak hours were:

- Morning: 6:45 AM to 7:45 AM; and
- Evening: 3:15 PM to 4:15 PM.

The traffic count data is summarised in **Figure 3-1**.

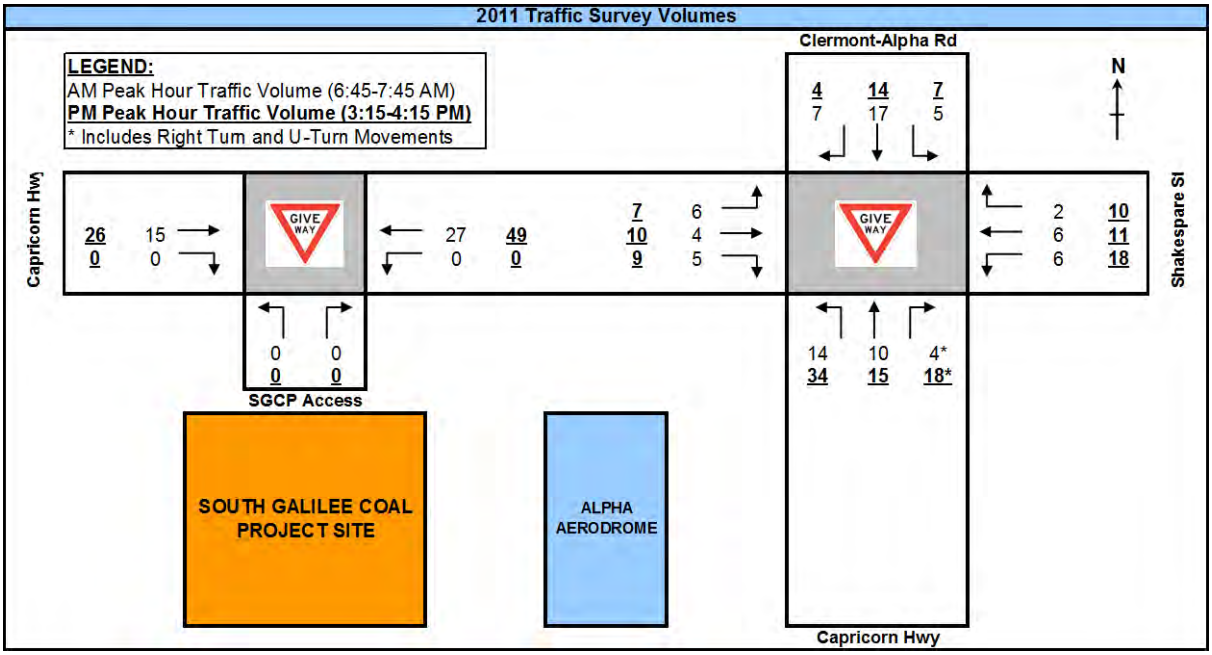


Figure 3-1 Background 2011 AM and PM Peak Traffic Volumes

3.5 Existing Pavement Loads

The existing pavement loads based on the traffic data supplied by DTMR are summarised in **Table 3-2** below.

Table 3-2 State-controlled Roads – Existing Pavement Loads

Road Section	ESA's per year (2012)	Design Traffic (20yr life)
16D: Capricorn Highway (West to East)		
SGCP to Infrastructure Corridor	58,231	1,611,617
Infrastructure Corridor to Clermont-Alpha Road	58,231	1,611,617
16C: Capricorn Highway (West to East)		
Clermont-Alpha Rd to Willows Gemfields Rd	56,379	1,560,369
Willows Gemfields Rd to Anakie-Sapphire Rd	73,112	2,023,475
Anakie-Sapphire Rd to Tyson Rd	128,880	3,566,935
Tyson Rd to Selma Rd	222,963	6,170,826

Road Section	ESA's per year (2012)	Design Traffic (20yr life)
Selma Rd to Gregory Hwy	504,445	13,961,261
16B: Capricorn Highway (West to East)		
Gregory Hwy to Ensham Rd	352,007	9,742,308
Ensham Rd to Blackwater-Cooroorah Rd	311,089	8,609,859
Blackwater-Cooroorah Rd to Arthur St	407,665	11,282,744
Arthur St to Fitzroy Development Rd	456,556	12,635,866
Fitzroy Development Rd to Duaringa Connection Rd	341,318	9,446,493
16ACapricorn Highway (West to East)		
Start Point to Duaringa Connection Rd	394,013	10,904,902
Leichhardt Hwy to End Point	412,652	11,420,744
Powerstation Rd to Leichhardt Hwy	401,576	11,114,224
Kabra Rd to Powerstation Rd	412,643	11,420,507
Kabra RdGavial-Gracemere Rd to	651,817	18,039,991
Gavial-Gracemere Rd to Bruce Hwy	1,080,586	29,906,826
552: Clermont-Alpha Road (South to North)		
Capricorn Hwy to Hobartville	43,368	1,200,277
Hobartville to Pioneer-Clydevale Rd	6,815	188,618
Pioneer-Clydevale Rd to Start Point	1,859	51,458
End Point to Clermont Connection	13,630	377,243
27A: Gregory Highway (North to South)		
Capricorn Hwy to Mayfair Dr	289,495	1,717,813
Mayfair Dr to Airport Turn Off	403,407	3,173,055
Airport Turn Off to Glenorina Rd	156,094	4,320,146
Glenoria Rd to HV Bypass	114,648	11,164,876
HV Bypass to Springsure Start Point	62,068	8,012,211
46D: Dawson Highway (North to South)		
Springsure End Point to Comet St	162,666	4,502,015
Comet St to Wealwandeangie Rd	337,409	933,8291
Wealwandangie Rd to Gap Ln	178,926	4,952,038
Gap Ln to Orion 10 Chn	89,321	2,472,102
Orion 10 Chn to Injune Turn Off	66,726	1,846,754
Injune Turn Off to Start Point	25,333	701,136
24E: Carnarvon Highway (North to South)		
Dawson Hwy to Wyseby Rd	41,960	1,161,304
Wyseby Rd to Maranoa Regional Council Bdy	32,381	896,205
Maranoa Regional Council Bdy to Start Point	59,415	1,644,386
24D: Carnarvon Highway (North to South)		
Start Point to Roma Taroom Rd	117,243	3,244,886
Roma Taroom Rd to Start Point	286,043	7,916,660

Road Section	ESA's per year (2012)	Design Traffic (20yr life)
Start Point to Bowen St	463,298	12,822,468
10E: Bruce Highway (South to North)		
Gladstone-Benaraby Rd to Dawson Hwy	613,761	16,986,961
Dawson Hwy to Gladstone Mt Larcom Rd	506,431	14,016,226
Gladstone-Mt Larcom to Bajool-Pt Alma Rd	816,968	22,610,791
Bajool-Pt. Alma Rd to Gavial-Gracemere Rd	762,336	21,098,774
Gavial-Gracemere Rd to Burnett Hwy	777,909	21,529,778
Burnett Hwy to Capricorn Hwy	695,575	19,251,063

3.6 Rail Network

During construction, the rail transportation of goods to the SGCP will utilise the existing narrow gauge Central Line Railway operated by Queensland Rail (QR). The Central Line Railway is an electrified track from Burngrove west to Emerald. West of Emerald, the track is not electrified. The railway system has three loops between Burngrove (to the east) and Alpha.

This is a single track system with four crossing loops between Burngrove and Emerald, and nine crossing loops between Emerald and Alpha, including one at Alpha.

During the summer months, high temperatures cause the precautions for track stability to be observed to reduce the risk of an incident. Where temperatures are above 38 degrees celcius and 40 degrees celcius all trains on timber sleepered tracks are reduced to speeds of 60km/h and 40km/h respectively.

The rail movements generated by the site are specified in **Section 2.8**.

Additional detail regarding the existing capacity of the rail network was sought from QR during the assessment, however details were not provided.

3.7 Air

The Alpha Aerodrome is listed as a registered aerodrome with CASA (Registration Number R076) and is owned and operated by the BRC. The existing runway is currently 1,450 metres long and 30 metres wide. The Alpha Aerodrome is located approximately 5km west of the main township of Alpha on the Alpha Aerodrome Access Road, which connects to the Capricorn Highway from the south. The airport is not currently equipped to cater for commercial passenger flights and is currently used irregularly only by small aircrafts.

There are a number of other airfields and aerodromes in the region, including:

- Emerald Airport (located 170 km east of the SGCP and serviced by QANTAS);
- Barcaldine Aerodrome;
- Aramac Airfield;
- Jericho Airfield; and

- Muttaburra Airfield.

Privately-owned property airstrips for agricultural or personal use are not considered in this assessment.

The SGCP will utilise the existing Alpha Aerodrome for the FIFO workforce. The mine site is located approximately 4km west of the Aerodrome.

No formal car parking or bus layover areas are designated at the aerodrome, however sufficient space is provided to allow for parking and manoeuvring of cars and buses.

3.8 Ports

The port proposed to be used by the SGCP is the APCT. The APCT currently comprises a rail in-loading facility, coal handling and stockpile areas, a single trestle jetty and conveyor connected to a berth and shiploader, located 2.75km off-shore. During the 2010-11 financial year, the APCT had a total throughput of approximately 15 million tonnes, handling a total of 190 ships. The live stockpile capacity is 260,000 tonnes on each side of the stacker. A further provision of 750,000 tonnes of 'dead' capacity can be created on the western stockpile by dozing from the live stockpile.

The APCT is currently undergoing significant expansion as part of the X50 project to increase capacity to 50 Mtpa.

4. Future Conditions

4.1 Proposed Road Improvement Projects

The scheduled road improvement projects specified in the Draft Queensland Infrastructure Plan 2011 are shown in **Table 4-1**below. This table includes works that are a part of the Natural Disaster Relief and Recovery Arrangements (NDRRA).

Table 4-1 Scheduled Road Improvement Projects

Road	Proposed Works	Indicative Timing
Capricorn Highway (Rockhampton - Duaringa)	Gracemere Industrial Access Project	2011 – 2013
Capricorn Highway (Bushleys – Leichhardt Highway)	Overtaking lanes	2011 – 2013
Bruce Highway (Calliope)	Calliope Crossroads upgrade	2011 –ongoing
Bruce Highway (Yeppen Lagoon)	Capricorn Highway intersection upgrade	2011–2014
Bruce Highway	FitzroyRiver Floodplain Study	2011–2012
Bruce Highway (Gin-Gin – Benaraby)	Reconstruct Section (NDRRA works)	2011–2013
Capricorn Highway (Emerald - Barcaldine	Restoration Works (NDRRA works)	2011–2014

4.2 Future Traffic Flows

An annual compound growth rate of 3%has been applied to the base year traffic volumes provided in **Table 3-1** of **Section 3.4**.This is consistent with previous correspondence with DTMR regarding growth rates for their rural based State-controlled Road network.

Table 4-2 is a summary of the future year link AADT volumes for each of the assessment years identified in **Section 2.2** for State-controlled roads. Note that the future year background volumes provided in **Table 4-2** are not inclusive of cumulative impact traffic.

Table 4-2 State-Controlled Roads – Future Year Link AADT Volumes

Site Description	2013	2014	2016	2019	2029
16D: Capricorn Highway (West to East)					
SGCP to Infrastructure Corridor	410	420	440	480	590
Infrastructure Corridor to Clermont-Alpha Rd	410	420	440	480	590
16C: Capricorn Highway (West to East)					
Clermont-Alpha Rd to Willows Gemfields Rd	440	450	480	510	630
Willows Gemfields Rd to Anakie-Sapphire Rd	570	590	620	670	820
Anakie-Sapphire Rd to Tyson Rd	1,380	1,410	1,490	1,600	1,980
Tyson Rd to Selma Rd	2,990	3,070	3,240	3,490	4,310
Selma Rd to Gregory Hwy	8,470	8,700	9,170	9,870	12,200
16B: Capricorn Highway (West to East)					
Gregory Hwy to Ensham Rd	3,700	3,800	4,010	4,310	5,330

Site Description	2013	2014	2016	2019	2029
Ensham Rd to Blackwater-Cooroorah Rd	2,520	2,590	2,730	2,940	3,640
Blackwater-Cooroorah Rd to Arthur St	4,320	4430	4670	5030	6220
Arthur St to Fitzroy Development Rd	3,040	3120	3290	3540	4370
Fitzroy Development Rd to Duaringa Connection Rd	3,200	3290	3460	3730	4610
16C: Capricorn Highway (West to East)					
Start Point to Duaringa Connection Rd	3,150	3,240	3,410	3,670	4,540
Leichhardt Hwy to End Point	3,510	3,600	3,790	4,080	5,050
Powerstation Rd to Leichhardt Hwy	3,770	3,870	4,080	4,390	5,420
Kabra Rd to Powerstation Rd	4,640	4,760	5,020	5,400	6,680
Kabra RdGavial-Gracemere Rd to	5,330	5,480	5,770	6,210	7,680
Gavial-Gracemere Rd to Bruce Hwy	17,160	17,630	18,570	19,990	24,710
552: Clermont-Alpha Road (South to North)					
Capricorn Hwy to Hobartville	100	100	100	110	140
Hobartville to Pioneer-Clydevale Rd	20	20	20	30	30
Pioneer-Clydevale Rd to Start Point	90	90	100	100	130
End Point to Clermont Connection	510	530	560	600	740
27A: Gregory Highway (North to South)					
Capricorn Hwy to Mayfair Dr	6,970	7,160	7,540	8,120	10,040
Mayfair Dr to Airport Turn Off	3,290	3,380	3,560	3,840	4,740
Airport Turn Off to Glenorina Rd	1,410	1,450	1,530	1,650	2,040
Glenoria Rd to HV Bypass	1,130	1,160	1,230	1,320	1,630
HV Bypass to Springsure Start Point	1,550	1,590	1,680	1,810	2,230
46D: Dawson Highway (North to South)					
Springsure End Point to Comet St	1,530	1,570	1,660	1,780	2,200
Comet St to Wealwandeangie Rd	1,680	1,730	1,820	1,960	2,420
Wealwandangie Rd to Gap Ln	1,120	1,150	1,210	1,300	1,610
Gap Ln to Orion 10 Chn	720	740	780	840	1,030
Orion 10 Chn to Injune Turn Off	650	670	700	760	940
Injune Turn Off to Start Point	690	710	740	800	990
24E: Carnarvon Highway (North to South)					
Dawson Hwy to Wyseby Rd	440	460	480	520	640
Wyseby Rd to Maranoa Council Bdy	390	400	420	450	560
Maranoa Council Bdy to Start Point	400	410	430	470	580
24D: Carnarvon Highway (North to South)					
Start Point to Roma Taroom Rd	700	720	760	820	1,010
Roma Taroom Rd to Start Point	1,550	1,590	1,680	1,800	2,230
Start Point to Bowen St	2,320	2,380	2,510	2,700	3,340

4.3 Proposed Rail Network Upgrades

The Galilee Basin is currently not connected to a major coal haulage railway system. However, Waratah Coal Pty Ltd, Hancock Prospecting Pty Ltd and Adani Mining Pty Ltd have all proposed to construct railway systems from the Galilee Basin to the APCT. All of these proponents have indicated to AMCI that their respective rail infrastructure will be open to third party access. Irrespective of which proponent(s) ultimately establish rail infrastructure to the APCT, the line(s) will be a standard gauge rail system.

SGCP product coal is proposed to be transported by rail to the APCT, using the 'common user' rail line. This rail connection will be used for all rail movements generated by the project during the operation period. AMCI propose to construct a SGCP rail spur component to connect the SGCP to the proposed common user rail line.

The SGCP proposes to use the Waratah Coal common user rail line or the Hancock Coal common user rail line (via the Waratah Coal connection) (**Figure 4-1**).

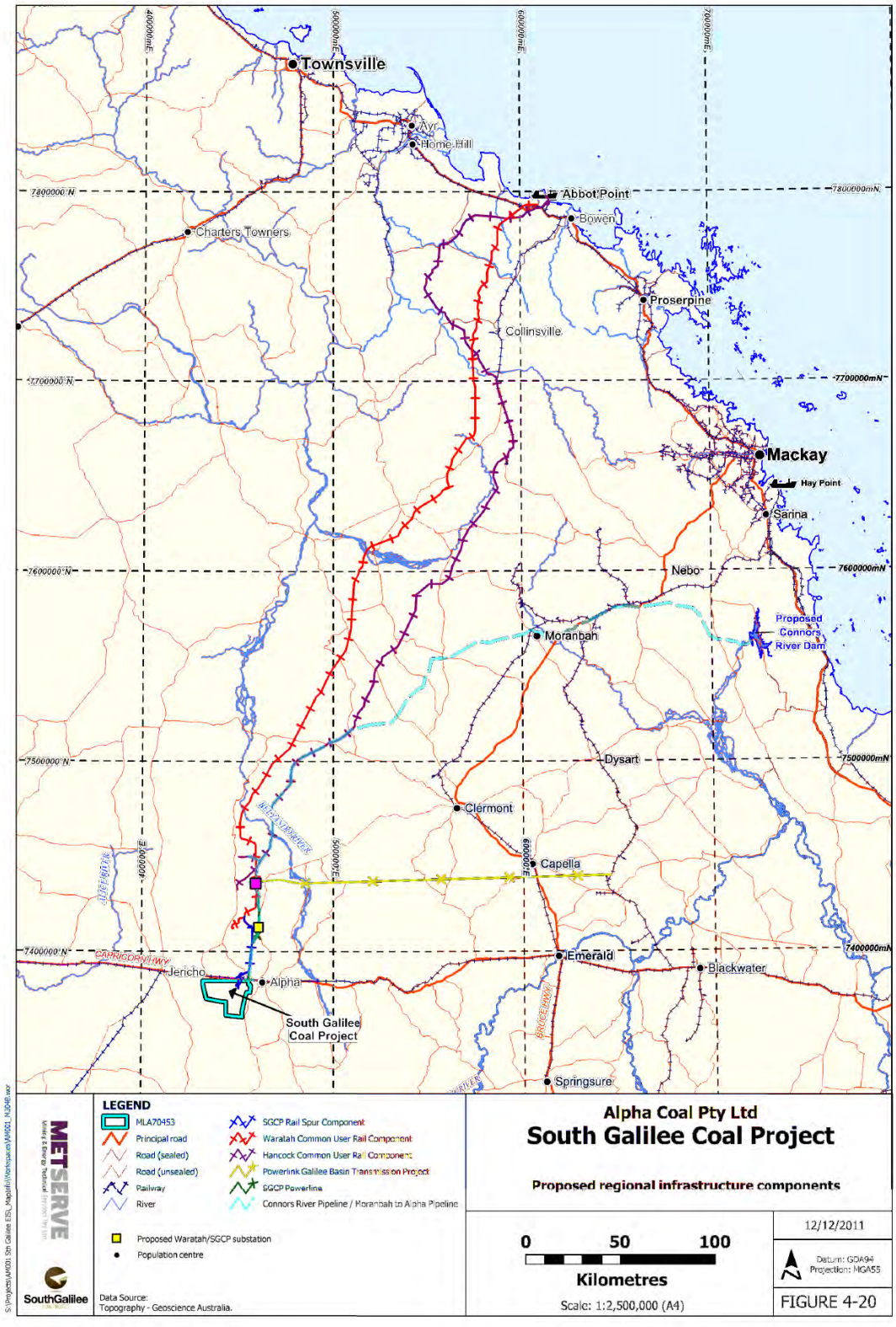


Figure 4-1 Proposed Regional Rail Infrastructure Components

4.4 Proposed Airport Upgrades

As a result of the requirements for FIFO workers for the SGCP, Galilee Coal Project and Alpha Coal Project, the Alpha Aerodrome will need to be upgraded to allow for the proposed aircraft (namely a DC-9, capable of carrying 100 – 125 people). This will require an extension

of the length of the runway by approximately 850m and a widening of 15m. It is anticipated that the cost of the upgrade will be met by commercial air service providers.

The cumulative impact of the air related transport is detailed in **Section 6.2**.

4.5 Proposed Port Upgrades

In May 2011, the Queensland Government announced the 99-year lease of the X50 APCT to Mundra Port Pty Ltd. Under the lease, the State will retain ownership of the Port land and fixed infrastructure such as the jetty and the wharf. The State will also continue to facilitate future private-sector funded expansion of export infrastructure within the broader port precinct, such as Terminal 2, Terminal 3 and the Multi Cargo Facility (MCF). North Queensland Bulk Ports remains the port authority for the APCT.

A number of major expansion projects are proposed for the APCT, including the following:

- T2 and T3 projects - the development of two additional separate tranches of coal terminal capacity (Preferred Developers are Hancock Coal Limited and BHP Billiton Limited).
- T4, T5, T6, T7, T8 and T9 projects (T4-T9) – the development of an additional coal terminal location within the Abbot Point State Development Area, comprising four additional separate tranches, each with a nominal capacity of 30 Mtpa. The Preferred Developers are:
    - Anglo American Metallurgical Coal;
    - Macmines Austasia;
    - North Queensland Coal Terminal (consortium of Macarthur Coal, Peabody Energy, New Hope Corporation, Middlemount Coal and Carabella Resources);
    - Rio Tinto Coal;
    - Vale; and
    - Waratah Coal.
- MCF – construction of a new multi trade port facility at Abbot Point adjacent to the existing APCT berths. The MCF would provide a sheltered harbour capable of handling multiple cargos for both import and export. This development will comprise a harbour accommodating up to 12 Capesize berths, a 370ha reclamation area, access channel and manoeuvring area to a depth of -18m LAT and associated common user infrastructure to be constructed in the marine precinct west of the existing off-shore jetty and Coal Terminal.

This expansion would make the APCT the largest coal port in the world with seven coal terminals with a capacity of between 110 million and 170 million tonnes per year.

The proposed rail connection from to the APCT would connect to the expanded terminal. APCT has an existing rail station within the terminal.

5. Road Impact Analysis and Mitigation Measures

5.1 Performance Criteria

The impacts of the SGCP on the links, intersections and pavement mentioned in **Section** 4 have been analysed based on *GARID*. These guidelines state that if the development generated traffic volumes do not result in increases of greater than 5% of existing background traffic at intersections, links and ESA's, the impact is considered insignificant. However, the capacities of the links and intersections are also taken into account as an impact of more than 5% may also be considered insignificant when an intersection or road section is projected to operate within acceptable levels of service.

5.1.1 Performance Indicators

5.1.1.1 Link Performance

Two-lane, two-way rural roads provide one lane for use by traffic travelling in each direction, while overtaking of slower vehicles on these roads requires the use of the opposing traffic lane when sight distance and gaps in the opposing traffic stream permit. The analysis for links of this type has been undertaken on the basis of the *Guide to Traffic Management Part 3: Traffic Studies and Analysis*. These guidelines are based on the US *Highways Capacity Manual 2000* (TRB, 2000) which provides the levels of service (LOS) of two-lane highways as shown in **Table 5-1**.

Table 5-1 LOS Criteria for Two-lane Highways

LOS	Service Flow Rate (2-way)		Description
	pcu*/hr	pcu/day**	
A	490	3,270	LOS A represents the highest quality of traffic service, when motorists are able to travel at their desired speed. Overtaking demand is well below overtaking capacity and bunches of three or more vehicles are rare.
B	780	5,200	LOS B characterises traffic flow with slightly lower than desired speeds, the demand for overtaking to maintain desired speeds becomes significant.
C	1,190	7,940	LOS C describes a further increase in traffic flow resulting in increased bunch size and frequency of overtaking impediments. Traffic flow is still stable at this LOS, however it is susceptible to congestion due to turning traffic and slow moving vehicles.
D	1,830	12,200	LOS D describes unstable traffic flow. The two opposing traffic streams begin to operate separately at higher volumes as overtaking becomes extremely difficult. Mean bunch sizes of five to 10 vehicles are common. Turning vehicles and roadside distractions cause major shock waves in the traffic stream.
E	3,200	21,340	LOS E describes the capacity of the highway where the traffic flow makes overtaking virtually impossible and bunching becomes intense as slower vehicles and other interruptions are encountered. Operating conditions at capacity are unstable and difficult to predict.
F	> 3,200	>21,340	LOS F represents heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity and speeds are highly variable.

Source: Adapted from the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis
** pcu = passenger car units or equivalents*
*** assumes the peak hour represents 15% of daily traffic as referenced in GARID*

According to *GARID*, in rural areas, LOS C is considered the minimum standard, although DTMR may accept LOS D where weekend peaks are the defining event and occur on recreational routes.

5.1.1.2 Intersection Performance Indicators

For 'T'-intersections where the volumes of through traffic and turning traffic are relatively low, both 'without' and 'with' the project generated traffic, an analysis of the capacity of the intersection is considered unnecessary. If an intersection carries through volumes and cross volumes as shown in **Table 5-2**, the impact on the intersection is considered insignificant and high levels of service are expected to be maintained.

Table 5-2 Intersection Volumes Below Which Capacity Analysis is Unnecessary

Type of Road	Light Cross and Turning Volumes Maximum Design Hour Volumes (two-way vehicles per hour)		
Two-lane major road	400	500	650
Cross Road	250	200	100
Four Lane Major Road	1,000	1,500	2,000
Cross Road	100	50	25

Source: Adapted from the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis Table 6.1

5.2 Traffic Impact

5.2.1 Link Analysis

5.2.1.1 Impact Identification

The link impact assessment is provided in **Appendix C**.

The impact analysis indicates that an increase in daily traffic of more than 5% is expected to occur for the following road sections:

- Capricorn Highway, between the Alpha and the SGCP–
    - 12.8%increase in background 2013 traffic volumes;
    - 11.4%increase in background 2014 traffic volumes;
    - 9.5% increase in background 2016 traffic volumes;
    - 7.0% increase in background 2019 volumes; and
    - 5.4% increase in background 2029 volumes.
- Clermont-Alpha Road from Pioneer-Clydevale Road to Hobartville –
    - 8.3% increase in background 2014 traffic volumes; and
    - 11.5% increase in background 2016 traffic volumes.

All other assessed roads at all other assessment years are expected to experience insignificant impacts, as per DTMR's *GARID*.

Future year traffic volumes for the abovementioned road sections are shown in **Table 5-3**. Comparison of these future year traffic volumes against LOS criteria is provided in **Section 5.2.1.2**.

Table 5-3 Future Year Traffic Volumes with Project

Movement description	Future Year Volumes Without Project					Future Year Volumes With Project				
	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029
Capricorn Highway *(Alpha to SGCP)*										

Movement description	Future Year Volumes Without Project					Future Year Volumes With Project				
	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029
Two-way Daily Volume	410	420	440	480	590	470	474	486	516	624
Two-way Peak Hour Volume*	62	63	66	72	89	94	97	100	106	134
Clermont-Alpha Road *(Pioneer-Clydevale Rd to Hobartville)*										
Two-way Daily Volume	20	20	20	30	30	20	21	22	33	33
Two-way Peak Hour Volume*	3	3	3	5	5	3	4	5	8	8

**Approximately 15% of total daily traffic based on DTMR advice published in GARID.*

With regards to the cumulative traffic impacts from the Galilee Coal Project, Alpha Coal Project and Kevin's Corner, the impact analysis indicates that an increase in daily traffic of more than 5% is expected to occur for the road sections identified in **Table 5-4**. The Carmichael Coal Mine and Railway is not included in the cumulative assessment as no detailed traffic assessment is currently publicly available.

Table 5-4 Cumulative Future Year Traffic Volumes

Effected Road Section	Percentage Increase By Year				
	2013	2014	2016	2019	2029
16D: Capricorn Highway (West to East)					
SGCP to Infrastructure Corridor	74.9%	74.4%	63.6%	61.3%	56.2%
Infrastructure Corridor to Clermont-Alpha Rd	74.9%	74.4%	63.6%	61.3%	56.2%
16C: Capricorn Highway (West to East)					
Clermont-Alpha Rd to Willows Gemfields Rd	72.6%	72.2%	60.3%	58.9%	53.7%
Willows Gemfields Rd to Anakie-Sapphire Rd	67.1%	66.4%	54.0%	52.2%	47.1%
Anakie-Sapphire Rd to Tyson Rd	45.8%	45.3%	32.8%	31.4%	27.0%
Tyson Rd to Selma Rd	28.0%	27.6%	18.4%	17.3%	14.5%
Selma Rd to Gregory Hwy	12.1%	11.9%	7.4%	6.9%	5.7%
16B: Capricorn Highway (West to East)					
Gregory Hwy to Ensham Rd	10.5%	10.3%	6.4%	6.0%	<5%
Ensham Rd to Blackwater-Cooroorah Rd	14.8%	14.5%	9.1%	8.6%	7.1%
Blackwater-Cooroorah Rd to Arthur St	9.2%	9.0%	5.6%	5.2%	<5%
Arthur St to Fitzroy Development Rd	12.5%	12.3%	7.7%	7.3%	6.0%
Fitzroy Development Rd to Duaringa Connection Rd	12.0%	11.8%	7.4%	6.9%	5.7%
16C: Capricorn Highway (West to East)					
Start Point to Duaringa Connection Rd	12.2%	11.9%	7.5%	7.0%	5.8%
Leichhardt Hwy to End Point	11.1%	10.9%	6.8%	6.4%	5.2%
Powerstation Rd to Leichhardt Hwy	10.4%	10.2%	6.3%	5.9%	<5%
Kabra Rd to Powerstation Rd	8.6%	8.4%	5.2%	<5%	<5%

Effected Road Section	Percentage Increase By Year				
	2013	2014	2016	2019	2029
Kabra RdGavial-Gracemere Rd to	7.6%	7.5%	<5%	<5%	<5%
Gavial-Gracemere Rd to Bruce Hwy	<5%	<5%	<5%	<5%	<5%
552: Clermont-Alpha Road (South to North)					
Capricorn Hwy to Hobartville	59.5%	59.7%	54.8%	52.7%	46.7%
Hobartville to Pioneer-Clydevale Rd	82.6%	82.8%	77.6%	70.2%	70.2%
Pioneer-Clydevale Rd to Start Point	57.3%	57.6%	48.7%	49.2%	42.7%
End Point to Clermont Connection	15.1%	14.8%	10.4%	10.0%	8.3%

5.2.1.2 Level of Service

LOS for the Capricorn Highway and Clermont-Alpha Road was calculated based on a comparison of the future year volumes against the daily flow rate thresholds identified in **Table 5-1**. The critical flow rate across all assessed years was identified and then compared against the service flow rate definitions for each LOS category to determine likely future year performance. As identified in **Section 5.1.1.1**, *GARID* stipulates that a minimum LOS C should be provided.

A comparison of service flow with the expected future year traffic volumes (inclusive of Project traffic and cumulative impact traffic) is shown in **Table 5-5**.

Table 5-5 Comparison of Future Year Volumes with LOS

Road Section	Future Year Volumes with Project Only		Future Year Volumes with Project & Cumulative	
	Maximum Future Year Volume[1] pcu[2]/day	LOS[3]	Maximum Future Year Volume[4] pcu[2]/day	LOS[3]
16D: Capricorn Highway (West to East)				
SGCP to Infrastructure Corridor	470	A	1,698	A
Infrastructure Corridor to Clermont-Alpha Rd	470	A	1,698	A
16C: Capricorn Highway (West to East)				
Clermont-Alpha Rd to Willows Gemfields Rd	Insignificant Impact		1,213	A
Willows Gemfields Rd to Anakie-Sapphire Rd	Insignificant Impact		1,353	A
Anakie-Sapphire Rd to Tyson Rd	Insignificant Impact		2,223	A
Tyson Rd to Selma Rd	Insignificant Impact		3,973	B
Selma Rd to Gregory Hwy	Insignificant Impact		9,907	D
16B: Capricorn Highway (West to East)				
Gregory Hwy to Ensham Rd	Insignificant Impact		4,289	B
Ensham Rd to Blackwater-Cooroorah Rd	Insignificant Impact		3,009	A
Blackwater-Cooroorah Rd to Arthur St	Insignificant Impact		4,949	B
Arthur St to Fitzroy Development Rd	Insignificant Impact		3,569	B
Fitzroy Development Rd to Duaringa Connection Rd	Insignificant Impact		3,739	B

Road Section	Future Year Volumes with Project Only		Future Year Volumes with Project & Cumulative	
16C: Capricorn Highway (West to East)				
Start Point to Duaringa Connection Rd	Insignificant Impact		3,689	B
Leichhardt Hwy to End Point	Insignificant Impact		4,069	B
Powerstation Rd to Leichhardt Hwy	Insignificant Impact		4,359	B
Kabra Rd to Powerstation Rd	Insignificant Impact		5,299	C
Kabra RdGavial-Gracemere Rd to	Insignificant Impact		6,053	C
Gavial-Gracemere Rd to Bruce Hwy	Insignificant Impact		18,867	E
552: Clermont-Alpha Road (South to North)				
Capricorn Hwy to Hobartville	Insignificant Impact		208	A
Hobartville to Pioneer-Clydevale Rd	22	A	72	A
Pioneer-Clydevale Rd to Start Point	Insignificant Impact		152	A
End Point to Clermont Connection	Insignificant Impact		612	A

(1)maximum project future year volume is taken from Table 5-3 and represents the critical year across the life of the project
(2)pcu = passenger car units or equivalents
(3) LOS is rated on the criteria presented in Table 5-1
(4)maximum cumulative future year volume is taken from Appendix C and represents the critical year across the life of the project
(5)maximum traffic volume for rural classified road sections of the segment

As demonstrated in **Table 5-5**, the maximum future year volumes on links with an increase of over 5% as a result of the Project on both the Capricorn Highway and Clermont-Alpha Road are expected to remain below the accepted daily volumes for a two-lane two-way highway with a LOS A. As such, a minimum LOS A is expected to be provided across all impacted road sections for the life of the Project.

Given the above, the future year volumes are considered acceptable and no upgrade works are warranted as a result of the SGCP.

With regards to the cumulative impact, the following road sections are expected to carry volumes above the acceptable daily volumes:

- Capricorn Highway (from Selma Rd to Gregory Hwy); and
- Capricorn Highway (from Gavial-Gracemere Rd to Bruce Hwy).

However, both of these links are expected to exceed the acceptable daily volumes for a two-lane two-way highway with a LOS C during the future year, before the addition of the project and cumulative project related traffic. All remaining impacted road sections will remain below the accepted daily volumes for a two-lane two-way highway with a LOS C which are also considered acceptable.

5.2.2 Intersection Impacts

Intersection impacts are identified when development generated traffic results in increases of greater than 5% of background traffic volumes for any movement. Under these circumstances, traffic flow has been compared against the turning flow criteria provided in **Section 5.1.1.2**.

5.2.2.1 Capricorn Highway / Clermont-Alpha Road / Shakespeare Street Intersection

The existing layout for the Capricorn Highway / Clermont-Alpha Road / Shakespeare Street intersection is shown in **Figure 5-1**.

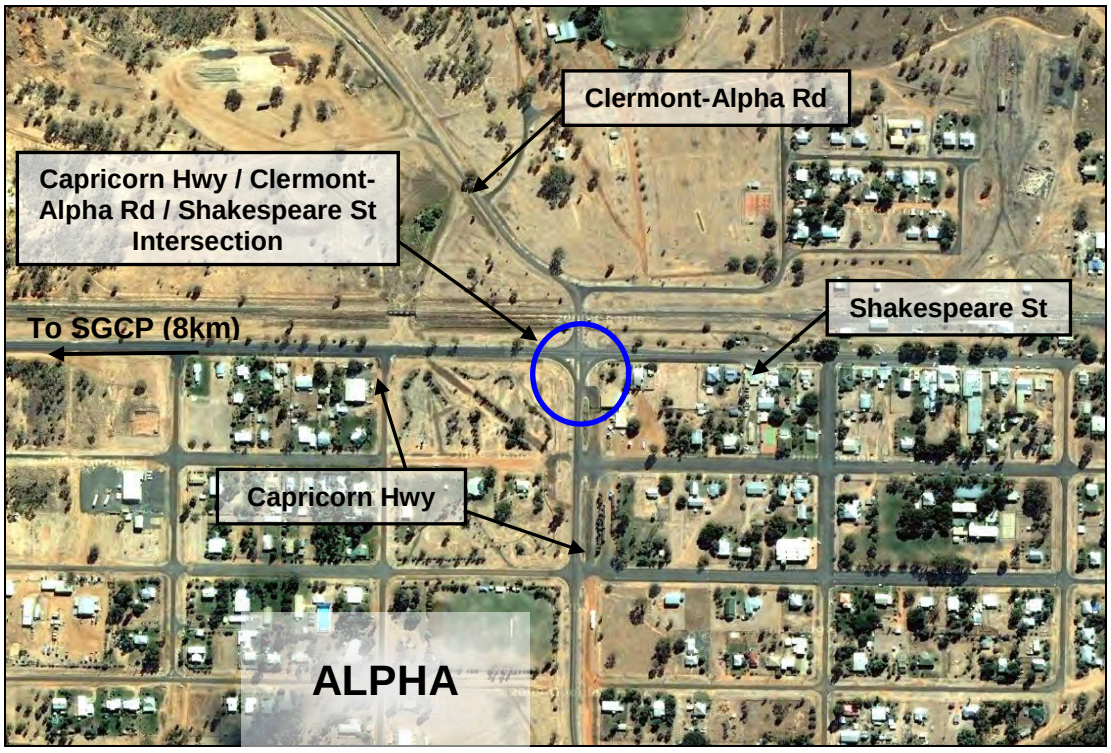


Figure 5-1 Capricorn Highway / Clermont-Alpha Road / Shakespeare Street – Existing Intersection Layout

The intersection impact identification is provided in **Appendix D**. The results of these analyses indicate that the Project is expected to increase background traffic for turning movements on all approaches by more than 5% for each of the assessed cases. This is due to the very light traffic volumes passing through the intersection in the base year.

The background traffic volumes at this intersection are currently very low and this is expected to continue well into the future, even with the presence of the Project. Austroads' *Guide to Traffic Management Part 3: Traffic Studies and Analysis* details warrants for identifying priority controlled intersections that operate under uninterrupted flow. Intersections which carry light crossing volumes and operate under uninterrupted flow do not require any flaring on the approaches. Based on the warrants provided in **Table 5-2**, the Capricorn Highway / Clermont-Alpha Road / Shakespeare Street intersection is expected to operate under uninterrupted flow conditions for all future years, up to and including the 10 year design horizon in 2029. The required layout is therefore a Basic Right Turn Treatment (BAR) / Basic Left Turn Treatment (BAL) which is the minimum intersection treatment required by DTMR's *RPDM* for safe operations.

The layout of the intersection has been compared with the standard accepted layouts in DTMR's *RPDM* to ensure that the junction can adequately and safely accommodate turn movements for all vehicle types expected to use the intersection.

The existing intersection configuration is consistent with the requirements of a BAR and BAL on a Two Lane Rural Road as specified in **Section 13.7.10.1** and **Section 13.7.13.2** of the

RPDM and is therefore considered suitable for accommodating traffic generated by the SGCP.

5.2.2.2 Capricorn Highway / SGCP Mine Access Road Intersection

The proposed location of the Capricorn Highway / SGCP Mine Access Road intersection is shown in **Figure 5-2** below.

The intersection impact identification is provided in **Appendix D**. Increases in traffic of greater than 5% occur for the turning movements to and from the east as the intersection currently does not exist.

The background traffic volumes at this location of the Capricorn Highway are currently very low and this is expected to continue well into the future, even with the presence of the SGCP. Based on the warrants provided in **Table 5-2**,the Capricorn Highway / SGCP Mine Access Road intersection is expected to operate under uninterrupted flow conditions for all future years, up to and including the design horizon at 2029. The required layout is therefore a Basic Right Turn Treatment (BAR) / Basic Left Turn Treatment (BAL) which is the minimum intersection treatment required by DTMR's *RPDM*.

However, given the SGCP will generate B-Doubles and oversized vehicles, it is recommended that an Auxiliary Right Turn treatment (AUR) and an Auxiliary Left Turn treatment (AUL) are provided at the Capricorn Highway / SGCP Mine Access Road intersection. The typical layouts for the AUR and AUL treatments are presented in **Figure 5-3**.

Figure 5-2 Capricorn Highway / SGCP Mine AccessRoad- Proposed Intersection Location

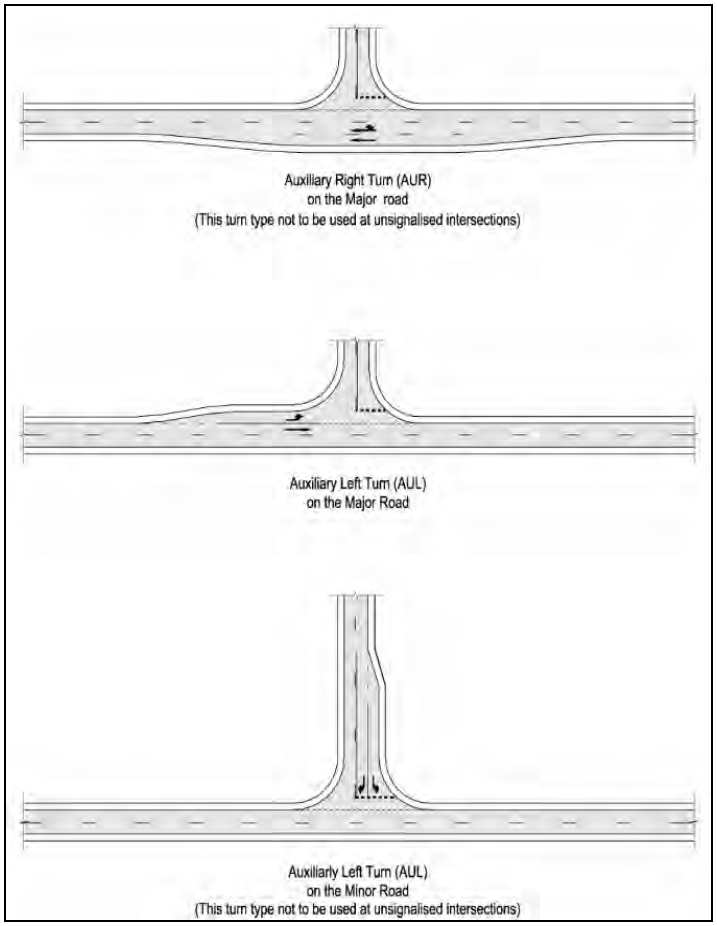


Figure 5-3 Recommended DTMR AUR and AUR Turn Treatment Layout

5.3 Pavement Impact

5.3.1 Maintenance Contribution

Operational maintenance is an ongoing annual cost to DTMR and developer payable maintenance contributions are typically triggered when an increase in background ESAs exceed 5% for any road section at each design year. For the purpose of calculating an increase in maintenance costs, it is assumed that the impacts are directly proportional to the increase in loading (ESAs) generated by development traffic. For example, if a development generates a 10% increase in the ESA loading, the annual increase in maintenance costs would be 10% of the annual maintenance costs.

The 5% trigger should be used with discretion as low volume roads may misleadingly report large 'impacts' from small increases in heavy vehicle activity. In these cases, consideration needs to be given to the construction design standard of the subject road section, and maintenance contributions need to be negotiated on a case by case basis between the development proponent and the relevant DTMR district.

The impact analysis indicates that an increase in ESA loadings of more than 5% occurs for the road sections as shown in **Table 5-6**.

Table 5-6 Significant ESA Loadings Increases

Road	Road Section	Direction	% Increase in ESA's			
			2014	2016	2019	2029
Capricorn Highway	From Anakie-Sapphire Road to Willows-Gemfields Road	Towards the SGCP	-	7%	-	-
Capricorn Highway	Willows-Gemfields Road to Clermont-Alpha Road	Towards the SGCP	6%	10%	-	-
Capricorn Highway	Clermont Alpha Road to SGCP proposed Rail Alignment	Towards the SGCP	8%	12%	-	-
Capricorn Highway	SGCP proposed Rail Alignment to Site Access	Towards the SGCP	8%	12%	-	-
Clermont-Alpha Road	Start Point to Pioneer-Clydevale Road	Towards the SGCP	13%	20%	8%	6%
Clermont-Alpha Road	Pioneer-Clydevale Road to Hobartville	Towards the SGCP	49%	72%	28%	22%
Clermont-Alpha Road	Pioneer-Clydevale Road to Hobartville	Away from the SGCP	-	6%	-	-
Clermont-Alpha Road	Hobartville to Capricorn	Towards the SGCP	7%	10%	-	-
Gregory Highway	HV Bypass to Springsure Start Point	Towards the SGCP	-	5%	-	-
Dawson Highway	Orion 10 Chn to Injune Turn Off	Towards the SGCP	-	5%	-	-
Dawson Highway	Injune Turn Off to Start Point	Towards the SGCP	9%	13%	5%	-
Carnarvon Highway	Maranoa Regional Council Boundary to Start Point	Towards the SGCP	-	5%	-	-

No BRC roads are expected to be impacted by the development as the haul routes use State-controlled roads and routes operated by AMCI within MLA 70453.

While the percentage increases appear to be significant, it is important to note that the impacted road sections currently carry low traffic volumes (i.e. less than 650 vehicles per day). As such, it is recommended that the required maintenance contributions for these road sections be negotiated on a special case by case basis rather than the standard DTMR PIA methodology.

5.3.2 Rehabilitation Contribution

The 5% trigger used for maintenance contributions is also applicable to road rehabilitation contributions. The trigger is converted to time by assuming that the design life of a pavement section is 20 years. The trigger then becomes 1 year (i.e. 5% of 20 years = 1 year). Impacts are therefore considered insignificant when the reduced life of the pavement as a result of additional development generated traffic is calculated to be less than one year.

The pavement impact assessment shows that the Project is expected to bring forward the date of rehabilitation on the following road sections:

- Clermont-Alpha Road (towards the SGCP) for the section from the Start Point to Pioneer-Clydevale Road:

- reduced pavement life of 6.4% (i.e. 1.3 years).

- Clermont-Alpha Road (towards the SGCP) for the section from Pioneer-Clydevale Road to Hobartville:
  - reduced pavement life of 20% (i.e. 4years).

While the percentage increases appear to be significant, it is important to note that the impacted road sections currently carry low traffic volumes (i.e. less than 650 vehicles per day). As such, it is recommended that the rehabilitation contribution for these road sections be assessed on a special case basis rather than the standard DTMR PIA methodology.

5.4 Summary of Required Mitigation Measures

Based on the findings presented in **Section 5.2** and **Section 5.3**, the following mitigation works are required in order to mitigate potential impacts as a result of the SGCP:

- A Transport Management Plan should be developed and implemented for the SGCP prior to the commencement of construction.

Link Impact

- No mitigation works are required as part of the proposed SGCP.

Intersection Impacts

- Given that the SGCP will generate B-Doubles and over-sized vehicles, it is recommended that an Auxiliary Right Turn treatment (AUR) and an Auxiliary Left Turn treatment (AUL) are provided at the Capricorn Highway / SGCP Mine Access intersection.

- No mitigation works are required at the Capricorn Highway/Clermont-Alpha Road/Shakespeare Street intersection.

Pavement Impacts

- Due to the low traffic volumes (i.e. less than 650 vehicles per day) on the road sections that are expected to experience an increase in ESA's greater than 5%, it is recommended that the maintenance and rehabilitation contributions for these road sections be assessed on a special case basis rather than the standard methodology.

6. Other Impacts

6.1 Rail Network Impacts

During the construction phase, it is expected that the Project will generate a maximum of 9 trains per week (or an average of 5 trains per week) on the Central Line Railway currently operated by QR. The impact of this low volume of trips generated by the project is expected to be negligible on the level crossings along the Central Line Railway.

During the operation phase, rail transportation to and from the SGCP will utilise the common user rail line. The SGCP is expected to generate an average of 14 trains per week during the operations phase.

A summary of the estimated cumulative capacity required for the rail movements from the projects listed in Section 2.9 is presented in **Table 6-1**, based on the assumptions of a Trains payload of 12,402tonnes.

Table 6-1 Cumulative Rail Movement Generation of Other Significant Projects

	Alpha Coal Project (vpd)	Galilee Coal Project	Kevin's Corner	SGCP
Maximum annual Product Coal (Mtpa)	30	56	30	16
Annual # Trains Required	2,427	4,530	2,427	1,294
Weekly # Trains Required	47	87	47	25

The cumulative impact of the abovementioned projects would result in a total of 132 Megatonnes generated in the peak year. This would result in the need for the proposed Common User Rail Line to have such capacity.

A conclusive assessment of the adequacy of the existing rail network for the construction phase transport cannot be made, as information from QR was not forthcoming during the preparation of this report.

6.2 Airport Impacts

As a result of the requirements for FIFO workers of the Project, the number of air movements generated each week at the Alpha Aerodrome are shown in **Table 6-2**. These air movements are based on aircraft with a capacity of 115 persons, which would require an upgrade of the Alpha Aerodrome.

The peak number of employees (i.e. 1,600) is limited by the capacity of the on-site accommodation village. The number of employees in each assessment year is specified in **Table 2-3**. The proportions of employees travelling to each region were provided by AMCI.

Table 6-2 Project Generated Air Movements

FIFO Air Movements Generated per Week	2013 / 2014 (Construction)	2016 (Stage 1 Operation and Construction)	2019 (First year of Stage 3Operations)	2029 (Future Year Operations)
SEQ	9	3	7	7
Townsville	3	1	2	2
Cairns	2	1	2	2
Bundaberg	1	1	1	1
Maryborough	1	1	1	1
Proserpine / Mackay / Bowen	1	1	1	1
TOTAL	**17air movements**	**8air movements**	**14air movements**	**14air movements**

The low volume of air movements generated by the project is not expected to result in adverse impacts at the Alpha Aerodrome. The EIS for both the Alpha Coal Project and Galilee Coal Project did not provide information on the number of air movements expected to be generated by the developments.

Notwithstanding, a summary of the estimated cumulative air movements from the projects listed in Section 2.9 is presented in **Table 6-3**.

Table 6-3 Cumulative Air Movement Generation per week of Other Significant Projects

FIFO Air Movements Generated per Week*	Alpha Coal Project (vpd)		Galilee Coal Project		Kevin's Corner	
	Construct Phase	Operations Phase	Construct Phase	Operations Phase	Construct Phase	Operations Phase
SEQ	11	6	14	11	14	11
Townsville	3	2	4	3	4	3
Cairns	2	1	3	2	3	2
Bundaberg	1	1	2	1	2	1
Maryborough	1	1	2	1	2	1
Proserpine / Mackay / Bowen	1	1	2	1	2	1
TOTAL	**19**	**12**	**27**	**19**	**27**	**19**

*Assumptions based on workforce data provided in EIS for each cumulative impact project.

The cumulative impact of the abovementioned projects would result in a total of 90 air movements generated per week during peak construction of each project and 64 movements per week during peak operations of each project. This equates to approximately 13 and 9 air movements per day respectively. The upgraded airport is considered adequate to handle this volume of air movements.

6.3 Port Impacts

Provisional product coal volumes for selected years are shown in **Table 6-4**. This coal will be railed to the APCT for export.

The proposed expansion of the APCT is expected to provide sufficient capacity to process the proposed SGCP product coal. The additional coal generated by the SGCP, Alpha Coal Project and the Galilee Coal Project are also expected to be adequately catered for, as they are included within the EIS for the expansion of the APCT.

Table 6-4 SGCP Product Coal

Tonnes of Product Coal per annum	2014 (Construction)	2016 (Stage 1Operation and Construction)	2019 (First year of Stage 3Operation Phase)	2029 (Future Year Operations)
Product Coal from SGCP to APCT	-	5,420,000 tonnes	12,990,000 tonnes	15,540,000 tonnes

6.4 Environmental Impacts

Impacts of transport associated with the SGCP on amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental impacts are discussed in the relevant sections of the EIS.

7. Conclusions

The proposed SGCP is a new coal mine to be operated by AMCI. It is located within the area controlled by BRC and is located approximately 8km west of the township of Alpha, approximately 170km west of Emerald. The Project includes both open cut and underground mining operations.

The Transport Assessment for the Project has been completed in accordance with the *Guidelines for Assessment of Road Impacts of Development* (DTMR, 2006).This has included the assessment of traffic and pavement impacts. Key findings and conclusions from this assessment are summarised below.

7.1 Traffic Generation

The estimated daily traffic generation resulting from the Project is for each of the assessment years is presented in **Table 7-1**.

Table 7-1 Estimated Project Daily Traffic Generation Volumes

Assessment Year	Project Personnel Vehicle Trips (vte)		Visitor Trips by Private Vehicle (vte)	Heavy Vehicle Mine Input Deliveries (vte)
	Private Vehicle Movements from Alpha	FIFO Bus Movements		
2013	14	4	18	24
2014	14	4	18	18
2016	6	2	18	20
2019	10	4	18	4
2029	10	4	18	2

7.2 Road Link Impact

As presented in **Section 5.2.1**, the only sections of the proposed haulage routes which are expected to exhibit increases in link volume greater than 5% as a result of the Project are:

- Capricorn Highway, between the Alpha and SGCP–
    - 12.8%increase in background 2013 traffic volumes;
    - 11.4%increase in background 2014 traffic volumes;
    - 9.5% increase in background 2016 traffic volumes;
    - 7.0% increase in background 2019 volumes; and
    - 5.4% increase in background 2029 volumes.
- Clermont-Alpha Road from Pioneer-Clydevale Road to Hobartville –
    - 8.3% increase in background 2014 traffic volumes; and

- 11.5% increase in background 2016 traffic volumes.

Theoretical link capacities for the abovementioned sections are not exceeded for any of the assessed design horizons, and as such, development generated volumes are expected to be accommodated by the existing road form.

As such, the Project is not expected to have an adverse impact on the future year daily operations of the proposed haul routes.

7.3 Intersection Impact

The intersection impact analysis found that no upgrades are required to the Capricorn Highway / Clermont-Alpha Road / Shakespeare Street intersection.

However, given the SGCP will generate B-Doubles and oversized vehicles, it is recommended that an Auxiliary Right Turn treatment (AUR) and an Auxiliary Left Turn treatment (AUL) are provided at the Highway / SGCP Mine Access Road intersection.

7.4 Pavement Impact

Due to the low traffic volumes (i.e. less than 650 vehicles per day) on the road sections that are expected to experience an increase in ESA's greater than 5%, it is recommended that the maintenance and rehabilitation contributions for these road sections be assessed on a special case basis rather than the standard methodology.

Maintenance and rehabilitation contributions are not required on any Council controlled roads.

7.5 Other Impacts

The Project is expected to generate up to a maximum of 9 train movements per week during construction in 2013 on the existing QR Central Line Railway. Following the completion of a common user rail line connecting the Galilee Basin to the APCT, the Project is expected to generate a maximum of 14 train movements per week in the operations phase.

The FIFO component of the workforce for the Project is expected to generate an additional 17 flights per week in 2014, 8 flights per week in 2016 and 14 flights per week in 2019 and 2029. These movements, along with movements generated by surrounding significant projects will result in the need to upgrade the Alpha Aerodrome.

Once agreed upon, the payment can be made by a single up-front payment based on the 'present value of costs' or annual payments, which would be subject to DTMR agreement.

Due to the proposed upgrade of the APCT, the movement of coal generated by the Project is not expected to result in any adverse impacts.

7.6 Cumulative Impact

Details of the other significant projects in the area are provided in **Section2.9**.

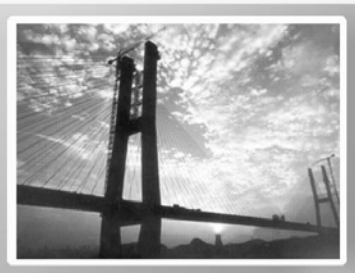
With regards to the cumulative traffic impacts of the proposed SGCP and proposed surrounding significant projects, as presented in **Section 5.2.1,** the following two road sections are expected to carry volumes above the acceptable daily limits:

- Capricorn Highway (from Selma Rd to Gregory Hwy); and
- Capricorn Highway (from Gavial-Gracemere Rd to Bruce Hwy).

However, both of these links are expected to exceed the acceptable daily volumes for a two-lane two-way highway with a LOS C during the future year, before the addition of the project and cumulative project related traffic. All remaining impacted road sections will remain below the accepted daily volumes for a two-lane two-way highway with a LOS C which are also considered acceptable.

The cumulative impacts of the rail movements determine that the proposed Common User Rail Line will be required to have a capacity of 133Mtpa.

The impact of the cumulative projects on the air movements at the Alpha Aerodrome are expected to be within the capacity of the proposed upgrades to the Aerodrome.

Appendices

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Appendix A: Glossary of Terms

AADT	Annual Average Daily Traffic is a common measure of traffic volume equivalent to the total volume of traffic passing a roadside observation point over the period of one year, divided by the number of days in the year.
Background Traffic	Background traffic is the traffic condition that arises under a "no development" scenario.
Equivalent Standard Axles(ESA's)	Equivalent Standard Axles (ESA) is a measure defining the cumulative damaging effect to pavements by design traffic. It is expressed in terms of the equivalent number of 80kN axles passing over the pavement up to the design horizon.
Intersection Impact	An intersection impact is the impact that a proposed development may have at an intersection due to an increase in traffic volumes. The Guidelines for Assessment of Road Impacts of Development (DTMR, 2006) states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5% of existing background traffic volumes for any left, through or right turn movement.
Level of Service (LOS)	Level of Services (LOS) is a qualitative measure describing operational conditions within a traffic stream and the perception of these by motorists. LOS measures from A to F, with definitions as follows: LOS A – This is the highest measure of LOS. It is a condition of free flow and individual drivers are virtually unaffected by others in the traffic stream; LOS B – This level is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream; LOS C – Most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic

stream;

LOS D – This level is close to the limit of stable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre in the traffic stream;

LOS E – This occurs when traffic volumes are at or close to capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream may lead to a traffic jam; and

LOS F – This service level is in the zone of forced flow. Flow breakdowns occur and queuing and delays result.

Link Impact

A link impact is the impact that a proposed development may have on a section of roadway due to an increase in traffic volumes. The Guidelines for Assessment of Road Impacts of Development (DTMR, 2006) states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5% of existing AADT.

Pavement Impact

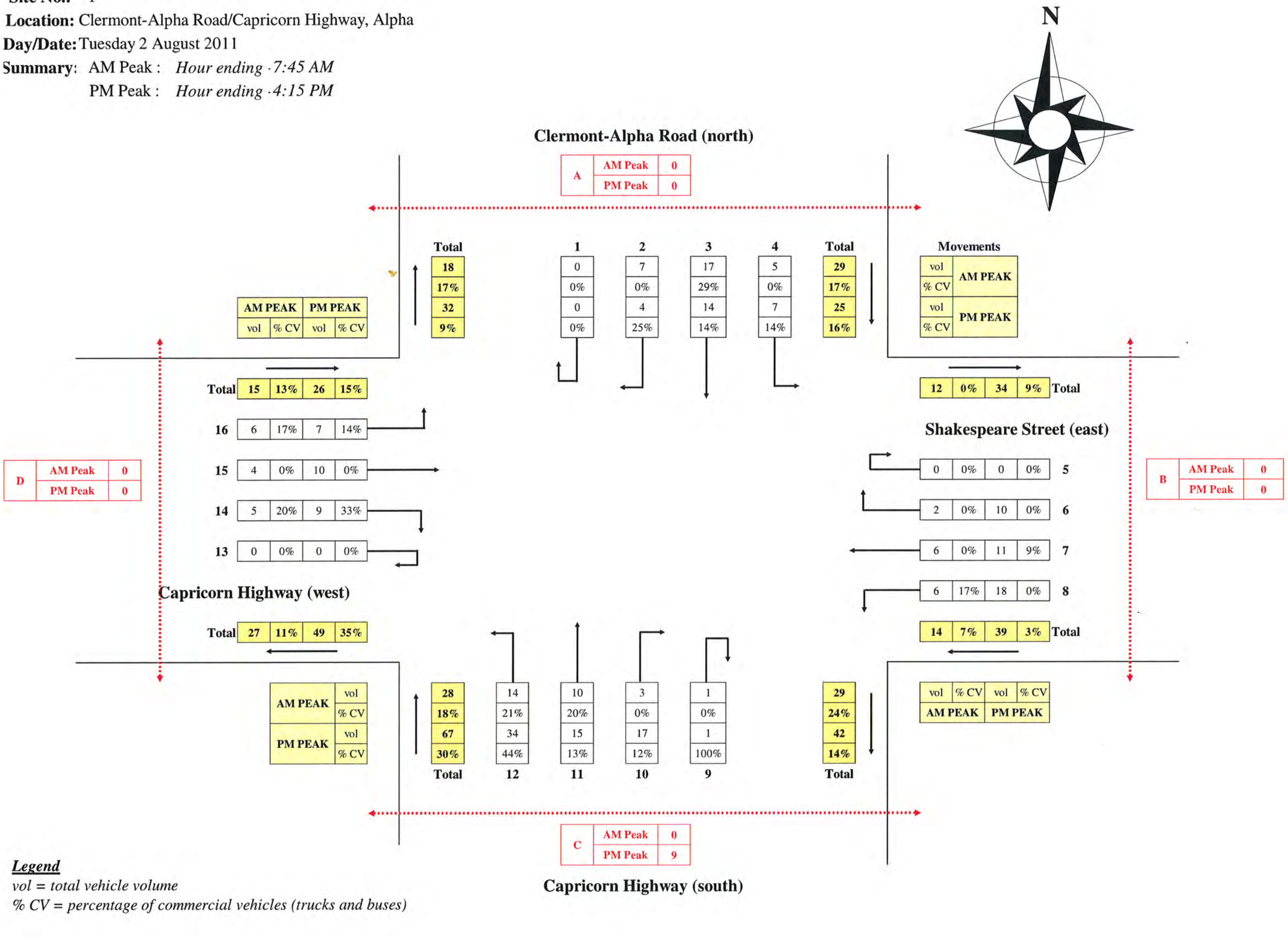
A pavement impact is the impact that a proposed development may have on a section of pavement due to an increase in ESA's. The Guidelines for Assessment of Road Impacts of Development (DTMR, 2006) states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5% of existing ESA's.

Pavement Rehabilitation	Pavement rehabilitation involves the group of activities that restore the structural capacity and condition of the carriageway, without altering the geometric standards. Pavements are designed to withstand a number of repeated standard axles, or ESA's. Increases in heavy vehicle traffic raise the rate at which the number of these repetitions is applied to the pavement, and the design life of the pavement in years is therefore reduced. Once the design life is reached, rehabilitation should occur to extend the operating life of the pavement.
SIDRA	Signalised & Unsignalised Intersection Design and Research Aid is a software package that is used by traffic engineers to determine the performance of intersections.
Trip Ends	A one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to/from a land use is counted as two trip ends.
Warrant	A warrant is the guideline or standard which is applicable to the assessment.

Appendix B: Intersection Survey

AUSTRAFFIC MANUAL INTERSECTION COUNT

Site No.: 1
Location: Clermont-Alpha Road/Capricorn Highway, Alpha
Day/Date: Tuesday 2 August 2011
Summary: AM Peak : *Hour ending -7:45 AM*
PM Peak : *Hour ending -4:15 PM*



Legend
vol = total vehicle volume
% CV = percentage of commercial vehicles (trucks and buses)

Appendix C: Link Impact Assessment

Road	Section	2010	Without Development Traffic Vol.					With Development Traffic Vol.					% Increase in Background Traffic				
			2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029
Bruce Highway	Gladstone-Mt Larcom to Bajool-Pt Alma Rd	5567	6070	6240	6570	7070	8740	1	3	4	1	1	0.0%	0.0%	0.1%	0.0%	0.0%
	Bajool-Pt. Alma Rd to Gavial-Gracemere Rd	5869	6400	6570	6930	7450	9210	1	3	4	1	1	0.0%	0.0%	0.1%	0.0%	0.0%
	Gavial-Gracemere Rd to Burnett Hwy	5614	6120	6290	6620	7130	8810	1	3	4	1	1	0.0%	0.0%	0.1%	0.0%	0.0%
	Burnett Hwy to Capricorn Hwy	8337	9090	9340	9840	10590	13090	1	3	4	1	1	0.0%	0.0%	0.0%	0.0%	0.0%
Capricorn Highway	Bruce Hwy to Gavial-Gracemere Rd	15741	17160	17630	18570	19990	24710	1	3	4	1	1	0.0%	0.0%	0.0%	0.0%	0.0%
	Gavial-Gracemere Rd to Kabra Rd	4891	5330	5480	5770	6210	7680	1	3	4	1	1	0.0%	0.0%	0.1%	0.0%	0.0%
	Kabra Rd to Powerstation Rd	4253	4640	4760	5020	5400	6680	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Powerstation Rd to Leichhardt Hwy	3455	3770	3870	4080	4390	5420	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Leichhardt Hwy to End Point	3216	3510	3600	3790	4080	5050	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Start Point to Duaringa Connection Rd	2892	3150	3240	3410	3670	4540	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Duaringa Connection Rd to Fitzroy Development Rd	2935	3200	3290	3460	3730	4610	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Fitzroy Development Rd to Arthur St	2786	3040	3120	3290	3540	4370	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Arthur St to Blackwater-Cooroorah Rd	3959	4320	4430	4670	5030	6220	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Blackwater-Cooroorah Rd to Ensham Rd	2316	2520	2590	2730	2940	3640	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Ensham Rd to Gregory Hwy	3396	3700	3800	4010	4310	5330	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Gregory Hwy to Selma Rd	7769	8470	8700	9170	9870	12200	1	3	4	1	1	0.0%	0.0%	0.0%	0.0%	0.0%
	Selma Rd to Tyson Rd	2745	2990	3070	3240	3490	4310	1	3	4	1	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Tyson Rd to Anakie-Sapphire Rd	1263	1380	1410	1490	1600	1980	1	3	4	1	1	0.1%	0.2%	0.3%	0.1%	0.0%
	Anakie-Sapphire Rd to Willows Gemfields Rd	524	570	590	620	670	820	1	3	4	1	1	0.2%	0.5%	0.6%	0.2%	0.1%
	Willows Gemfields Rd to Clermont-Alpha Rd	403	440	450	480	510	630	1	3	4	1	1	0.2%	0.6%	0.8%	0.2%	0.1%
	Clermont-Alpha Rd to Jericho	377	410	420	440	480	590	60	54	46	36	34	12.8%	11.4%	9.5%	7.0%	5.4%
Gregory Highway	Capricorn Hwy to Mayfair Dr	6392	6970	7160	7540	8120	10040	2	5	7	2	1	0.0%	0.1%	0.1%	0.0%	0.0%
	Mayfair Dr to Airport Turn Off	3020	3290	3380	3560	3840	4740	2	5	7	2	1	0.1%	0.1%	0.2%	0.1%	0.0%
	Airport Turn Off to Glenorina Rd	1298	1410	1450	1530	1650	2040	2	5	7	2	1	0.1%	0.3%	0.4%	0.1%	0.0%
	Glenoria Rd to HV Bypass	1039	1130	1160	1230	1320	1630	2	5	7	2	1	0.2%	0.4%	0.5%	0.2%	0.1%
	HV Bypass to Springsure Start Point	1423	1550	1590	1680	1810	2230	2	5	7	2	1	0.1%	0.3%	0.4%	0.1%	0.0%
Dawson Highway	Springsure End Point to Comet St	1404	1530	1570	1660	1780	2200	2	5	7	2	1	0.1%	0.3%	0.4%	0.1%	0.0%
	Comet St to Wealwandeangie Rd	1541	1680	1730	1820	1960	2420	2	5	7	2	1	0.1%	0.3%	0.4%	0.1%	0.0%
	Wealwandangie Rd to Gap Ln	1027	1120	1150	1210	1300	1610	2	5	7	2	1	0.2%	0.4%	0.5%	0.2%	0.1%
	Gap Ln to Orion 10 Chn	658	720	740	780	840	1030	2	5	7	2	1	0.2%	0.6%	0.8%	0.2%	0.1%
	Orion 10 Chn to Injune Turn Off	597	650	670	700	760	940	2	5	7	2	1	0.3%	0.7%	0.9%	0.3%	0.1%
	Injune Turn Off to Start Point	631	690	710	740	800	990	2	5	7	2	1	0.3%	0.6%	0.9%	0.2%	0.1%
Carnarvon Highway	Dawson Hwy to Wyseby Rd	407	440	460	480	520	640	2	5	7	2	1	0.4%	1.0%	1.3%	0.4%	0.2%
	Wyseby Rd to Maranoa Regional Council Bdy	357	390	400	420	450	560	2	5	7	2	1	0.5%	1.1%	1.5%	0.4%	0.2%
	Maranoa Regional Council Bdy to Start Point	367	400	410	430	470	580	2	5	7	2	1	0.4%	1.1%	1.5%	0.4%	0.2%
	Start Point to Roma Taroom Rd	643	700	720	760	820	1010	2	5	7	2	1	0.3%	0.6%	0.8%	0.2%	0.1%
	Roma Taroom Rd to Start Point	1421	1550	1590	1680	1800	2230	2	5	7	2	1	0.1%	0.3%	0.4%	0.1%	0.0%
	Start Point to Bowen St	2128	2320	2380	2510	2700	3340	2	5	7	2	1	0.1%	0.2%	0.3%	0.1%	0.0%
Clermont - Alpha Road	Clermont Connection to End Point	472	510	530	560	600	740	1	2	3	1	0	0.1%	0.3%	0.5%	0.1%	0.1%
	Start Point to Pioneer-Clydevale Rd	81	90	90	100	100	130	1	2	3	1	0	0.8%	2.0%	2.5%	0.8%	0.3%
	Pioneer-Clydevale Rd to Hobartville	21	20	20	20	30	30	1	2	3	1	0	3.5%	8.3%	11.5%	2.6%	1.3%
	Hobartville to Capricorn	88	100	100	100	110	140	1	2	3	1	0	0.7%	1.8%	2.5%	0.7%	0.3%

Linear Growth Rate: 3%

	Traffic Generation - Heavy Vehicles				
	2013	2014	2016	2019	2029
Input	24	18	20	4	2
Off-site	15%	50%	65%	100%	100%

	Traffic Generation - Journey to Work				
	2013	2014	2016	2019	2029
Alpha	14	14	6	10	10
Airport	4	4	2	4	4

	Visito Trips Private Vehicles
Alpha	18
Airport	0

Route Choice (Heavy Vehicles) -->

Heavy Vehicle Input

Site to Brisbane	50% -->	Capricorn Highway from SGCP Access Road to Gregory Highway,
Site to Gladstone	30% -->	Capricorn Highway from SGCP Access Road to Bruce Highway
Site to Mackay	20% -->	Capricorn Highway from SGCP Access Road to Clermont-Alpha Road

Route Choice (Journey to Work) -->

Site to Alpha:	Capricorn Highway from Alpha to SGCP Access Road
Site to Airfield:	Capricorn Highway from Airfield Access Road to SGCP Access Road

Heavy Vehicle Output None

Note: Off-site refers to heavy vehicle movements that travel beyond the SGCP and rail alignment sites

Road	Section	2010	Without Development Traffic Vol.					Project Traffic Volumes					Project Traffic Volumes					% Increase in Background Traffic					Project + Cumulative Traffic Volumes					% Increase in Background Traffic					With Project + Cumulative Traffic Volumes				
			2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029	2013	2014	2016	2019	2029
Bruce Highway	Gladstone-Mt Larcom to Bajool-Pt Alma Rd	5567	6070	6240	6570	7070	8740	1	4	5	7	7	6071	6244	6575	7077	8747	0.0%	0.1%	0.1%	0.1%	0.1%	1	4	5	7	7	0.0%	0.1%	0.1%	0.1%	0.1%	6072	6247	6579	7084	8754
	Bajool-Pt Alma Rd to Gavial-Gracemere Rd	5869	6400	6570	6930	7450	9210	1	4	5	7	7	6401	6574	6935	7457	9217	0.0%	0.1%	0.1%	0.1%	0.1%	1	4	5	7	7	0.0%	0.1%	0.1%	0.1%	0.1%	6402	6577	6939	7464	9224
	Gavial-Gracemere Rd to Burnett Hwy	5614	6120	6290	6620	7130	8810	1	4	5	7	7	6121	6294	6625	7137	8817	0.0%	0.1%	0.1%	0.1%	0.1%	1	4	5	7	7	0.0%	0.1%	0.1%	0.1%	0.1%	6122	6297	6629	7144	8824
	Burnett Hwy to Capricorn Hwy	8337	9090	9340	9640	10590	13090	1	4	5	7	7	9091	9344	9645	10597	13097	0.0%	0.0%	0.0%	0.1%	0.1%	1	4	5	7	7	0.0%	0.0%	0.0%	0.1%	0.1%	9092	9347	9649	10604	13104
Capricorn Highway	Bruce Hwy to Gavial-Gracemere Rd	15741	17160	17630	18570	19990	24710	1	4	5	7	7	17161	17634	18575	19997	24717	0.0%	0.0%	0.0%	0.0%	0.0%	454	457	293	295	295	2.6%	2.5%	1.6%	1.5%	1.2%	17615	18090	18867	20292	25012
	Gavial-Gracemere Rd to Kabra Rd	4891	5330	5480	5770	6210	7680	1	4	5	7	7	5331	5484	5775	6217	7687	0.0%	0.1%	0.1%	0.1%	0.1%	454	457	293	295	295	7.9%	7.7%	4.8%	4.5%	3.7%	5785	5940	6067	6512	7982
	Kabra Rd to Powerstation Rd	4253	4640	4760	5020	5400	6680	1	4	5	7	7	4641	4764	5025	5407	6687	0.0%	0.1%	0.1%	0.1%	0.1%	454	457	293	295	295	8.9%	8.8%	5.5%	5.2%	4.2%	5095	5220	5317	5702	6982
	Powerstation Rd to Leichhardt Hwy	3455	3770	3870	4080	4390	5420	1	4	5	7	7	3771	3874	4085	4397	5427	0.0%	0.1%	0.1%	0.2%	0.1%	454	457	293	295	295	10.7%	10.6%	6.7%	6.3%	5.2%	4225	4330	4377	4692	5722
	Leichhardt Hwy to End Point	3216	3510	3600	3790	4080	5050	1	4	5	7	7	3511	3604	3795	4087	5057	0.0%	0.1%	0.1%	0.2%	0.1%	454	457	293	295	295	11.8%	11.3%	7.2%	6.7%	5.5%	3965	4060	4067	4382	5352
	Start Point to Duaringa Connection Rd	2892	3150	3240	3410	3670	4540	1	4	5	7	7	3151	3244	3415	3677	4547	0.0%	0.1%	0.1%	0.2%	0.2%	454	457	293	295	295	12.6%	12.4%	7.9%	7.4%	6.1%	3605	3700	3707	3972	4842
	Duaringa Connection Rd to Fitzroy Development Rd	2935	3200	3290	3460	3730	4610	1	4	5	7	7	3201	3294	3465	3737	4617	0.0%	0.1%	0.1%	0.2%	0.2%	454	457	293	295	295	12.4%	12.2%	7.8%	7.3%	6.0%	3655	3750	3757	4032	4912
	Fitzroy Development Rd to Arthur St	2786	3040	3120	3290	3540	4370	1	4	5	7	7	3041	3124	3295	3547	4377	0.0%	0.1%	0.1%	0.2%	0.2%	454	457	293	295	295	13.0%	12.8%	8.2%	7.7%	6.3%	3495	3580	3587	3842	4672
	Arthur St to Blackwater-Cooroorah Rd	3959	4320	4430	4670	5030	6220	1	4	5	7	7	4321	4434	4675	5037	6227	0.0%	0.1%	0.1%	0.1%	0.1%	454	457	293	295	295	9.5%	9.3%	5.9%	5.5%	4.5%	4775	4890	4967	5332	6522
	Blackwater-Cooroorah Rd to Ensham Rd	2316	2520	2590	2730	2940	3640	1	4	5	7	7	2521	2594	2735	2947	3647	0.0%	0.1%	0.2%	0.2%	0.2%	454	457	293	295	295	15.3%	15.0%	9.7%	9.1%	7.5%	2975	3050	3027	3242	3942
	Ensham Rd to Gregory Hwy	3396	3700	3800	4010	4310	5330	1	4	5	7	7	3701	3804	4015	4317	5337	0.0%	0.1%	0.1%	0.2%	0.1%	454	457	293	295	295	10.9%	10.7%	6.8%	6.4%	5.2%	4155	4260	4307	4612	5632
	Gregory Hwy to Selma Rd	7769	8470	8700	9170	9870	12200	1	4	5	7	7	8471	8704	9175	9877	12207	0.0%	0.0%	0.1%	0.1%	0.1%	454	457	293	295	295	5.1%	5.0%	3.1%	2.9%	2.4%	8925	9160	9467	10172	12502
	Selma Rd to Tyson Rd	2745	2990	3070	3240	3490	4310	1	4	5	7	7	2991	3074	3245	3497	4317	0.0%	0.1%	0.1%	0.2%	0.2%	454	457	293	295	295	13.2%	12.9%	8.3%	7.8%	6.4%	3445	3530	3537	3792	4612
	Tyson Rd to Anakie-Sapphire Rd	1263	1380	1410	1490	1600	1980	1	4	5	7	7	1381	1414	1495	1607	1987	0.1%	0.3%	0.3%	0.4%	0.4%	454	457	293	295	295	24.8%	24.5%	16.4%	15.6%	13.0%	1835	1870	1787	1902	2282
	Anakie-Sapphire Rd to Willows Gemfields Rd	524	570	590	620	670	820	1	4	5	7	7	571	594	625	677	827	0.2%	0.6%	0.7%	1.1%	0.9%	454	457	293	295	295	44.3%	43.6%	32.1%	30.8%	26.5%	1025	1050	917	972	1122
	Willows Gemfields Rd to Clermont-Alpha Rd	403	440	450	480	510	630	1	4	5	7	7	441	454	485	517	637	0.2%	0.8%	1.0%	1.4%	1.1%	454	457	293	295	295	50.8%	50.4%	37.9%	36.7%	31.9%	895	910	777	812	932
	Clermont-Alpha Rd to Jericho	377	410	420	440	480	590	60	54	46	36	34	470	474	486	516	624	12.8%	11.4%	9.5%	7.0%	5.4%	1228	1218	1210	1200	1198	75.6%	74.4%	73.3%	71.4%	67.0%	1698	1692	1696	1716	1822
Gregory Highway	Capricorn Hwy to Mayfair Dr	6392	6970	7160	7540	8120	10040	2	6	8	12	12	6972	7166	7548	8132	10052	0.0%	0.1%	0.1%	0.1%	0.1%	2	6	8	12	12	0.0%	0.1%	0.1%	0.1%	0.1%	6974	7172	7556	8144	10064
	Mayfair Dr to Airport Turn Off	3020	3290	3380	3560	3840	4740	2	6	8	12	12	3292	3386	3568	3852	4752	0.1%	0.2%	0.2%	0.3%	0.3%	2	6	8	12	12	0.1%	0.2%	0.2%	0.3%	0.3%	3294	3392	3576	3864	4764
	Airport Turn Off to Glenorina Rd	1298	1410	1450	1530	1650	2040	2	6	8	12	12	1412	1456	1538	1662	2052	0.1%	0.4%	0.5%	0.7%	0.6%	2	6	8	12	12	0.1%	0.4%	0.5%	0.7%	0.6%	1414	1462	1546	1674	2064
	Glenoria Rd to HV Bypass	1039	1130	1160	1230	1320	1630	2	6	8	12	12	1132	1166	1238	1332	1642	0.2%	0.5%	0.6%	0.9%	0.7%	2	6	8	12	12	0.2%	0.5%	0.6%	0.9%	0.7%	1134	1172	1246	1344	1654
	HV Bypass to Springsura Start Point	1423	1550	1590	1680	1810	2230	2	6	8	12	12	1552	1596	1688	1822	2242	0.1%	0.4%	0.5%	0.7%	0.5%	2	6	8	12	12	0.1%	0.4%	0.5%	0.7%	0.5%	1554	1602	1696	1834	2254
Dawson Highway	Springsura End Point to Comet St	1404	1530	1570	1660	1780	2200	2	6	8	12	12	1532	1576	1668	1792	2212	0.1%	0.4%	0.5%	0.7%	0.5%	2	6	8	12	12	0.1%	0.4%	0.5%	0.7%	0.5%	1534	1582	1676	1804	2224
	Comet St to Wealwandangie Rd	1541	1680	1730	1820	1960	2420	2	6	8	12	12	1682	1736	1828	1972	2432	0.1%	0.3%	0.4%	0.6%	0.5%	2	6	8	12	12	0.1%	0.3%	0.4%	0.6%	0.5%	1684	1742	1836	1984	2444
	Wealwandangie Rd to Gap Ln	1027	1120	1150	1210	1300	1610	2	6	8	12	12	1122	1156	1218	1312	1622	0.2%	0.5%	0.6%	0.9%	0.7%	2	6	8	12	12	0.2%	0.5%	0.6%	0.9%	0.7%	1124	1162	1226	1324	1634
	Gap Ln to Orion 10 Chn	658	720	740	780	840	1030	2	6	8	12	12	722	746	788	852	1042	0.2%	0.8%	1.0%	1.4%	1.2%	2	6	8	12	12	0.2%	0.8%	1.0%	1.4%	1.2%	724	752	796	864	1054
	Orion 10 Chn to Injune Turn Off	597	650	670	700	760	940	2	6	8	12	12	652	676	708	772	952	0.3%	0.9%	1.1%	1.8%	1.3%	2	6	8	12	12	0.3%	0.9%	1.1%	1.6%	1.3%	654	682	716	784	964
	Injune Turn Off to Start Point	631	690	710	740	800	990	2	6	8	12	12	692	716	748	812	1002	0.3%	0.8%	1.0%	1.5%	1.2%	2	6	8	12	12	0.3%	0.8%	1.0%	1.5%	1.2%	694	722	756	824	1014
Carnarvon Highway	Dawson Hwy to Wyseby Rd	407	440	460	480	520	640	2	6	8	12	12	442	466	488	532	652	0.4%	1.3%	1.6%	2.3%	1.8%	2	6	8	12	12	0.4%	1.3%	1.6%	2.3%	1.8%	444	472	496	544	664
	Wyseby Rd to Maranoa Regional Council Bdy	357	390	400	420	450	560	2	6	8	12	12	392	406	428	462	572	0.5%	1.5%	1.8%	2.6%	2.1%	2	6	8	12	12	0.5%	1.5%	1.8%	2.6%	2.1%	394	412	436	474	584
	Maranoa Regional Council Bdy to Start Point	367	400	410	430	470	580	2	6	8	12	12	402	416	438	482	592	0.4%	1.4%	1.8%	2.5%	2.0%	2	6	8	12	12	0.4%	1.4%	1.8%	2.5%	2.0%	404	422	446	494	604
	Start Point to Roma Taroom Rd	643	700	720	760	820	1010	2	6	8	12	12	702	726	768	832	1022	0.3%	0.8%	1.0%	1.4%	1.2%	2	6	8	12	12	0.3%	0.8%	1.0%	1.4%	1.2%	704	732	776	844	1034
	Roma Taroom Rd to Start Point	1421	1550	1590	1680	1800	2230	2	6	8	12	12	1552	1596	1688	1812	2242	0.1%	0.4%	0.5%	0.7%	0.5%	2	6	8	12	12	0.1%	0.4%	0.5%	0.7%	0.5%	1554	1602	1696	1824	2254
	Start Point to Bowen St	2128	2320	2380	2510	2700	3340	2	6	8	12	12	2322	2386	2518	2712	3352	0.1%	0.3%	0.3%	0.4%	0.4%	2	6	8	12	12	0.1%	0.3%	0.3%	0.4%	0.4%	2324	2392	2526	2724	3364
Clermont - Alpha Road	Clermont Connection to End Point	472	510	530	560	600	740	1	2	3	5	5	511	532	563	605	745	0.1%	0.5%	0.6%	0.8%	0.6%	91	92	65	67	67	15.1%	14.8%	10.4%	10.0%	8.3%	601	625	628	672	812
	Start Point to Pioneer-Clydevale Rd	81	90	90	100	100	130	1	2	3	5	5	91	92	103	105	135	0.6%	2.6%	3.0%	4.6%	3.6%	121	122	95	97	97	57.3%	57.6%	48.7%	49.2%	42.7%	211	215	198	202	232
	Pioneer-Clydevale Rd to Hobartville	21	20	20	20	30	30	1	2	3	1	0	21	22	23	31	30	3.5%	8.3%	11.5%	2.6%	1.3%	95	96	69	67	66	82.6%	82.7%	77.4%	69.0%	68.9%	115	118	91	98	97
	Hobartville to Capricorn	88	100	100	100	110	140	1	2	3	5	5	101	102	103	115	145	0.7%	2.3%	3.0%	4.2%	3.3%	147	148	121	123	123	59.5%	59.7%	54.8%	52.7%	46.7%	247	251	224	238	268

Linear Growth Rate: 3%

Traffic Generation - Heavy Vehicles

	2013	2014	2016	2019	2029
Input	24	18	20	4	2
Off-site	15%	50%	65%	100%	100%

Traffic Generation - Journey to Work

	2013	2014	2016					2019	2029
Alpha	14	14	6					10	10
Airport	4	4	2					4	4

Visito Trips

Private Vehicles	
Alpha	18
Airport	0

Cumulative Traffic Generation

		ACP	GCP		KC
			Construction	Operation	
Clermont-Alpha Rd	Alpha-Hobartville	59	73	45	14
	Hobartville-Clermont	3	73	45	14
Capricorn Hwy	Alpha-Emerald	36	435	270	44
	Emerald-Rockhampto	0	435	270	18
	Alpha-Jericho	4	1160	720	4

Alpha Coal Project (ACP) traffic is for peak operation in 2017, however it is assumed this traffic generation occurs for each of the assessment years
Galilee Coal Project (GCP) construction traffic is assumed to occur betwee 2013 & 2014 while operational traffic occurs in 2016, 2019 & 2029

Heavy Vehicle Input

Route Choice (Heavy Vehicles) -->

Site to Brisbane	50% -->	Capricorn Highway from SGCP Access Road to Bruce Highway	
Site to Gladstone	30% -->	Capricorn Highway from SGCP Access Road to Bruce Highway	
Site to Mackay	20% -->	Capricorn Highway from SGCP Access Road to Clermont-Alpha Road	

Route Choice (Journey to Work) -->

Site to Alpha:	Capricorn Highway from Alpha to SGCP Access Road
Site to Airfield:	Capricorn Highway from Airfield Access Road to SGCP Access Road

Heavy Vehicle Output None

Note: Off-site refers to heavy vehicle movements that travel beyond the SGCP and rail alignment sites

Appendix D: Intersection Impact Assessment

CAPRICORN HIGHWAY / CLERMONT-ALPHA ROAD / SHAKESPEARE STREET INTERSECTION

BACKGROUND TRAFFIC												
	Cap'orn Hwy (S)			Sha'peare St (E)			Cle-Alpha Rd (N)			Cap'orn Hwy (W)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak												
2013	15	11	4	7	7	2	5	19	8	7	4	5
2014	16	11	5	7	7	2	6	19	8	7	5	6
2016	17	12	5	7	7	2	6	20	8	7	5	6
2019	18	13	5	8	8	3	7	22	9	8	5	7
2029	25	18	7	11	11	4	9	30	12	11	7	9
PM Peak												
2013	37	16	20	20	12	11	8	15	4	8	11	10
2014	38	17	20	20	12	11	8	16	5	8	11	10
2016	41	18	21	21	13	12	8	17	5	8	12	11
2019	44	20	23	23	14	13	9	18	5	9	13	12
2029	60	26	32	32	19	18	12	25	7	12	18	16

WITH DEVELOPMENT TRAFFIC												
	Cap'orn Hwy (S)			Sha'peare St (E)			Cle-Alpha Rd (N)			Cap'orn Hwy (W)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak												
2013	35	11	4	6	8	2	5	18	8	8	6	7
2014	36	11	4	7	8	2	5	19	9	8	6	8
2016	37	12	5	7	8	2	6	20	9	8	5	9
2019	38	13	5	8	9	3	6	22	10	8	6	8
2029	43	17	7	10	11	3	9	29	13	11	8	10
PM Peak												
2013	38	16	19	19	13	11	7	15	5	8	12	30
2014	40	16	20	20	13	11	8	15	6	9	12	32
2016	43	17	21	21	14	12	8	16	6	9	12	32
2019	45	19	23	23	15	13	9	18	6	10	14	31
2029	59	26	31	31	20	17	12	24	7	13	18	35

% INCREASE												
	Cap'orn Hwy (S)			Sha'peare St (E)			Cle-Alpha Rd (N)			Cap'orn Hwy (W)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak												
2013	133%	0%	0%	-14%	14%	0%	0%	-5%	0%	14%	50%	40%
2014	125%	0%	-20%	0%	14%	0%	-17%	0%	13%	14%	20%	33%
2016	118%	0%	0%	0%	14%	0%	0%	0%	13%	14%	0%	50%
2019	111%	0%	0%	0%	13%	0%	-14%	0%	11%	0%	20%	14%
2029	72%	-6%	0%	-9%	0%	-25%	0%	-3%	8%	0%	14%	11%
PM Peak												
2013	3%	0%	-5%	-5%	8%	0%	-13%	0%	25%	0%	9%	200%
2014	5%	-6%	0%	0%	8%	0%	0%	-6%	20%	13%	9%	220%
2016	5%	-6%	0%	0%	8%	0%	0%	-6%	20%	13%	0%	191%
2019	2%	-5%	0%	0%	7%	0%	0%	0%	20%	11%	8%	158%
2029	-2%	0%	-3%	-3%	5%	-6%	0%	-4%	0%	8%	0%	119%

Sourced from GARID: Table 13.4 - Intersection Capacity - Uninterrupted Flow Conditons

Major Road Types [1]	Major Road Flow (vph) [2]		Minor Road Flow (vph) [3]
2 Lane	400		250
	500		200
	650		100
4 Lane	1000		100
	1500		50
	2000		25

Notes:
1. Major Road is through road i.e. has priority
2. Major road design volumes include through and turning movements
3. Minor Road design volumes include through and turning volumes

CAPRICORN HIGHWAY / CLERMONT-ALPHA ROAD / SHAKESPEARE STREET

	Major Road Flow	Minor Road Flow	Uninterupted?
AM PEAK			
2013	37	81	YES
2014	39	84	YES
2016	39	89	YES
2019	42	94	YES
2029	53	118	YES
PM PEAK			
2013	93	100	YES
2014	97	105	YES
2016	100	111	YES
2019	106	120	YES
2029	134	159	YES

CAPRICORN HIGHWAY / SGCP MINE ACCESS ROAD

	Major Road Flow	Minor Road Flow	Uninterupted?
AM PEAK			
2013	75	28	YES
2014	74	30	YES
2016	74	26	YES
2019	77	24	YES
2029	95	23	YES
PM PEAK			
2013	110	28	YES
2014	110	30	YES
2016	113	26	YES
2019	119	24	YES
2029	150	23	YES

CAPRICORN HIGHWAY / SGCP MINE ACCESS ROAD

BACKGROUND TRAFFIC						
	Mine (S)		Cap (E)		Cap (W)	
	L	R	L	T	T	R
AM Peak						
2013	1	1	1	30	16	1
2014	1	1	1	30	17	1
2016	1	1	1	32	18	1
2019	1	1	1	35	20	1
2029	1	1	1	47	26	1
PM Peak						
2013	1	1	1	54	28	1
2014	1	1	1	55	29	1
2016	1	1	1	59	31	1
2019	1	1	1	64	34	1
2029	1	1	1	86	46	1

WITH DEVELOPMENT TRAFFIC						
	Mine (S)		Cap (E)		Cap (W)	
	L	R	L	T	T	R
AM Peak						
2013	1	27	29	29	16	1
2014	1	29	27	30	16	1
2016	1	25	25	31	17	1
2019	1	23	23	34	19	1
2029	1	22	22	46	26	1
PM Peak						
2013	1	27	29	52	28	1
2014	1	29	27	54	28	1
2016	1	25	25	57	30	1
2019	1	23	23	62	33	1
2029	1	22	22	83	44	1

% INCREASE						
	Mine (S)		Cap (E)		Cap (W)	
	L	R	L	T	T	R
AM Peak						
2013	0%	2600%	2800%	-3%	0%	0%
2014	0%	2800%	2600%	0%	-6%	0%
2016	0%	2400%	2400%	-3%	-6%	0%
2019	0%	2200%	2200%	-3%	-5%	0%
2029	0%	2100%	2100%	-2%	0%	0%
PM Peak						
2013	0%	2600%	2800%	-4%	0%	0%
2014	0%	2800%	2600%	-2%	-3%	0%
2016	0%	2400%	2400%	-3%	-3%	0%
2019	0%	2200%	2200%	-3%	-3%	0%
2029	0%	2100%	2100%	-3%	-4%	0%