14 Transport Infrastructure

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Summary

Road

The Queensland Coke and Power Plant Project (the Project) will primarily generate private vehicle traffic relating to operation and construction, with low volumes of heavy vehicle traffic during the operational stages of the facility. All vehicle access to the project site will be via Power Station Road. Project traffic generation has been conservatively estimated based on the expected construction and operation of the plant. Light vehicle traffic has been assumed to be proportional to anticipated staff numbers at the plant and has been distributed and assigned to the network in accordance to the probable residence of plant employees during construction and operation. Construction is scheduled to proceed from 6:00 am to 6:00 pm six days a week, and therefore, the transport of construction workers to and from the site by bus is unlikely to coincide with the operation of school bus services.

The Gladstone Road/Port Curtis Road/Lower Dawson Road intersection will exceed the desirable Degree of Saturation (DOS) under background growth. The Project will not add traffic to the critical movement at the intersection. The addition of project-related traffic to the roundabout located at the intersection of the Bruce Highway and Capricorn Highway will cause an increase in the DOS of the intersection. Additional project traffic will bring forward the year at which the intersection would exceed the desirable DOS.

In terms of pavement impact, the Project will increase the annual Equivalent Standard Axle (ESA) loading on a number of links between Power Station Road and the Bruce Highway. The increase in heavy vehicle traffic is attributed to the transport of materials for the construction of Stage 1 and Stage 2 of the Project. During the operational phase, heavy vehicle traffic will decrease significantly from the construction phases, although the operational ESA loading will be greater than 5%. As such, significant pavement impacts on the road network will occur during the construction phases, with low impacts during the operational phase.

Rail

Stage 1 of the Project will produce up to 1.6 Mtpa of coke for export, requiring approximately 2.5 Mtpa of coking coal, assumed to be sourced from the Bowen Basin coal fields. Stage 2 of the Project will produce up to 3.2 Mtpa of coke for export, requiring approximately 5 Mtpa of wet Bowen Basin coking coal. This coal is proposed to be railed from mines within the Blackwater Rail System to the SPS rail loop. The transport of approximately 2.5 Mtpa of coking coal to the unloading facility at the project site will result in an additional 8 coal trains per week operating on the Blackwater rail corridor. A new eastern angle connection from the SPS rail loop to the central Blackwater line is proposed to be constructed. This connection will allow the transportation of approximately 1.6 Mtpa of coke from the loading facility on the SPS rail loop to the Fisherman's Landing unloading facility and is estimated to require approximately eight loaded trains per week or 16 train movements. It is anticipated that for both stages of operation, mainline rail infrastructure enhancements will be required to provide rail infrastructure capacity in the Blackwater system for the required tonnages to be transported to Stanwell and also for product to be transported to Fisherman's Landing. Duplication of some sections of the existing rail loops at Stanwell

and Fisherman's Landing is expected to be required for Stage 2 operations. This will enable simultaneous usage by QCE and adjacent facilities.

Port Facility

A coke unloader will be constructed on a second spur line of the Cement Australia rail loop to unload the coke railed from the project site at Stanwell. Coke will be discharged from trains and conveyed to a stockpile area, or will report directly to a ship if docked. Berth 3 at Fisherman's Landing will be developed for outloading coke and the elevated wharf conveyor will direct coke to a shiploader. The shiploader will be designed to load Panamax and Post Panamax vessels that have a loading capacity of 45,000 t. For Stage 1 operations it is anticipated that 35 ships per year, or approximately three ships per month, would be required for the export of 1.6 Mtpa of coke to export markets. Stage 2 coke export will require approximately 70 ships per year or 6 ships per month.

14.1 Non-Transport Related Infrastructure

Infrastructure including gas and water pipelines, power lines, telecommunications systems, constructed waterways and other services infrastructure required for the Project are discussed in Section 2 – Project Description. A number of easements, encumbrances and/or interests for the provision of these services exist on land in the project area at Stanwell and at Fisherman's Landing. These are shown in Table 14.1.

Table 14.1 Tenure for Services Infrastructure

Real Property Description and Owner	Easement/ Encumbrance/Interest Number	Easement Beneficiary	Service
Project Area			
Lots 44/SP140243 and 1/SP140243 Stanwell Corporation Ltd	601387005 (C611688N) 17.02.91	Water Resources Commission vested to SunWater 06.11.02 (706095708)	Water
	700603106 12.04.95	Queensland Electricity Transmission Corporation Ltd	Electricity
Lots 1/RP608422 and 2/RP801218 Stanwell Corporation Ltd	700544656 09.03.95	Queensland Electricity Transmission Corporation Ltd	Electricity
Port Facility Area			
Lot 102/SP108926 Queensland Cement Limited	601635453 (C424198)	Capricornia Electricity Board	Electricity

14.2 Regional Planning for Transport Infrastructure

14.2.1 Capricornia Integrated Regional Transport Plan 2004-2030

The Capricornia Integrated Regional Transport Plan (CapIRTP) (Queensland Department of Transport, 2004) identifies a need in the region to integrate transport networks and land use to facilitate the movement of freight and people. The key planning assumptions in the CapIRTP that relate to the Project are:

- Potential major employment areas include the Stanwell corridor for industrial growth;
- The capacity of the Capricorn Highway in the vicinity of Stanwell is sufficient to accommodate estimated future traffic and the transport of industrial goods by rail should be promoted, particularly in relation to new industry, to reduce any pavement impacts; and
- Consideration of the need for rail infrastructure in addition to the main electrified railway service at Stanwell would be made at the planning stages, should further industrial development at Stanwell be proposed.

Planned actions under the CapIRTP include investigation of the road intersection capacity at Stanwell and the Capricorn highway and undertaking of a rail corridor direction study for the North Coast line which will include consideration of capacity of existing rail systems to cater for future freight from industrial development in the area. No future road works relevant to the Project are proposed. Various rail infrastructure programs have capital programs in place. Proposed rail works for the Project are discussed in Section 14.4 below.

14.2.2 Gladstone Integrated Regional Transport Plan 2001-2030

As with the CapIRTP, the Gladstone Integrated Regional Planning Transport Plan (GIRTP) (Queensland Department of Transport, 2001) identifies a need in the region to integrate transport networks and land use to facilitate the movement of freight and to cater for the needs of residents. The key planning assumptions in the GIRTP relevant to the Project are that the movement of freight by road and rail, to and within the Gladstone region and through the port, will increase and freight movements will continue to increase through Fisherman's Landing Wharf. This will lead to continued expansion and development of the wharf facility.

The recommended capital program includes the construction of an additional rail spur to Fisherman's Landing Wharf for the future development of the wharf and associated industry in the short to longer-term, and the extension and upgrade of Landing Road on strategic port land to serve Fisherman's Landing Wharf in the short to medium-term. The Project will not involve use of Landing Road for hauling of coke, only potentially for personnel movement. However, an upgrade (duplication) of the rail loop at Fisherman's Landing for Stage 2 of operations is proposed by QRNational, as identified in the GIRTP (refer Section 14.4 below).

14.2.3 Roads Implementation Program 2004-05 to 2008-09

The Queensland Department of Main Roads (DMR) "Roads Implementation Program 2004-05 to 2008-09" (Department of Main Roads (DMR), 2004) for the Central Queensland Region provides for a five year program of roads infrastructure projects that DMR plans to deliver to achieve the network outcomes in the roads network strategy document "Roads Connecting Queensland". A number of state controlled roads in Fitzroy Shire are proposed to be upgraded including the Capricorn Highway (Rockhampton to Duaringa) and the Gavial-Gracemere Road. The only upgrade on the road network proposed to be used for the Project is on the Capricorn Highway at Scrubby Creek, Gracemere. The proposed works comprise the addition of some auxiliary lanes to the highway. The Project is anticipated to have no significant impact on these works as proposed traffic volumes are expected to be relatively low (Section 14.3).

14.2.4 Local Planning Schemes

The Fitzroy Shire Planning Scheme (Fitzroy Shire Council, 2005) is the local government planning scheme for the project area. The Capricorn Highway and part of Power Station Road is within land zoned as Rural/Village Balance Precinct K. Fitzroy Shire Council's local laws apply to roads and rail on land zoned as Village (including those in Stanwell). The rail loop (but not the spur) used by SPS is zoned as part of the Special Industry Precinct I for industrial activities with some synergy to the SPS. Any transport infrastructure requirements for the Project will be consistent with the planning scheme.

14.3 Roads

14.3.1 Existing Infrastructure

The project site is located on Power Station Road and will be accessed primarily via this existing single access road. Other roads in the vicinity of the Project comprise Brickworks Road to the immediate north of the project site and Warren and Switchyard Roads to the west of the Stanwell Power Station rail loop. Coombs Road was removed as part of the former AMC project. These roads are owned by the State and no road reserves were identified in the project site.

There are no road works planned for the Project and no identified requirements for new or changed services in road reserves. There will be no impact on the location or tenure of roads and road reserves in the area as a result of the Project. Information has been obtained from the Department of Main Roads (DMR) as part of the traffic study below. DMR will also be consulted as part of the release of the EIS.

Study Methodology

Eppell Olsen & Partners was commissioned to undertake a Road Impact Assessment Study as part of the environmental impact assessment for the Project. This study has been prepared generally in accordance with the "Guidelines for Assessment of Road Impacts of Development Proposals" (DMR, 2000). These

guidelines identify the procedures for assessment of traffic-related impacts of major projects. The objective of this assessment is to evaluate the traffic impacts of the Project on the adjacent road network.

Traffic impacts considered include any effects on intersection and link operations along the extent of the haulage and private vehicle traffic routes. To address these impacts, the following tasks have been undertaken and are discussed in detail in the following sections:

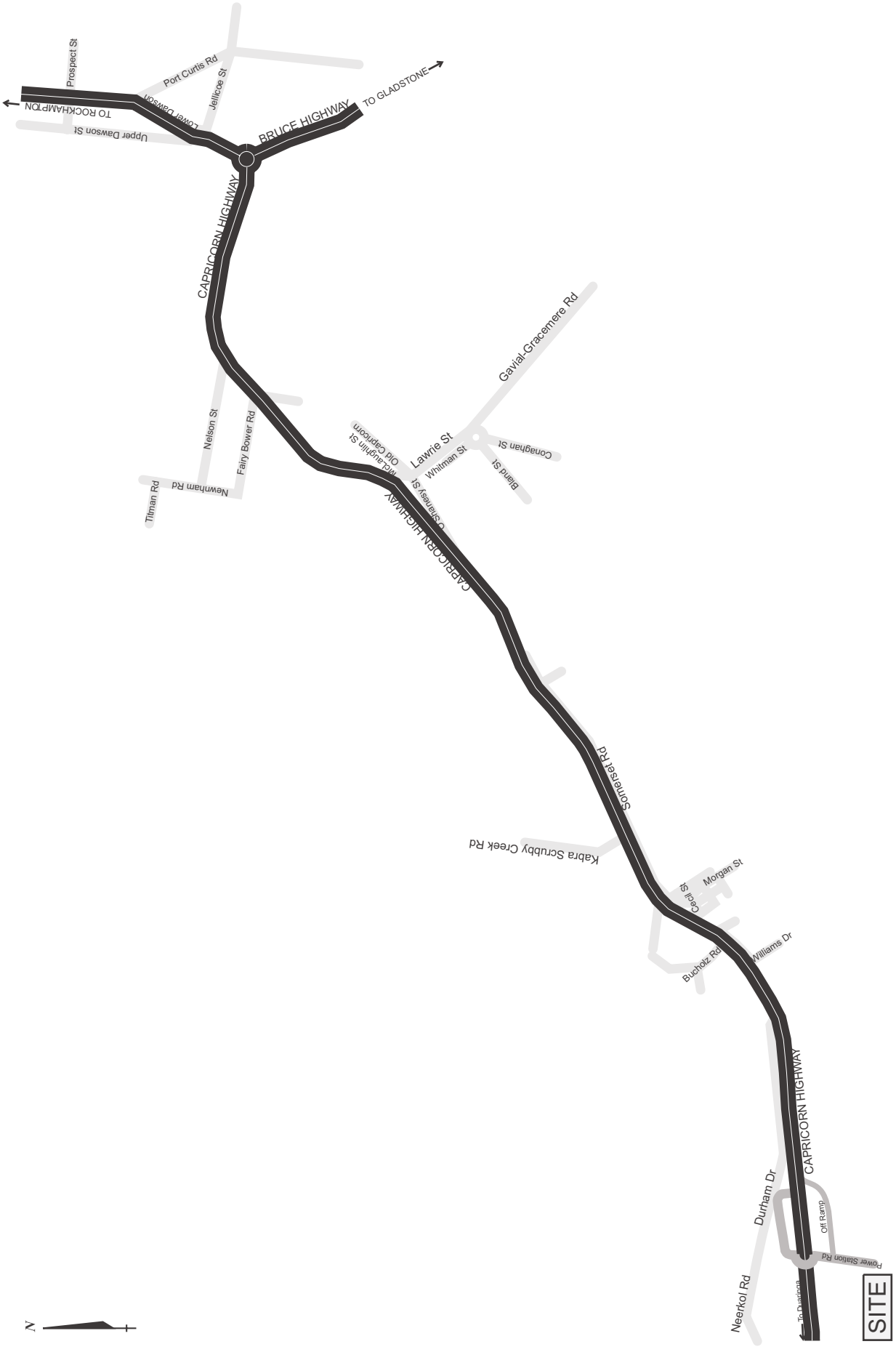
- Inspection of the site and surrounding road network between Rockhampton and the Stanwell Energy Park;
- Review of existing operation of the study network including measurement of existing traffic demand;
- Estimation of the likely traffic generation of the Project and distribution of this additional traffic to the surrounding road network;
- Consideration of historic growth patterns within the study area;
- Estimation of future traffic levels with and without the Project;
- Analysis of intersection operation for each of the design scenarios identified; and
- Identification of any road network improvements or works necessary to improve network performance or conditions with and without the Project.

Existing Road Network

The Project is proposed to be constructed in the existing Stanwell Energy Park to make use of the existing services and resources such as water, rail and road infrastructure. The Stanwell Energy Park is located approximately 25 km south-west of Rockhampton City Centre and access is via a single access road for private vehicles on Power Station Road, off the Capricorn Highway and secondary access locations for truck and heavy vehicle movements. The Project will primarily generate private vehicle traffic relating to the operation and construction of the facility (i.e. plant and construction personnel), with low volumes of heavy vehicle traffic during the operational stages of the facility. All vehicle access to the project site will be via Power Station Road. Large volume resources required for the coking process will be transported to the site via rail so there will be no road haulage of coal or coke. Outputs will be transported from the site via rail to dock facilities at Fisherman's Landing, Gladstone.

The majority of project-related traffic is anticipated to travel to and from the east. The study area, which includes Power Station Road, the Capricorn Highway east to the Bruce Highway, Gavial - Gracemere Road (through Gracemere) and the Bruce Highway between Capricorn Highway and Port Curtis Road, is shown on Figure 14.1. The key sections of the study road network are described in the following paragraphs:

- Power Station Road is a sealed, 6.5m wide undivided roadway posted at 80 km/h at the access to the Stanwell Energy Park. It connects to the Capricorn Highway via a grade separated interchange;



Source: Eppell Olsen & Partners, Figure 2.1, 25-10-05

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ROAD NETWORK STUDY AREA

Drawn: VH	Approved: JMcD	Date: 06-01-06	Figure: **14.1**	Rev. A
Job No.: **42625626**	File No. 42625626-g-045.cdr			A4

- The Capricorn Highway forms part of the State controlled road network and extends east to the Bruce Highway, and west to smaller communities and Central Queensland. For the most part, the Capricorn Highway is a two lane, undivided roadway, with several overtaking lane sections provided along the study section. The section is generally posted with a speed limit of 100 km/h, however some sections are posted at 80 km/h; and

- The Bruce Highway forms part of the National Highway system and where it meets the Capricorn Highway, is a sealed, two lane roadway posted at 60 km/h. The Bruce Highway connects Gladstone to the south and feeds directly to the Rockhampton CBD to the north.

Planned Road Infrastructure Improvements

Information contained in the Department of Main Roads "Roads Implementation Program 2004-2005 to 2008-2009" (DMR, 2004) indicates that there are some improvements scheduled for the next five financial year periods along the route to the east or west of the project site. The works scheduled that are located on the study network are located within the Fitzroy Shire. The only project located on the study network is project number 54/16A/34 and is located at the Capricorn Highway crossing of Scrubby Creek in Gracemere.

Intersection Geometry

With respect to traffic operations, a number of key intersections between Rockhampton and the project site have been included in this assessment:

- Gladstone Road/Lower Dawson Road/Port Curtis Road;

- Bruce Highway/Capricorn Highway;

- Capricorn Highway/Gavial - Gracemere Road;

- Old Capricorn Highway/Gavial - Gracemere Road/Lawrie Street/O'Shanesy Street; and

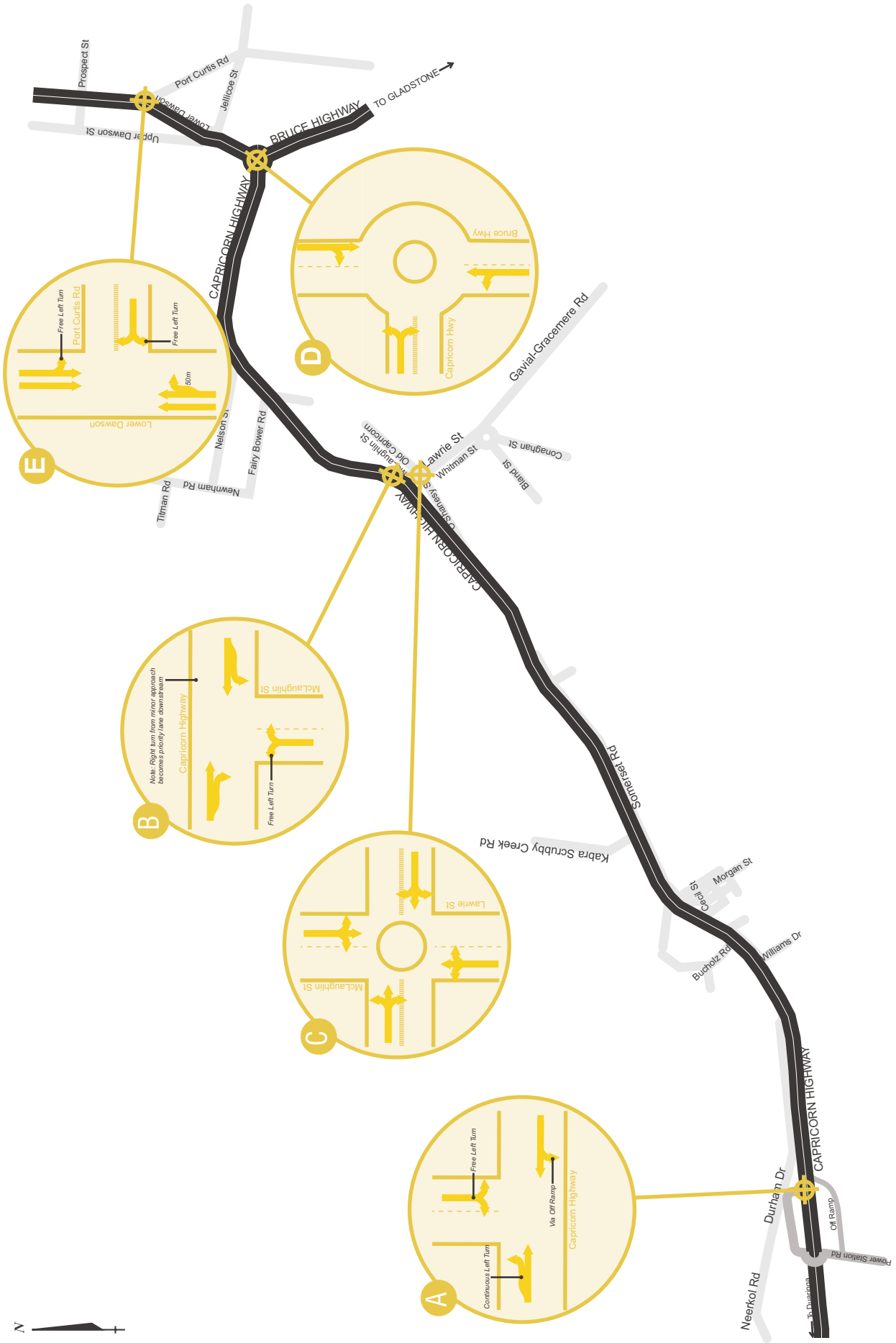
- Capricorn Highway/Power Station Road.

Existing lane configurations for each of these intersections are shown on Figure 14.2.

Gladstone Road/Lower Dawson Road/Port Curtis Road

The intersection of the Bruce Highway and Port Curtis Road is located to the south of the Rockhampton CBD in the suburb of Allenstown. The intersection comprises an unsignalised T-intersection with Gladstone Road (Bruce Highway) - Lower Dawson Road forming the priority north-south leg of the intersection.

Gladstone Road - Lower Dawson Road is a four lane carriageway with median separation at the intersection with Port Curtis Road. Turning movements into Port Curtis Road are provided with a 50 m right turn lane on the southern leg and a free left turn lane on the northern approach. The Port Curtis Road



Volume Notation - AM (PM)

Source: Eppell Olsen & Partners, Figure 2.2, 25-10-05

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EXISTING LANE CONFIGERATIONS

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leg of the intersection comprises of a right turn lane and a free left turn lane with capacity to store a number of vehicles without blocking the right turn lane.

Bruce Highway/Capricorn Highway

The Bruce Highway/Capricorn Highway intersection is constructed as a three leg, single lane roundabout. The Bruce Highway forms the north-east (towards Rockhampton) and south-east (towards Gladstone) approach legs with the western approach leg being the Capricorn Highway (towards Gracemere and Stanwell). The roundabout island is in the order of 80 m in diameter.

Capricorn Highway/Gavial - Gracemere Road

This intersection is a high speed seagull intersection that provides priority to westbound through movements along the Capricorn Highway, which has a posted speed limit of 80 km/h at the intersection. The seagull form of the intersection provides a right turn deceleration lane into Gavial - Gracemere Road, and an acceleration lane for the right turn movement out of the latter. This lane becomes the priority lane downstream (east) of the intersection and eastbound through traffic along the Capricorn Highway merges with this traffic. A left turn deceleration lane is provided for westbound traffic entering Gavial - Gracemere Road.

Old Capricorn Highway/Gavial - Gracemere Road/Lawrie Street/O'Shanesy Street

This intersection is constructed as a four leg, single lane roundabout with a circulating island diameter of approximately 20 m and provides an entry to the township of Gracemere.

Capricorn Highway/Power Station Road

Access to Power Station Road from the Capricorn Highway is partially grade separated via a flyover ramp. Westbound left turning vehicles are provided an off-ramp with sufficient deceleration length prior to an unsignalised T-intersection. Vehicles turning into Power Station Road from the west first turn left at the unsignalised Capricorn Highway/Power Station Road T-intersection and then travel via the overpass to a stop control with the westbound left turn vehicles (i.e. vehicles leaving the Capricorn Highway via the off ramp).

Eastbound traffic from Power Station Road uses the overpass and then a left turn acceleration lane onto Capricorn Highway. Outbound westbound traffic turns right out of Power Station Road onto the Capricorn Highway. Site observations found a number of large road vehicles (i.e. greater than 12 axles) traveling to and from the west entering Power Station Road. The Capricorn Highway in this section is posted at 100 km/h and consists of a two lane, 6.5 m wide undivided carriageway with 1.8 m to 2.3 m wide sealed shoulders.

Existing Traffic Demand

Intersection Turning Movements

Peak hour traffic volumes at the subject intersections were sourced from turning movement counts collected by Australasian Traffic Surveys on 4 April 2005, and previous turning movement counts conducted by the Department of Main Roads (DMR) on 9 March 2005 (Capricorn Highway/Power Station Road and Capricorn Highway/Gavial - Gracemere Road intersections). A summary of existing traffic volumes at each of the study intersections is provided on Figure 14.3.

Link Volumes

Average Annual Daily Traffic (AADT) link volumes, measured in vehicles per day (vpd), for various sections of the study road network have been obtained from DMR traffic counts collected in 2003. These results are summarised in Table 14.2.

Table 14.2 2003 AADT Link Volumes

Link	Road	Point 1	Point 2	AADT (vpd)
1	Lower Dawson Road	Capricorn Highway	Port Curtis Road	15,909
2	Capricorn Highway	Bruce Highway	Gavial-Gracemere Road	10,969
3	Capricorn Highway	Gavial-Gracemere Road	Kabra Road	3,586
4	Capricorn Highway	Kabra Road	Power Station Road	3,137

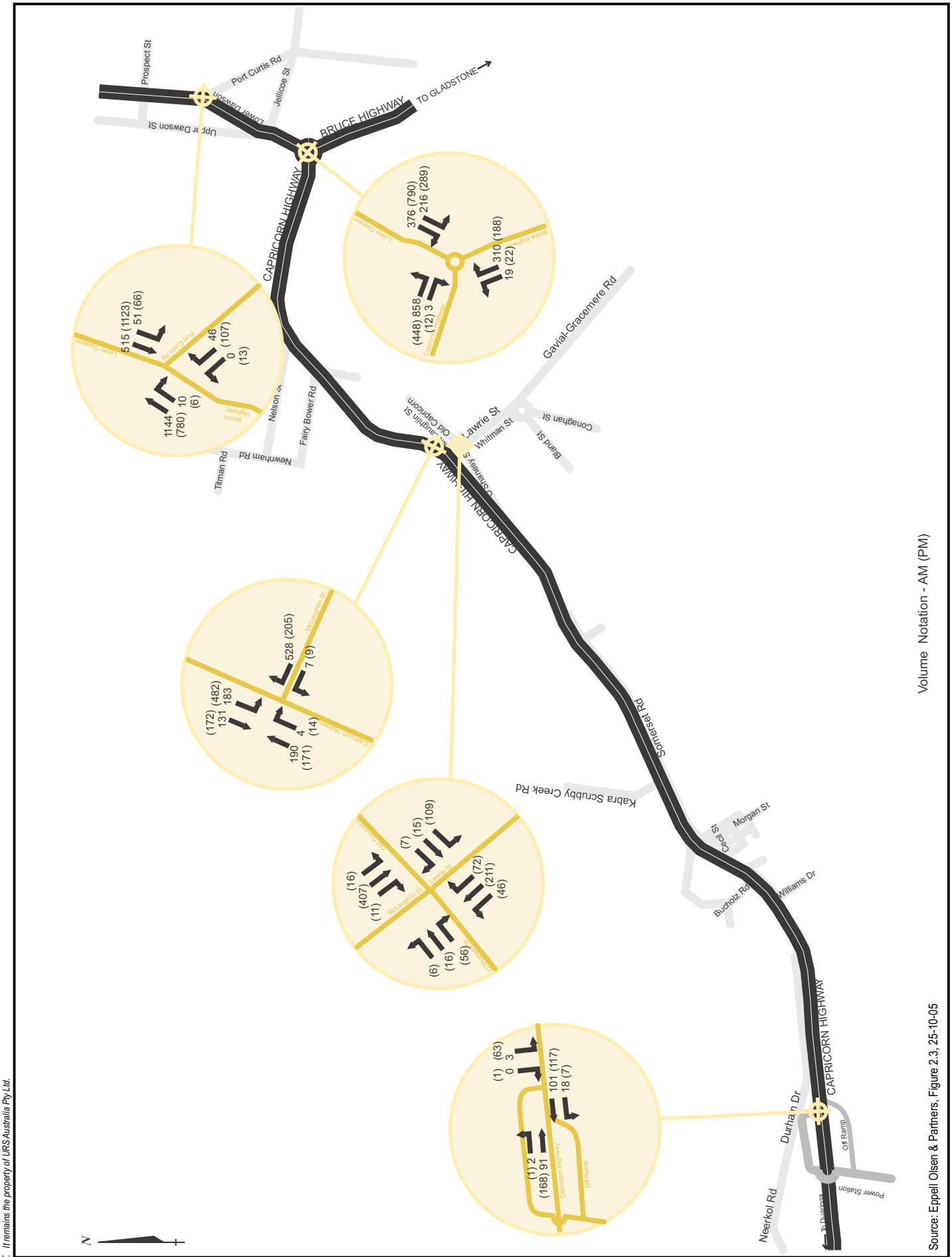
Table 14.3 presents the breakdown by vehicle type for the road sections along the haulage route using the same link information as in Table 14.2.

Table 14.3 2003 AADT Vehicle Classification along Haulage Route

Link	Classified Vehicle Volumes (vpd)					
	Light	Rigid Truck	Articulated	B Doubles	Heavy Vehicle Percentage (%)	Total
1	14,205	876	625	202	10.7	15,909
2	10,064	516	265	122	8.3	10,969
3	3,062	244	174	105	14.6	3,586
4	2,615	224	181	116	16.6	3,137

Crash History

The crash history of the study road network has been reviewed, based on information provided by Queensland Transport that summarises crash location, type and severity for incidents recorded in the four-year period 2000 – 2004. This data, as well as a description of Queensland Transport's crash type coding, is included in Appendix L. All crash locations are plotted on Figure 14.4 and a tabulation of crash type,



Volume Notation - AM (PM)

Source: Eppell Olsen & Partners, Figure 2.3, 25-10-05

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2005 TRAFFIC VOLUMES
(Scenario A)

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1 Capricorn Highway/Malchi Nine Mile Road

Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
303			1		1	2
308	1					1

2 Capricorn Highway/O'Shanesy Street

Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
104	1					1
303			1			1
506		1				1

3 Capricorn Highway/Old Capricorn Highway

Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
104		1	1	1		3

4 Capricorn Highway/Gavial Gracemere Road

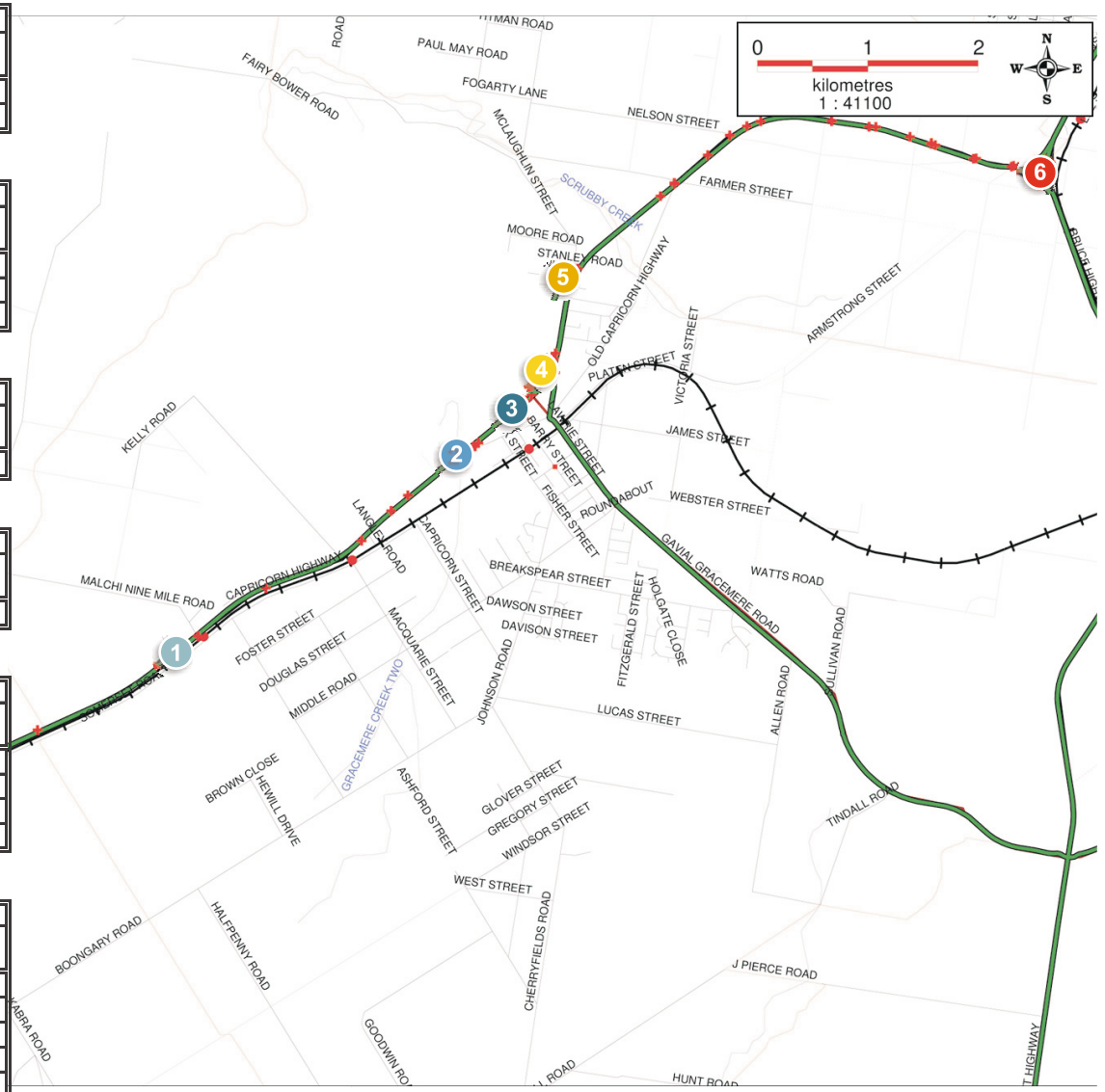
Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
104	2	1		3		6

5 Capricorn Highway/Mclaughlin Street

Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
104	1					1
105	1					1
202				1		1
308				1		1

6 Bruce Highway/Capricorn Highway

Type	Severity					
	PDO	Minor injury	Medical treatment	Hospitalisation	Fatal	Total
301	1		1			2
600	1					1
702		1				1
704	1					1
706			1			1
708	7			2		9
801	1					1
805				1		1



Source: Eppell Olsen & Partners, Figure 2.4, 25-10-05

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CRASH DATA MATRICES CAPRICORN HIGHWAY (Bruce Highway - Meteor Park Road)

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Job No.: 42625626 | File No. 42625626-g-048.cdr

Figure: 14.4

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severity, and frequency is provided for locations recording high crash frequencies (i.e. more than three crashes).

Six crashes were observed during the period at the Capricorn Highway/Gavial – Gracemere Road intersection that involved a right turning vehicle being struck by the adjacent through movement. The incident descriptions do not identify whether these occurrences are related to a pattern in approach, time of day, etc.

The Bruce Highway/Capricorn Highway intersection recorded nine crashes involving vehicles driving off the designated carriageway and into traffic island areas. The incident descriptions do not identify any consistency in approach, time of day, weather conditions, etc to determine if there is an existing deficiency at the intersection contributing to this crash type.

All other locations shown on Figure 14.4 show no consistent pattern in crash types and have therefore not been reviewed further.

Although a high crash frequency has not been recorded during the past five years, a review of the Capricorn Highway/Fairy Bower Road intersection was undertaken during a site visit in May 2005. The intersection is an unsignalised four-way intersection, however adequate sight distance and appropriate speed limits have been provided at the intersection. It is thought that the design of this intersection is adequate for current and anticipated (with the addition of the Project) traffic levels.

14.3.2 Potential Impacts and Mitigation Measures

The focus of the road traffic assessment is on road safety impacts. A Road Use Management Plan has been prepared to allow for the management of these aspects of the Project during construction and operations (Section 16 – Environmental Management Plan). This Plan will be implemented in consultation with the Department of Transport and DMR and will address any requirements for the escorting of wide loads to and from the Project.

Due to restrictions placed on the Project by workforce availability, accommodation, rail infrastructure and availability of materials, it is likely that the two 1.6 Mt stages of the Coke Plant will be constructed in 800,000 tonne stages. This will lengthen the construction period, reducing the average workforce numbers required for construction and enable raw materials to be supplied as required. The data below has been based on the peak employment figures and maximum traffic generation and provides worst case scenarios in relation to potential impacts.

Construction Traffic Demands

Light Vehicle Traffic

Construction of Stage 1 of the Project is programmed to start in 2006 with construction to occur in a number of phases from which a peak of around 1,600 staff is expected at the project site. Given the daily operation schedules likely to be adopted during the construction phase, it is likely that vehicle traffic

generated during peak construction will result in the majority of traffic arriving and departing outside the defined road peaks. However, for the purpose of intersection capacity analysis, it is assumed that this traffic will coincide with the road peak, to provide a conservative analysis.

Construction staff are likely to be housed in village-style or private accommodation to the east of the project site (e.g. Gracemere and Rockhampton) and transported to the site via 45-seat passenger buses. Assuming all staff are to be employed on the site at the same time, this would represent in the order of 74 bus trips per hour (37 vph in/37 vph out) during the morning and evening peak hours (Table 14.4). Construction will be undertaken over 6-day work weeks (Monday to Saturday) with the hours of construction work being between 6:00am to 6:00pm.

Heavy Vehicle Traffic

Material inputs to the construction phase of Stage 1 are likely to approximate 560 vehicle trips per week (280 in/280 out). Assuming that these vehicles arrive consistently throughout any given day, and that a 6-day work week and a 12-hour work day is employed for materials supply to the site, it is expected that construction inputs will represent approximately 8 vehicle trips per hour (4 vph in/4 vph out). Deliveries are proposed to be made by B-double vehicles though it has been noted that the availability of such type of vehicle in the region may be limited and as such the use of conventional semi-trailers may be required. It is as yet unknown what proportion of deliveries will be made by semi-trailer or B-double (Table 14.4).

It is expected that a reduction in construction traffic volumes during the construction of Stage 2 will result in comparison to Stage 1 as a result of construction set-up being minimised. As such, a 10% reduction has been applied for Stage 2 (Table 14.4).

Operation Traffic Demand

Light Vehicle Traffic

The Project is expected to employ in the order of 145 staff upon commencement of operation of both Stages 1 and 2. Staff are likely to employ private vehicle transport to the site and an occupancy factor of 1.2 persons per vehicle has been assumed. The facility requires 50 personnel to man the Stage 1 operations, with 75 personnel required to man the Stage 2 facility (i.e. 75 staff for both stages combined). The plant will operate continuously and comprise of three 8 hour shifts, with shifts assumed to start at 7:00am, 3:00pm and 11:00pm.

It is assumed that a complete operational personnel changeover will occur within a 1 hour peak window with all staff not working driving to the plant, with a similar number of personnel traveling home from the plant. This results in a peak generation of 50 vph (25 vph in and 25 vph out) for Stage 1 and 84 vph (42 vph in and 42 vph out) for Stage 2. A nominal amount of visitor traffic has been assumed as 5% of staff based traffic (Table 14.4).

Heavy Vehicle Traffic

Inputs to the coking process are not likely to generate significant heavy vehicle traffic volumes. Coking coal is to be transported via rail to the site from the Bowen Basin. Other inputs are expected to be minimal and a nominal figure of 4 vph (2 vph in/2 vph out) has been assumed and applied only to the peak periods for the purposes of this assessment.

The coke product is to be transported via rail to the purpose-built export facility at Fisherman's Landing, Gladstone. There may be some additional outputs from the process, such as some waste types that will require transport off site (refer Sections 2 – Project Description and 10 – Waste Impacts). This is expected to represent only minor traffic volumes and have been nominally assumed as 4 vph (2 vph in/2 vph out) during the peak hours (Table 14.4).

Table 14.4 Peak Hour Traffic Generation*

Item	Quantity	Peak Hour Traffic Generation (vph)			Notes
		Total	In	Out	
Stage 1 Construction					
Staff	1,600 people	74	37	37	900 person camp at Gracemere; 45 seat bus transport
Materials	280 vehicles/week	12	6	6	B-doubles; 5 day week/10 hour day
Stage 2 Construction					
Staff	1,485 people	66	33	33	10% reduction from Stage 1
Materials	225 vehicles/week	12	6	6	
Stage 1 Operations					
Staff	100 employee pool, 50 operations staff	50	25	25	Private vehicle occupancy 1.2 persons/vehicle
Visitors		6	3	3	Represents 5% of shift staff
Inputs		4	2	2	Nominal
Outputs		2	1	1	Nominal
Stage 1 and 2 Operations					
Staff	145 employee pool, 75 operations staff	84	42	42	Private vehicle occupancy 1.2 persons/vehicle
Visitors		8	4	4	Represents 5% of shift staff
Inputs		8	4	4	Nominal
Outputs		4	2	2	Nominal

Note: * The volumes above have been applied only to the peak periods (i.e. not over the period of a day) and represent the total volumes irrespective of vehicle class.

Project Traffic Distribution and Assignment

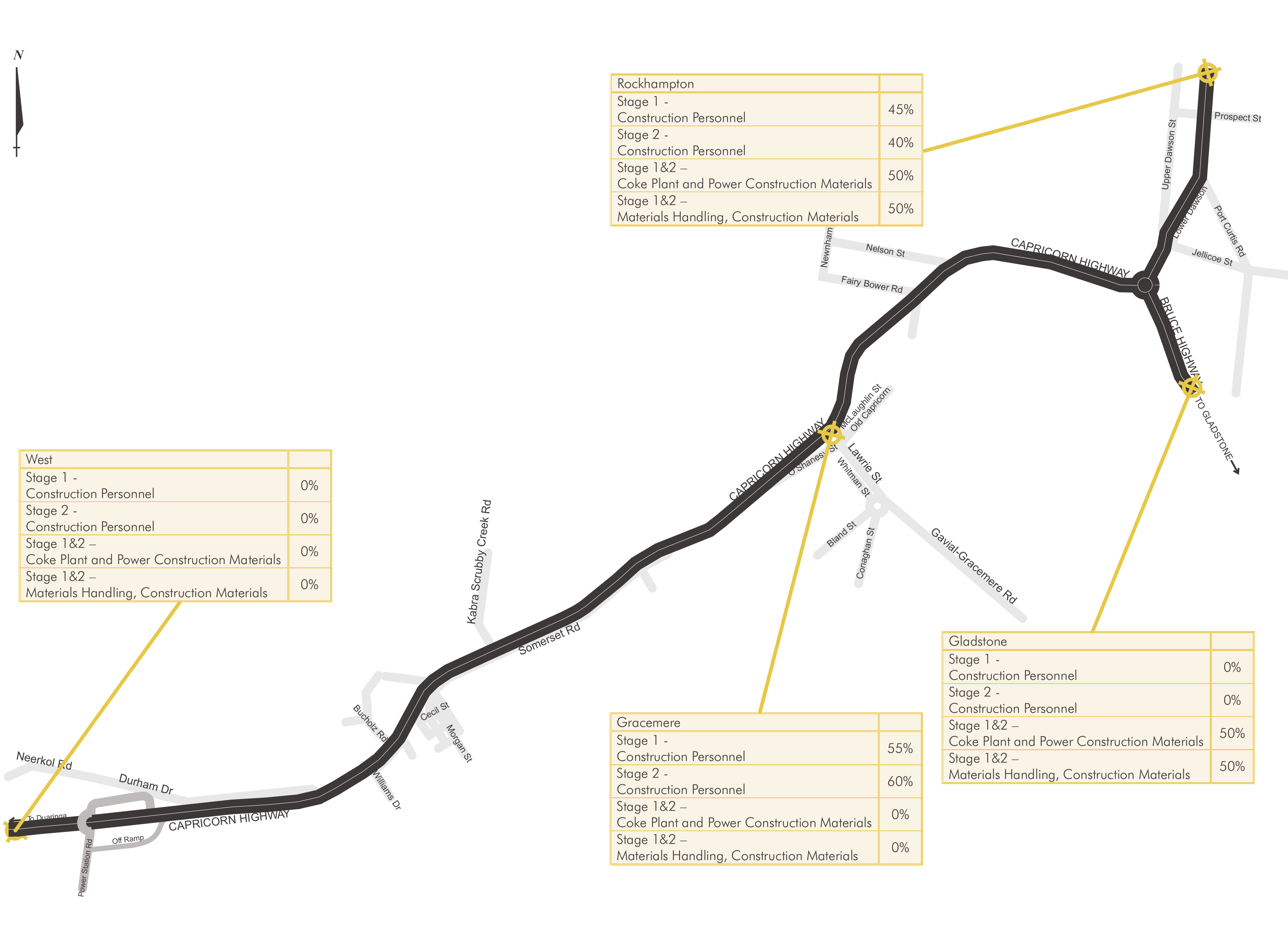
Light vehicle traffic will consist of a number of components that have been distributed to the traffic network as follows:

- Construction staff will be housed in village-style and/or private accommodation proposed to be built in Gracemere (55%) and Rockhampton (45%) for Stage 1. Stage 2 accommodation has been assumed at 60% for Gracemere and 40% for Rockhampton. This traffic has been distributed to the road network according to these percentages. These assumptions are based on a 900 person accommodation village proposed at Gracemere;
- Operational staff will likely reside in Gracemere (20%) or Rockhampton and beyond (e.g. Yeppoon) (75%). There may also be a small component living to the west of the project site (5%). This traffic has been distributed to the road network according to these percentages; and
- Operational visitors will consist of couriers, deliveries, occasional site visitors, etc and will likely travel from Rockhampton.

Heavy vehicle traffic has been assumed to be distributed as follows:

- Construction materials:
  - 50% Rockhampton;
  - 50% Gladstone.
- Operation inputs:
  - 50% Rockhampton;
  - 50% Gladstone.
- Operation outputs (waste):
  - 25% Rockhampton;
  - 25% Gladstone;
  - 50% Gracemere.

Traffic generated by the Project has been assigned to the road network in accordance with the above generation and distribution assumptions. Figures 14.5 and 14.6 present the assignment of generated traffic along the haulage route in terms of Stage 1 and 2 construction and operation traffic volumes respectively. Stage 2 construction traffic represents a reduction compared to Stage 1 construction traffic.



Rockhampton	
Stage 1 - Construction Personnel	45%
Stage 2 - Construction Personnel	40%
Stage 1&2 – Coke Plant and Power Construction Materials	50%
Stage 1&2 – Materials Handling, Construction Materials	50%

Gladstone	
Stage 1 - Construction Personnel	0%
Stage 2 - Construction Personnel	0%
Stage 1&2 – Coke Plant and Power Construction Materials	50%
Stage 1&2 – Materials Handling, Construction Materials	50%

Gracemere	
Stage 1 - Construction Personnel	55%
Stage 2 - Construction Personnel	60%
Stage 1&2 – Coke Plant and Power Construction Materials	0%
Stage 1&2 – Materials Handling, Construction Materials	0%

West	
Stage 1 - Construction Personnel	0%
Stage 2 - Construction Personnel	0%
Stage 1&2 – Coke Plant and Power Construction Materials	0%
Stage 1&2 – Materials Handling, Construction Materials	0%

Source: Epell Olsen & Partners, Figure 3.1, 25-10-05

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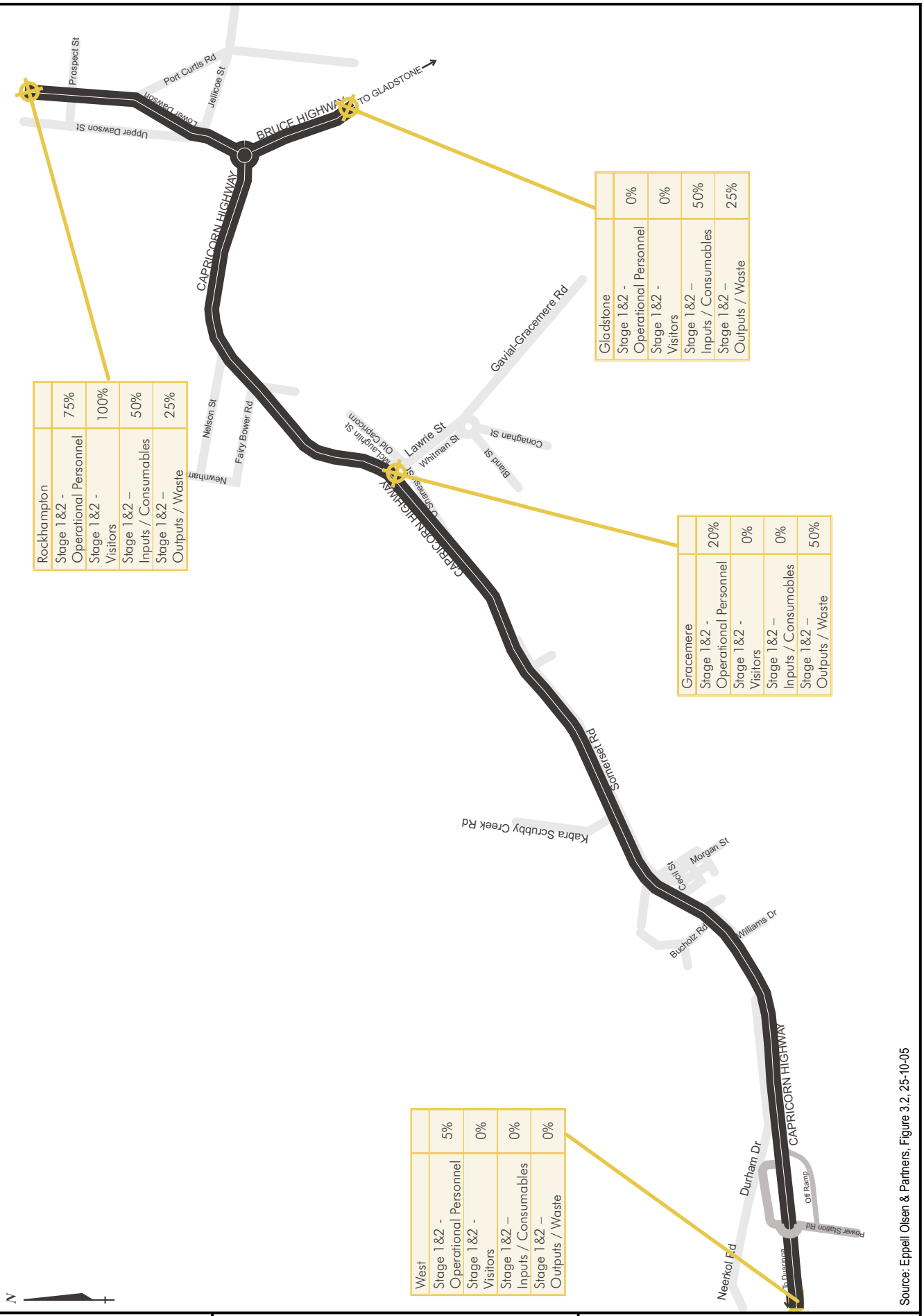
QUEENSLAND COKE
AND POWER PLANT PROJECT
ENVIRONMENTAL IMPACT STATEMENT

CONSTRUCTION TRAFFIC DISTRIBUTION (Stages 1 & 2)

Drawn: VH | Approved: JMcD | Date: 06-01-06
Job No.: **42625626** | File No. 42625626-g-049.cdr

Figure: **14.5** | Rev. A | A4



Source: Eppell Olsen & Partners, Figure 3.2, 25-10-05

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QUEENSLAND COKE
AND POWER PLANT PROJECT
ENVIRONMENTAL IMPACT STATEMENT

OPERATION TRAFFIC DISTRIBUTION
(Stages 1 & 2)

Drawn: VH	Approved: JMcD	Date: 06-01-06
Job No.: **42625626**	File No. 42625626-g-050.cdr	

Figure: **14.6**

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School Bus Services

Numerous school bus services operate between Rockhampton and Gracemere along the Capricorn Highway. These services operate between 7:15 am and 8:15 am in the morning, and 3:00 pm and 5:00pm during afternoon. As construction is scheduled to proceed from 6:00 am to 6:00 pm six days a week, the transport of construction workers to and from the site is unlikely to coincide with the operation of school bus services.

Future Traffic Volumes

Background Traffic Growth (Without Project)

Historic traffic patterns have been reviewed from AADT data provided by the DMR. Over the last 10 years, background traffic growth on the Capricorn Highway has been recorded as approximately 5 - 6% p.a. between the Bruce Highway and Gracemere and approximately 2% p.a. west of Gracemere.

Historic growth on the section of the Capricorn Highway between the Bruce Highway and Gracemere is likely a result of increased development activity in Gracemere. This will likely continue for the immediate future, however over the longer term (i.e. to the design horizon of 2020) this will settle to a lower level. To account for this expected periodic decline in background traffic growth, an average 3% annual traffic growth has been adopted for this section. Some future growth within Gracemere will be accounted for in calculations of project traffic, particularly given the Project's interest in housing staff in this community. Background traffic growth of the section of Capricorn Highway west of Gracemere will likely remain constant throughout the design horizon at approximately 2% p.a. For the purposes of this analysis, a background traffic growth rate of 3% p.a has been applied linearly to all movements at the study intersections throughout the design horizon.

Traffic Scenarios

The following traffic scenarios have been formulated based on the current staging information:

- Scenario A – 2005 Existing traffic volumes.
- Scenario B – 2006 Base traffic volumes.
- Scenario C – 2006 Base plus Project. *Represents construction of Stage 1.*
- Scenario D – 2008 Base traffic volumes.
- Scenario E – 2008 Base plus Project. *Represents commencement of operation of Stage 1 and construction of Stage 2.*
- Scenario F – 2010 Base plus traffic volumes.
- Scenario G - 2010 Base plus Project. *Represents full operation of Stages 1 and 2.*

- Scenario H - 2020 Base traffic volumes.
- Scenario I - 2020 Base plus Project. *Represents a ten-year design horizon from the first year of full operation.*

Traffic volumes for each of the above scenarios are documented in Appendix L.

Network Operation

Intersection Operation

The identified study intersections have been assessed for the relevant design traffic scenarios. Some scenarios have been omitted where the analysis results are not considered to be relevant to the conclusions drawn here.

The worst case scenario intersection capacity is Scenario I which combines the operational traffic from Stage 1 and Stage 2 of the Project with the 2020 background traffic. Where the capacity analysis for this scenario shows acceptable operation under the existing intersection layout, the other "with Project" scenarios have not been analysed.

Intersection operation has been assessed using the aaSIDRA modelling software for all intersections. Analysis results for the AM and PM peak periods are summarised in Tables 14.5 and 14.6. Desirable maximum degree of saturation (DOS) values of 0.90, 0.85 and 0.8 for signalised, roundabout and priority intersections respectively have been adopted for this assessment in accordance with AUSTROADS practice guidelines. Where traffic volumes create performance levels above these thresholds, improvements have been considered to maintain acceptable safety and operational conditions. The results shown in Tables 14.5 and 14.6 represent traffic operations for the existing intersection configurations.

Table 14.5 AM Peak Network Operation

Intersection	Deficiency DOS	Intersection Degree of Saturation (DOS%)								
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G	Scenario H	Scenario I
Gladstone Road/Lower Dawson Road/Port Curtis Road	0.80	0.96	>1.0	-	>1.0	-	>1.0	-	>1.0 0.59[1]	-
Bruce Highway/ Capricorn Highway	0.85	0.61	0.63	-	0.68	-	0.73	0.74	1.00 0.40[2] 0.52[3]	1.04 0.41[2] 0.54[3]
Capricorn Highway/ Gavial - Gracemere Road	0.80	0.29	0.30	-	0.32	-	0.34	-	0.43	0.43
Old Capricorn Hwy/ Gavial – Gracemere Road/ Lawrie Street/ O'Shanesy Street	0.85	n/a*	-	-	-	-	-	-	-	-
Capricorn Highway/ Power Station Road	0.80	0.06	0.06	-	0.06	-	0.07	-	0.08	0.08

Notes: * AM Peak hour count not available at this intersection.

[1] DOS for an upgraded signalised intersection form.

[2] DOS with an upgrade allowing for the western approach left turns and northern approach through movements to bypass the roundabout.

[3] DOS for a two lane roundabout (without slip lanes).

Table 14.6 PM Peak Network Operation

Intersection	Deficiency DOS	Intersection Degree of Saturation (DOS%)								
		Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G	Scenario H	Scenario I
Gladstone Road/Lower Dawson Road/Port Curtis Road	0.80	0.95	>1.0	-	>1.0	-	>1.0	-	>1.0 0.68[1]	-
Bruce Highway/ Capricorn Highway	0.85	0.60	0.61	-	0.65	-	0.69	0.71	0.87 0.66[2] 0.50[3]	0.90 0.69[2] 0.52[3]
Capricorn Highway/ Gavial - Gracemere Road	0.80	0.48	0.49	-	0.53	-	0.55	-	0.70	0.70
Old Capricorn Hwy/ Gavial – Gracemere Road/ Lawrie Street/ O'Shanesy Street	0.85	0.35	0.36	-	0.38	-	0.41	-	0.53	0.54
Capricorn Highway/ Power Station Road	0.85	0.09	0.10	-	0.10	-	0.11	-	0.14	0.17

Notes: [1] DOS for an upgraded signalised intersection form.
[2] DOS with an upgrade allowing for the western approach left turns and northern approach through movements to bypass the roundabout.
[3]. DOS for a two lane roundabout (without slip lanes).

The tables above show that all intersections operate below capacity under 2005 existing traffic conditions (Scenario A) with the exception of the Gladstone Road/Lower Dawson Road/Port Curtis Road intersection, which exceeds desirable capacity limits.

Under base traffic volumes (i.e. without the addition of project-generated traffic volumes) at 2006, 2008, 2010 and 2020 (Scenarios B, D, F and H respectively) the following intersections operate beyond desirable capacity limits in their existing form:

- Gladstone Road/Lower Dawson Road/Port Curtis Road (2005 onwards); and
- Bruce Highway/Capricorn Highway (2015 onwards).

All other intersections operate within desirable capacity limits under base traffic volumes for the AM and PM peaks throughout the design horizon.

For both the AM and PM peak periods, the degree of saturation at the Gladstone Road/Lower Dawson Road/Port Curtis Road intersection is approaching or exceeding the theoretical capacity (i.e. DOS = 1.0) and requires upgrade irrespective of the presence of project-related traffic. The critical movement at the intersection is the right turn out of Port Curtis Road, which is opposed by through movements along Gladstone Road in the order of 1,650 vph and 1,900 vph during the AM and PM peak hours respectively. The Project will only introduce through traffic to the intersection. Therefore the Project will not increase the critical intersection movements and should not be responsible for any works at the intersection.

The existing Bruce Highway/Capricorn Highway roundabout will reach its maximum desirable capacity (0.85) at approximately 2015 under background traffic volumes alone. The critical movements at the intersection are Capricorn Highway (west) – Bruce Highway (north), inbound during the AM peak and outbound during the PM peak. With project-related traffic, the intersection capacity (0.85) is exceeded at approximately 2014. As such the Project will be responsible for bringing forward the intersection upgrading works by one year.

Upgrading the intersection to include turn and/or bypass lanes to accommodate this traffic would be required to achieve adequate intersection operation. Alternatively, the intersection could be upgraded to a two lane roundabout (i.e. two circulating lanes and two approach lanes on each leg). Under either option, satisfactory operation is achieved. The two lane roundabout is likely to be the most appropriate treatment.

The Capricorn Highway/Gavial - Gracemere Road junction operates at the 2020 horizon with development of the Project (Scenario I). Degree of saturation results are no more than 0.70.

The existing roundabout at Old Capricorn Highway/Gavial - Gracemere Road/Laurie Street/O'Shanesy Street has a forecast degree of saturation less than 0.54 in all scenarios at the PM peak. Volumes for the AM peak were unavailable, however it is anticipated that capacity/operation would be similar. Accordingly, no works are required at this intersection.

The intersection/interchange at Capricorn Highway/Power Station Road will operate with degree of saturation results less than 0.17 under all scenarios. Therefore, no works are required. There is potentially

an issue with the capacity of Power Station Road as it is not designated as a B-Double route. However, a permit is currently held by a quarry operator for the use of Power Station Road (from Switchyard Road to Capricorn Highway) by B-Doubles. Therefore, it is anticipated that such a permit would be available for the Project as negotiated with the Department of Main Roads.

Pavement Impact Assessment

Heavy vehicle demand by classification generated as a result of the Project has been estimated from the information supplied. The resulting breakdown of heavy vehicle types generated by the plant is discussed in Section 14.3.1 above, as is the distribution to the road network of heavy vehicle traffic generated by the Project.

The average Equivalent Standard Axle (ESA) loading for each heavy vehicle along the study network has been determined from ESA loadings per heavy vehicle type and existing classified link counts (provided by the DMR) for a number of locations along the study network as shown in Appendix L. Based upon this information, an estimate of existing annual ESA loading along the study network has been calculated as shown in Appendix L.

The classification of heavy vehicles generated by the Project has been used to determine the additional annual ESA loadings produced along the study network as a result of project traffic added to the network. A percentage change in annual ESA loadings along each link was then determined. This has been done for three scenarios: Stage 1 construction; Stage 2 construction; and Combined Stage 1 and Stage 2 operation (Appendix L).

A comparison of the percentage change in each road section under each scenario identifies those sections where further pavement impact assessment and potential contribution by the Project is required. Under the DMR impact assessment guidelines, the latter is to occur where project traffic ESAs is more than 5% of existing traffic ESAs. This comparison identifies that during the operational phase of the plant, ESA loadings will be increased by greater than 5% and therefore, has been included in the analysis.

Pavement impact assessment (and potential project contribution to pavement works) is required for the Stage 1 and Stage 2 construction over the following road sections:

- Capricorn Highway – Bruce Highway to Gracemere;
- Capricorn Highway – Gracemere to Kabra;
- Capricorn Highway – Kabra to Power Station Road;
- Lawrie Street – Capricorn Highway to Ranger Street; and
- Lawrie Street – Ranger Street to Bland Street Roundabout.

Appendix L outlines detailed characteristics of the assessed portions of the study network with Table 14.7 presenting the pavement impacts and bring forward time periods caused by the construction of the proposed coking coal plant.

Table 14.7 Study Network Bring Forward Times

Road	Section	Bring Forward Time Period (years)
16A – Capricorn Highway	10E Bruce Highway to 450 Gavial Gracemere	0.3
16A – Capricorn Highway	450 Gavial Gracemere to Kabra	0.9
16A – Capricorn Highway	Kabra to Power Station Rd	0.4
450 – Gavial Gracemere Rd	Capricorn Highway to Ranger Street	0.8
450 – Gavial Gracemere Rd	Ranger Street to Bland Street	0

The portion of Gavial – Gracemere Road from Ranger Street to Bland Street has exceeded its 30 year life and therefore no contribution is required from the proponents.

Conclusion

Traffic generation of the Project has been conservatively estimated from the information provided regarding the expected operation of the facility. Light vehicle traffic has been assumed to be proportional to anticipated staff numbers at the facility and has been distributed and assigned to the network in accordance to the probable residence of plant employees and assumes that a majority of employees will reside within Rockhampton.

Construction of the plant is planned to commence in 2006 with construction of the entire facility anticipated to finish approximately 2009. Operation of the plant is expected to commence in 2008 with full production at 2010. No 'ramp up' period to full production potential has been used in this assessment.

The Gladstone Road/Port Curtis Road/Lower Dawson Road intersection will exceed the desirable DOS under background growth. The Project will not add traffic to the critical movement at the intersection, and as such is not responsible for any works required at the intersection. The addition of project-related traffic to the roundabout located at the intersection of the Bruce Highway and Capricorn Highway will cause an increase in the DOS of the intersection. Additional project traffic will bring forward the year at which the intersection would exceed the desirable DOS. As such the Project would be responsible for the bring forward cost (by approximately one year) of upgrading this intersection to a two lane roundabout.

All other intersections assessed will experience no significant impact, and therefore do not require works as a result of the Project.

In terms of pavement impact, the Project will increase the annual Equivalent Standard Axle (ESA) loading on a number of links between Power Station Road the Bruce Highway. The increase in heavy vehicle traffic is attributed to the transport of materials for the construction of Stage 1 and Stage 2 of the Project. During the operational phase, heavy vehicle traffic will decrease significantly from the construction phases, although the operational ESA loading will be greater than 5%. As such, significant pavement impacts on the road network will occur during the construction phases, with low impact during the operational phase. This increase in heavy vehicle traffic is expected to bring forward the need for pavement rehabilitation on the following sections of the study road network:

- Capricorn Highway – Bruce Highway to Gracemere;
- Capricorn Highway – Gracemere to Kabra;
- Capricorn Highway – Kabra to Power Station Road;
- Lawrie Street – Capricorn Highway to Ranger Street; and
- Lawrie Street – Ranger Street to Bland Street Roundabout.

The bring forward time periods for the above portions of the study are in the order of 0.3 to 0.9 years. The portion of the study network from Ranger Street to Bland Street has currently exceeded the nominal 30 year pavement life.

Mitigation

Several measures are proposed to mitigate traffic and road impacts from the Project:

- Designation of specified routes for heavy vehicles to avoid residential and built-up areas where possible.
- Promotion of car pooling and bus services.
- Restriction of truck deliveries to daytime working hours as much as possible.
- Transportation of dangerous goods, heavy equipment and oversized loads to be managed in accordance with appropriate codes and in co-ordination with the Department of Main Roads.
- Clear signage and restricted speed limit on site (30 km/h).

Other Potential Traffic Impacts

Drainage

It is anticipated that there will be no impact from road use during the Project construction or operation on existing road drainage. It is proposed that traffic will access the project site via a sealed road extending north from Power Station Road which was constructed during the former AMC project. At that time, major channels were established along the western and eastern site boundaries from the southern end of the site. These drain in a generally north-westerly direction. Surface runoff from the southern portion of the site flows south towards a three-stage surface water buffer pond system to the east of SPS (Section 5 – Water Resources). Construction activities that will affect existing drainage channels and control measures will only be carried out after suitable stormwater management infrastructure has been completed on-site. There will be no road construction and impact on road drainage is considered to be negligible.

Noise

In addition to road safety and drainage, the project traffic may impact on existing noise levels. The impacts of traffic noise are discussed in Section 9 – Noise and Vibration.

14.4 Rail

14.4.1 Existing Infrastructure

The Blackwater System and the Central West Line allows for the transport of coal from the mines in Central Queensland to Stanwell (Queensland Department of Transport, 2004). The existing rail infrastructure in the immediate vicinity of the Project comprises a rail loop for the transport of coal to the Stanwell Power Station. The rail loop joins to the main Central West Line which runs in an east/west direction, parallel to the Capricorn Highway. Other rail infrastructure comprises the Stanwell Powerhouse Overbridge, the Neerkol and Stuart Creek crossings of the main line, and two crossings of Neerkol Creek for the rail loop (Queensland Rail, 2005).

From Stanwell, coke product will be transported through Gracemere to Fisherman's Landing along the North Coast Line (Queensland Department of Transport, 2004). This part of the Blackwater rail system links with the Moura rail system which allows for the transport of mine product from the Moura area to Gladstone Port. At Fisherman's Landing, rail infrastructure comprises the Hanson Road Overbridge, a number of crossings of Boat Creek and the rail loop and spur currently used by Cement Australia for the unloading of coal and limestone.

The existing rail infrastructure in the project area and at Fisherman's Landing is owned by the State of Queensland as represented by the Department of Transport and operated by Queensland Rail. The Blackwater rail system, rail loop used by SPS, and the rail line to Gladstone are electrified, however, a combination of electric and diesel powered trains use this infrastructure.

14.4.2 Potential Impacts and Mitigation Measures

Project Rail Requirements

It is anticipated that Stage 1 of the Project will produce up to 1.6 Mtpa of coke for export, requiring approximately 2.5 Mtpa of Bowen Basin coking coal, assumed to be sourced from the Bowen Basin coal fields. Stage 2 of the Project will produce up to 3.2 Mtpa of coke for export, requiring approximately 5 Mtpa of wet Bowen Basin coking coal. This coal is proposed to be railed from mines within the Blackwater rail system to the Stanwell Power Station rail loop. The transport of approximately 2.5 Mtpa of coking coal to the unloading facility at the project site will result in an additional 8 coal trains per week operating on the Blackwater rail corridor. These additional train services will be operated under existing corridor operating parameters.

A new eastern angle connection from the Stanwell Power Station rail loop to the central Blackwater line is proposed to be constructed. This connection will allow the transportation of approximately 1.6 Mtpa of coke from the loading facility on the Stanwell Power Station rail loop to the Fisherman's Landing unloading facility and is estimated to require approximately eight loaded trains per week or 16 train movements.

Based on the current rail infrastructure, capacity does not exist to haul the tonnages proposed under the Project. It is anticipated that for both stages of operation, mainline rail infrastructure enhancements will be required to provide rail infrastructure capacity in the Blackwater system for the required tonnages to be transported to Stanwell and also for product to be transported to Fisherman's Landing Wharf.

Stage 1 Infrastructure

Infrastructure enhancements will be required to haul the tonnages for Stage 1 of the Project. These enhancements will provide capacity for current contracted domestic coal tonnages of up to 3.5 Mtpa of coking coal into Stanwell and up to 2.2 Mtpa of coke from the project site to be hauled to Fisherman's Landing. These enhancement works comprise:

- Duplication Tryphinia-Dingo (indicative completion August 2005);
- Duplication Windah-Grantleigh (indicative completion March 2006);
- Duplication Blackwater-Bluff (indicative completion October 2006);
- Duplication Aronna-Duaringa (indicative completion March 2007);
- Duplication Grantleigh-Tunnel (indicative completion October 2007); and
- Duplication Blackwater-Burngrove (indicative completion March 2008).

Stage 2 Infrastructure

For the rail infrastructure to have the capacity to haul the additional coal and/or coke tonnages for Stage 2 of the Project within the Blackwater system to Stanwell, the duplication of Rocklands to Gracemere will require to be completed, in addition to the enhancement works to be completed for Stage 1. The indicative completion time for this work would be December 2008. Additional track infrastructure will need to be constructed, including signaling upgrades at Mt Miller, to enable haulage without disruption to other services within the Blackwater rail system. To enable simultaneous unloading of feedstock coal for SPS and the Coke Plant, duplication of sections of the existing rail loop will be required.

During Stage 2 operations, the requirement exists to have dedicated loops for the unloading of coke at the new unloading facility at Fisherman's Landing and for the unloading of coal/limestone at the existing Cement Australia unloading facility. The rail loop will be required to be duplicated to enable simultaneous unloading through both facilities.

The completion of these works will provide capacity for current contracted domestic coal tonnages of up to 5 Mtpa of coking coal into Stanwell and up to 3.2 Mtpa of coke to be hauled to Fisherman's Landing.

Infrastructure Development Capacity

Queensland Rail National (QRNational) has indicated that it can meet the demand for the infrastructure enhancement works for Stage 1 of the Project with its program of currently committed and planned locomotive and wagon projects in the Blackwater rail corridor. It is estimated that the necessary rail resources, including crew and rolling stock, would be in place for haulage in Stage 1 of the Project by January 2008. The time estimate for when additional rolling stock and crew resources would be installed for Stage 2 of the Project is uncertain as it depends on the commencement date of the Stage 2 tonnages.

It is anticipated that by the year 2009/2010 the rail usage on the main east-west line of the Blackwater rail corridor will have increased to 230 trains per week. The increase in rail traffic due to the Project will be approximately 16 trains per week, comprising 7% of the growth for the main east-west line.

Environmental Issues

It is proposed that 4,000 class diesel locomotives will be utilised for hauling coal and coke during the Project. These trains are designed to meet strict noise and exhaust emission criteria and it is anticipated that any impact additional to the existing condition on local communities will be minimal.

Spills of coke product railed to Fisherman's Landing are unlikely and all relevant rail spill management procedures will be implemented by the rail provider. Coke is less likely to spill from rail wagons than coal due to its more robust structure and matrix. It is also considerably more environmentally benign than coal.

Investigation of the extent of dust emissions from rail wagons during loading, transport and unloading of coke has found that the coke tested was considerably less dusty than coal currently being railed on the Blackwater rail corridor, and therefore should not impact on local communities (O'Brien, 2002). In addition, the coke product will be sized and screened to remove all fine coke particles from the product before it is loaded onto trains at Stanwell. Environmental management along the rail corridors will be managed by QR under the strategies designed specifically for these infrastructure areas.

14.5 Port Facility

14.5.1 Existing Infrastructure

The Fisherman's Landing site currently comprises:

- A rail loop currently used to unload coal/ limestone at the Cement Australia unloading facility;
- Cement Australia onshore facilities;
- Docking berths for Cement Australia, Comalco and for loading and unloading bulk liquids; and
- Reclaimed land owned by Orica and Comalco.

These facilities are currently managed by the Central Queensland Port Authority (CQPA) under arrangement with the various parties using the site.

14.5.2 Potential Impacts and Mitigation Measures

Proposed Infrastructure and Management

A new coke unloader will be constructed on a second spur line of the Cement Australia rail loop to unload the coke railed from the project site at Stanwell. Coke will be discharged from trains and conveyed to a stockpile area on reclaimed land. In the event that a ship is docked and available for loading, the coke will bypass the stockpile system and report directly to the ship. Alternatively the coke will be diverted to the stacker/reclaimer for placement onto the stockpile (Figure 2.5).

All coke reclaimed from the stockpile or bypassed around the stockpile system will be directed into the screening station prior to ship loading. The screen oversize will be collected on the jetty conveyor and directed to a sampling plant located at the transfer between the jetty and elevated wharf conveyors. The Fisherman's Landing Berth 3 will be developed for outloading coke and the elevated wharf conveyor will direct coke at rate of 2,000 t/hr to a shiploader on Berth 3 for export.

It is proposed that the CQPA will manage the processes described above of unloading the coke from the rail loop, stockpiling the coke and loading the coke onto the ships at the Fisherman's Landing site. Detailed arrangements between the proponents and CQPA for the management of this process will be confirmed closer to commissioning of the Project. Consequently the responsibility for management of potential environmental impacts from the process will be that of CQPA and will be included in the existing Environmental Authority and Environmental Management Systems for the facility.

Shipping

The shiploader to be constructed at Berth 3 will be designed to load Panamax and Post Panamax vessels which are suitable for that berth. Due to the channel width being less than the International Navigation

Association PANIC Guidelines of three times the vessel beam, Post Panamax vessels will only be accepted where it is demonstrated that the vessel handling ability is acceptable to the Regional Harbour Master and the Marine Pilots.

Due to the bulk density of the product, the vessels shall load approximately 45,000 t at a Nominal Loading Rate of 2,000 t/hr. At a Gross Loading Rate of 70% of the Nominal Loading Rate, vessels will be expected to be at the berth for approximately 36 hours.

For early Stage 1 ramp up operations it is anticipated that the equivalent of approximately 20 ships per year (1.6 ships per month) will be required. For full Stage 1 operations it is anticipated that 35 ships per year, (3 ships per month), would be required for the export of 1.6 Mtpa of coke. Stage 2 coke export will require approximately 70 ships per year (6 ships per month).

CQPA advise that two scenarios exist for the channel depth of Targinie Channel. The first is to retain the existing channel depth of Reduced Level (RL) 10.6 m Low Water Datum (LWD) and the second is to deepen the channel to RL 11.7 m LWD. Deepening of the channel is being proposed in association with improved access for vessels to the existing Fisherman's Landing Berths and future developments.

On departure the QCE vessels will be required to depart at approximately half tide or better and as such will follow deep draft Cape sized vessels sailing from R G Tanna Coal Terminal. Deepening the channel further improves options for QCE vessels to sail. Based on modelling of the port capacity, it is considered that there is no impact on vessel queuing times as a result of the QCE development. Discussions with the Gladstone Harbour Master were undertaken in relation to the Project confirming the proposed arrangements.