

Wandoan Coal Project

Transport impact study

November, 2008

Wandoan Joint Venture

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Attachment A

Austroads vehicle classes

Glossary

<i>%CV</i>	Percentage of Commercial Vehicles
<i>AADT</i>	Annual Average Daily Traffic
<i>Auxiliary lane</i>	An additional lane (or lanes) added to the carriageway for safety and/or intersection capacity purposes
<i>CHR</i>	Channelised right turn
<i>ESA's</i>	Equivalent standard axles
<i>HML</i>	Higher Mass Limits
<i>LoS</i>	Level of Service
<i>PIA</i>	Pavement Impact Assessment
<i>Main Roads</i>	Queensland Department of Main Roads
<i>MIA</i>	Mine Infrastructure Area
<i>MLA</i>	Mining Lease Application
<i>Mid-block crashes</i>	Generally head on crashes occurring on undivided two way roads with one driver coming onto the wrong side of the road and colliding with oncoming traffic.
<i>RIA</i>	Road Impact Assessment
<i>SAR</i>	Standard axle repetition
<i>SCR</i>	State controlled road
<i>t</i>	tonne

Executive summary

Due to the additional road traffic anticipated to be generated by the proposed Wandoan Coal Project (the Project) the impacts on the existing roads in the area were investigated for the construction and operational phases of the Project. A transportation impact study included a preliminary assessment of the current conditions of the road network and the determining of baseline traffic (without the Project in place) from various datasets. Traffic operation impacts and pavement impacts were then assessed. The study area for the transportation impact assessment extends beyond the borders of the Mining Lease Application (MLA) areas and includes sections of the following state controlled roads (SCRs):

- Jackson-Wandoan Road (4302)
- Leichhardt Highway (Banana–Taroom) (26A)
- Leichhardt Highway (Taroom–Miles) (26B)
- Dawson Highway (Biloela–Banana) (46B)
- Warrego Highway (Toowoomba–Dalby) (18B)
- Warrego Highway (Dalby–Miles) (18C).
- Roma Taroom Road (Durham Downs– Peek-A-Do) (4397)
- Capricorn Highway (16A) between the Leichhardt Highway and Duaringa
- Capricorn Highway (16B) between Duaringa and Dingo
- Fitzroy Developmental Road (85C) between Dingo and Dysart-Middlemount Road
- Dysart-Middlemount Road (519) between Fitzroy Developmental Road and Crinum Road

The Guidelines for Assessment of Road Impacts of Development (Main Roads 2006) (the Guidelines) has been used as a point of reference in this assessment. The Guidelines provide information about the processes to assess road impacts triggered by a proposed development. The Guidelines state that 'the process of compiling and analysing information on road impacts of specific development proposals is termed road impact assessment (RIA)'. A RIA is generally required when, as part of the development approval process, a development proposal is referred to the Queensland Department of Main Roads (Main Roads) and the impacts are expected to be significant. In general, Main Roads will consider a development's road impacts to be insignificant if the development generates an increase in traffic on SCRs of less than 5% over existing levels, either measured in terms of annual average daily traffic (AADT) or equivalent standard axles (ESAs). Scenarios with and without the Project have been developed. Potential impacts have been quantified and the nature of their significance established.

From the investigations undertaken, it was determined that the existing major roads within the study area are in a generally good condition and appear to be well maintained. Generally, additional traffic associated with the construction and operation of the Project will not adversely impact on the operation of the SCRs. However, pavement impacts during the construction period are predicted on the Leichhardt Highway (between the intersection of the Warrego Highway and mine access road).

Mitigation strategies have been recommended to minimise the potential impacts of the Project, and are summarised below:

- any new roads and intersections should be constructed to Main Roads standards — for the new mine access road intersection with the Leichhardt Highway, a CHR turn treatment is recommended
- appropriate traffic management measures should be used where these roads intersect any SCRs
- negotiations with local government bodies and relevant state bodies (e.g. Main Roads) will be required for the use of road reserves for pipeline alignments. Written authorisation from the CEO's will be required where the pipelines cross the Surat Basin Rail and QR Rail corridors or any state controlled roads
- construction crew travel to and from the MIA during shift changes should be restricted to certain hours of the day, and traffic management measures employed around the intersection of the new MIA access road and Leichhardt Highway during the hours of construction crew travel
- appropriate traffic management measures must be implemented where pipelines are required to be trenched across roads.

Steps should also be taken to ensure the safety of the workforce and other road users. An appropriate fatigue management system should be implemented to ensure there are adequate rest periods, which prohibit long journeys by road, directly upon completion of shifts. In addition, haulage operators need to have sufficient rest breaks and driver changes as required.

1. Introduction

1.1 Project background

The Wandoan Coal Project (the Project) comprises the development of thermal coal resources situated immediately west of the Wandoan township, located in Dalby Regional Council local government area. The Project is located approximately 350 km northwest of Brisbane and 60 km south of Taroom as shown in Figure 1-1. The coal reserves for this Project are covered by three mining lease applications, MLA 50229, 50230 and 50231 as shown in Figure 1-2. The coal resources are proposed to be developed as an open cut mine with related infrastructure. The mining of the coal resources will be undertaken using a combination of truck, excavator, dozer and dragline mining equipment. Coal will be mined at a rate of around 30 million tonnes per annum (Mtpa) run of mine (ROM) coal. The coal will be crushed, sized and washed before being transported by rail to port facilities in the Gladstone area.

The Project will be developed by the Wandoan Joint Venture. The joint venture partners are Xstrata Coal Queensland Pty Ltd (XCQ), ICRA RPW Pty Ltd and Sumisho Coal Australia Pty Ltd.

1.2 Description of study area

Figure 1-2 shows the Project area which is located in the Surat Basin immediately west of the Wandoan Township in the Dalby Regional Council local government area. Other towns of note include Taroom and Miles which are located approximately 60 km to the north and 69 km to the south of Wandoan respectively.

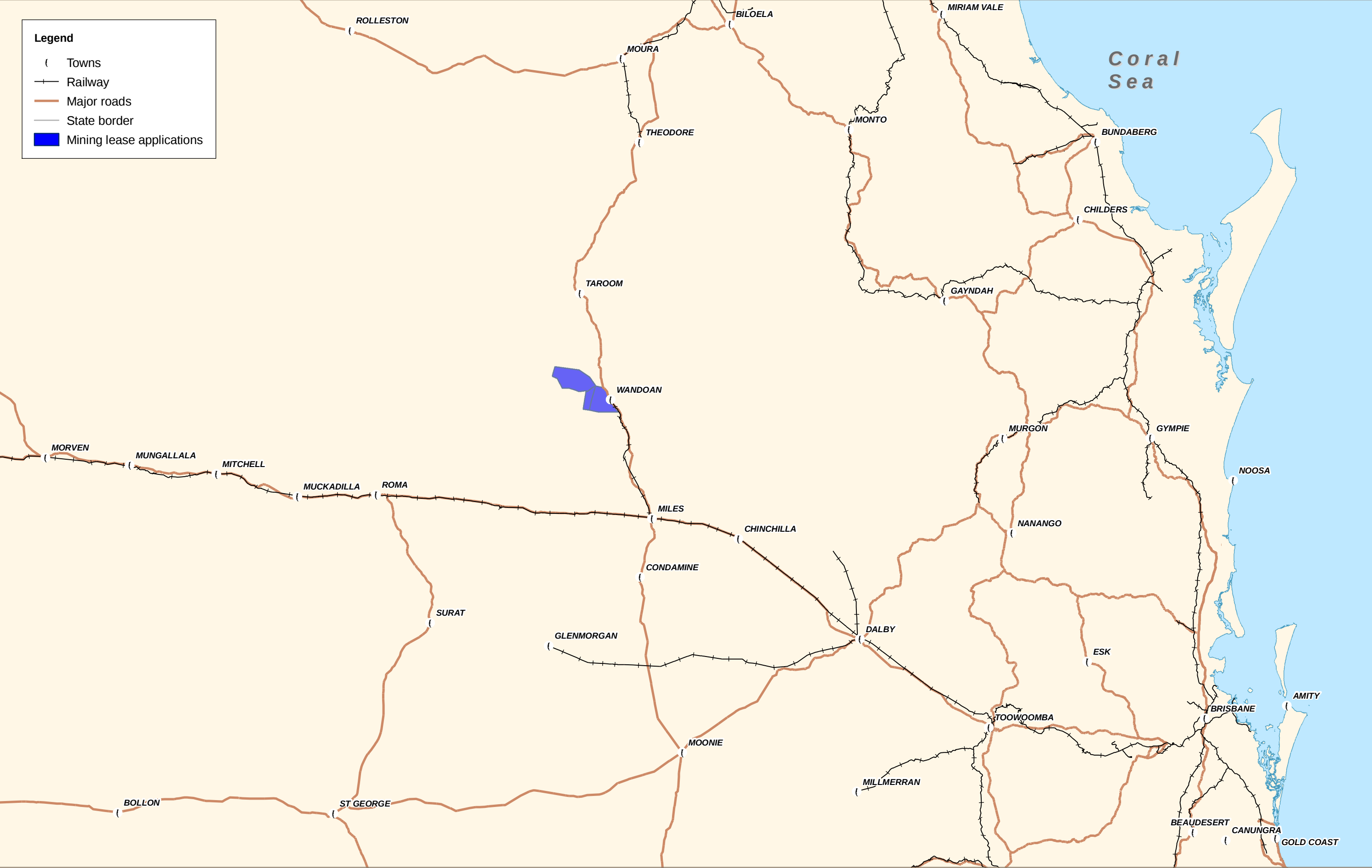
The study area (shown in Figure 1-2) for the transportation impact assessment extends beyond the borders of the MLAs and includes the following state controlled roads (SCRs):

- Jackson-Wandoan Road (4302)
- Leichhardt Highway (Banana–Taroom) (26A)
- Leichhardt Highway (Taroom–Miles) (26B)
- Dawson Highway (Biloela–Banana) (46B)
- Warrego Highway (Toowoomba–Dalby) (18B)
- Warrego Highway (Dalby–Miles) (18C).
- Roma-Taroom Road (Durham Downs–Peek-A-Do) (4397)
- Capricorn Highway (16A) between the Leichhardt Highway and Daringa
- Capricorn Highway (16B) between Daringa and Dingo
- Fitzroy Developmental Road (85C) between Dingo and Dysart-Middlemount Road
- Dysart-Middlemount Road (519) between Fitzroy Developmental Road and Crinum Road.

These roads are described in more detail in Section 3.1. Although deliveries are expected from centres such as Brisbane and Gladstone, the full lengths of roads leading to these

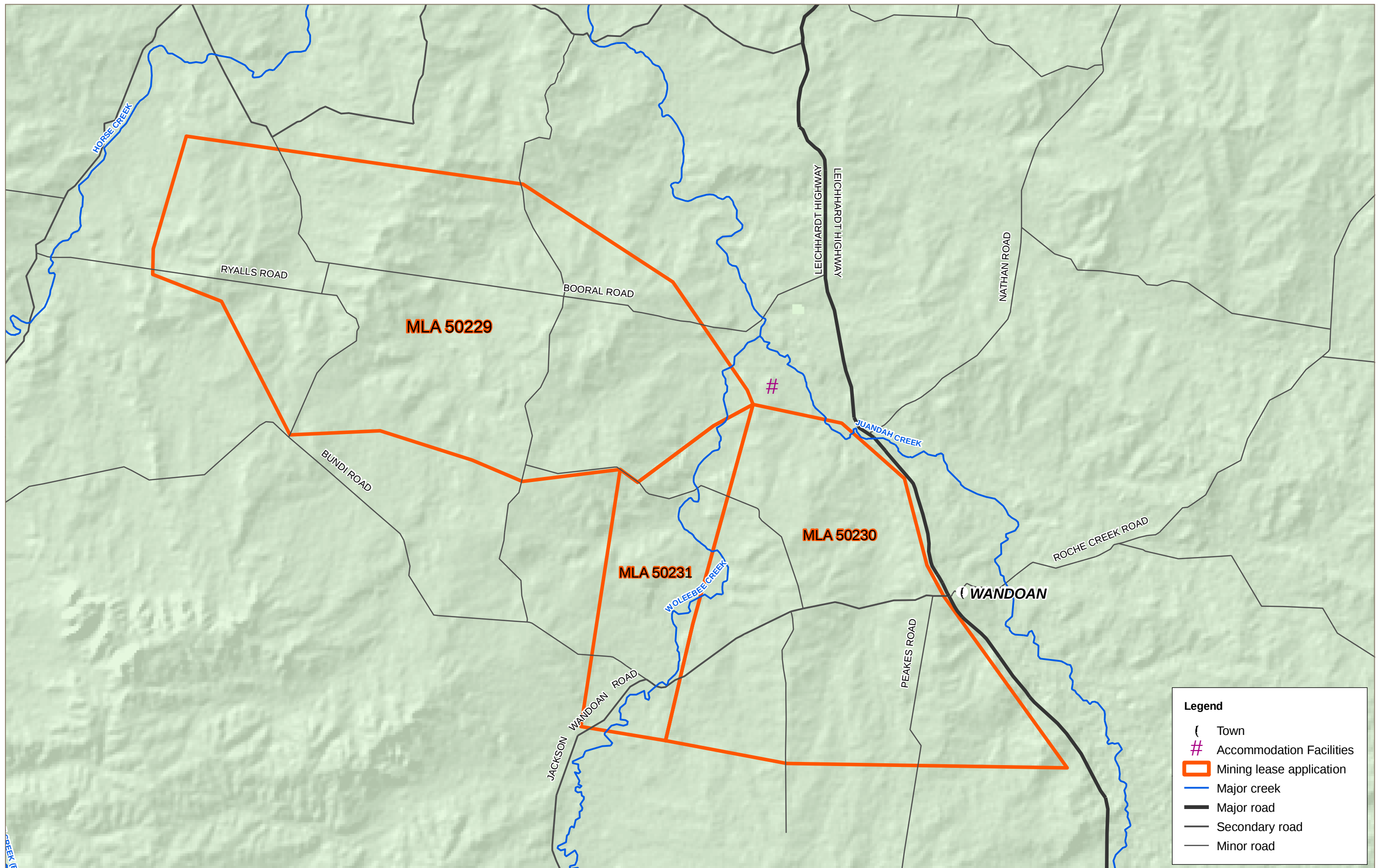
centres (i.e. beyond the extents of roads listed above) were not included in the analyses as the Project does not adversely affect these sections of road(s).

The haul routes for the 500,000 t bulk sample and construction materials for the pipelines include other roads controlled by local council which are not covered in this assessment as no date is available for these roads — see the heading 'Impacts on other roads' under Section 4.3 for more details.



J:\A442-ENG\PROJ\2133006C__Wandoan_prefea\10_GIS\Projects\Env\Technical Report\Figure 1-1 Project Location.mxd

Source: Roads, QLD State Digital Road Network (2004); Towns, Coastline , boundaries, 1:250K Topo, Geoscience Australia (2006)



J:\A442-ENG\PROJ\2133006C__Wandoan_prefea\10_GIS\Projects\Env\Technical Report\Figure 1-2 Project Area.mxd

Source: Roads, QLD State Digital Road Network (2004); Towns, creeks 1:250K Topo, Geoscience Australia (2006)

2. Methodology of assessment

2.1 Relevant legislation and guidelines

2.1.1 *The Guidelines for Assessment of Road Impacts of Development*

The *Guidelines for Assessment of Road Impacts of Development* (Main Roads 2006) (the Guidelines) has been used as a point of reference in this assessment. The Guidelines provide information about the processes involved to assess road impacts triggered by a proposed development. The Guidelines only apply to SCRs, however, a local government may choose to adopt or use them.

Chapter 1, page 1 of the Guidelines state that ‘the process of compiling and analysing information on the road impacts of specific development proposals is termed road impact assessment (RIA)’.

A RIA is generally required when, as part of the development approval process, a development proposal is referred to the Queensland Department of Main Roads (Main Roads) and the impacts are expected to be significant. In general, Main Roads will consider a development’s road impacts to be insignificant if the development generates an increase in traffic on SCRs of less than 5% over existing levels, either measured in terms of annual average daily traffic (AADT) or equivalent standard axles (ESAs).

2.1.2 *The Transport Infrastructure Act 1994 (Queensland)*

The *Transport Infrastructure Act 1994* (TI Act) encourages effective integrated planning and efficient transport infrastructure management and provides for the planning and management of road, rail, and air infrastructure.

SCRs are defined by Part 2 of the TI Act. Main Roads manages the SCR network within Queensland and a number of SCRs, as described in Section 1.2 in this report, fall within the study area and may be subject to laws and regulations as stated within the TI Act. Of note in the TI Act are the following:

- cost sharing arrangements — section 32 of TI Act
 - Main Roads may arrange for sharing costs with another person or body for any road works on the SCR or other works that interfere with the effectiveness, efficiency or operation of a SCR
- prohibition on road works etc. on SCRs — section 33 of TI Act
 - written approval is required for any proposed works on a SCR or works that may interfere with a SCR and its operation
- property access — section 54 of the TI Act
 - approval is likely to be required to gain property access or other access onto a State-controlled road
- permits for construction, maintenance etc. on SCRs — section 50 of the TI Act

- project works to construct, maintain, operate or conduct ancillary works and encroachment on SCRs (e.g. intersection upgrades, water and gas supply pipelines traversing under the road) will require an Ancillary Works and Encroachment Permit under the TI Act.

2.1.3 The Land Act 1994 (Queensland)

The *Land Act 1994* provides a framework for the allocation of State land as leasehold, freehold or other tenure and their subsequent management.

Under Chapter 4, Part 4 of the Land Act, Permits to Occupy are required for the occupation of a reserve, road or unallocated State land. Where infrastructure (such as powerlines, water pipelines and gas pipelines) are to be developed on unallocated State land, reserves or roads, a Permit to Occupy will be required.

Chapter 3, Part 2, Division 2 of the Land Act contains provisions for permanent or temporary closures of SCRs.

2.1.4 Local laws

The Project area falls within the Dalby Regional Council (DRC) local government area limits. DRC is the new local government area created in March 2008 upon the amalgamation of the former local government areas of Dalby Town Council and the Shires of Chinchilla, Murilla, Tara, Wambo and Division two of Taroom (Wandoan area). To the north of the MLAs, Division One of the former Taroom Shire local government has been transferred to the Banana Shire Council (BSC) local government area.

The local laws in place prior to the local government amalgamations in March 2008 continue in force to the same geographical area to which they applied prior to the amalgamation until the local laws are adopted by the DRC which apply to the whole new local government area.

The following local laws are potentially of relevance:

- Dalby Town Council Local Law 21 (Roads) Part 4 Division 1
- Chinchilla Shire Council Local Law 11 (Roads) Part 4 Division 1
- Murilla Shire Council Local Law 21 (Roads) Part 4 Division 1
- Tara Shire Council Local Law 21 (Roads) Part 3 Division 1
- Wambo Shire Council Local Law 21 (Roads) Part 4 Division 1
- Taroom Shire Council Local Law No. 21 (Roads) Part 3 Division 1.

These laws relate to the 'alteration or improvement' of local government roads, and generally provide that:

...a person (other than the local government) must not make an alteration or improvement to a local government road unless authorised by a licence under this Division.

2.2 Transport planning, programs and transport services

The headings below is a short summary of the relationship between the roads affected by the Project and any existing regional strategies and plans, implementation and maintenance programs and transport services that exist within the study area.

2.2.1 Transport strategies, plans and projects

At present, no regional transport strategies, transport initiatives or transport projects exist within the Central Queensland region that is applicable to the Project.

2.2.2 Roads Implementation Program

The Roads Implementation Program (RIP), released by Main Roads, is a capital works program for SCRs within Queensland and is a mechanism for delivering roads to meet current and future needs. Development of the RIP is a requirement under the Transport Infrastructure Act. The latest version, RIP 2008–09 to 2012–13, was released in June 2008.

Table 2-1 lists works planned in the Darling Downs region that are of relevance to the Project.

Table 2-1: Planned roads works for Darling Downs region

Road	Location	Period	Work description
Leichhardt Highway (Taroom–Miles)	87.00–90.00 km	2009–10	Hazards close to road
Leichhardt Highway (Taroom–Miles)	36.60–36.80 km	2008–09	Intersection improvements
Leichhardt Highway (Taroom–Miles)	87.00–89.36 km and 90.81–91.95 km	2008–09	Recycle pavement
Leichhardt Highway (Taroom–Miles)	29.90–35.01 km	2008–09 2009–10	Widen pavement
Leichhardt Highway (Taroom–Miles)	24.90–29.90 km	2008–09 2009–10 2010–11 to 2012–13	Widen pavement
Leichhardt Highway (Taroom–Miles)	81.90–85.60 km	2010–11 to 2012–13	Widen pavement
Leichhardt Highway (Taroom–Miles)	78.05–89.10 km (section 1)	2008–09	Widen pavement

Source: Roads Implementation Program 2008–09 to 2012–13 (Main Roads 2008)

In addition to the above, the road works listed in Table 2-2 cover other regions (Fitzroy and Mackay/Whitsunday) that are impacted upon by the Project during Year -2 due to the haulage of the bulk sample — see Section 4 for more information regarding the bulk sample haulage and the full developmental profile of the Project.

Table 2-2: Planned road works for other regions

Road	Location	Period	Work description
Leichhardt Highway (Taroom–Miles)	11.40–14.96 km and 22.52–24.90 km	2010–11 to 2012–13	Widen pavement
Leichhardt Highway (Westwood–Taroom)	Dawson River–12 Mile Creek	2008–09	Widen pavement
Leichhardt Highway (Westwood–Taroom)	North of Dawson Park Road	2008–09	Widen pavement
Leichhardt Highway (Westwood–Taroom)	Don River bridges area	2008–09	Miscellaneous works
Leichhardt Highway (Westwood–Taroom)	Don River bridges	2009–10 2010–11 to	Replace bridges

Road	Location	Period	Work description
		2012–13	
Leichhardt Highway (Westwood–Taroom)	156.00–165.00 km	2009–10	Widen and seal
Capricorn Highway (Duarina–Emerald)	Sections: Bluff Town	2010–11 to 2012–13 Beyond 2013	Seal shoulders
Capricorn Highway (Duarina–Emerald)	Bluff Creek	2010–11 to 2012–13 Beyond 2013	Improve drainage
Capricorn Highway (Duarina–Emerald)	Sections: 0.01– 159.55 km	2009–10	Miscellaneous works
Capricorn Highway (Duarina–Emerald)	East of Yamala	2009–10 2010–11 to 2012–13	Seal shoulders
Capricorn Highway (Duarina–Emerald)	West of Yamala	2008–09	Rehabilitate and widen
Capricorn Highway (Duarina–Emerald)	Winton Creek– Agricultural College	2010–11 to 2012–13	Rehabilitate and widen
Capricorn Highway (Rockhampton–Duarina)	Sections: 0–73.30 km	2008–09	Drivers fatigue management
Fitzroy Developmental Road (Dingo–Mt Flora)	Sections: 76.22– 234.52 km	2008–09	Intersection lighting
Dysart-Middlemount Road	Sections: German Creek–Middlemount	2008–09	Seal shoulders
Dysart-Middlemount Road	24.13–43.46 km	2010–11 to 2012–13	Reconstruct pavement

Source: Roads Implementation Program 2008–09 to 2012–13 (Main Roads 2008)

2.2.3 Transport services

School bus routes

The existing school bus routes in the area use parts of the Leichhardt Highway, Warrego Highway, Jackson-Wandoan Road and Grosmont Road. Figure 2-1 shows the existing school bus routes in the area — the different coloured lines indicate the different runs in the area.

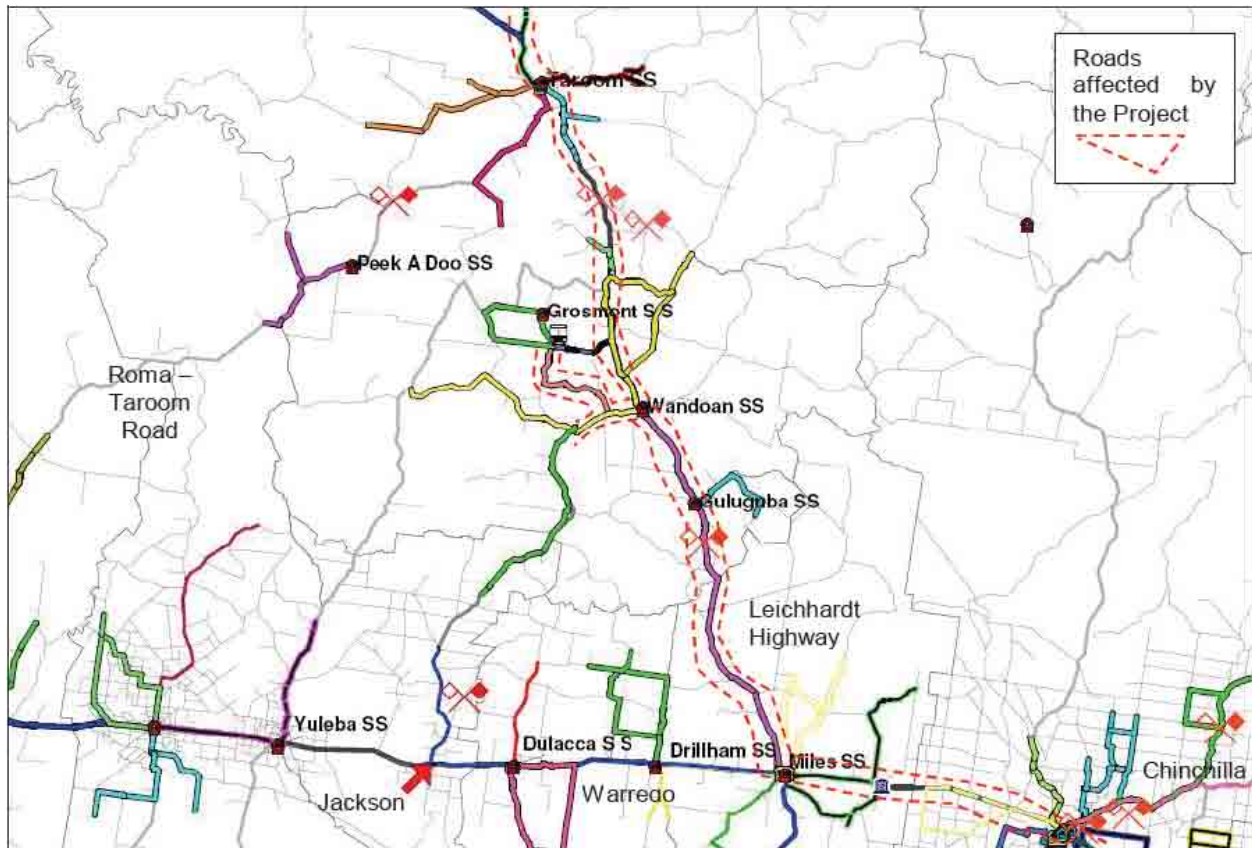


Figure 2-1: School bus routes in the vicinity of the Project

Source: Queensland Transport, Passenger Transport Division

Other transport services

At present no public transport services exist in the area surrounding the Project.

2.3 How the study was conducted and information obtained

2.3.1 Methodology

In order to accurately assess the likely road impacts during the construction and operation of the Project, scenarios with and without the Project have been developed. Potential impacts have been quantified and the nature of their significance established.

The following tasks were undertaken as part of the traffic and transport assessment within the Project study area:

- field survey of the road pavements and intersections
- description of the current road conditions and intersection arrangements
- review of historic maintenance records for major roads
- assessment of pavement impacts (in terms of ESAs) as a result of increased traffic during construction and operation of the Project.

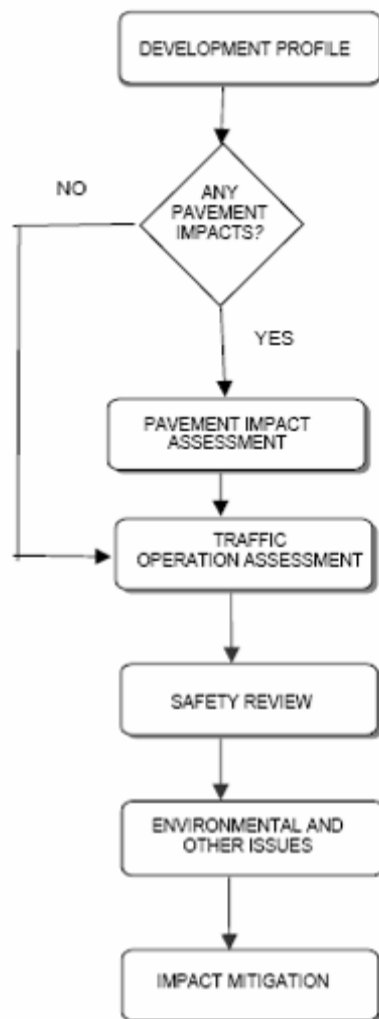
Further details of the methodology for the above analyses, as well as their results, are provided throughout this technical report.

2.3.2 Scope

This technical report has been prepared in accordance with the Terms of Reference for the Project. The scope of works included undertaking a preliminary assessment of the current conditions of the road network surrounding the Project. The potential traffic impacts during construction and operation of the Project were then assessed.

The scope of a RIA depends significantly on the location, type, staging and size of a development. The aim of a RIA is to determine the impacts on the existing road network due to the additional traffic generated by a development and any potential mitigation measures required.

Figure 2-2 provides an overview of the different stages in a RIA.



Source: Main Roads (2006)

Figure 2-2: Road impact assessment overview

2.3.3 Summary of provided datasets

A number of different datasets, provided by Main Roads have been used in this assessment and are listed below. The role of each piece of information in this assessment is described in *italics*:

1. Annual average daily traffic (AADT), yearly growth rates and percentage of commercial vehicles (%CV) data cover the 2008 calendar year

This information is the latest information available at the time of this assessment and was extrapolated to determine base traffic for future years (e.g. 10-year design horizon) along various sections of the relevant SCRs.

2. Equivalent standard axle (ESA) analysis

This analysis provides an initial indication of the likely pavement impacts resulting from the development. An average value of 3.5 ESA's per commercial vehicle has been used in the pavement impact investigations as discussed in Sections 4 and 5 — this value has been determined from Weigh in Motion sites.

In addition to the above, input was sought from the various specialists involved with the Project, specifically on material quantities for the various elements of the mine — e.g. the coal handling process plant (CHPP), rail spur, mining equipment and power. This is discussed in more detail in the development profile in Section 4.

2.4 Limitations

A number of conservative assumptions, based on the available information and previous projects of a similar nature, have been made during the development profile. Material quantities supplied are the totals required for construction of the entire Project. In order to compare the development's traffic impacts to an equivalent existing situation the totals have been averaged out over the construction period. This also takes into account the construction activities taking place during the first few years of operation. An assumption was also made on the traffic distribution during the construction phase. These and other assumptions/limitations are discussed in more detail in the development profile in Section 4 of this report.

3. Existing and future traffic environment

3.1 Existing road network

The Project area is traversed by a number of roads, most notably Jackson-Wandoan Road which is an SCR. The proposed mining pit locations will result in a number of temporary road closures, new sections of roads and road relocations within and adjacent to the MLA areas including the Jackson-Wandoan Road.

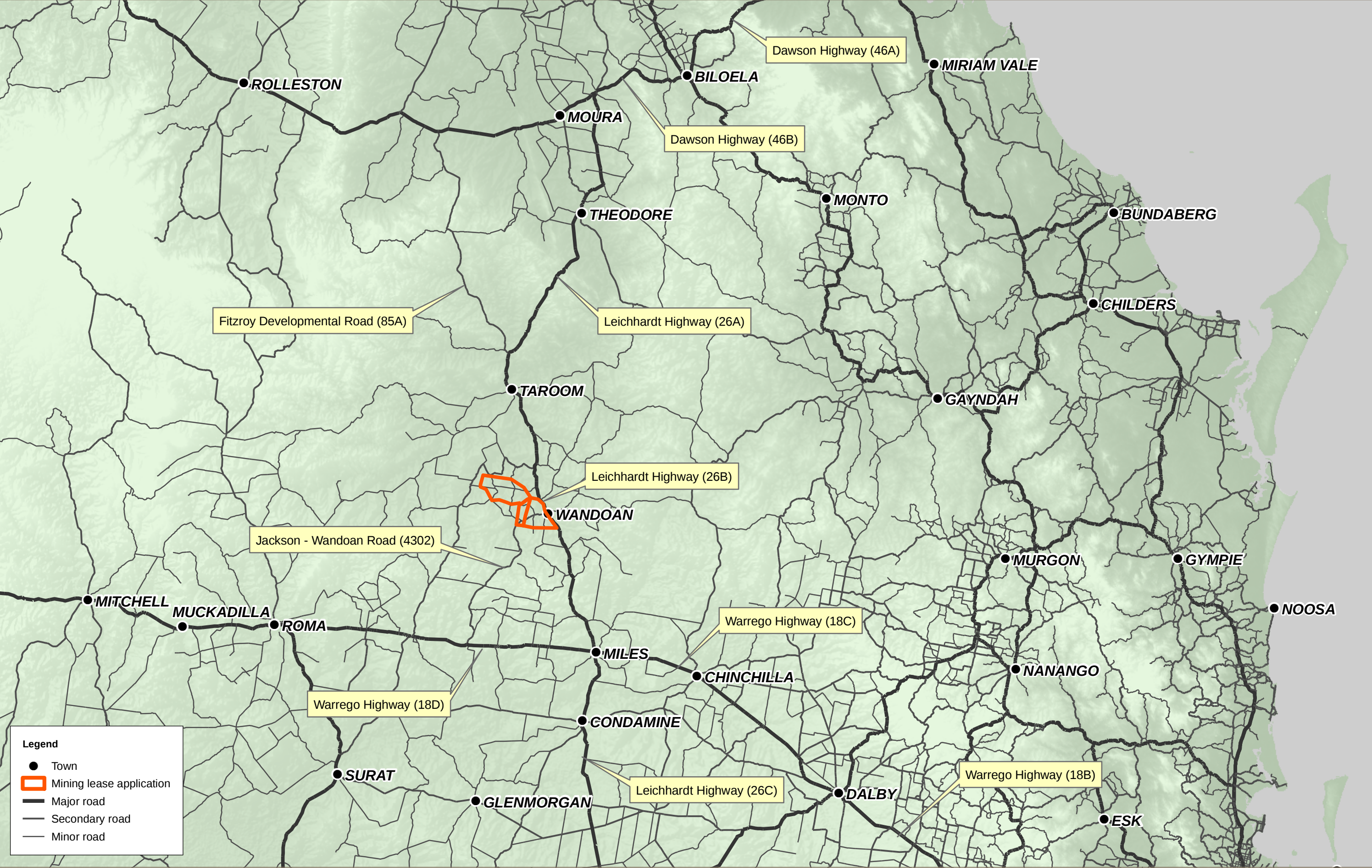
The Leichhardt Highway is located directly to the east of the Project area and connects Miles, Wandoan and Taroom. From Miles the Leichhardt Highway continues in a northerly direction through the towns of Theodore and Banana. At the town of Banana the Leichhardt Highway connects to the Dawson Highway which in turn connects to the Port of Gladstone. From here the Leichhardt Highway continues north passing through the towns of Dululu before it terminates as it intersects the Capricorn Highway.

The Capricorn Highway runs east to west and connects Yeppoon and Rockhampton to Emerald via towns such as Dingo and Blackwater. The Fitzroy Developmental Road runs between the Peak Downs Highway to the north and Dingo to the south, it then continues on south to Bauhinia and beyond. Dysart-Middlemount Road connects Dysart to Fitzroy Developmental Road.

To the southeast of the Project, the Warrego Highway connects Miles to Toowoomba and continues further east to Brisbane.

To the northwest of the Project, Roma-Taroom Road runs between the Carnarvon Highway and Taroom.

In general, the region has well established road infrastructure. Figure 3-1 shows the surrounding road network.



J:\A442-ENG\PROJ\2133006C__Wandoan_prefea\10_GIS\Projects\Env\Technical Report\Figure 2-1 Test Pit and test bore locations .mxd

3.2 Site visit

A site visit was conducted in July 2008 to observe the current condition of roads in the study area. Observations are listed below:

- the SCRs typically have a posted speed limit of 100 km/h with lower speeds, usually 60 km/h and 80 km/h at town areas. The Warrego Highway has a maximum posted speed limit of 110 km/h in some sections
- all of the SCRs are single carriageway roads (one lane each direction) with adequate lane widths and painted edge lines
- the SCRs typically have good sight lines
- generally the pavement is in good condition, although some pavement and surface defects were detected — these are however considered normal due to the high volume of commercial vehicles (CVs) in use on these roads
- the SCRs appear to be regularly maintained.



Photo 3-1: Warrego Highway — typical road train



Photo 3-2: Warrego Highway outside Dalby — looking west



Photo 3-3: Intersection of Warrego and Leichhardt Highways — looking west



Photo 3-4: Leichhardt Highway — looking north



Photo 3-5: Leichhardt Highway — newly ressealed shoulders

3.3 Baseline traffic

Baseline traffic data for 2008 was supplied by Main Roads. Furthermore, average ESAs per commercial vehicle (CV) for the South Western District was determined through Weigh in Motion sites. Main Roads lists the ESA factor (F_1) for this district as 3.5. The number of CVs is multiplied by the F_1 factor in order to determine the current baseline ESAs for each road segment.

Table 3-1 shows the 2008 AADT (bidirectional) together with number of CVs (determined from the %CV as per the supplied datasets) and average daily ESAs for each road segment.

Table 3-1: Background traffic (2008)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	537	190	666
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	654	189	661
Jackson–Wandoan Road intersection–Miles	638	203	711
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	66	14	50
Chainage 68.5 km — Wandoan	132	27	95
Warrego Highway (18C)			
Main Roads district boundary–Miles	1,846	428	1,500
Warrego Highway (18B)			
Dalby–Road 325 intersection	5,639	861	3,012
Road 325 intersection–chainage 27.0 km	4,433	964	3,375
Chainage 27.0 km–chainage 10.5 km	11,482	1,372	4,802
Chainage 10.5 km–intersection McDougall Street, Toowoomba	13,068	1,112	3,892
Dawson Highway (46B)			
1 km east of Banana	1,384	234	818
900 m west of Burnett Highway (41E)	1,832	285	996
700 m west of Burnett Highway (41D)	6,091	639	2,236
Roma–Taroom Road (4397)			
0.14 km north of Wybara Road	52	12	40
16.28 km south of Taroom	94	22	78
Leichhardt Highway (26A)			
Sandy Creek	906	249	873
11 km south of Wowan	687	165	576

Road/section	AADT	Daily CVs	Daily ESAs
100 m north of Woolein Creek	690	170	596
300 m south of Fairview	664	169	591
Bowen Street west of Banana	2,458	449	1,572
Branch Creek	681	200	701
400 m south of The Boulevard	737	156	545
Tim Shay Creek	515	149	520
Capricorn Highway (16A)			
41 Mile Creek	2,717	561	1,962
500 m west of Dawson River	2,651	608	2,127
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	2,702	598	2,092
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	860	238	834
6 km South of Mackenzie River	812	206	720
South of Middlemount Turnoff	662	160	559
Dysart-Middlemount Road (519)			
West of Middlemount	2,254	294	1,028

3.3.1 Recent road works

From consultation with Main Roads about recent road works, the following are of note:

- Dawson Highway (46B), Banana to Prospect Creek — reconstructed, November 2007
- Leichhardt Highway (26B) north of Wandoan — shoulder reseal, mid 2008 (ongoing).

3.4 Future traffic environment — ‘without development’ scenario

The development profile for the construction phase, which is discussed in detail in Section 4 of this report, contains information regarding the construction timing and phases for the Project. Construction activities are anticipated to start in 2010 (Year -2) and continue through to 2011 (Year -1), after which time the mine is proposed commence operations. However, as discussed in Section 4 of this report some construction activities will continue beyond this date. As such, construction traffic has been investigated from Year -2 through to Year 4 and these years are used as base years for comparison purposes for the ‘with development’ and ‘without development’ scenarios.

Projected traffic volumes for Year -2 to Year 4 without the development are summarised in Tables 3-2 to 3-7 below. The expected ESAs along each road segment, without the development are also shown. This data is used as a baseline for comparison during the construction impact analysis.

As per the Guidelines, traffic impacts also need to be assessed to a ten year horizon after the completion of construction. The calendar year 2025 (Year 14) is therefore employed as the baseline for operations assessment. Table 3-8 shows the projected traffic volumes and ESAs for Year 14. The projected volumes in Years 15 and 17 without the Project are presented in Tables 3-9 and 3-10 as draglines 4 and 5 will be assembled during these years. The Project will impact on more roads during Years -1 and -2 due to the bulk sample transportation, details of this can be found in Section 4 of this report.

Projected traffic volumes were calculated using the growth rates supplied in the datasets (refer Section 2.3.3 of this report) as follows:

- Leichhardt Highway (26A)
 - 1.62 km south of Fitzroy Development Road — 3.0%
- Leichhardt Highway (26B)
 - Taroom Jackson-Wandoan Road intersection — 3.0%
 - Jackson-Wandoan Road intersection Miles — 3.0%
- Leichhardt Highway (26A)
 - Sandy Creek — 3.9%
 - 11 km south of Wowan — 5.0%
 - 100 m north of Woolein Creek — 3.0%.
 - 300 m south of Fairview — 3.0%
 - Bowen Street west of Banana — 16.2%
 - Branch Creek — 3.00%
 - 400 m south of The Boulevard — 1.5%
 - Tim Shay Creek — 4.8%
- Jackson-Wandoan Road (4302)
 - Jackson Chainage 68.5 km — 3.0%
 - Chainage 68.5 km Wandoan — 3.0%
- Warrego Highway (18C)
 - Main Roads district boundary Miles — 3.0%
- Warrego Highway (18B)
 - Dalby Road 325 intersection — 3.3%
 - Road 325 intersection Chainage 27.0 km — 5.4%
 - Chainage 27.0 km Chainage 10.5 km — 3.8%
 - Chainage 10.5 km intersection McDougall St, Toowoomba — 4.4%
- Dawson Highway (46B)
 - 1 km east of Banana — 8.3%
 - 900 m west of Burnett Highway (41E) — 4.8%
 - 700 m west of Burnett Highway (41D) — 13.9%

- Roma-Taroom Road (4397)
 - 0.14 km north of Wybara Road — 3.0%.
 - 16.28 km south of Taroom — 3.0%
- Capricorn Highway (16A)
 - 41 Mile Creek — 8.6%
 - 500 m west of Dawson River — 7.1%
- Capricorn Highway (16B)
 - 1.5 km east of Dingo Roadhouse — 7.8%
- Fitzroy Developmental Road (85C)
 - 2.8 km north of Capricorn Highway — 10.1%
 - 6 km south of Mackenzie River — 11.8%
 - South of Middlemount turnoff — 9.7%
- Dysart-Middlemount Road (519)
 - West of Middlemount — 8.7%.

Table 3-2: Predicted traffic without the Project (Year -2)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	569	202	707
Leichhardt Highway (26B)			
Taroom–Jackson-Wandoan Road intersection	694	200	702
Jackson-Wandoan Road intersection–Miles	677	216	755
Jackson-Wandoan Road (4302)			
Jackson–chainage 68.5 km	70	15	53
Chainage 68.5 km–Wandoan	140	29	101
Warrego Highway (18C)			
Main Roads district boundary–Miles	1,958	455	1,591
Warrego Highway (18B)			
Dalby–Road 325 intersection	6,011	917	3,211
Road 325 intersection–chainage 27.0 km	4,921	1,070	3,746
Chainage 27.0 km–chainage 10.5 km	12,381	1,479	5,178
Chainage 10.5 km–intersection McDougall Street, Toowoomba	14,241	1,212	4,242
Dawson Highway (46B)			
1 km east of Banana	1,624	274	960
900 m west of Burnett Highway (41E)	2,014	313	1,095

Road/section	AADT	Daily CVs	Daily ESAs
700 m west of Burnett Highway (41D)	7,906	829	2,903
Roma-Taroom Road (4397)			
0.14 km north of Wybara Road	57	13	44
16.28 km south of Taroom	103	25	86
Leichhardt Highway (26A)			
Sandy Creek	979	269	943
11 km south of Wowan	757	182	635
100 m north of Woolein Creek	732	181	632
300 m south of Fairview	705	179	627
Bowen Street west of Banana	3,318	607	2,123
Branch Creek	716	211	737
400 m south of The Boulevard	760	161	562
Tim Shay Creek	566	163	571
Capricorn Highway (16A)			
41 Mile Creek	3,090	637	2,231
500 m west of Dawson River	3,042	697	2,440
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	3,138	694	2,429
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,043	289	1,011
6 km South of Mackenzie River	1,014	257	899
South of Middlemount Turnoff	796	192	672
Dysart-Middlemount Road (519)			
West of Middlemount	2,662	347	1,214

Table 3-3: Predicted traffic without the Project (Year -1)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	586	208	728
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	715	206	723
Jackson–Wandoan Road intersection–Miles	697	222	777
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	72	15	54

Road/section	AADT	Daily CVs	Daily ESAs
Chainage 68.5 km–Wandoan	144	30	104
Warrego Highway (18C)			
Main Roads district boundary–Miles	2,017	468	1,639
Warrego Highway (18B)			
Dalby–Road 325 intersection	6,207	947	3,315
Road 325 intersection–chainage 27.0 km	5,185	1,128	3,947
Chainage 27.0 km–chainage 10.5 km	12,856	1,536	5,377
Chainage 10.5 km–intersection McDougall Street, Toowoomba	14,866	1,265	4,428
Dawson Highway (46B)			
1 km east of Banana	1,759	297	1,040
900 m west of Burnett Highway (41E)	2,111	328	1,147
700 m west of Burnett Highway (41D)	9,008	945	3,307
Leichhardt Highway (26A)			
Sandy Creek	1,017	280	980
11 km south of Wowan	794	191	667
100 m north of Woolein Creek	754	186	651
300 m south of Fairview	726	184	646
Bowen Street west of Banana	3,856	705	2,467
Branch Creek	734	216	756
400 m south of The Boulevard	772	163	570
Tim Shay Creek	593	171	598
Capricorn Highway (16A)			
41 Mile Creek	3,295	680	2,379
500 m west of Dawson River	3,259	747	2,614
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	3,382	748	2,618
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,149	318	1,114
6 km South of Mackenzie River	1,133	287	1,005
South of Middlemount Turnoff	873	211	737
Dysart-Middlemount Road (519)			
West of Middlemount	2,893	377	1,320

Table 3-4: Predicted traffic without the Project (Year 1)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	604	214	750
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	736	213	744
Jackson–Wandoan Road intersection–Miles	718	229	801
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	74	16	56
Chainage 68.5 km–Wandoan	149	31	107
Warrego Highway (18C)			
Main Roads district boundary–Miles	2,078	482	1,688
Warrego Highway (18B)			
Dalby–Road 325 intersection	6,409	978	3,423
Road 325 intersection–chainage 27.0 km	5,463	1,188	4,158
Chainage 27.0 km–chainage 10.5 km	13,350	1,595	5,584
Chainage 10.5 km–intersection McDougall Street, Toowoomba	15,518	1,321	4,622
Dawson Highway (46B)			
1 km east of Banana	1,906	322	1,127
900 m west of Burnett Highway (41E)	2,213	344	1,203
700 m west of Burnett Highway (41D)	10,262	1,077	3,768

Table 3-5: Predicted traffic without the Project (Year 2)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	622	221	772
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	758	219	767
Jackson–Wandoan Road intersection–Miles	740	236	825
Jackson–Wandoan Road (4302)			
Jackson chainage 68.5 km	77	16	57
Chainage 68.5 km Wandoan	153	31	110
Warrego Highway (18C)			

Road/section	AADT	Daily CVs	Daily ESAs
Main Roads district boundary–Miles	2,140	497	1,738
Warrego Highway (18B)			
Dalby–Road 325 intersection	6,617	1,010	3,534
Road 325 intersection–chainage 27.0 km	5,755	1,252	4,381
Chainage 27.0 km–chainage 10.5 km	13,862	1,657	5,798
Chainage 10.5 km–intersection McDougall Street, Toowoomba	16,200	1,379	4,825
Dawson Highway (46B)			
1 km east of Banana	2,064	349	1,220
900 m west of Burnett Highway (41E)	2,320	360	1,261
700 m west of Burnett Highway (41D)	11,692	1,226	4,293

Table 3-6: Predicted traffic without the Project (Year 3)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	641	227	795
Leichhardt Highway (26B)			
Taroom–Jackson-Wandoan Road intersection	781	226	790
Jackson-Wandoan Road intersection–Miles	762	243	849
Jackson-Wandoan Road (4302)			
Jackson–chainage 68.5 km	79	17	59
Chainage 68.5 km–Wandoan	158	32	113
Warrego Highway (18C)			
Main Roads district boundary–Miles	2,204	512	1,791
Warrego Highway (18B)			
Dalby–Road 325 intersection	6,832	1,043	3,649
Road 325 intersection–chainage 27.0 km	6,064	1,319	4,616
Chainage 27.0 km–chainage 10.5 km	14,395	1,720	6,021
Chainage 10.5 km–intersection McDougall Street, Toowoomba	16,911	1,439	5,037
Dawson Highway (46B)			
1 km east of Banana	2,236	378	1,322
900 m west of Burnett Highway (41E)	2,432	378	1,322
700 m west of Burnett Highway (41D)	13,321	1,397	4,891

Table 3-7: Predicted traffic without the Project (Year 4)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	660	234	819
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	804	232	813
Jackson–Wandoan Road intersection–Miles	785	250	875
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	81	17	61
Chainage 68.5 km–Wandoan	162	33	117
Warrego Highway (18C)			
Main Roads district boundary–Miles	2,270	527	1,844
Warrego Highway (18B)			
Dalby–Road 325 intersection	7,054	1,076	3,768
Road 325 intersection–chainage 27.0 km	6,389	1,390	4,864
Chainage 27.0 km–chainage 10.5 km	14,948	1,786	6,252
Chainage 10.5 km–intersection McDougall Street, Toowoomba	17,653	1,502	5,258
Dawson Highway (46B)			
1 km east of Banana	2,422	409	1,432
900 m west of Burnett Highway (41E)	2,549	396	1,386
700 m west of Burnett Highway (41D)	15,176	1,592	5,572

Table 3-8: Predicted traffic without the Project (Year 14)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	887	315	1,101
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	1,081	312	1,093
Jackson–Wandoan Road intersection–Miles	1,055	336	1,176
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	109	23	82
Chainage 68.5 km–Wandoan	218	45	157
Warrego Highway (18C)			

Road/section	AADT	Daily CVs	Daily ESAs
Main Roads district boundary–Miles	3,051	708	2,479
Warrego Highway (18B)			
Dalby–Road 325 intersection	9,713	1,482	5,187
Road 325 intersection–chainage 27.0 km	10,769	2,342	8,198
Chainage 27.0 km–chainage 10.5 km	21,788	2,604	9,113
Chainage 10.5 km–intersection McDougall Street, Toowoomba	27,128	2,309	8,080
Dawson Highway (46B)			
1 km east of Banana	5,386	910	3,184
900 m west of Burnett Highway (41E)	4,086	635	2,221
700 m west of Burnett Highway (41D)	55,917	5,866	20,530

Table 3-9: Predicted traffic without the Project (Year 15)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	914	324	1,134
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	1,113	322	1,126
Jackson–Wandoan Road intersection–Miles	1,086	346	1,211
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	112	24	84
Chainage 68.5 km–Wandoan	225	46	162
Warrego Highway (18C)			
Main Roads district boundary–Miles	3,143	729	2,553
Warrego Highway (18B)			
Dalby–Road 325 intersection	10,028	1,530	5,356
Road 325 intersection–chainage 27.0 km	11,346	2,468	8,638
Chainage 27.0 km–chainage 10.5 km	22,625	2,704	9,463
Chainage 10.5 km–intersection McDougall Street, Toowoomba	28,318	2,410	8,435
Dawson Highway (46B)			
1 km east of Banana	5,834	985	3,449
900 m west of Burnett Highway (41E)	4,283	665	2,328
700 m west of Burnett Highway (41D)	63,706	6,683	23,390

Table 3-10: Predicted traffic without the Project (Year 17)

Road/section	AADT	Daily CVs	Daily ESAs
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	969	344	1,203
Leichhardt Highway (26B)			
Taroom–Jackson–Wandoan Road intersection	1,181	341	1,194
Jackson–Wandoan Road intersection–Miles	1,152	367	1,285
Jackson–Wandoan Road (4302)			
Jackson–chainage 68.5 km	119	26	89
Chainage 68.5 km–Wandoan	238	49	172
Warrego Highway (18C)			
Main Roads district boundary–Miles	3,334	774	2,708
Warrego Highway (18B)			
Dalby–Road 325 intersection	10,691	1,631	5,710
Road 325 intersection–chainage 27.0 km	12,595	2,740	9,588
Chainage 27.0 km–chainage 10.5 km	24,396	2,915	10,203
Chainage 10.5 km–intersection McDougall Street, Toowoomba	30,859	2,626	9,191
Dawson Highway (46B)			
1 km east of Banana	6,846	1,156	4,047
900 m west of Burnett Highway (41E)	4,707	731	2,558
700 m west of Burnett Highway (41D)	82,691	8,674	30,360

4. Description of the project

The mine will be accessed via a newly constructed access road which will intersect the Leichhardt Highway approximately 6 km to the north of the Wandoan Township. The mine access road will provide safe traffic movement to and from the mine site and also connect the accommodation facilities with the mine infrastructure area (MIA) via security facilities at the main gate to the mine site.

The proposed coal pit locations will result in a number of temporary road closures, new sections of roads and road relocations within and adjacent to the MLA areas. Details of the road works are discussed in Chapters 5 and 6 of Volume 1. Apart from Jackson-Wandoan Road, these roads are local government owned.

4.1 Construction phase

Construction will commence in Year -2 and continue until Year -1, with only early works expected to occur in mid Year -3. Mine operations will commence after this period. However, over the first four years of operations, there will continue to be construction activities including:

- the establishment of second and third draglines
- ongoing construction of the accommodation facilities to meet the operational workforce demands
- continued development of internal mine road works including haul and light vehicle roads
- completion of the CHPP and construction of the second dump station and western conveyor
- water management structures.

Early works activities are anticipated to start in the second half of 2009 (Year -3) and are expected to be minimal during this time and involve little if any local traffic effect. The years 2010–2011 (Year -2 and Year -1) will be the busiest in terms of traffic associated with the site preparation and construction activities. The construction traffic determined in the development profile is spread over the six year period between Year -2 and Year 4 according to the expected construction workforce numbers on site for each of the years investigated. These years are used in this transportation impact study as the base years for comparing to the 'without development' scenario.

The fourth and fifth drag lines will be constructed in Years 15 and 17, therefore the effects of these draglines are considered during the operational phase.

The majority of materials and plant are expected to come from Brisbane and will be delivered to site via the Warrego and Leichhardt Highways. Some of the larger components, such as transformers, draglines and parts for the wash plant will come through the Port of Gladstone and would be delivered to site via the Dawson Highway and Leichhardt Highway to the north of the MLAs. Gravel, to be used as sub-base and base material in road construction and as aggregate in concrete, will be from local sources. Several sources that lie within a 50 km radius of the MIA are currently being investigated.

From the Leichhardt Highway, materials and plant will be delivered via the new mine access road and stored on site within the MLAs for distribution internally where needed.

The headings below comprise the various elements of the Project in relation to the workforce, and quantities of materials/plant required to be brought onto site for the entire construction period. Some conservative assumptions have been made in order to simplify this assessment and are discussed in more detail below.

4.1.1 Construction workforce

Construction workforce for Year -2 is estimated to peak at 1,425 (this includes the estimated 1,375 workforce for the mine and 50 for the proposed gas and water pipelines). The workforce will increase rapidly from the first quarter of Year -2, from as low as 15 to a maximum of 1,425 by early Year -1. The majority of the construction workers will be housed in the accommodation facilities which are located along the mine access road to the north of the main entrance to the mine, and will be transported to and from the mine construction areas by bus. Construction crews are expected to work seven days a week, mostly during daylight hours with some works/deliveries taking place during the night time. A 10/4 or similar shift is likely to be employed. Based on shift structures on similar projects, a crew will be expected to arrive the night before the start of their shift and only depart the morning after the completion of the shift or after adequate rest. These safety measures are to reduce driver fatigue.

Transport to/from the work sites will be provided in the form of buses using the mine access road. This movement will not impact on the existing road network and is therefore not investigated further in this study. While the accommodation facilities are planned to cater for the entire construction crew, it is likely that some, including XCQ staff, may choose to live outside these facilities. Based on previous mine development experience, the WJV expects that about 30 persons will likely choose this option during Year -1.

Transport between the accommodation facilities and home bases will not be provided by the WJV and the workforce are expected to organise their own travel arrangements. Assuming that half of the total workforce is on-site at a time, there will be approximately 700 workers travelling to and from the Project site during shift changes (during Year -1). Assuming about a third of the workforce car pool, this results in approximately 460 private vehicle trips to/from the Project site every 10 days (i.e. the length of a shift). The construction workforce will be sourced from various locations with a possible distribution being Brisbane/Toowoomba/etc (40%), Roma/Mitchell/etc (10%), Rockhampton (30%), Gladstone (20%). For this assessment the 460 vehicles associated with these movements have been dispersed along the road network accordingly.

4.1.2 Construction materials

This chapter summarises the activities that will be undertaken during the construction phase, for which construction materials will be transported to the project site. The estimated quantities of the construction materials required for each activity are set out in Table 4-1.

Mine access road, internal roads and relocation of existing roads

The works for the access road includes a new 7.2 m wide sealed road connecting the Leichhardt Highway to the accommodation facilities and MIA as well as the intersection at

the Leichhardt Highway and a security building at the main gate to the mine site. The access road consists of:

- 9.25 km of new road from the Leichhardt Highway to the MIA — this new road will be a two lane sealed road
- major drainage and a 2-lane floodway where the access road crosses over Frank Creek
- sealed two lane road spur, 0.725 km in length, from the main access road to the accommodation facilities
- intersection with the Leichhardt Highway — fully sealed with turning lane tapers on the eastern side of the highway and deceleration lane on the southern approach. This intersection will be constructed to Main Roads standards with appropriate line marking, signage and lighting.

Internal haul roads will service the mine pits. These roads will consist of a 900 mm gravel pavement and be 30 m wide (3.5 times design vehicle width). These roads will be continuously developed during the mine operations period. For this assessment quantities required for Years 1 to 4 have been included.

A 3.5 km light vehicle (LV) access road is also proposed. This road will consist of a 300 mm gravel pavement, will be 6 m wide and connect the MIA to Dump Station No 1 following the conveyor alignment. No other dedicated LV access roads are proposed. In addition, a 10 m wide heavy vehicle access road is proposed to run from the MIA to the western dump stations to allow for construction and ongoing delivery traffic.

The proposed mining pit locations will result in a number of temporary road closures, new sections of roads and road relocations within and adjacent to the mining lease area. These roads are local government owned, with the exception of the Jackson-Wandoan Road. Closures and road relocations will be sequenced according to the mining schedule. Details of the road works are discussed in Chapters 5 and 6 of Volume 1.

The new sections of road will be sealed roads with pavement imported crushed rock. Construction/relocation will include appropriate signage, road furniture and line marking as well as fencing.

Mine infrastructure area

The mine infrastructure area (MIA) has an overall area of approximately 520 m x 450 m and includes the following:

- temporary construction management facilities (during Year -2 and Year -1) — to be removed once mine is operational
- gravel earthworks including hardstands and laydown area
- administration facility — includes offices for staff, muster area for shift changes and bathhouse facilities
- workshop and store — for servicing heavy mining equipment
- tyre change building and store
- fuel facility
- lube and oil storage facility
- infield fuel facility

- washdown facility
- reticulated services, including fire/raw water, potable water, power, lighting, sewage disposal and communications.

The required earthworks for the MIA area include:

- foundation works for administration facility, dragline facility, washdown facility, fuel facility, tyre facility and workshop
- hardstand area of approximately 350 m x 300 m for heavy vehicle parking and manoeuvring
- 90 m x 11 m laydown area for belts, and spare parts
- 60 m x 100 m heavy mining equipment store
- formation of internal access roads
- drainage around MIA via underground drains
- site environmental sedimentation dams.

Earthworks will be formed by cut to fill methods to subgrade level to minimise the overall requirements for earthworks. Tie-in earthworks will be required to ensure the MIA ties into the mine access road and haul roads.

Coal handling and processing plant (CHPP)

The CHPP will take approximately 20 months to construct and will process the run of mine (ROM) coal, from where the coal stockpile will be stored on a compacted gravel base before it is transported off site by rail. The CHPP will consist of several structures containing plant machinery constructed on a reinforced concrete pad.

Rail spur

The proposed Surat Basin Rail (SBR) main line will pass adjacent to the Leichhardt Highway near Wandoan connecting into the Central Queensland rail network. In order to transport coal from the MLAs to the Gladstone area, the construction of a rail spur, which connects to the SBR main line, is proposed as part of the SBR project.

Dragline facility

Construction of the dragline store compound is proposed with this area to be utilised for construction offices and car parks over the two year construction period. This will consist of a 60 bay car park as well as a demountable construction office facility.

The dragline facility will include the following elements:

- 400 m x 200 m, dragline construction pad including pavements and supports
- 150 m x 100 m future dragline store compound, including 50 m x 40 x 8 m m dragline warehouse (to be constructed after completion of the first dragline)
- 15 m x 30 m igloo and arch pit (to be constructed after completion of the first dragline)
- 15 m x 30 m dragline workshop (to be constructed after completion of the first dragline).

Access to the dragline facility will be via the MIA access road.

During construction, the future dragline compound will be used as a laydown area for the construction activities including office facilities and car parking.

A fourth and fifth dragline will be constructed in Years 15 and 17 to commence operation in Years 16 and 18 respectively.

Airstrip

An airstrip and supporting administration building will be constructed within or immediately adjacent to the MLA to allow the operational workforce to fly in and out of the mine for shift changes. The airstrip will serve the mine, and be available to the general public. As such the airstrip will generate limited traffic impacts on the road network when it is in operation. Details of the air strip options can be found in Chapter 6 (of Volume 1).

Accommodation facilities

To provide an acceptable standard of living for the construction workforce, accommodation facilities will be constructed to the north of the mine entrance. Accommodation will be provided in the form of single ensuited rooms and will be either three or four rooms to a block.

During the construction phase the facilities would include the following elements:

- dining room, laundries and kitchen
- recreation room and covered barbeque areas
- external lighting to the buildings, walkways and car park
- communications to the main facilities, a limited number of units and public phones
- internal reticulation of water, power and sewer
- 1,400 car parks (not covered) and circulating roadway
- grassing and landscaping
- security fencing
- covered walkways.

The construction phase accommodation facilities are discussed in more detail in Chapter 5 of Volume 1.

During the operational phase, the accommodation facilities would include the following elements:

- dining room, laundries and kitchen
- recreation room and covered barbeque areas
- external lighting to the buildings, walkways and car park
- communications to all facilities and each room
- 100 car parks (uncovered)
- 320 covered car parks in close proximity to each accommodation unit and circulating roadway
- grassing and landscaping
- swimming pool
- security fencing
- internal reticulation of water, power and sewer

- public phones
- covered walkways.

The operations phase accommodation is discussed in more detail in Chapter 6 of Volume 1.

Power and communications

Reticulation of high voltage (HV) and low voltage (LV) power will be provided to the following within the mine boundaries:

- MIA and construction offices
- accommodation facilities
- draglines
- dump stations and conveyors
- CHPP and train load out facilities.

The anticipated communications requirements are expected to be as follows:

- optical fibre cable from the Leichhardt Highway to the accommodation facilities, CHPP and MIA
- broadband internet capability for up to 100 computers
- capacity for up to 100 telephone and three facsimile lines
- capacity for digital TV distribution throughout the accommodation facilities.

An allowance has been made for materials for the above where required, for example for the accommodation facilities and MIA. The large components such as the transformers and generators have been included as part of the plant/machinery.

Conveyors/dump stations

Two overland conveyor systems are proposed to link the three dump stations to the CHPP.

Gas supply pipeline

The gas supply pipeline is approximately 25 km long. Figure 4-1 shows the gas supply pipeline alignment. It has been assumed that construction of the gas pipeline would be complete by Year -1. The pipe sections are assumed to be sourced from Brisbane and will be transported via the Warrego Highway and Leichhardt Highway. Pipeline construction will require the transportation of sand for sand beds and miscellaneous items such as valves and other fittings in addition to pipe sections. The pipe sections and other supplies will be delivered to various drop off points spaced approximately 20 km apart along the proposed pipeline corridor. Based on these assumptions Nathan Road will also be used for haulage during the pipeline construction.

Raw water supply pipeline

Two potential raw water supply options (i.e. a southern and western alignment) exist for the Project, as well as a third option for connecting a pipeline to the proposed Glebe Weir. At the time of preparation of the impact assessment, the WJV had not determined a preferred option. For further discussion on the pipeline options, refer to Volumes 2, 3 and 4 of the EIS.

The option discussed in Volume 2 proposes to take coal seam methane by-product water from the Condamine Power Station and associated infrastructure to the MLA areas. As this is the longest pipeline option (i.e. the southern CSM pipeline option) and will require the

most construction material, it has been used for traffic impact assessment purposes which allows for a 'worst case scenario' in terms of the traffic and pavement impacts assessment.

The southern CSM water supply pipeline will transport water to the MIA from the Condamine Power Station. It is approximately 93 km in length — the alignment is shown in Figure 4-2. It was assumed that construction of the pipeline would be complete by Year -1.

As with the gas supply pipeline, and regardless of which option is chosen by the WJV, the pipe sections for the raw water supply are assumed to be sourced from Brisbane and transported via the Warrego Highway and Leichhardt Highway. The pipes will be delivered to a series of drop off points spaced approximately 20 km apart between the Condamine Power Station and the MLA. Baileys Road and Fosters Road will also be used for haulage during the pipeline construction.

Further analysis during the detail design phase may be required once a decision on a preferred pipeline has been made.

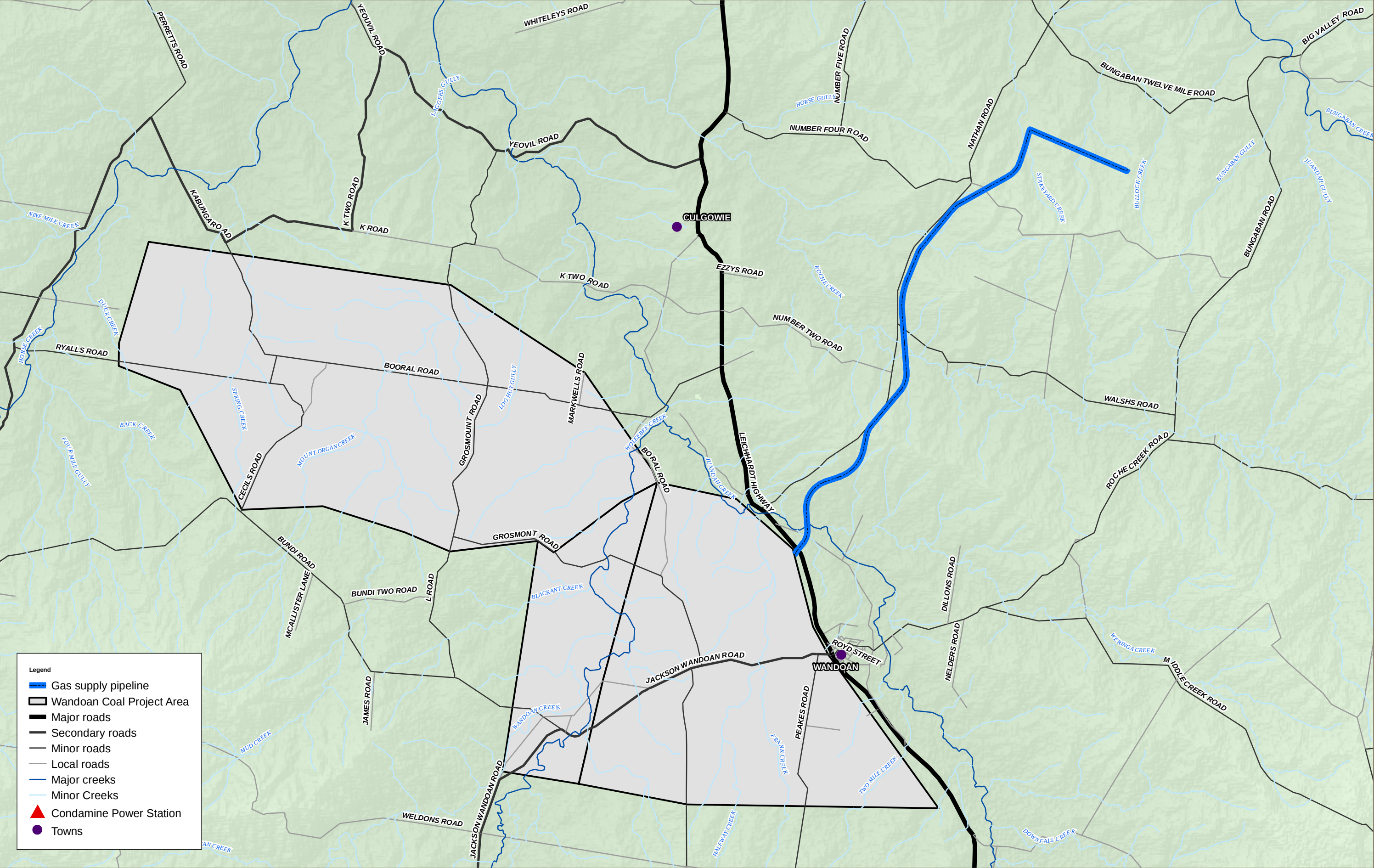
Initial mining (500,000 tonne bulk sample during Years -2 and -1)

The proposed next phase of bulk sample operations will involve the extraction of up to 500,000 tonne of coal from an area immediately adjacent to the existing sample pit. The coal will be crushed on site before being transported by road to an existing operating coal mine for washing. The route to be used is by road to Oaky Creek Coal Mine. Figure 4-3 shows the route to be used.

The sample will be transported with a mix of AB triples, Road Trains and B-doubles, with 85% of the fleet likely to be made up of AB triples. The 500,000 tonne sample will be transported over a two year period; 250,000 t will be transported in Year -2 and another 250,000 tonnes will be transported in Year -1. In both years, 16 unit movements will be required in a 24 hour period.

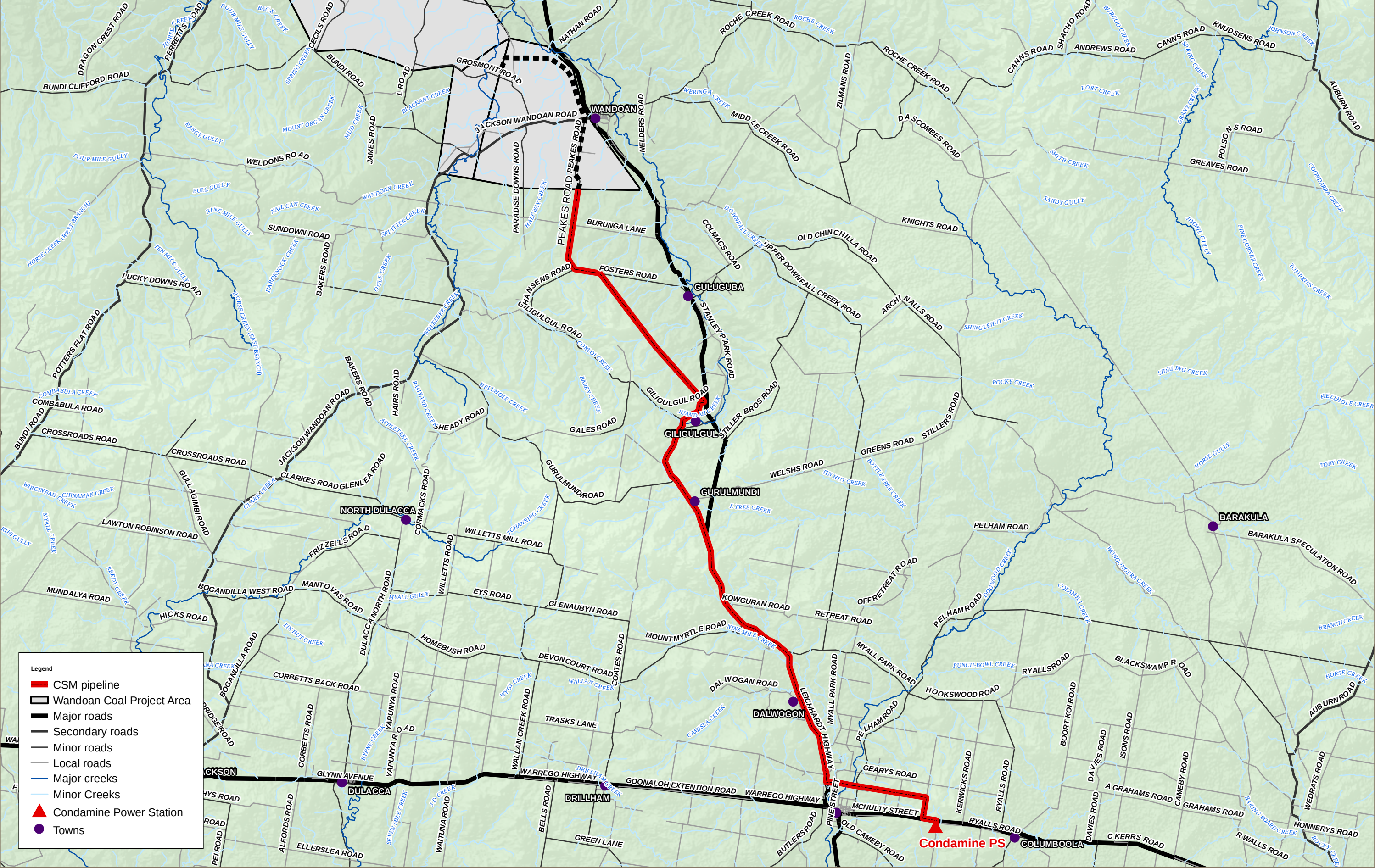
Applications for Higher Mass Limits (HML) approval for these movements have been made and accordingly truck movements under HML loading was assumed for the analyses. The 250,000 tonne can be delivered within 33 weeks, with a possible extension to 40 weeks in the event of interruptions due to wet weather.

The transportation will operate 24/7, with appropriate measures in place to limit individual driver working hours to reduce driver fatigue. It is envisaged that the transport operator will structure the roster and shifts to accommodate these factors.



J:\A442-ENG\PROJ\2133006C_-_Wandoan_prefea\10_GIS\Projects\Technical Reports\Pipelines (Route Selection)\Water\Figure 6-1 Proposed West Route Options.mxd

Source: Roads, QLD State Digital Road Network (2004); Towns, creeks 1:250K Topo, Geoscience Australia (2006)



J:\A442-ENG\PROJ\2133006C_-_Wandoan_prefea\10_GIS\Projects\Technical Reports\Pipelines (Route Selection)\Water\Figure 6-1 Proposed West Route Options.mxd

Source: Roads, QLD State Digital Road Network (2004); Towns, creeks 1:250K Topo, Geoscience Australia (2006)



Figure 4-3: 500,000 tonne bulk sample route

Summary of construction materials

Table 4-1 below provides a summary of the estimated quantities for all construction materials required as discussed above. An assumption regarding the most likely origin of each material is also presented Table 4-1.

Table 4-1: Summary of construction materials quantities

Material	Total weight (t)	Origin
Bitumen	7,600	Brisbane
Cable	300	Brisbane
Cement	123,400	Brisbane
Concrete — precast	1,300	Brisbane
Crushed rock/gravel/sand	820,000	Local sources
Miscellaneous items	115,600	Brisbane
Rail Sleepers	8,400	Gladstone
Special items	800	Brisbane
Steel — reinforcement	1,500	Brisbane

Material	Total weight (t)	Origin
Steel — structural	108,300	Brisbane
Pipe — raw water supply	16,500	Brisbane
Pipe — gas	4,100	Brisbane
TOTAL	1,207,800	

Miscellaneous items include items such as paint for line marking and buildings, road signs, signals, building blocks, valves for the pipelines, etc. Special items refer to items such as transformers for the power station, that need to be transported via 'low-loaders' — this is discussed in more detail under the 'Construction traffic' heading later in this report. Also, while an allowance for 320,000 tonnes of gravel for construction of the product coal stockpile pad has been included in the above estimate, the WJV is investigating the use of alternative materials sourced from the mine site. Accordingly, the estimated total quantity of construction materials in Table 4-1 may overstate the total quantities to be transported. This will be confirmed in detailed design.

4.1.3 Mining fleet/plant

The mining method will be based on a dragline, plus truck and excavator operation. During the mine start-up period the mining fleet will be made up as detailed in Table 4-2 below. With the exception of some of the larger components, such as those required for the draglines, all plant is expected to come from Brisbane.

Table 4-2: Anticipated mining fleet during start up — Year -1 to 4

Plant	Major specifications	Quantity	Total weight (T)	Origin
Dragline	110 m ³ bucket	3	22,500	Gladstone
Medium hydraulic excavator	550 t machine, 27 m ³ bucket	2	1,266	Brisbane
Small hydraulic excavator	350 t machine, 21 m ³ bucket	2	806	Brisbane
Large front end loader	30 m ³ bucket	2	200	Brisbane
Large rear dump truck	220 t capacity (combo body)	26	3,034	Brisbane
Large overburden drill	Diesel overburden drill — 760 hp	5	156	Brisbane
Medium overburden drill	Diesel overburden drill — 475 hp	1	23	Brisbane
Large tracked dozer	850 hp diesel dozer	18	1,358	Brisbane
Large wheel dozer	800 hp diesel dozer	3	298	Brisbane
Large wheeled grader	24' blade/500 hp diesel grader	3	186	Brisbane
Large water truck	110,000 litre water truck	3	224	Brisbane
	TOTALS	68	30,089	

In addition to the plant listed in Table 4-2 draglines 4 and 5 will be delivered and assembled in Years 15 and 17 respectively..

4.1.4 Construction traffic

The majority of construction work will take place during Year -2 and Year -1. As such, the majority of materials will be delivered during this time. For simplicity the total tonnage on road for deliveries of construction materials has been spread over the six year period from Year -2 through to Year 4 according to the anticipated construction workforce numbers for each of the years. This method allows for a robust assessment in terms of traffic operations as the year with the bulk of the construction workforce on site (Year -1) will also be the year with most materials deliveries. Table 4-3 below shows the percentage values and resultant tonnage (for materials) on road for each year. In addition, tonnage of plant (to be delivered to site) is also shown to give a total tonnage on road for each of the years between Year -2 and Year 4.

Table 4-3: Deliveries to site — tonnage on road by year

Year	Construction workforce (No.)	Construction workforce (%)	Construction materials (t)	Plant (t)	Total on road (t)
Year -2	1,190	37.9%	457,733	-	457,733
Year -1	1,425	45.4%	548,126	11,918	560,044
Year 1	150	4.8%	57,697	8,351	66,049
Year 2	140	4.5%	53,851	9,781	63,632
Year 3	15	0.5%	5,770	39	5,809
Year 4	220	7.0%	84,623		84,623
TOTALS	3,140	100%	1,207,800	30,089	1,237,889

Materials will be sourced from Brisbane, Gladstone and local aggregate sources. The majority of plant deliveries will also originate in Brisbane with exception of major equipment such as the draglines. From the assumed origin of the materials and plant, traffic distribution (by weight transported) is as follows:

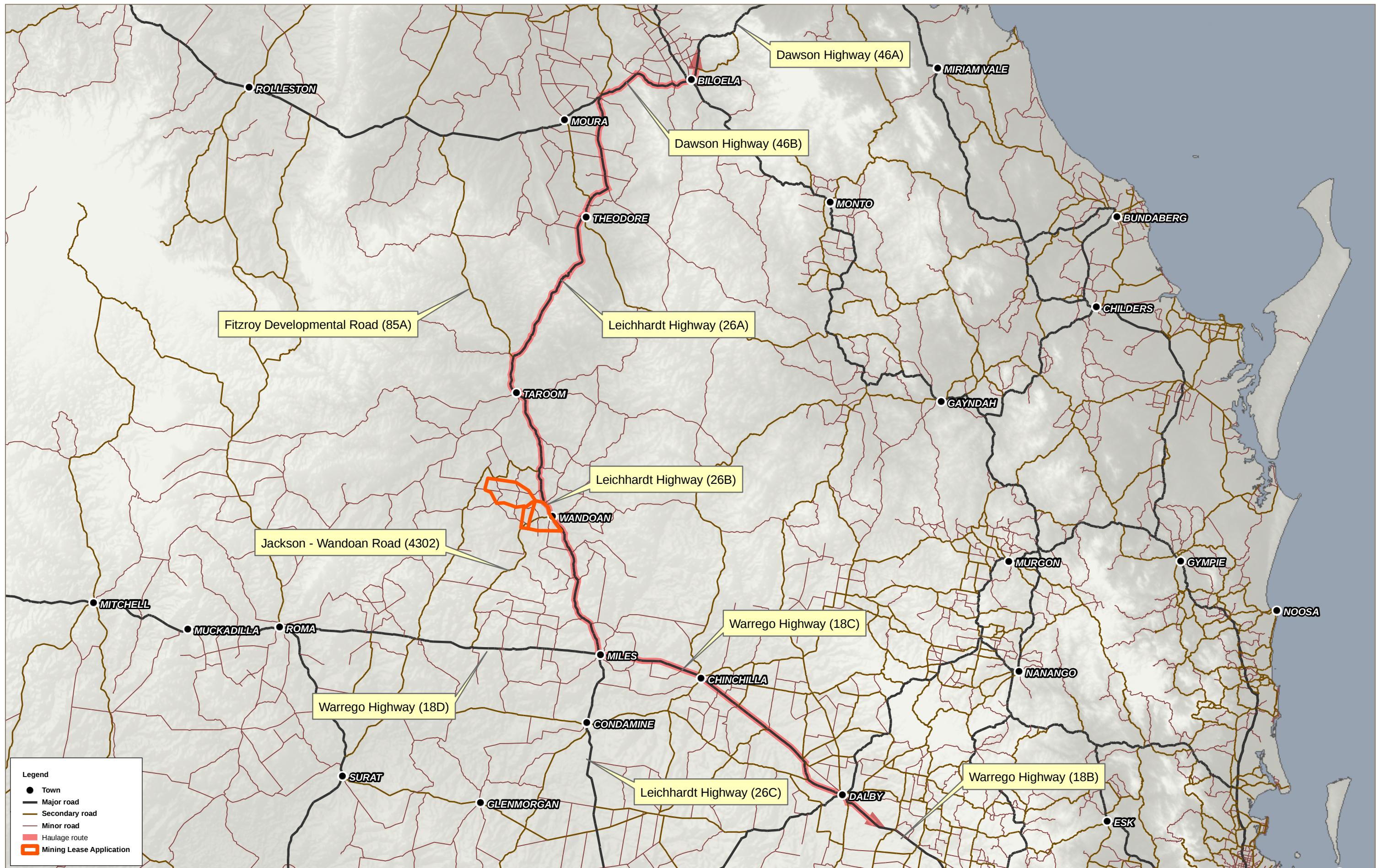
- from Brisbane — 31.9%
 - via Warrego Highway and Leichhardt Highway
- local aggregate sources (from within a 50 km radius of the MIA) — 66.2%
 - via Leichhardt Highway (a 50/50 split to the north and south of the MLA was assumed). Currently, six aggregate sources are currently being investigated — to allow for a robust assessment it was assumed that three of these are to the north of the site and three to the south
- Gladstone — 1.8%
 - via Dawson Highway and Leichhardt Highway.

Based on the above, Table 4-4 shows the distribution of construction traffic for each segment of the SCRs within the study area.

Table 4-4: Construction traffic distribution

Road/section	Construction traffic
Leichhardt Highway (26A)	
1.62 km south of Fitzroy Developmental Road	1.82%
Leichhardt Highway (26B)	
Taroom–Jackson–Wandoan Road intersection	34.94%
Jackson–Wandoan Road intersection–Miles	65.06%
Warrego Highway (18C)	
Main Road district boundary–Miles	31.94%
Warrego Highway (18B)	
Dalby–Road 325 intersection	31.94%
Road 325 intersection–chainage 27.0 km	31.94%
Chainage 27.0 km–chainage 10.5 km	31.94%
Chainage 10.5 m–intersection McDougall Street, Toowoomba	31.94%
Dawson Highway (46B)	
1 km east of Banana	1.82%
900 m west of Burnett Highway (41E)	1.82%
700 m west of Burnett Highway (41D)	1.82%

Figure 4-4 indicates the roads considered for the haulage routes.



J:\A442-ENG\PROJ\2133006C__Wandoan_prefea\10_GIS\Projects\Technical Reports\Pipelines (Route Selection)\Water\Figure 6-1 Proposed West Route Options.mxd

Source: Roads, QLD State Digital Road Network (2004); Towns, creeks 1:250K Topo, Geoscience Australia (2006)

Materials will be transported to site using a mix of vehicles, including three-axle and four-axle trucks, B-doubles, semi trailers and road trains.

Plant/machinery will be assembled on site with the significant parts transported on oversized 'low-loaders' via the road network. These vehicles will conform to Main Roads standards and may require special permits for travelling on SCRs. Compliance assessment is beyond the scope of this study and it is the responsibility of the relevant contractor(s) to ensure suitable arrangements are in place. However, according to the *Guideline for Multi Combination Vehicles* (Queensland Transport 2008) all of the roads within the study area are approved routes for Type 1 road trains, as well as 23 m and 25 m B-doubles.

Austroroads groups vehicles into twelve classes — a pictorial summary of this is provided in Attachment A. Table 4-5 below provides a list of typical vehicles, by type and class, used in this assessment. The ESA values per vehicle, sourced from Chapter 5 of the *Road Planning and Design Manual* (Main Roads, 2004) are also supplied. The unloaded ESA values were assumed to be 1.6 for all of the vehicles. A low-loader has been assumed as having the same capacity/impact as two road trains.

Table 4-5: Typical construction vehicles

Type	Austroroads class	ESAs (Standard loading)	ESAs (unloaded)	HML ESAs (loaded)
Three axle articulated	Class 6	4.4	1.6	n/a
Semi trailer	Class 9	5.1	1.6	n/a
B Double	Class 10	7.2	1.6	n/a
25 m B Double	Class 10	6.4	1.6	8.32
Type I road train	Class 11	8.6	1.6	10.78
Type 1 Road Train with tri-axle dolly	Class 11	7.8	1.6	10.53
AB Triple with tri-axle dolly	Class 11	9.2	1.6	12.72
Low-loader	n/a	17.2	1.6	n/a

Initial mining (500,000 t bulk sample during Years -2 and -1)

Table 4-6 shows the daily number of vehicles used to transport each of the 250,000 t batches in Years -2 and -1 (to transport the full 500,000 t sample) from the MLA to Oaky Creek Coal Mine. The bulk sample movements have been treated as independent of the other construction operations, and are therefore not included in the distribution percentages detailed in Table 4-4.

Table 4-6: Bulk sample daily vehicle usage in Years -2 and -1

Road/section	25 m B-Double	Type I Road Train with tri-axle dolly	AB-Triple with tri-axle dolly
Leichhardt Highway (26A)			
Sandy Creek	1	2	14
11 km south of Wowan	1	2	14
100 m north of Woolein Creek	1	2	14
300 m south of Fairview	1	2	14
Bowen Street west of Banana	1	2	14
Branch Creek	1	2	14
400 m south of The Boulevard	1	2	14
Tim Shay Creek	1	2	14
Capricorn Highway (16A)			
41 Mile Creek	1	2	14
500 m west of Dawson River	1	2	14
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	1	2	14
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1	2	14
6 km South of Mackenzie River	1	2	14
South of Middlemount Turnoff	1	2	14
Dysart-Middlemount Road (519)			
West of Middlemount	1	2	14
Leichhardt Highway (26A)			
Sandy Creek	1	2	14

4.2 Operational phase

All coal will be transported via the Surat Basin Rail to port facilities in Gladstone. Mining operations are expected to commence during Year 1 (nominally 1st quarter 2012) with a predicted workforce of 502. Over the following three years (to Year 4), the number of operational employees is expected to increase to the full compliment of staff and operators (including shut down personnel) of 844. It is anticipated that the number of employees and operators will remain relatively constant from there on.

Personnel movement assumptions for the operational phase include that:

- the mine will operate 24/7 with two shifts per day:
 - day shift — 6:00 to 18:00

- night shift — 18:00 to 6:00
- town-based accommodation is anticipated to be around 125 persons by full operations, with an assumed 60:20:20 split for residing in Wandoan, Taroom and Miles respectively. It is assumed that the remainder of the construction and mining personnel will reside in the accommodation facilities.

Shuttle buses will be provided for employees travelling from the towns of Wandoan, Taroom and Miles. A total of four return trips are estimated that will be made by the shuttle buses every day. That is two return trips between Miles, Wandoan and the mine and two return trips between Taroom and the mine.

While an airstrip is proposed within or adjacent to the MLA to allow employees to fly in and out during shift changes it has been assumed for the purposes of this assessment that transport will be provided solely in the form of a coach which will travel between Wandoan and Brisbane. This allows for a worst case scenario in the traffic assessment for the road network. This scenario (with shuttle buses) also covers any vehicle travel to/from the air strip by the community should the air strip option proceed. Based on anticipated shift changes and numbers of personnel requiring transportation, five return trips per week between the MLA and Brisbane will to be required during Year 1. This will gradually increase to a maximum of nine return trips per week by Year 4.

In addition, various deliveries will be required for the operation of the mine, including fuel and supplies. Table 4-7 shows the quantities to be delivered during the mine operation from Years 1 to 17. Fuel will be delivered from Brisbane, explosives will be brought in from a source north of the MLA and the general supplies are assumed to be delivered in equal proportions from Brisbane and Gladstone. The explosive to be used will be Ammonium Nitrate and Fuel Oil (ANFO). Although diesel may be delivered by rail, this was not considered in the analysis in order to allow for a worst case scenario. Materials such as fuel and ANFO are classified as hazardous materials. Hazardous materials, including the transport and handling of these materials, are discussed in more detail in Chapters 23 and 24 of Volume 1. Supplies include food items and other general products that will be required by the mine staff.

Table 4-7: Annual delivery quantities (Years 1 to 17)

Material	Annual quantity
Fuel (diesel)	24 to 50 million litres
Explosives (ammonium nitrate)	12,000 to 39,000 tonnes
Supplies	Approximately 4,000 tonnes

4.3 Development profile traffic summary

Due to the construction and operational phases overlapping, impacts from the total resultant traffic — as set out in Section 4.1 and 4.2 above — are investigated in Section 5 of this report rather than differentiating between construction and operational traffic. This is done individually for each of the six years between Year -2 and Year 4. This allows for a robust assessment that provides a close approximation to the situation envisaged over this period.

Tables 4-8 to 4-13 below present the total number of CVs required for each of the six years between Year -2 and Year 4. The various vehicle types/classes required are shown, as well

as the resultant ESAs impacting on the SCRs. ESAs quoted are the totals for the loaded and unloaded directions combined.

Table 4-8: Construction/operation vehicle inventory and total ESAs (Year -2)

Type	Austroroads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	0	0.0
Three axle bus	Class 4	0	0.0
Three axle articulated vehicle	Class 6	274	1,644.0
Five axle articulated vehicle	Class 8	0	0.0
Semi trailer	Class 9	2,459	15,829.7
B Double	Class 10	8,893	78,258.4
Type I road train	Class 11	12	122.4
Low-loader	n/a	4	75.2
25 m B-double	Class 10	224	2,226.8
Type I Road Train with tri-axle dolly	Class 11	224	2,722.9
AB-Triple with tri-axle dolly	Class 11	3,143	45,002.3
TOTALS		15,234	145,881.7

Table 4-9: Construction/operation vehicle inventory and total ESAs (Year -1)

Type	Austroroads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	0	0.0
Three axle bus	Class 4	0	0.0
Three axle articulated vehicle	Class 6	335	2,010.0
Five axle articulated vehicle	Class 8	0	0.0
Semi trailer	Class 9	2,984	19,215.6
B Double	Class 10	10,879	95,735.2
Type I road train	Class 11	14	142.8
Low-loader	n/a	5	94.0
25 m B-double	Class 10	224	2,226.8
Type I Road Train with tri-axle dolly	Class 11	224	2,722.9
AB-Triple with tri-axle dolly	Class 11	3,143	45,002.3
TOTALS		17,809	167,149.6

Table 4-10: Construction/operation vehicle inventory and total ESAs (Year 1)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,697.6
Three axle bus	Class 4	260	1,378.0
Three axle articulated vehicle	Class 6	41	246.0
Five axle articulated vehicle	Class 8	403	3,022.5
Semi trailer	Class 9	222	1,487.4
B Double	Class 10	1,689	15,179.6
Type I road train	Class 11	2	20.4
Low-loader	n/a	1	18.8
TOTALS		4,074	28,050.3

Table 4-11: Construction/operation vehicle inventory and total ESAs (Year 2)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,697.6
Three axle bus	Class 4	364	1,929.2
Three axle articulated vehicle	Class 6	39	234.0
Five axle articulated vehicle	Class 8	492	3,690.0
Semi trailer	Class 9	214	1,433.8
B Double	Class 10	1,785	16,223.2
Type I road train	Class 11	2	20.4
Low-loader	n/a	1	18.8
TOTALS		4,353	30,247.0

Table 4-12: Construction/operation vehicle inventory and total ESAs (Year 3)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,697.6
Three axle bus	Class 4	416	2,204.8
Three axle articulated vehicle	Class 6	4	24.0
Five axle articulated vehicle	Class 8	839	6,292.5
Semi trailer	Class 9	21	140.7

Type	Austrorads class	No. of vehicles	Total ESAs
B Double	Class 10	862	8,407.4
Type I road train	Class 11	1	10.2
Low-loader	n/a	1	18.8
TOTALS		3,600	23,796.0

Table 4-13: Construction/operation vehicle inventory and total ESAs (Year 4)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,697.6
Three axle bus	Class 4	468	2,480.4
Three axle articulated vehicle	Class 6	52	312.0
Five axle articulated vehicle	Class 8	820	6,150.0
Semi trailer	Class 9	284	1,902.8
B Double	Class 10	2,442	22,343.6
Type I road train	Class 11	3	30.6
Low-loader	n/a	1	18.8
TOTALS		5,526	39,935.8

The impacts of the results as shown in Tables 4-8 through to 4-13 are explored further in Section 5 of this report.

As discussed in Section 3.4 of this report, traffic also needs to be assessed ten years after completion of construction, i.e. Year 14. Table 4-15 below provides a summary of the annual traffic requirements associated with the operation of the Project during Year 14. Traffic impacts for the ten year design horizon allow only for operations as no construction is expected during this time. ESAs quoted are the totals for the loaded and unloaded directions combined.

Table 4-14: Operational vehicle inventory and total ESAs (Year 14)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,697.6
Three axle bus	Class 4	468	2,480.4
Three axle articulated vehicle	Class 6	0	0.0
Five axle articulated vehicle	Class 8	641	4,807.5
Semi trailer	Class 9	0	0.0
B Double	Class 10	758	7,513.2

Type	Austrorads class	No. of vehicles	Total ESAs
Type I road train	Class 11	0	0.0
Low-loader	n/a	0	0.0
TOTALS		3,323	21,498.7

The above information in Table 4-14 equates to an additional nine vehicles — and 59 ESAs — per day, due to the operation of the Project. It is expected fuel will be sourced from Brisbane and explosives will be delivered from a source to the north of the MLA, while general supplies are assumed to come from the north and south (i.e. Toowoomba and Rockhampton) of the MLA in equal proportions. Supplies from the south are assumed to come from Brisbane, travelling along the Warrego and Leichhardt Highways, while supplies from the north are assumed to come from Gladstone, travelling along the Dawson and Leichhardt Highways.

Tables 4-15 and 4-16 summarises the additional traffic generated by the Project during Years 15 and 17 — the construction periods for draglines 4 and 5 respectively. The potential impacts from the additional traffic is analysed in Section 5 of this report.

Table 4-15: Project vehicle inventory and total ESAs (Year 15)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,698
Three axle bus	Class 4	468	2,480.4
Three axle articulated vehicle	Class 6	0	0.0
Five axle articulated vehicle	Class 8	673	5,047.5
Semi trailer	Class 9	3	20.1
B Double	Class 10	762	7,554.0
Type I road train	Class 11	0	0.0
Low-loader	n/a	1	18.8
TOTALS		3,363	21,818.4

Table 4-16: Project vehicle inventory and total ESAs (Year 17)

Type	Austrorads class	No. of vehicles	Total ESAs
Two axle bus	Class 3	1,456	6,698
Three axle bus	Class 4	468	2,480.4
Three axle articulated vehicle	Class 6	0	0.0
Five axle articulated vehicle	Class 8	732	5,490.0
Semi trailer	Class 9	0	0.0

Type	Austrorads class	No. of vehicles	Total ESAs
B Double	Class 10	907	9,033.0
Type I road train	Class 11	0	0.0
Low-loader	n/a	1	18.8
TOTALS		3,564	23,719.8

Impacts on other roads

Roads owned by local councils will also be impacted during the transportation of the bulk sample as well as the pipe sections and related fittings for the two pipelines to be constructed (i.e. raw water pipeline and gas pipeline as discussed in Section 4.1.2). The total volumes of vehicles that are likely to use these roads have been calculated and are shown in Table 4-17. The water pipeline considered in Table 4-18 is the southern pipeline option, as discussed in Section 4.1.2 — further analysis during the detail design phase may be required once a decision on a preferred pipeline has been made.

Table 4-17: Construction traffic using local roads (totals for Years -2 and -1)

Road/section	Annual volume
Raw water supply pipeline	
Baileys Road	394
Fosters Road	784
Gas pipeline	
Nathan Road	241
Bulk sample	
Crinum Road	7,183

5. Potential impacts

As per the Guidelines, traffic impacts need to be considered for any section of a SCR where traffic due to the construction or operation of a development equals or exceeds 5% of the existing levels on the road, measured either in AADT or ESAs.

To determine the potential impacts of the Project, the additional traffic generated by the Project for both the construction and operational phases (as determined in the development profile in Section 4 of this report) is compared to the projected future traffic for each of the six years from Year -2 through to Year 4.

The distribution of construction traffic, as discussed in the development profile and shown in Table 4-4, has been used to determine the AADT and ESAs along each segment of road for the 'with development' scenario. It has been assumed that all construction traffic will return along the same route to its place of origin — i.e. the volume of construction traffic is equal for the loaded and unloaded direction.

The proposed mining pit locations will also result in a number of temporary road closures, new sections of road and road relocations. These changes to the road network will result in slightly longer journey times. Details of these can be found in Chapters 5 and 6 of Volume 1.

5.1 Construction phase (Year -2 to Year 4)

5.1.1 Traffic impact assessment

Figure 5-1 demonstrates the steps to be undertaken during the traffic operations assessment process.

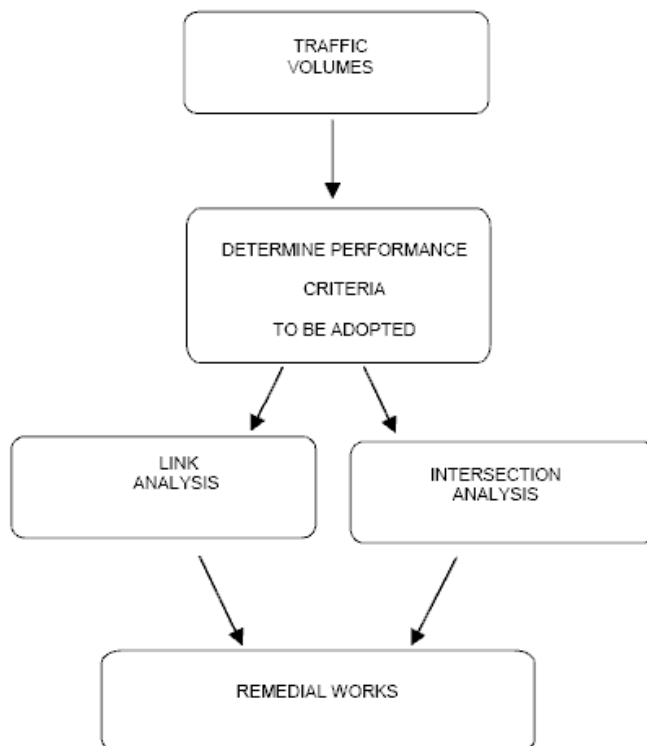


Figure 5-1: Traffic operations assessment process

A link analysis was carried out in this transportation impact study since the available information from the datasets was mid-block (or link) counts.

Link analysis

Tables 5-1 to 5-6 list the projected AADT for Year -2 through to Year 4 without the Project, as well as total AADT levels that can be ascribed to the Project. Increases, given as a percentage over existing levels for each road segment, are also shown. A greater number of road sections are impacted during Years -2 and -1 due to the construction of the pipelines and the movement of the bulk sample as reported in the development profile in Section 4.

Table 5-1: AADT comparison with and without the Project (Year -2)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	569	16	2.8%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	694	28	4.0%
Jackson-Wandoan Road intersection Miles	677	21	3.2%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,958	11	0.5%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,011	11	0.2%
Road 325 intersection chainage 27.0 km	4,921	11	0.2%
Chainage 27.0 km chainage 10.5 km	12,381	11	0.1%
Chainage 10.5 km intersection McDougall Street, Toowoomba	14,241	11	0.1%
Dawson Highway (46B)			
1 km east of Banana	1,624	0	0.0%
900 m west of Burnett Highway (41E)	2,014	0	0.0%
700 m west of Burnett Highway (41D)	7,906	0	0.0%
Leichhardt Highway (26A)			
Sandy Creek	979	16	1.6%
11 km south of Wowan	757	16	2.1%
100 m north of Woolein Creek	732	16	2.2%
300 m south of Fairview	705	16	2.3%
Bowen Street west of Banana	3,318	16	0.5%
Branch Creek	716	16	2.2%
400 m south of The Boulevard	760	16	2.1%

Table 5-2: AADT comparison with and without the Project (Year -1)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	586	18	3.0%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	715	33	4.7%
Jackson-Wandoan Road intersection Miles	697	33	4.7%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,017	16	0.8%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,207	16	0.3%
Road 325 intersection chainage 27.0 km	5,185	16	0.3%
Chainage 27.0 km chainage 10.5 km	12,856	16	0.1%
Chainage 10.5 km intersection McDougall Street, Toowoomba	14,866	16	0.1%
Dawson Highway (46B)			
1 km east of Banana	1,759	2	0.1%
900 m west of Burnett Highway (41E)	2,111	2	0.1%
700 m west of Burnett Highway (41D)	9,008	2	0.0%
Leichhardt Highway (26A)			
Sandy Creek	1,017	16	1.6%
11 km south of Wowan	794	16	2.0%
100 m north of Woolein Creek	754	16	2.1%
300 m south of Fairview	726	16	2.2%
Bowen Street west of Banana	3,856	16	0.4%
Branch Creek	734	16	2.2%
400 m south of The Boulevard	772	16	2.1%
Tim Shay Creek	593	16	2.7%
Capricorn Highway (16A)			
41 Mile Creek	3,295	16	0.5%
500 m west of Dawson River	3,259	16	0.5%
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	3,382	16	0.5%
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,149	16	1.4%

Road/section	Without Project	Project traffic	Increase
6 km South of Mackenzie River	1,133	16	1.4%
South of Middlemount Turnoff	873	16	1.8%
Dysart-Middlemount Road (519)			
West of Middlemount	2,893	16	0.6%

Table 5-3: AADT comparison with and without the Project (Year 1)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	604	2	0.3%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	736	4	0.6%
Jackson-Wandoan Road intersection Miles	718	8	1.1%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,078	4	0.2%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,409	4	0.1%
Road 325 intersection chainage 27.0 km	5,463	4	0.1%
Chainage 27.0 km chainage 10.5 km	13,350	4	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	15,518	4	0.0%
Dawson Highway (46B)			
1 km east of Banana	1,906	2	0.1%
900 m west of Burnett Highway (41E)	2,213	2	0.1%
700 m west of Burnett Highway (41D)	10,262	2	0.0%

Table 5-4: AADT comparison with and without the Project (Year 2)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	622	2	0.3%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	758	5	0.6%
Jackson-Wandoan Road intersection Miles	740	8	1.1%

Road/section	Without Project	Project traffic	Increase
Warrego Highway (18C)			
Main Roads district boundary Miles	2,140	4	0.2%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,617	4	0.1%
Road 325 intersection chainage 27.0 km	5,755	4	0.1%
Chainage 27.0 km chainage 10.5 km	13,862	4	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	16,200	4	0.0%
Dawson Highway (46B)			
1 km east of Banana	2,064	2	0.1%
900 m west of Burnett Highway (41E)	2,320	2	0.1%
700 m west of Burnett Highway (41D)	11,692	2	0.0%

Table 5-5: AADT comparison with and without the Project (Year 3)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	641	0	0.0%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	781	3	0.4%
Jackson-Wandoan Road intersection Miles	762	7	0.9%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,204	3	0.1%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,832	3	0.0%
Road 325 intersection chainage 27.0 km	6,064	3	0.1%
Chainage 27.0 km chainage 10.5 km	14,395	3	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	16,911	3	0.0%
Dawson Highway (46B)			
1 km east of Banana	2,236	0	0.0%
900 m west of Burnett Highway (41E)	2,432	0	0.0%
700 m west of Burnett Highway (41D)	13,321	0	0.0%

Table 5-6: AADT comparison with and without the Project (Year 4)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	660	0	0.0%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	804	6	0.7%
Jackson-Wandoan Road intersection Miles	785	10	1.3%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,270	5	0.2%
Warrego Highway (18B)			
Dalby Road 325 intersection	7,054	5	0.1%
Road 325 intersection chainage 27.0 km	6,389	5	0.1%
Chainage 27.0 km chainage 10.5 km	14,948	5	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	17,653	5	0.0%
Dawson Highway (46B)			
1 km east of Banana	2,422	0	0.0%
900 m west of Burnett Highway (41E)	2,549	0	0.0%
700 m west of Burnett Highway (41D)	15,176	0	0.0%

As can be seen from Table 5-1 through to Table 5-6, additional traffic due to the construction of the Project are less than 5% over existing levels for all of the links or segments of the SCRs within the study area for each of the years investigated.

Construction work force traffic

During Years -2 and -1, there will be a movement of private vehicles to and from the MIA every 10 days as construction crews change shifts. This movement, together with the relevant CV movements (as it occurs every ten days) is shown in Tables 5-7 and 5-8.

Table 5-7: AADT comparison with and without the Project during shift change days (Year -2)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	569	266	46.7%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	694	206	29.7%
Jackson-Wandoan Road intersection Miles	677	200	29.5%
Warrego Highway (18C)			

Road/section	Without Project	Project traffic	Increase
Main Roads district boundary Miles	1,958	153	7.8%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,011	153	2.6%
Road 325 intersection chainage 27.0 km	4,921	153	3.1%
Chainage 27.0 km chainage 10.5 km	12,381	153	1.2%
Chainage 10.5 km intersection McDougall Street, Toowoomba	14,241	153	1.1%
Dawson Highway (46B)			
1 km east of Banana	1,624	71	4.4%
900 m west of Burnett Highway (41E)	2,014	71	3.5%
700 m west of Burnett Highway (41D)	7,906	71	0.9%
Leichhardt Highway (26A)			
Sandy Creek	979	123	12.6%
11 km south of Wowan	757	123	16.3%
100 m north of Woolein Creek	732	123	16.8%
300 m south of Fairview	705	123	17.5%
Bowen Street west of Banana	3,318	195	5.9%
Branch Creek	716	195	27.2%
400 m south of The Boulevard	760	195	25.6%
Tim Shay Creek	566	195	34.4%
Capricorn Highway (16A)			
41 Mile Creek	3,090	16	0.5%
500 m west of Dawson River	3,042	16	0.5%
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	3,138	16	0.5%
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,043	16	1.5%
6 km South of Mackenzie River	1,014	16	1.6%
South of Middlemount Turnoff	796	16	2.0%
Dysart-Middlemount Road (519)			
West of Middlemount	2,662	16	0.6%

Table 5-8: AADT comparison with and without the Project during shift change days (Year -1)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	586	347	59.1%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	715	269	37.6%
Jackson-Wandoan Road intersection Miles	697	268	38.4%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,017	204	10.1%
Warrego Highway (18B)			
Dalby Road 325 intersection	6,207	204	3.3%
Road 325 intersection chainage 27.0 km	5,185	204	3.9%
Chainage 27.0 km chainage 10.5 km	12,856	204	1.6%
Chainage 10.5 km intersection McDougall Street, Toowoomba	14,866	204	1.4%
Dawson Highway (46B)			
1 km east of Banana	1,759	96	5.4%
900 m west of Burnett Highway (41E)	2,111	96	4.5%
700 m west of Burnett Highway (41D)	9,008	96	1.1%
Leichhardt Highway (26A)			
Sandy Creek	1,017	157	15.4%
11 km south of Wowan	794	157	19.8%
100 m north of Woolein Creek	754	157	20.8%
300 m south of Fairview	726	157	21.6%
Bowen Street west of Banana	3,856	251	6.5%
Branch Creek	734	251	34.2%
400 m south of The Boulevard	772	251	32.5%
Tim Shay Creek	593	251	42.4%
Capricorn Highway (16A)			
41 Mile Creek	3,295	16	0.5%
500 m west of Dawson River	3,259	16	0.5%
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	3,382	16	0.5%
Fitzroy Developmental Road (85C)			

Road/section	Without Project	Project traffic	Increase
2.8 km North of Capricorn Highway	1,149	16	1.4%
6 km South of Mackenzie River	1,133	16	1.4%
South of Middlemount Turnoff	873	16	1.8%
Dysart-Middlemount Road (519)			
West of Middlemount	2,893	16	0.6%

Tables 5-7 to 5-8 indicate that the traffic resulting from the shift change-over will create a significant increase (i.e. more than 5%) in traffic along Leichhardt Highway between Warrego Highway and Capricorn Highway during Years -2 and -1. It should be noted however that this impact will not be a daily occurrence, and should only be experienced every 10 days. As the construction crew traffic will be non-commercial vehicles (i.e. private cars) these will have no pavement impacts and as such are not considered during the pavement impact assessment.

5.1.2 Pavement impact assessment

Table 5-9 to 5-14 lists the projected daily ESAs for Year -2 through to Year 4 without the Project, as well as average daily ESAs that can be ascribed to the Project. Increases, given as a percentage over existing levels for each road segment, are also shown.

Table 5-9: ESA comparison with and without the Project (Year -2)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	706.6	222.5	31.5%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	701.6	315.8	45.0%
Jackson-Wandoan Road intersection Miles	754.8	173.7	23.0%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,590.9	85.3	5.4%
Warrego Highway (18B)			
Dalby Road 325 intersection	3,210.7	85.3	2.7%
Road 325 intersection chainage 27.0 km	3,746.1	85.3	2.3%
Chainage 27.0 km chainage 10.5 km	5,178.2	85.3	1.6%
Chainage 10.5 km intersection McDougall Street, Toowoomba	4,241.5	85.3	2.0%
Dawson Highway (46B)			
1 km east of Banana	960.2	0.0	0.0%
900 m west of Burnett Highway (41E)	1,094.5	0.0	0.0%

Road/section	Without Project	Project ESAs	Increase
700 m west of Burnett Highway (41D)	2,902.8	0.0	0.0%
Leichhardt Highway (26A)			
Sandy Creek	942.9	222.5	23.6%
11 km south of Wowan	635.3	222.5	35.0%
100 m north of Woolein Creek	632.2	222.5	35.2%
300 m south of Fairview	626.8	222.5	35.5%
Bowen Street west of Banana	2,123.1	222.5	10.5%
Branch Creek	737.4	222.5	30.2%
400 m south of The Boulevard	561.8	222.5	39.6%
Tim Shay Creek	570.5	222.5	39.0%
Capricorn Highway (16A)			
41 Mile Creek	2,231.1	222.5	10.0%
500 m west of Dawson River	2,440.4	222.5	9.1%
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	2,429.4	222.5	9.2%
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,011.3	222.5	22.0%
6 km South of Mackenzie River	899.3	222.5	24.7%
South of Middlemount Turnoff	672.5	222.5	33.1%
Dysart-Middlemount Road (519)			
West of Middlemount	1,214.1	222.5	18.3%

Table 5-10: ESA comparison with and without the Project (Year -1)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	727.8	459.8	63.2%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	722.6	385.0	53.3%
Jackson-Wandoan Road intersection Miles	777.4	302.5	38.9%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,638.7	148.5	9.1%
Warrego Highway (18B)			

Road/section	Without Project	Project ESAs	Increase
Dalby Road 325 intersection	3,315.1	148.5	4.5%
Road 325 intersection chainage 27.0 km	3,946.9	148.5	3.8%
Chainage 27.0 km chainage 10.5 km	5,377.1	148.5	2.8%
Chainage 10.5 km intersection McDougall Street, Toowoomba	4,427.8	148.5	3.4%
Dawson Highway (46B)			
1 km east of Banana	1,040.1	237.3	22.8%
900 m west of Burnett Highway (41E)	1,147.4	237.3	20.7%
700 m west of Burnett Highway (41D)	3,307.2	237.3	7.2%
Leichhardt Highway (26A)			
Sandy Creek	979.9	222.5	22.7%
11 km south of Wowan	667.0	222.5	33.4%
100 m north of Woolein Creek	651.1	222.5	34.2%
300 m south of Fairview	645.6	222.5	34.5%
Bowen Street west of Banana	2,467.1	222.5	9.0%
Branch Creek	756.1	222.5	29.4%
400 m south of The Boulevard	570.5	222.5	39.0%
Tim Shay Creek	597.8	222.5	37.2%
Capricorn Highway (16A)			
41 Mile Creek	2,379.2	222.5	9.4%
500 m west of Dawson River	2,614.2	222.5	8.5%
Capricorn Highway (16B)			
1.5 km east of Dingo Roadhouse	2,618.2	222.5	8.5%
Fitzroy Developmental Road (85C)			
2.8 km North of Capricorn Highway	1,113.8	222.5	20.0%
6 km South of Mackenzie River	1,005.2	222.5	22.1%
South of Middlemount Turnoff	737.4	222.5	30.2%
Dysart-Middlemount Road (519)			
West of Middlemount	1,319.5	222.5	16.9%

Table 5-11: ESA comparison with and without the Project (Year 1)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	749.6	237.3	31.7%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	744.3	27.3	3.7%
Jackson-Wandoan Road intersection Miles	800.7	50.7	6.3%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,687.8	24.9	1.5%
Warrego Highway (18B)			
Dalby Road 325 intersection	3,422.8	24.9	0.7%
Road 325 intersection chainage 27.0 km	4,158.4	24.9	0.6%
Chainage 27.0 km chainage 10.5 km	5,583.6	24.9	0.4%
Chainage 10.5km intersection McDougall Street, Toowoomba	4,622.1	24.9	0.5%
Dawson Highway (46B)			
1 km east of Banana	1,126.6	237.3	21.1%
900 m west of Burnett Highway (41E)	1,202.8	237.3	19.7%
700 m west of Burnett Highway (41D)	3,767.8	237.3	6.3%

Table 5-12: ESA comparison with and without the Project (Year 2)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	772.1	237.3	30.7%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	766.6	29.7	3.9%
Jackson-Wandoan Road intersection Miles	824.7	55.3	6.7%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,738.4	27.2	1.6%
Warrego Highway (18B)			
Dalby Road 325 intersection	3,534.1	27.2	0.8%
Road 325 intersection chainage 27.0 km	4,381.3	27.2	0.6%
Chainage 27.0 km chainage 10.5 km	5,798.0	27.2	0.5%
Chainage 10.5 km intersection McDougall Street,	4,825.0	27.2	0.6%

Road/section	Without Project	Project ESAs	Increase
Toowoomba			
Dawson Highway (46B)			
1 km east of Banana	1,220.3	237.3	19.4%
900 m west of Burnett Highway (41E)	1,260.9	237.3	18.8%
700 m west of Burnett Highway (41D)	4,292.7	237.3	5.5%

Table 5-13: ESA comparison with and without the Project (Year 3)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	795.3	0.0	0.0%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	789.6	23.4	3.0%
Jackson-Wandoan Road intersection Miles	849.5	43.6	5.1%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,790.6	21.4	1.2%
Warrego Highway (18B)			
Dalby Road 325 intersection	3,648.9	21.4	0.6%
Road 325 intersection chainage 27.0 km	4,616.1	21.4	0.5%
Chainage 27.0 km chainage 10.5 km	6,020.6	21.4	0.4%
Chainage 10.5km intersection McDougall Street, Toowoomba	5,036.9	21.4	0.4%
Dawson Highway (46B)			
1 km east of Banana	1,321.9	0.0	0.0%
900 m west of Burnett Highway (41E)	1,321.8	0.0	0.0%
700 m west of Burnett Highway (41D)	4,890.7	0.0	0.0%

Table 5-14: ESA comparison with and without the Project (Year 4)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	819.1	0.0	0.0%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	813.3	38.8	4.8%

Road/section	Without Project	Project ESAs	Increase
Jackson-Wandoan Road intersection Miles	875.0	72.2	8.3%
Warrego Highway (18C)			
Main Roads district boundary Miles	1,844.3	35.5	1.9%
Warrego Highway (18B)			
Dalby Road 325 intersection	3,767.5	35.5	0.9%
Road 325 intersection chainage 27.0 km	4,863.6	35.5	0.7%
Chainage 27.0 km chainage 10.5 km	6,251.8	35.5	0.6%
Chainage 10.5 km intersection McDougall Street, Toowoomba	5,258.0	35.5	0.7%
Dawson Highway (46B)			
1 km east of Banana	1,431.9	0.0	0.0%
900 m west of Burnett Highway (41E)	1,385.7	0.0	0.0%
700 m west of Burnett Highway (41D)	5,571.9	0.0	0.0%

As can be seen from Tables 5-9 to 5-14 significant pavement impacts due to the Project, i.e. an increase in excess of 5% over existing levels, occur along the Leichhardt Highway (26B) for each of the six years investigated. As can be expected, the construction impacts are highest during the peak construction periods (Years -2 and -1). For example, an ESA increase as high as 53.3% is predicted along the Leichhardt Highway between Taroom and the (present) Jackson-Wandoan Road intersection, which represents the potential impact along approximately the 6 km stretch between Wandoan township and the new mine access road.

Tables 5-8 and 5-9 show that all roads utilised during the bulk sample transportation will incur significant pavement impacts due to these movements — however, these roads are only impacted during Years -2 and -1. The ESA increase of 53.3% along the Leichhardt Highway during Year -1 is largely due to the vehicles transporting the bulk sample.

During Years -2 and -1 the Warrego Highway (18C) experiences a traffic increase of 5.4% and 9.1% respectively. The other roads investigated experience load increases below 5% over existing levels for all for each of the years investigated.

5.2 Operational phase

5.2.1 Traffic impact assessment

As per the traffic impacts investigated during the construction phase, a link analysis was carried out for the operational phase. Table 5-15 below shows the projected AADT for Year 14 without the Project, as well as additional AADT levels due to the Project. Increases, given as a percentage over existing levels, for each road segment are also shown. Tables 5-16 and 5-17 show the AADT without the Project and the Project generated traffic for years 15 and 17 respectively.

Table 5-15: AADT comparison with and without the Project (Year 14)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	887	2	0.2%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1,081	2	0.2%
Jackson-Wandoan Road intersection Miles	1,055	8	0.8%
Warrego Highway (18C)			
Main Roads district boundary Miles	3,051	8	0.3%
Warrego Highway (18B)			
Dalby Road 325 intersection	9,713	8	0.1%
Road 325 intersection chainage 27.0 km	10,769	8	0.1%
Chainage 27.0 km chainage 10.5 km	21,788	8	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	27,128	8	0.0%
Dawson Highway (46B)			
1 km east of Banana	5,386	0	0.0%
900 m west of Burnett Highway (41E)	4,086	0	0.0%
700 m west of Burnett Highway (41D)	55,917	0	0.0%

Table 5-16: AADT comparison with and without the Project (Year 15)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	914	2	0.2%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1,113	2	0.2%
Jackson-Wandoan Road intersection Miles	1,086	8	0.7%
Warrego Highway (18C)			
Main Roads district boundary Miles	3,143	8	0.3%
Warrego Highway (18B)			
Dalby Road 325 intersection	10,028	8	0.1%
Road 325 intersection chainage 27.0 km	11,346	8	0.1%
Chainage 27.0 km chainage 10.5 km	22,625	8	0.0%
Chainage 10.5 km intersection McDougall Street,	28,318	8	0.0%

Road/section	Without Project	Project traffic	Increase
Toowoomba			
Dawson Highway (46B)			
1 km east of Banana	5,834	0	0.0%
900 m west of Burnett Highway (41E)	4,283	0	0.0%
700 m west of Burnett Highway (41D)	63,706	0	0.0%

Table 5-17: AADT comparison with and without the Project (Year 17)

Road/section	Without Project	Project traffic	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	969	2	0.2%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1,181	2	0.2%
Jackson-Wandoan Road intersection Miles	1,152	8	0.7%
Warrego Highway (18C)			
Main Roads district boundary Miles	3,334	8	0.2%
Warrego Highway (18B)			
Dalby Road 325 intersection	10,691	8	0.1%
Road 325 intersection chainage 27.0 km	12,595	8	0.1%
Chainage 27.0 km chainage 10.5 km	24,396	8	0.0%
Chainage 10.5 km intersection McDougall Street, Toowoomba	30,859	8	0.0%
Dawson Highway (46B)			
1 km east of Banana	6,846	0	0.0%
900 m west of Burnett Highway (41E)	4,707	0	0.0%
700 m west of Burnett Highway (41D)	82,691	0	0.0%

As can be seen from the previous tables, additional traffic due to the operation of the Project is less than 5% over existing levels for all of the relevant links or segments of the SCRs within the study area.

5.2.2 Pavement impact assessment

Tables 5-18 to 5-20 list the projected daily ESAs for Years 14, 15 and 17 without the Project, as well as average daily ESAs that can be ascribed to the Project. Increases, given as a percentage over existing levels, for each road segment are also shown.

Table 5-18: ESA comparison with and without the Project (Year 14)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	1,100.8	12.1	1.1%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1,093.0	12.1	1.1%
Jackson-Wandoan Road intersection Miles	1,175.9	46.9	4.0%
Warrego Highway (18C)			
Main Roads district boundary Miles	2,478.6	46.9	1.9%
Warrego Highway (18B)			
Dalby Road 325 intersection	5,187.5	46.9	0.9%
Road 325 intersection chainage 27.0 km	8,198.1	46.9	0.6%
Chainage 27.0 km chainage 10.5 km	9,112.8	46.9	0.5%
Chainage 10.5 km intersection McDougall Street, Toowoomba	8,079.9	46.9	0.6%
Dawson Highway (46B)			
1 km east of Banana	3,184.1	1.4	0.0%
900 m west of Burnett Highway (41E)	2,220.8	1.4	0.1%
700 m west of Burnett Highway (41D)	20,529.9	1.4	0.0%

Table 5-19: ESA comparison with and without the Project (Year 15)

Road/section	Without Project	Project ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	1133.8	12.2	1.1%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1125.8	12.2	1.1%
Jackson-Wandoan Road intersection Miles	1211.2	47.8	3.9%
Warrego Highway (18C)			
Main Roads district boundary Miles	2553.0	47.8	1.9%
Warrego Highway (18B)			
Dalby Road 325 intersection	5356.1	47.8	0.9%
Road 325 intersection chainage 27.0 km	8637.5	47.8	0.6%
Chainage 27.0 km chainage 10.5 km	9462.8	47.8	0.5%

Road/section	Without Project	Project ESAs	Increase
Chainage 10.5 km intersection McDougall Street, Toowoomba	8434.6	47.8	0.6%
Dawson Highway (46B)			
1 km east of Banana	3449.0	1.4	0.0%
900 m west of Burnett Highway (41E)	2328.1	1.4	0.1%
700 m west of Burnett Highway (41D)	23389.7	1.4	0.0%

Table 5-20: ESA comparison with and without the Project (Year 17)

Road/section	Without Project	Additional ESAs	Increase
Leichhardt Highway (26A)			
1.62 km south of Fitzroy Developmental Road	1202.9	15.1	1.3%
Leichhardt Highway (26B)			
Taroom Jackson-Wandoan Road intersection	1194.4	15.1	1.3%
Jackson-Wandoan Road intersection Miles	1284.9	49.9	3.9%
Warrego Highway (18C)			
Main Roads district boundary Miles	2708.4	49.9	1.8%
Warrego Highway (18B)			
Dalby Road 325 intersection	5709.9	49.9	0.9%
Road 325 intersection chainage 27.0 km	9588.3	49.9	0.5%
Chainage 27.0 km chainage 10.5 km	10203.5	49.9	0.5%
Chainage 10.5 km intersection McDougall Street, Toowoomba	9191.5	49.9	0.5%
Dawson Highway (46B)			
1 km east of Banana	4046.8	1.4	0.0%
900 m west of Burnett Highway (41E)	2558.4	1.4	0.1%
700 m west of Burnett Highway (41D)	30360.0	1.4	0.0%

The results in Tables 5-18 to 5-20 show that during Years 14 to 17, the additional ESAs due to the Project is less than 5% over projected background levels

5.3 Road safety

The construction and operation of the mine will result in increased commercial vehicle activity in the area around the MLAs as well as along the Warrego, Leichhardt and Capricorn Highways. Adherence to and vigilance of road safety considerations is therefore important during the life of the Project.

Shift changes during Years -2 and -1 will result in approximately 460 vehicles travelling to and from the MIA. This will occur every 10 days (or the duration of the shift). This volume of traffic creates some safety concerns for the surrounding road network, particularly at the new intersection giving access to the MIA. In order to minimise the impact on the road network, it is recommended that these movements are to be at staggered times (i.e. stipulate that construction crews may only leave the site during set hours of the day). Traffic control measures such as variable message signs should also be used to reduce the speed limit around the new intersection of the MIA access road and the Leichhardt Highway during the hours that construction crews arrive/depart.

Disruptions to traffic movements are likely during the construction phase of the Project due to trenching for the pipeline(s) and due to the temporary road closures and relocations. Chapters 5 and 6 of Volume 1 contain more details pertaining to the temporary road closures and road relocations.

School bus routes

The existing school bus routes in the area use parts of the Leichhardt Highway, Warrego Highway, Jackson-Wandoan Road and Grosmont Road — refer Figure 2-1 in Section 2.2.3 of this report. The Project will result in increased commercial vehicle movements along the Leichhardt Highway and Warrego Highway during the construction phase.

6. Mitigation measures

6.1 Construction phase (Year -2 to Year 4)

6.1.1 Traffic impact assessment

By definition, construction traffic impacts due to construction of the Project are deemed to be insignificant as additional traffic levels are less than 5% over existing levels for all of the SCRs within the study area. The link capacity of the SCRs investigated is therefore considered adequate. As such, no additional mitigation measures are required.

The mine access road intersection with the Leichhardt Highway should be constructed to Main Roads standards. For safety purposes, appropriate traffic management measures are recommended during the construction of this intersection, in accordance with the current Manual on Uniform Traffic Control Devices (Main Roads 2003) requirements.

As discussed in Section 3.1 and Section 4 of this report the Project will result in a number of road relocations adjacent to the MLA areas including the Jackson-Wandoan Road. Again, these roads should be constructed to Main Roads standards and appropriate traffic management measures should be employed during the construction of these roads and their respective intersections as mentioned above.

During the construction of the proposed gas, water and services pipelines there is likely to be some disruptions to the traffic on the road network. The proposed pipelines are required to run across several roads (for example the services and gas pipelines will have to cross the Leichhardt Highway to reach the MIA), which will require trenches to be cut across the affected roads. Appropriate traffic management techniques must be employed during such construction works on the road network (both SCR and non-SCR) to ensure the safety of construction workers, the public and to minimise disruptions to the affected traffic. In addition, the road pavement must be repaired to a suitable condition afterwards.

The *Transport Infrastructure Act 1994* requires written authorisation from the Chief Executive where the pipelines cross the proposed Surat Basin Rail and existing QR corridors or any SCRs. Main Roads approval will also be necessary in order to use the road reserves of SCRs for the proposed pipeline alignments. Negotiations with local government may be necessary to gain their agreement to utilise any local government controlled road reserves for the pipeline alignments.

6.1.2 Pavement impact assessment

As per the Guidelines, significant pavement impacts, that is, in excess of 5%, are predicted along the Leichhardt Highway (26B) between its intersection with the Warrego Highway and the new mine access road for each year from Year -2 through to Year 4 due to the construction of the Project. The Leichhardt Highway (26A and 26B), Capricorn Highway (16A and 16B), Fitzroy Developmental Road (85C) and Dysart-Middlemount Road (519) also incur significant pavement impacts due to the transportation of the 500,000 t bulk sample during Years -2 and -1.

While the annual maintenance costs have not been determined at this time, it is suggested that the percentage increases determined in Section 5.2.1 of this report be used as a starting point for these discussions with Main Roads.

6.2 Operational phase

6.2.1 Traffic impact assessment

Similar to the construction phase, traffic impacts during the operation of the Project are considered insignificant. As such, no additional mitigation measures are required.

6.2.2 Pavement impact assessment

As per the Guidelines, significant pavement impacts (those being in excess of 5%) are predicted along the Leichhardt Highway (26B) between its intersection with the Warrego Highway and the new mine access road. This is likely to be an ongoing occurrence during the operational phase of the Project. The Warrego Highway (18C) between the Main Roads Boundary and Miles will also experience significant impacts due to the Project during Year -1.

As per the recommendation in the construction phase, it is suggested that the percentage increases determined in Section 5.2.2 of this report be used as a starting point for determining necessary contributions to road maintenance through discussions with Main Roads.

6.3 Residual impacts

No residual traffic impacts are predicted due to either the construction or the operation phases of the Project. Safety and environmental impacts are discussed separately below.

6.3.1 Safety impacts

Traffic increases due to the Project — i.e. a maximum of 42 additional CVs per day during Year -2 and 9 additional CVs per day in Year 14 (as determined in Section 5 of this report) — are not anticipated to impact negatively on road safety on the links and intersections along the haulage routes in general. However some measures can be implemented in order to ensure that road safety is maintained during the life of the Project, for example restricting vehicle movements on the Warrego and Leichhardt Highways during school bus operational hours will reduce interaction between construction traffic and the school buses which will negate any negative safety impacts.

Construction crew travel should be restricted to certain hours of the day during days when shift changes occur, avoiding hours when school bus routes operate. Appropriate traffic management measures should also be employed during the times that shift change over travel is allowed (for example variable message signs reducing the speed in the vicinity of the intersection the Leichhardt Highway and the new MIA access road).

Intersection upgrade

The new intersection connecting the MIA to the Leichhardt Highway will be built to the required Main Roads standards. Haulage vehicles making a right turn manoeuvre from the

MIA access road to Leichhardt Highway present the biggest safety concern. As per the Road Planning and Design Manual (Main Roads 2006) there are two fundamental types of right turn treatments for two lane rural roads:

- basic right turn treatment (BAR)
- channelised right turn treatment with a short turn slot (CHR).

The CHR turn treatment is recommended for the mine access road intersection with the Leichhardt Highway. This type of turn treatment requires all through traffic to deviate, it provides safer performance by removing the stationary turning vehicle from the through traffic lane. It provides for a safer traffic environment for both the through traffic along Leichhardt Highway and the traffic turning into the MIA. A typical CHR turn treatment layout is shown in Figures 6-1.

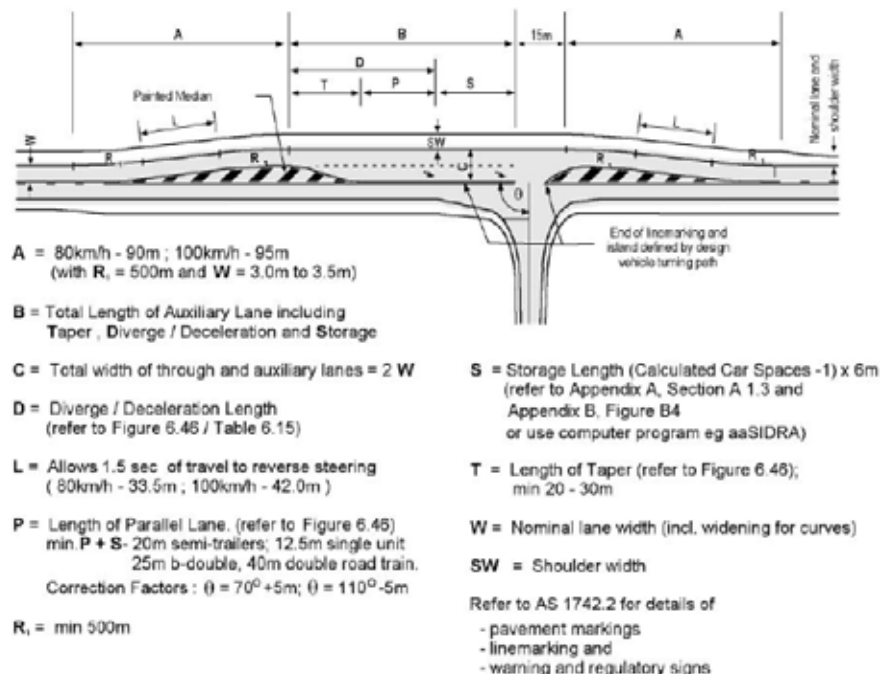


Figure 6-1: Typical CHR right turn treatment

Source: Road Planning and Design Manual (Main Roads 2006)

6.3.2 Environmental and other impacts

The additional traffic due to the construction and operation of the Project may contribute to social and environmental impacts, e.g. noise and air quality issues. These issues and related management measures are addressed separately under their respective headings in the various EIS chapters and other technical reports.

7. Conclusions

The existing roads within the study area are in a generally good condition and appear to be well maintained.

From the investigations in this RIA, generally additional traffic associated with the construction and operation of the Project will not adversely impact on the operation and safety of the SCRs. It should be noted however that Leichhardt Highway between Warrego Highway and Capricorn Highway will experience significant increases in traffic volumes during the days when shift change over occurs during Years -2 and -1 (i.e. the construction years). Significant pavement impacts (an increase in excess of 5% over existing ESA levels) are predicted, as follows:

- construction period (Year -2 through to Year 4)
 - Leichhardt Highway (26B), between its intersection with the Warrego Highway and the mine access road — additional ESAs as high as 38.9% over existing levels during the peak construction period and ranging between 5.1% and 8.3% during Year 1 through to 4
 - Warrego Highway (18C) between the Main Roads boundary and Miles during Years -1 and -2 — additional ESAs of 5.4% and 9.1% above background volumes respectively
 - during Years -1 and -2 the bulk sample transportation results in some significant ESA increases on the roads used. The affected road segments include the Leichhardt Highway (26A and 26B), the Capricorn Highway (16A and 16B), Fitzroy Developmental Road (85C), and Dysart-Middlemount Road (519). ESA increases as high as 52.6% are predicted along the Leichhardt Highway (between the MIA and Taroom).

Mitigation strategies are suggested in Section 8 of this report based on the above findings. In addition, recommendations are also made in relation to the construction of the mine access road and road relocations.

8. Summary of mitigation strategies

Recommended mitigation strategies to minimise potential impacts of the Project, as previously detailed in this traffic impact assessment, are summarised below:

- any new roads and intersections, including realigned roads should be constructed to Main Roads standards. For the new intersection between the mine access road and the Leichhardt highway, a CHR turn treatment is recommended
- appropriate traffic management measures should be used during construction where these roads, as well as the rail spur, intersect any SCRs in accordance with the current Manual on Uniform Traffic Control Devices (Main Roads 2003) requirements. Traffic management is detailed in the Traffic Management Plan as part of the Environmental Management Plan
- construction crew travel to and from the MIA during shift changes should be restricted to certain hours of the day, and traffic management measures employed around the intersection of the new MIA access road and Leichhardt Highway during the hours of construction crew travel
- negotiations with local government bodies and relevant state bodies (e.g. Main Roads) will be required for the use of road reserves for pipeline alignments. Written authorisation from the CEO's will be required where the pipelines cross the proposed Surat Basin Rail or existing QR corridors or any state controlled roads
- appropriate traffic management measures must be implemented where proposed gas, water and services pipelines are required to be trenched across roads.

References

- Queensland Department of Main Roads 2006, *Guidelines for Assessment of Road Impacts of Development*.
- Queensland Department of Main Roads 2005, *Pavement Design Manual*.
- Queensland Department of Main Roads 2006, *Road Planning and Design Manual*.
- Queensland Transport 2008, *Guideline for Multi Combination Vehicles*.

Attachment A

Austroads vehicle classes

AUSTROADS Vehicle Classification System

Level 1	Level 2		Level 3	AUSTROADS Classification		
Length (indicative)	Axles and Axle Groups		Vehicle Type			
Type	Axles	Groups	Typical Description	Class	Parameters	Typical Configuration
Short up to 5.5m	LIGHT VEHICLES					
		1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	$d(1) \leq 3.2\text{m}$ and axles = 2	
Medium 5.5m to 14.5m	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc	2	groups = 3 $d(1) \geq 2.1\text{m}$, $d(1) \leq 3.2\text{m}$, $d(2) \geq 2.1\text{m}$ and axles = 3, 4 or 5	
	HEAVY VEHICLES					
	2	2	Two Axle Truck or Bus	3	$d(1) > 3.2\text{m}$ and axles = 2	
	3	2	Three Axle Truck or Bus	4	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle, or Rigid vehicle and trailer	6	$d(1) > 3.2\text{m}$, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle, or Rigid vehicle and trailer	7	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle, or Rigid vehicle and trailer	8	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 5 and groups > 2	
	≥ 6	> 2	Six Axle Articulated Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	B Double B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6	
	> 6	5 or 6	Double Road Train Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	Triple Road Train Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions:
 Group: Axle group, where adjacent axles are less than 2.1m apart
 Groups: Number of axle groups
 Axles: Number of axles (maximum axle spacing of 10.0m)

$d(1)$: Distance between first and second axle
 $d(2)$: Distance between second and third axle