13 TRANSPORT

13.1 INTRODUCTION

This chapter provides responses to submissions received on the draft EIS related to transport associated with the Pipeline Component.

Where changes to the project description, as detailed in *Volume 2, Chapters 8* and *12* have impacted transport, these impacts, and measures to mitigate impacts are described.

13.2 RESPONSES TO SUBMISSIONS

A summary of the submissions received on transport associated with the Pipeline Component and a response to those submissions is provided in *Table 4.13.1*.

Table 4.13.1 Responses to Submissions on the draft EIS

Issue Raised	QCLNG Response	Relevant Submissions(s)
The Supplementary EIS should include a Crash Assessment and Safety Review of the impacted state-controlled roads in accordance with Guideline for Assessment or Road Impacts of Development (GARID) 2006 or as amended. The proponent and their consultants should work closely with the relevant contacts.	Refer to *Section 13.3.5.5*.	27
The impact on the life of the various road pavements due to the additional Equivalent Standard Axles (ESA) from the Project as well as the additional impact on the road surfaces due to tyre scrubbing by the very long trucks. Council also holds concerns over the cumulative impact upon local roads from the various gas pipeline projects. The geometry restrictions of the road network. Most rural intersections may be suitable for B Double movements, however the 18 m long pipes will be transported on "extended body" trucks, which will require much bigger turning radii than standard trucks. The Calliope Cross Roads intersection has its traffic signs damaged weekly, and almost daily, with present standard truck movements. This will become more of a problem if nonstandard trucks will traverse this intersection. Council considers that the potential cumulative impacts from pipe transport should haulage for this and any other project occur at the same time are extreme. Safety - Safety is a factor considered, indirectly, in all of the above. However it is worthy of note that long trucks will take longer to overtake than most other vehicles on the road.	Cumulative impacts of road transport through Gladstone have been addressed in *Volume 5, Chapter 14*.	29

Issue Raised	QCLNG Response	Relevant Submissions(s)
Crossings to be generally perpendicular to the Centreline of the state controlled roads. Pipe depth to top of pipe to be a minimum 1.8 m below natural surface or 1.5 m below bottom of table drain whichever the greater for the entire width of the SCRR. All bore pits to be outside the state-controlled road corridor. Enveloper pipe to be used for the entire crossing of the state-controlled road corridor.	Refer to *Section 13.3.5.6.*	27
The supplementary EIS should undertake a detailed Road Impact Assessment of the impacts of project related traffic for both construction and operation phases on the state-controlled road network. The proponent and their consultants should work closely with the relevant departmental contacts in the development of the supplementary EIS.	Refer to *Section 13.3*.	27
The supplementary EIS should nominate alternative stockpile sites as stockpiles of project-related material shall not be within the state-controlled road corridor or safety clear zones.	QGC duly notes that stockpiles are not to be located within the state-controlled road corridor or safety clear zones. This will be factored into the logistics planning process.	27
The supplementary EIS should additionally detail that Traffic Management Plans (TMP) shall be prepared and submitted to the department for approval for traffic control of construction activities impacting on state-controlled roads. It should be noted that there have been recent changes to the requirements for training for persons preparing TMP's which require compliance.	Refer to *Section 13.3.5.7*.	27
While not all roads have measured traffic loadings, Council does have a hierarchical structure for all its roads and hence design standards and maintenance regimes applicable to the respective road design.	Refer to *Section 13.3.5.4 Pavement Impacts.*	28
Council implore that a condition of approval be imposed which encourages the proponent to take responsibility for any damages or decreased quality in the pavement surfaces during the life of the project and that this include consultation with Banana Shire Council regarding specific design, pavement dimensions, signage, drainage and delineation.	Refer to *Section 13.3.5.4*.	28
Callide Dam Road is listed as one of the local government roads, this road is a Declared Main Road, not council controlled.	Noted and amended.	28
Consideration must be given to the use of the rail network for the transportation of the gas pipeline.	QGC is committed to the use of rail where this is available to minimise transport impacts and improve safety performance.	21

Issue Raised	QCLNG Response	Relevant Submissions(s)
With the increased number of projects operating in the region the volume of traffic has increased, placing an unsustainable burden on the local road network, increasing the maintenance costs and the frequency rates that WDRC has had to carry out its road maintenance programs. The proponent must clearly account for any road infrastructure upgrading and maintenance created by the project. Work should include:		36
• A comprehensive traffic impact study be undertaken to assess the impact of the project particularly the local road networking.	Refer to *Section 13.3.5.4*.	
• Submission of Traffic Management Plan.	Refer to *Section 13.3.5.7*.	
• The development of mitigation and management measure to reduce impacts on WDRC roads.	Refer to *Section 13.3.5.4*.	
• QGC Ltd entering into an infrastructure agreement with WDRC for the life of the project where QGC is responsible for the funding of any upgrading of roads and any additional maintenance required during and after the construction phase.	Refer to *Section 13.3.5.4*.	
• That all roads providing access to work camps be constructed to an all weather access standard, with appropriate turning facilities provided from major roads.	Refer to *Section 13.3.5.2 Accommodation Camps.*	

13.3 CHANGES TO PROJECT DESCRIPTION

Due to a number of changes that have occurred in the Project description (refer to *Volume 2, Chapters 7, 8, 11* and *12*) the road impact assessment study has been revised for the Pipelines and Gas Field Components of the Project. The changes that this has made to the assumptions used in the Pipeline Component transport requirements are set out in *Table 4.13.2*.

Table 4.13.2 Comparison of assumptions draft EIS v supplementary EIS

Item	Draft EIS	Supplementary EIS
Individual line pipe length	18 m	12 m
Number of construction spreads	2 per pipeline	3 per pipeline
Number of camps	5	6
Construction work numbers (Peak)	800	1,487
Personnel per camp (Peak)	200[1]	200 to 400
Pipe delivery	All pipe delivery via the Port of Gladstone[2]	Pipe delivery 125 km length via Port of Gladstone remainder via Port of Brisbane
Pipe fittings	All via Brisbane	All via Brisbane

1 The potential for 400 persons was indicated but not assessed
2 The need to divide the pipe between Gladstone and Brisbane was discussed but not assessed

A revised study has been carried out to address these changes in the Project description. The studies will need to be revised when the next stage of logistics studies has been completed and a transport contractor appointed. QGC will continue to liaise with both the Department of Transport and Main Roads (DTMR) and the relevant local government authorities to ensure that all studies and construction programs are satisfactorily completed to ensure no long term negative impacts on the road networks. The basis of the studies carried out for the supplementary EIS are the same as those assumed for the draft EIS which are:

- The gas collection header, including the Woleebee Creek section, the water collection header and the export pipeline will be constructed at the same time.
- Pipe haulage for the gas collection header and export pipeline would be 40 km per month combined total, with a maximum of 2 km in any one day, over a period of 15 months.
- Vehicles generated by the haulage of the 1,050 mm diameter pipe are based on four by 12 m pipe lengths per truck.
- The current procurement program alternates the delivery between the export pipeline and the gas collection header month by month.
- Haulage will be undertaken using semitrailers for pipeline and construction camp components.
- Haulage may be undertaken 24 hours per day seven days per week on occasion.

A logistics study has been carried out and QGC is committed to using rail transport and in developing a long-term relationship with Queensland Rail throughout the field life cycle. It is QGC's intention to make rail transport a central plank of its logistics network and to use all available rail paths as they

become available. Consolidation centres will be set up to move as much freight as possible off the road and on to rail transport. However, at this stage it is still not clear what volume of materials will be able to be transported by rail. The revised transport study has therefore been based on the worst case assessment of all of the materials being transported by road.

Whilst multimodal transport (rail to Chinchilla, Miles or Biloela and then by road) has not been assessed in detail an assumption that 75 per cent of the pipe material being delivered to the Gas Field area during the construction phase (i.e. up to 2014) can be transported by rail has been considered. This has been undertaken to provide a realistic comparison to the worst case loads and impacts on pavement life on the various routes and is addressed in *Volume 3, Chapter 14*.

The remainder of this chapter addresses the revised transport numbers as they relate to the Pipeline Component of the Project. A portion of the pipeline materials will be transported along the same routes as those employed for the delivery of the Gas Field Component materials. This chapter identifies those materials however the impact of their transport which will occur in conjunction with the transport of Gas Field materials is addressed in *Volume 3, Chapter 14.*

13.3.1 Time Span of Haulage

Haulage is scheduled to commence in December 2010 and cease in May 2012. Based on this delivery schedule, construction on the export pipeline would commence in March 2011 and be completed in September 2012, with the construction of the gas and water collection headers commencing in January 2011 and being completed in December 2012.

13.3.2 Terminology and Approach

In this section the following terminology has been used:

- *Trucks* The number of truck loads to transport the materials
- *Vehicle* Any other project vehicles (construction worker transport)
- *Trips* One trip is the movement of a truck/vehicle from its origin to its destination. The return movement is counted as a separate trip.

A preliminary road impact assessment has been carried out for the pipelines and is provided in *Appendix 3.5.*

13.3.3 Methodology

The original base case used in the draft EIS assumed all materials would be transported by road. This was adopted on the grounds that it would create the greatest impact on the road network, enabling key impact areas to be identified and mitigation strategies to be assessed. This approach has again been used for the supplementary EIS.

However as previously stated it is QGC's intention to use rail where this is available. An assessment of the impacts resulting if 75 per cent of the materials were to be transported by rail between the Port of Brisbane and the town of Miles has been carried out as a realistic comparison to the worst case (refer to *Volume 3, Chapter 14*).

Potential vehicle numbers have been calculated to cover transport of pipe and fittings, mobilisation and demobilisation of plant, equipment and camps and construction worker movements.

The impact on the state-controlled network for the duration of construction for the pipelines was then reassessed in accordance with Queensland Department of Transport and Main Roads (DTMR) *Guidelines for Assessment of Road Impacts of Development (2006)*. This included a preliminary pavement impact assessment, link analysis, intersection analysis, safety review and environmental review.

Once this impact assessment was conducted, the EIS risk assessment methodology as described in *Volume 1, Chapter 4* was applied.

The distribution of the traffic generated on the local government-controlled network has not been assessed at this stage because routes on this network have not been fully determined. Roads that may be affected (refer to *Annex A-1.2* and *A-2.1*) have been considered but will not be confirmed until a transport contractor is appointed prior to construction. These roads are unchanged from those given in the draft EIS.

13.3.4 Existing Environment

13.3.4.1 Existing Road Network

The key roads with the potential to be impacted were identified and described in the supplementary EIS. These have not changed.

13.3.4.2 Existing Road Traffic Volumes

Data on existing traffic volumes on the potentially affected roads were obtained for the draft EIS from the relevant DTMR regional offices (i.e. Wide Bay/Burnett, Fitzroy, Darling Downs and South West). New data have not been sourced at this stage. This will be done once the transport strategy has been finalised and the relevant roads and their actual loads have been finally determined. The revised studies reported here therefore focus on changes in the Project traffic compared to the original DTMR data used in the draft EIS.

13.3.4.3 Existing Rail Network

Rail infrastructure intersected by the Pipeline routes has been detailed in *Volume 4, Chapter 5.*

As stated above, QGC is committed to the use of rail for transport and is in negotiations with rail transport providers to try and maximise transport of all materials, plant and equipment by rail.

13.3.4.4 Shipping

Logistics studies have shown that line pipe for the Pipeline Component of the Project should be delivered through both the Ports of Gladstone and Brisbane as opposed to all through the Port of Gladstone. The proposed split is to bring 125 km of pipeline via the Port of Gladstone and the remainder through the Port of Brisbane. Preliminary discussions with the Port of Brisbane indicate that this would be viable. The draft EIS proposed that 730 km of 1,050 mm diameter pipe would be delivered to Gladstone for transport by road requiring up to 10,280 truck loads. The ability to ship the materials for the gas Collection Header and 40 per cent of the Export Pipeline through Brisbane would result in only 2,605 truck loads being required on roads through Gladstone.

All impacts associated with the Port of Gladstone and transport through the Gladstone City Council region have been assessed in *Volume 5, Chapter 14.*

13.3.4.5 Existing Aerodromes

Six aerodromes/airfields have been identified within two to fours hours driving distance of the potential camp locations for the gas field development. These are:

- Gladstone Aerodrome (certified)
- Thangool Aerodrome (certified)
- Theodore Aerodrome (not certified)
- Moura Aerodrome (not certified)
- Taroom Aerodrome (registered)
- Chinchilla Aerodrome (registered).

Gladstone and Thangool both have the capacity to service the northern end of the Export Pipeline work. The time savings in using Theodore or Moura airports would not warrant the upgrade costs for the limited duration of pipeline construction.

At the southern end of the pipeline the best options would be Taroom or Chinchilla. As discussed in *Volume 3, Chapter 14* both of these airfields would need some form of upgrade work to make them suitable for Project needs.

QGC is considering all options in its logistics studies.

13.3.5 Potential Impacts and Mitigation Measures

13.3.5.1 Transport Methods

As previously discussed the transport of plant and materials for the pipelines is expected to be a combination of shipping, rail and road.

The key items to be transported remain:

- Pipe and fittings.
- Pre-assembled components (e.g. scraper and meter stations).
- Construction plant and equipment.
- Camp facilities.

In addition, there will be daily movements of construction vehicles servicing the accommodation camps, water trucks for dust management and movement of personnel to and from the work areas.

13.3.5.2 Traffic Generation

This section presents the traffic generation for the base case in which all materials are transported by road. Transport by rail has the potential to reduce the pipe and pipeline facilities transport numbers. This would reduce the volume of traffic through areas such as Gladstone and Toowoomba and along sections of the Dawson and Warrego Highways. It is not anticipated that other elements such as camp components and heavy plant and equipment would be transported by rail.

Pipe Transport

Export Pipeline

Based on the logistics studies to date it is expected that 125 km of the 1,050 mm pipe for the Export Pipeline will be delivered via the Port of Gladstone with the remainder coming via the Port of Brisbane. All plant and equipment for construction of the pipelines is expected to be transported from Brisbane. The routes considered for road haulage of all equipment and plant to the export pipeline worksites are detailed in *Annex A-1.*

The draft EIS anticipated that pipe would be delivered in 18 m lengths at the rate of two to three pipes per truck. It is now proposed that the pipe will be delivered in 12 m lengths at the rate of 4 pipes per trucks. The total quantity of pipe to be transported for the Export Pipeline and the number of vehicles that this will generate is provided in *Table 4.13.3.* The estimated loads for two pipes per truck are 5.5 tonnes on a single steer axle, and 11.5–12 tonnes on the two tandem axle groups on the prime mover and trailer.

Table 4.13.3 Truck volumes for pipe deliveries to pipeline

Pipeline description	Approximate length (km)	Pipe diameter (mm)	Pipe length/ truck (m)	draft EIS		sEIS	
				Total no. truck loads	Approximate vehicle trips/day	Total no. truck loads	Approximate vehicle trips/day
Export Pipeline (Gladstone)	125	1,050	48	10,420	112	2,605	84*
Export Pipeline (Brisbane)	255	1,050	48	0	0	5,500	84*
Gas Collection Header – Miles to Ruby	100	1,050	48	5,840	112	1,980	84*
Gas Collection Header - Woleebee Creek	55	1,050	48	N/A	N/A	1,189	84*
Water Collection Header	160	800	108	1,956	38	1,518	38
Total	**711**			**18,216**		**12,792**	

* 1,050 mm diameter pipe materials will be delivered to only one pipeline at any one time.

Gas and Water Collection Headers

The 155 km of 1,050 mm pipe for the gas Collection Header is also expected to be transported from the Port of Brisbane.

The 100 km of 800 mm water Collection Header is expected to originate from other sources in Brisbane as it is manufactured in Australia. The routes considered for road haulage for the gas and water Collection Headers are detailed in *Annex A-2*.

The total quantity of pipe to be transported for the Collection Headers and the number of vehicles that this will generate is provided in *Table 4.13.3.*

Pre-assembled Components

The number of preassembled components has reduced with less MLVs expected along each of the pipeline routes. The number of components and the generated truck loads are set out in *Table 4.13.4*.

Table 4.13.4 Truck volumes for pipeline facilities haulage

		draft EIS		sEIS	
Description	Pipeline description	Number of facilities	Total truck loads	Number of facilities	Total truck loads
Scraper stations	Export pipeline	7	70	3	30
	Gas collection header			3	30
Meter stations	Export pipeline	2	20	2	20
MLV	Export pipeline	5	15	4	12
	Gas collection header	3	9	1	3
Miles receipt station	Export pipeline	1	10	1	10
Total			**124**		**105**

Construction Plant and Equipment

The volume of plant and equipment for the construction of each pipeline remains unchanged from the draft EIS and are restated in *Table 4.13.5*.

Table 4.13.5 Heavy plant required quantities for pipeline sites

Plant item	Transported via	Quantity required	Truck loads
Bulldozers	Semitrailer	20	20
Graders	Semitrailer	6	6
Excavators	Semitrailer	30	30
Side boom tractors	Low loader	12	12
Roller	Semitrailer	2	2
Heavy cranes	Independent	2	2
Total			**72**

Accommodation Camps

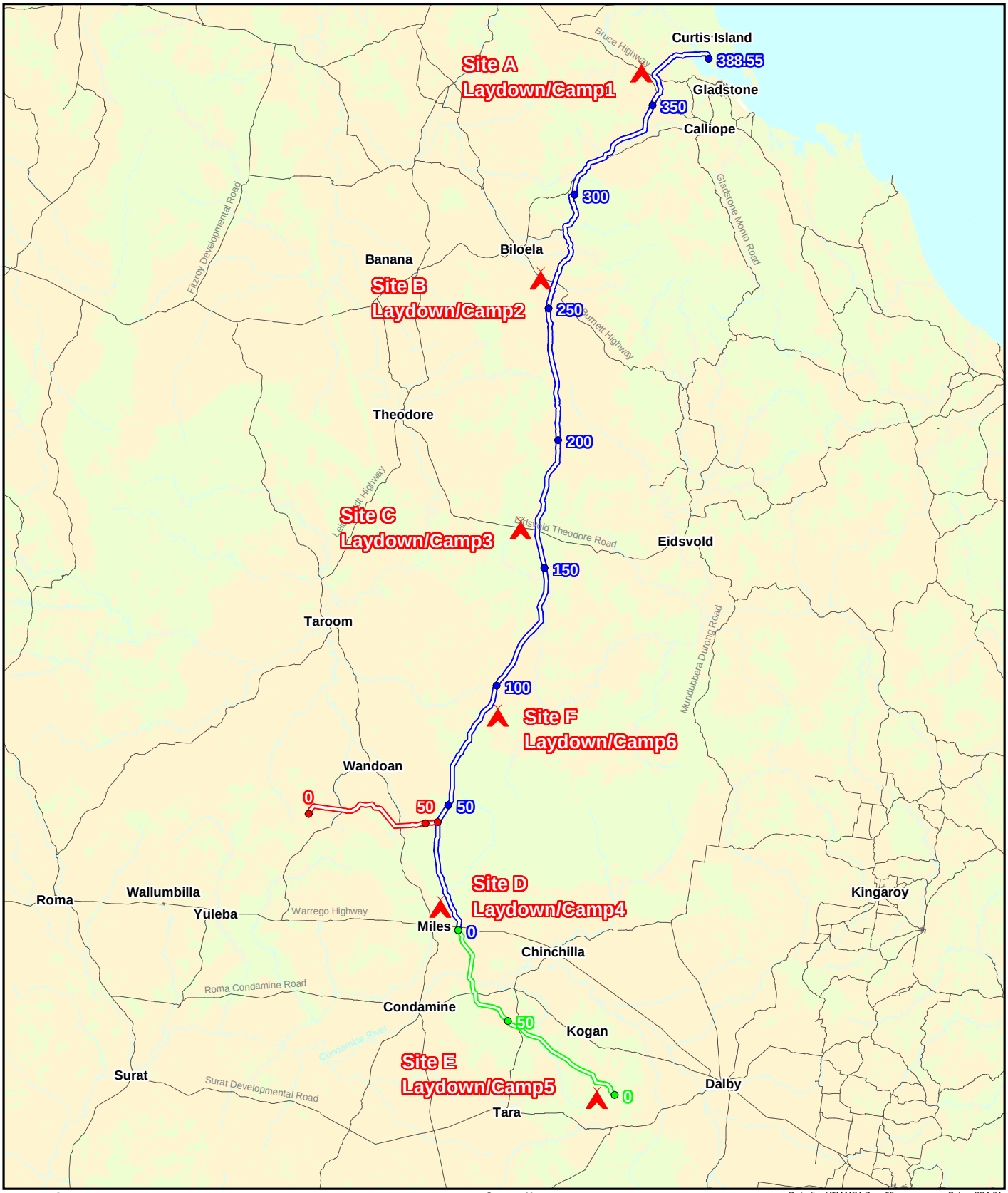
A total of six campsites, rather than five as set out in the draft EIS, will be established for the gas and water collection headers and export pipeline. It is anticipated that all six of the camps will be installed and maintained for the duration of construction rather than one or two camps being installed and relocated at intervals during construction. Camps will be located to give a maximum travel distance to the work area of 60–70 km. A map showing the indicative camp locations is provided in *Figure 4.13.1*.

Construction camps will be set back from road boundaries so that all activities associated with the camps occur clear of the road reserves and any buffer zones. Parking and traffic circulation around the parking areas will not create queues back onto the road carriageway. Access to pipeline accommodation camps will be created to a standard adequate for the construction period and the level of traffic generated.

It has been assumed that only one camp will be constructed at any one time at a rate of 20 truck loads per day for the majority of camps (<200 workers), with 40 truck loads per day for the larger camps (>200 workers) giving a 33 day construction period per camp (refer to *Table 4.13.6*). This gives a varying number of trucks per camp such that the numbers set out in *Table 4.13.6* are not evenly divisible by the number of camps.

Table 4.13.6 Truck volumes for construction of camp for pipeline camps

Item	Quantity of item	Units required	Truck loads
Accommodation units	514	12 m x 3 m	514
Central ablution	8	36 m x 9 m	72
Mess	14	48 m x 12 m	224
Recreation room	14	48 m x 12 m	224
Offices	15	12 m x 3 m	15
Furniture and Fittings			29
Total trucks			**1,078**



Legend:

- Export Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point
- Woleebee Creek Route & Kilometre Point

Source Note:

1:250,000 Topographic vector copyright Geoscience Australia

Projection UTM MGA Zone 56 Datum GDA 94

0 20 40 60 80

Kilometres

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QUEENSLAND CURTIS LNG
A BG Group business

Project	Queensland Curtis LNG Project
Client	QGC - A BG Group business

Title **Indicative Laydown and Camp Locations**

ERM
Environmental Resources Management Australia Pty Ltd

Drawn	Unidel	sEIS Volume 4 Figure	S4.13.1
Approved	CDP	File No	EO5-P-MA-96238
Date	18.01.10	Revision	Supplementary

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Construction Trips

Construction trips relate to the transport activities associated with the servicing of camps and workshops and moving construction workers. It has been assumed that the camp and workshop servicing will require 30 trips per day per camp. Movement of construction workers includes daily movement of personnel from the camp to the RoW and transport of personnel to and from the camp at the start and end of each cycle.

Quarry Material

Whilst the majority of bedding material for pipeline installation will be provided by screening spoil material in rocky areas it may be necessary to import further bedding material. This bedding material would be sourced from borrow pits of better quality material along the pipeline and thus minimising the haulage over both state controlled and local government roads. The sources of suitable materials have not been determined at this stage, but it is anticipated that the quarry source will be within 50 km of the work area. An allowance has been made for bedding material based on a length of 200 km of trench requiring a 100 mm depth of sand/bedding in a 2.0 m wide trench. The quantity of sand/backfill that this would generate is set out in *Table 4.13.7*.

Quarry material will also be required for the installation of hardstand areas associated with meter stations, mainline valve stations, scraper station and construction camps. The quantity of materials, and number of trucks required for transport, for each element are set out in *Table 4.13.7.*

Table 4.13.7 Estimated quarry materials required for pipelines

Item	Material	Volume (m^3)	Approx. weight (tonnes)	Truck loads
Pipeline bedding	Sand/backfill	40,000	76,000	2,715
Tunnel boring	Grout	120	288	11
Meter stations (2 of)	Gravel/soil/fill	500	1,000	36
Main line valves (4 of)	Gravel/soil/fill	120	240	18
Camps (6 of)	Gravel/soil/fill	81,000	162,000	5,786
Scraper stations (6 of)	Gravel/soil/fill	1,500	3,000	108
Total		**123,240**	**242,528**	**8,674**

For the purpose of the analysis, 10 per cent of the total volumes of the sand bedding and grout required have been assigned to the road adjacent to the relevant worksite. This assignment will, for the majority of the roads,

overestimate the number of quarry vehicles on the road, but captures a possible worst case on a small number of road sections.

Field Joint Coating

Once the pipe sections are welded together each weld needs to be coated to provide corrosion protection. The volumes of trucks required for the transport of field joint coating material is summarised in *Table 4.13.8*.

Table 4.13.8 Truck volumes for field joint coatings

Pipeline description	Approximate length (km)	Garnet weight (tonnes)	Total no. truck loads	Approx. maximum vehicle trips/day over life of the project
Export pipeline (Brisbane)	125	475	22	2
Export pipeline (Gladstone)	264	1,003	45	2
Gas collection header	95	361	19	2
Woleebee Creek	57	217	11	2
Total	**541**	**2,056**	**97**	**N/A**

Maintenance and Surveillance

There is no change in the maintenance and surveillance requirements for the pipelines with the overall road usage being negligible.

13.3.5.3 Traffic Generation

Traffic generation has been calculated based on the data in *Section 13.3.5.2*. On this basis the number of loads and/or trips for each transport element has been summarised in *Table 4.13.9*; where a load will equal two trips (i.e. in loaded and out empty).

Table 4.13.9 Transport Numbers

	draft EIS		sEIS	
Item	Total Trucks	Trips/day	Total Trucks	Trips/day
Pipe and Fittings				
Export Pipeline	10,420	112	8,105	84*
Collection Header				
Gas	5,840	112	1,980	84*
Water	1,956	38	1,518	84*
Pre-assembled components	150	8	105	6

	draft EIS		sEIS	
Plant and equipment/spread	72	n/a	72	n/a
Camps/camp/spread	185	18	1078	40-80
Construction trips/spread	n/a	260	n/a	260-460
Quarry Material	8,674	55 max	4,937	-
Field Joint Coating Material	134	N/A	97	N/A

* 1,050 m diameter pipe materials will be delivered to only one pipeline at any one time

13.3.5.4 Road Impacts

Traffic Impacts

Annual Average Daily Traffic

Where the percentage increase in annual average daily traffic (AADT) as a result of a project exceeds 5 per cent of the current AADT the DTMR Guidelines deem this to be a significant effect. A summary of the existing AADT, projected project transport numbers for pipeline only affected state-controlled roads and the calculated percentage increase in AADT is provided in *Table 4.13.10*. A diagrammatic representation of the current AADT, truck loads, and construction worker vehicles long the state controlled network is given in *Figure 4.13.2* and *Figure 4.13.3*.

Table 4.13.10 AADT percentage increase on state controlled roads

Road	Section	Current AADT	Generated traffic volumes (vpd)	Maximum impact
Isis Highway	Childers–Biggenden	870–1,390	84	6–10%
	Biggenden–Coalstoun Lakes	950–1,250	84	7–9%
Leichhardt Highway	Westwood–Taroom	500–2,200	550–632	30–112%
Bruce Highway	Maryborough–Gin Gin	3,290–4,390	84	<5%
	Gin Gin–Benaraby	3,050–5,030	84	<5%
	Benaraby–Rockhampton	3,500–4,600	124–155	<5% – 16%
Burnett Highway	Nanango–Goomeri	780–2,090	52	<5%– 7%

Road	Section	Current AADT	Generated traffic volumes (vpd)	Maximum impact
Brisbane Valley Highway	Goomeri–Gayndah	580–2,370	40–52	<5%– 9%
	Gayndah–Monto	640–3,190	40	<5%– 6%
	Monto–Biloela	700–2,400	40–551	<5%–82%
	Ipswich–Harlin	2,490–9,160	52	<5%
Dawson Highway	Gladstone–Biloela	900–28,700	84–435	<5% – 42%
Moonie Highway	Biloela–Banana	1,300–5,500	86	<5% – 7%
D'Aguilar Highway	Kilcoy–Yarraman	2,770–3,360	52	<5%
Gladstone–Mt Larcom Road	Yarraman–Kingaroy	3,380–4,700	52	<5%
		2,900–9,000	276–781	<5% – 27%
Eidsvold–Theodore Road		80–800	84–314	11–397%
Biloela–Callide Road		360–1,050	243	23–68%
Booyal–Dallarnil Road		490	84	17%

Level of Service

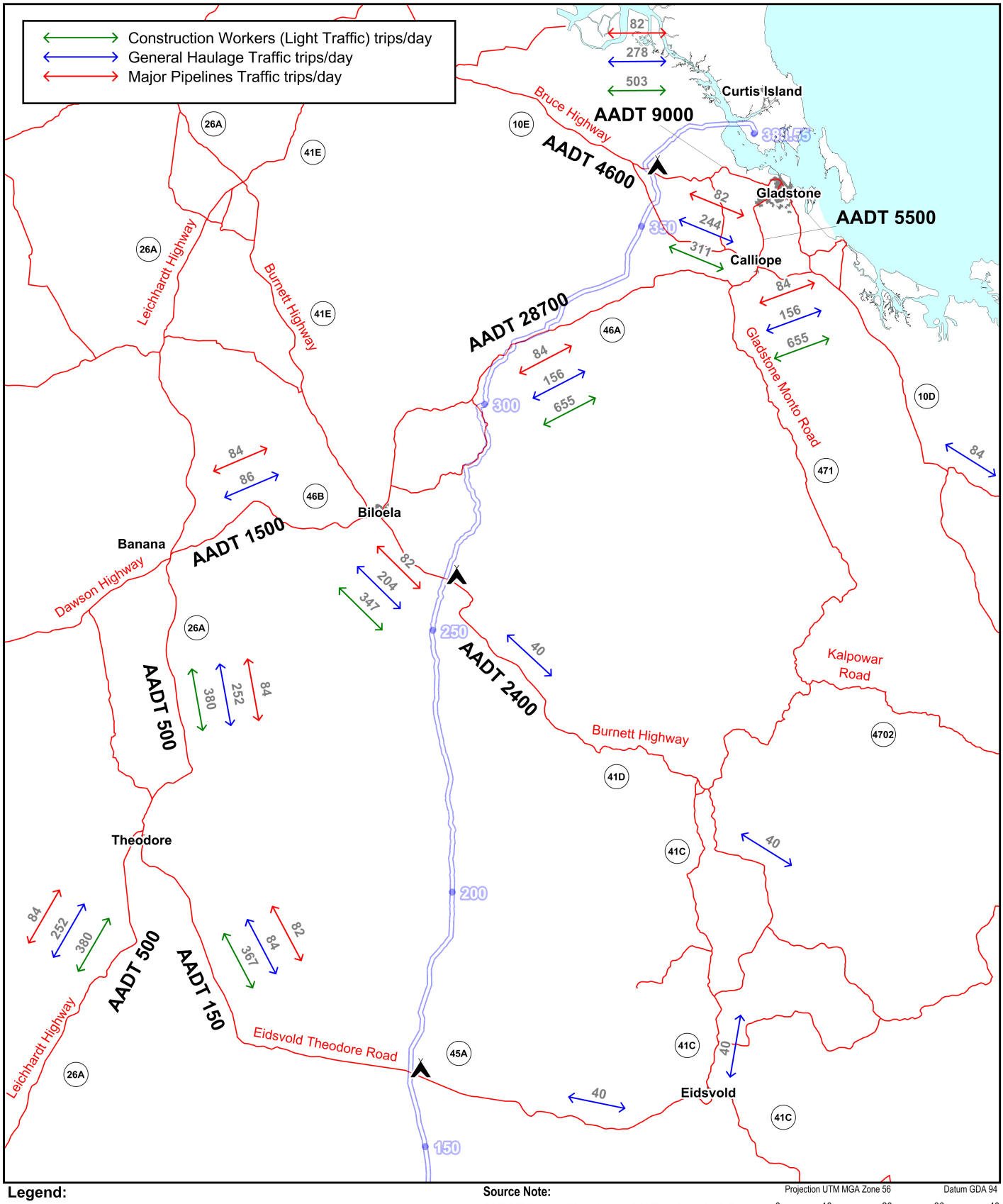
The increase in AADT can lead to some alterations in the 'level of service' (LOS) experienced on a road. Level of service generally describes the operational conditions within a traffic stream and their perception by motorists.

Routes on which a change to level of service may be experiences have been reviewed (refer to *Appendix 3.5*). It has been identified that a change may occur in the LOS on the Leichhardt Highway (Westwood–Taroom) from LOS A to LOS A–B.

The requirements for road improvement works as a result of any changes in LOS are being investigated in greater detail in the next phase of the Project.

Traffic Congestion

The findings of the draft EIS in relation to traffic congestion as a result of pipeline construction actives are unchanged with impacts likely to result from slow-moving traffic, increases in traffic volume and localised traffic disruption associated with constructing a pipeline across a road corridor. The ability to transport pipeline elements by rail would reduce the volume of traffic through Brisbane, Ipswich, Toowoomba and Gladstone. The traffic movement through townships such as Dalby, Miles, Chinchilla, Biloela and other regional centres are not expected to reduce as a result of rail transport as the materials will need to be transferred to road in these locations. The mitigation measures also remain as set out in the draft EIS.



Legend:

Export Pipeline & Kilometre Point

Proposed Camps

Source Note:

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AADT information from Kellogg Brown & Root Pty Ltd

Projection UTM MGA Zone 56 Datum GDA 94

0 10 20 30 40

Kilometres

N

QUEENSLAND CURTIS LNG
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Project: Queensland Curtis LNG Project

Client: QGC - A BG Group business

Title: **Pipeline Transport Routes Gladstone to Eidsvold**

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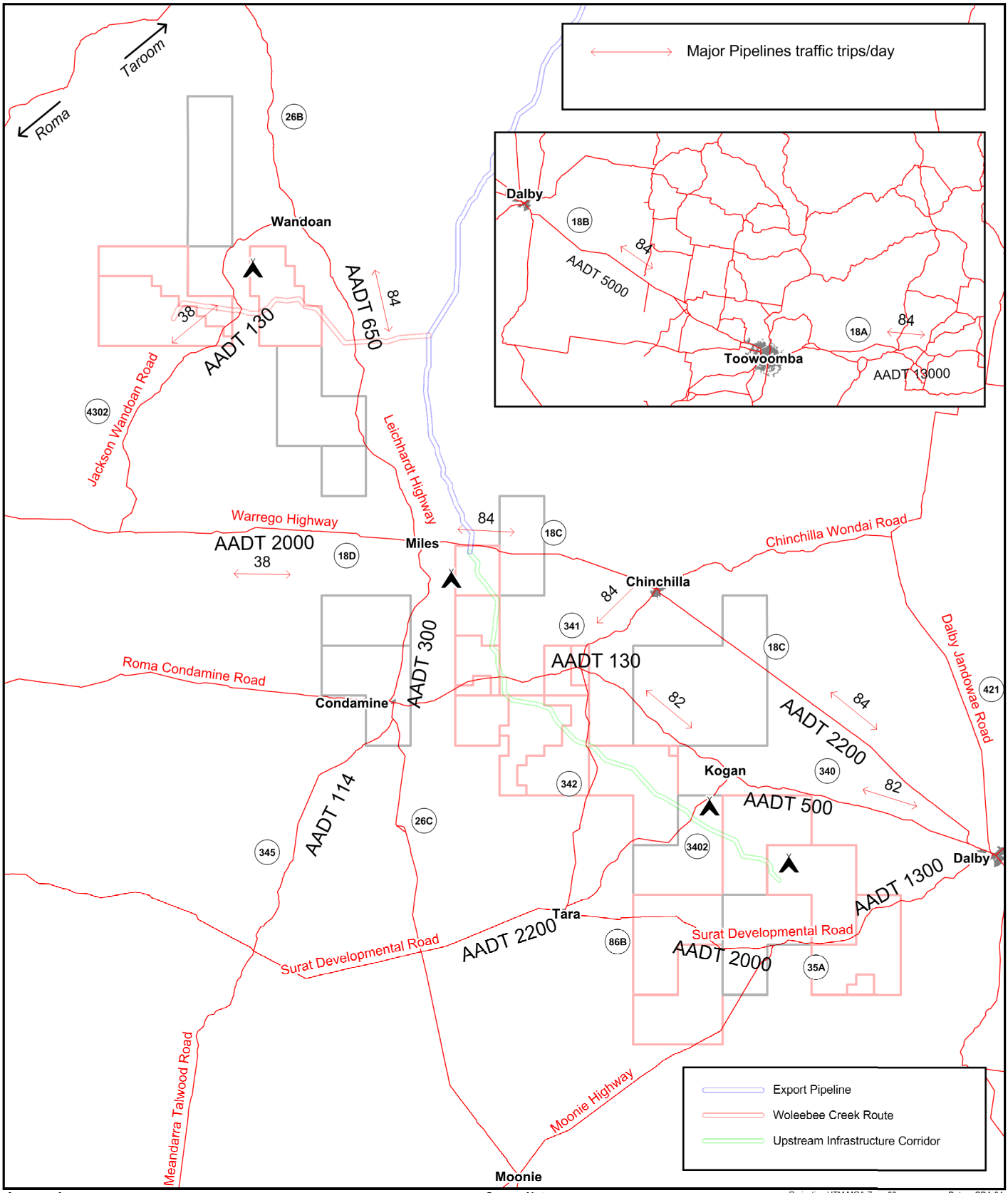
Drawn	Mipela	**sEIS Volume** 4	**Figure** s4.13.2
Approved	CDP	File No:	EO5-P-MA-96241
Date	12.01.2010	Revision	Supplementary



Legend:

Gas Fields - Authority to Prospect

Gas Fields - Petroleum Lease/Petroleum Lease Application

Proposed Camps

Source Note:

1:250,000 Topographic vector copyright Geoscience Australia
AADT information from Kellogg Brown & Root Pty Ltd

Projection UTM MGA Zone 56 Datum GDA 94

0 10 20 30 40

Kilometres

N

QUEENSLAND CURTIS LNG
A BG Group business

Project	Queensland Curtis LNG Project
Client	QGC - A BG Group business

Title **Pipeline Transport Routes Brisbane to Miles**

ERM
Environmental Resources Management Australia Pty Ltd

Drawn	Mipela	sEIS Volume 3	Figure s4.13.3
Approved	CDP	File No:	E05-P-MA-96250
Date	12.01.09	Revision	Supplementary

Road Pavement Integrity

A revised study has been carried out to assess the potential impacts on assumed transport routes (refer to *Appendix 3.5*) based on the estimated Project traffic (refer to *Section 13.3.5.2*).

Current pavement loadings on the state-controlled roads have been assessed using traffic count volumes, proportion of heavy vehicles and annual growth rates provided by the respective DTMR regional offices for the draft EIS.

Where a development will create more than a 5 per cent increase in the existing ESA loading on a road or section of road the DTMR requires an assessment of impact on the road pavement. Based on the calculations set out in *Appendix 3.5* a list of the state controlled roads where the average daily produced ESA is greater than 5 per cent of the current ESA has been compiled (refer to *Table 4.13.11*). *Table 4.13.11* addresses those roads that are only affected by pipeline transport. Roads used for pipeline transport that are also used for gas field transport (e.g. Warrego Highway) are provided in *Volume 3, Chapter 14*. Pavement loading from construction has been calculated for the 20 year life of the pavement for each road unit (refer to *Table 4.13.11*) and shows that for pipelines only the loadings on the 20 year pavement life are predominantly less than point one per cent. The construction impacts associated with the pipeline component of the Project will be of relatively short duration and the impact over a 12 month period would not be regarded as significant.

The use of rail for pipe deliveries between Gladstone and Biloela has not been calculated but it may be possible to transport 100 per cent of the pipe by rail. This could reduce the potential impacts on the Dawson Highway.

Table 4.13.11 Pavement impact of pipelines

Road	Section	Generated ESAs (ESA/year)	Maximum impact (ESA/year)	Number of days under effect	Increase in 20 year pavement loading
Isis Highway	Childers-Biggenden	2.34×10^2	<5%	7	<0.1%
	Biggenden-Coalstoun Lakes	2.34×10^2	<5%	7	<0.1%
Leichhardt Highway	Westwood–Taroom	6.0×10^3 – 9.6×10^3	<5.0% – 8.3%	33 – 50	0.1% – 0.3%
Bruce Highway	Benaraby–Rockhampton	1.7×10^3 – 2.8×10^3	<5.0%	14-15	<0.1%
	Gin Gin–Benaraby	2.34×10^2	<5.0%	5	<0.1%
	Maryborough–Gin Gin	2.34×10^2	<5.0%	5	<0.1%
D'Aguilar Highway	Kilcoy–Yarraman	5.47×10^2	<5.0%	19	<0.1%
	Yarraman–Kingaroy	5.47×10^2	<5.0%	19	<0.1%
Burnett Highway	Nanango–Goomeri	5.47×10^2	<5.0%	19	<0.1%
	Goomeri–Gayndah	3.13×10^2 – 5.47×10^2	<5.0%	14 – 19	<0.1%
	Gayndah–Monto	1.54×10^2 – 3.13×10^2	<5.0%	7 – 12	<0.1%
	Monto–Biloela	1.54×10^2 – 8.42×10^3	<5.0% – 14.7%	7 – 43	<0.1% – 0.45%
Brisbane Valley Highway	Ipswich–Harlin	5.47×10^2	<5%	19	<0.1%
Dawson Highway	Gladstone–Biloela	1.43×10^4 – 1.60×10^4	<5.0% – 14.40%	93 – 105	<0.1% – 0.44%
	Biloela–Banana	7.01×10^3	<5.0% – 6.0%	50	<0.1% – 0.18%
Gladstone – Mt Larcom Road		3.84×10^3 – 3.86×10^3	<5%	18 – 28	<0.1%
Eidsvold–Theodore Road		1.59×10^2 – $2.74. \times 10^3$	<5.0% – 22.7%	5 – 20	<0.1% – 0.69%
Biloela–Callide Road		15.2	<5.0%	1	<0.1%
Booyal–Dallarnil Road		2.34×10^2	<5.0%	5	<0.1%

A road condition audit will be carried out in consultation with the relevant Council prior to the cartage of any materials on their Council's roads. The audit will be carried out once a final transport strategy has been arrived at.

Any identified road improvements or maintenance requirements will be agreed with the relevant authority (i.e. DTMR or Council) and will be carried out in accordance with DTMR or Council design standards and maintenance regimes.

As stated in the draft EIS (refer to *Volume 4, Chapter 13, Section 13.5.3.2*) any damage proven to be caused by hauling Project pipes and equipment on gazetted roads will be rectified in agreement with the DTMR or the relevant local government authority

Any alterations or repairs will be carried out in accordance with Council's design specifications.

13.3.5.5 Crash Assessment and Safety Review

A crash assessment of the impacted state-controlled roads in accordance with Guideline for Assessment or Road Impacts of Development (GARID) 2006 or as amended will be carried out once a transport contractor has been appointed and the transport modes finalised.

The proponent and their consultants will work closely with the relevant DTMR contacts in carrying out this assessment.

13.3.5.6 Construction within the Road and Rail Reserves

There may be localised traffic disruption associated with constructing a pipeline within a road or rail reserve. These impacts could be the need for decreased speed in rail travel or diversion of road transport for example. Engineering drawings for each crossing type will be provided to the relevant authority with the application to carry out the work. This will be done by the construction contractor once they are appointed.

All sealed, state-controlled roads and rail lines will be crossed using trenchless techniques with the boreholes located outside of the road or rail reserve (refer to *Volume 2, Chapter 12*). This should reduce impacts on traffic flow and ensure no damage to road pavement or rail lines.

The feasibility of using trenchless techniques is limited by site conditions including depth required, width of crossing, geology, landform, soil type and service / infrastructure. However, this technique is usually well adapted to both road and rail crossings.

On unsealed roads, which are typically open cut and can take up to six hours to transit, traffic may be delayed. However, QGC and its contractors, will always have bypass or detour options agreed with the local road manager (e.g. DTMR, regional council) prior to commencing these crossings.

In general, crossings of roads and rail will be perpendicular to the centreline of the road or rail line. All water pipe will be encased in an enveloper for the full width of the crossing. For gas pipelines the pipeline will either be encased in an enveloper or buried at greater depth to ensure no interference to road or rail maintenance techniques. This will be agreed with the relevant authority prior to construction at the time of application for the appropriate permits to construct.

As discussed in *Volume 2, Chapter 12* of this supplementary EIS, the pipe will be buried to a minimum 1.8 m below the natural surface, or 1.5 m below the bottom of a table drain, whichever is the greater, for the entire width of the state-controlled road reserve. Similarly for rail crossings the pipe will be a minimum of two metres below the rail and 1.2 m below the rail corridor for the full width of the rail corridor.

13.3.5.7 Transport Management Measures

Traffic management plans will be prepared and implemented by suitably qualified personnel in accordance with the Manual of Uniform Traffic Control Devices (MUTCD).

Any works carried out within state-controlled road corridors will be in accordance with DTMR requirements.

13.3.5.8 Procedures for Assessing and Agreeing Mitigation

The studies have considered the worst case whereby all of the Pipeline Component materials and equipment are transported by road. To give perspective to the potential variation in the impacts a case has also been modelled whereby 75 per cent of the transport is carried out by rail (refer to *Appendix 3.5*). The main areas in which pavement impact benefits would accrue from this scenario are in the southern portion of the transport routes where Pipeline and Gas Field transport interact and this is addressed in *Volume 3, Chapter 14*. The transport of materials by rail from Gladstone to Biloela would reduce the traffic on the Dawson Highway however this has not been modelled at this time.

QGC considers that it would be highly misleading to use the worst case assessment to calculate development contributions as a result of impacts of Project transport. Similarly the 75 per cent scenario may also prove to be inaccurate for the calculation of development contributions. The assessment has, however, identified the areas of most concern for transport and potential road impacts. QGC proposes the following program for finalisation of the road impact assessment and development contributions:

- Agreement with DTMR that the methodology used for assessing road impacts is appropriate and that the correct factors for calculating ESA loadings is in accordance with the regional offices requirements
- Regular meetings (e.g. 2 monthly) with the relevant road authority (e.g. DTMR regional offices, Regional Councils) to review the status of the logistics planning and potential rail use
- Upon confirmation of QGC's transportation plan, which would include having reached contractual agreement with a rail transport contractor, QGC will have an appropriately qualified engineering firm recalculate the AADT, ESA loadings and required development contribution for each of the state-controlled roads identified for transport of materials
- Conduct a condition audit of all roads in conjunction with the relevant road

authority (i.e. DTMR or local government)

- Agree the existing condition of roads
- Agree with the relevant road authority any road works required to be carried out by QGC or its construction contractor prior to the commencement of construction or transportation in a given area
- Agree with the relevant road authority who would actually undertake any such identified road works.

13.3.6 Conclusion

The model for transport impacts has been reviewed in light of submissions and discussions with DTMR. Logistics studies have further refined the transport volumes and confirmed the potential transport routes. The final impact on the road network is still uncertain and will not be finalised until the completion of negotiations with rail transport providers. The model does quantitatively predict, to the greatest extent possible, the likely transport impacts from the development of the Pipeline Component of the QCLNG Project should all components need to be transported by road. The model highlights those roads which have the potential to be adversely impacted by the Project. A methodology for determining the overall impact and management strategies has been proposed.

ANNEX A-1

A-1 TRANSPORT ROUTES FOR EXPORT PIPELINE

A-1.1 State Controlled Roads

From Brisbane

- Gateway Motorway (South) U13A
- Cunningham Arterial U16 (Ipswich Motorway)
- Cunningham Highway 17A (Ipswich Motorway)
- Port of Brisbane Road 904
- Leichhardt Highway 26A (Westwood–Taroom) and 26B (Taroom–Miles)
- Warrego Highway 18A (Ipswich–Toowoomba)
- Warrego Highway 18B (Toowoomba–Dalby)
- Warrego Highway 18C (Dalby–Miles)

From Gladstone

- Dawson Highway 46A (Gladstone–Biloela) and 46B (Biloela–Banana)
- Bruce Highway 10E (Benaraby–Rockhampton)
- Burnett Highway 41D (Monto–Biloela)
- Leichhardt Highway 26A (Westwood–Taroom)
- Eidsvold–Theodore Road 454
- Biloela–Callide Road 472
- Gladstone – Mt. Larcom Road 181

A-1.2 Local Government Roads

- Auburn Range Road
- Big Valley Road
- Borania Road
- Bungaban Road
- Callide Dam Road
- Calvale Road
- Camboon Road
- Cool Road
- Cracow Banana Boundary Road

- Crowsdale Camboon Road
- Cullens Road
- Deearne Road
- Defence Road
- Dingley Dell Road
- Duck Holes Road
- Flinders Road
- Greens Road
- Halls Road
- Hookswood Road
- Inverness Road
- Kaluda Road
- Knudsens Road
- Lookerble Road
- Middle Creek Road
- Millards Road
- Moocooraba Road
- Moretti Road
- Mount Alma Road
- Myall Park Road
- Nicholas Road
- Off Retreat Road
- Ogdens Road
- Old Chinchilla Road
- Pelham Road
- Phillipies Landing Road
- Pine Creek Road
- Ponty Pool Road
- Rawbelle Road
- Red Range Road
- Roche Creek Road
- Rockybar Fairyland Road
- Russian Club Road
- Ryalls Road

- Targini Road
- Thangool Lookerble Road
- The Narrow Road
- Tollemaches Road
- Upper Downfall Creek Road
- Valentines Plains Road
- Warramoo Road
- Welshs Road
- Zilmans Road

ANNEX A-2

A-2 TRANSPORT ROUTES FOR GAS AND WATER COLLECTION HEADERS

A-2.1 State Controlled Roads

- Port of Brisbane Road 904
- Gateway Motorway (South) U13A
- Cunningham Arterial U16 (Ipswich Motorway)
- Cunningham Highway 17A (Ipswich Motorway)
- Warrego Highway 18A (Ipswich–Toowoomba) including Cohoe Street and Jones Street, Toowoomba
- Warrego Highway 18B (Toowoomba–Dalby) including James Street, Tor Street and Bridge Street, Toowoomba
- Leichhardt Highway 26A (Westwood–Taroom) & 26B (Taroom–Miles)
- Warrego Highway 18C (Dalby–Miles) and 18D (Miles–Roma)
- Jackson–Wandoan Road 4302
- Dalby–Kogan Road 340
- Chinchilla-Tara Road 341
- Kogan–Condamine Road 342

A-2.2 *Local Government Roads*

- Akers Gully Road
- Baileys Road
- Bakers Road
- Beelbee Road
- Brownlies Road
- Campion Road
- Churck Road
- Clarke Creek Road
- Clarkes Road
- Coates Road
- Cormacks Road
- Dawson St
- Douglas Road
- Dulacca North Road
- Eys Road
- Fosters Road
- Gadsbys Road
- Gilligulgul Road
- Glen Mona Road
- Glenafton Road
- Glenlea Road
- Goombie Fairymeadow Road
- Grahams Road
- Greenswamp Road
- Gregory St
- Gulera Road
- Gurulmundi Road
- Halliford Road
- Hansens Road
- Haslops Road
- Healys Crossing Road
- Hubbards Road
- Jundah Creek Road
- Kerrs Road
- Kumbarila Ln
- Leichhardt Creek Taroom Road
- Martindale Road
- Matthews Road
- McNulty St
- Millbank Boundary Road
- Myranga Road
- N E Robinsons Road
- North Dulacca Hall Road
- Number One Off Jackson Wandoan Road
- Old Moonie Road
- Paddys Creek Road
- Pine St
- R Clarkes Road
- Racecourse Road
- Reserved Road
- Stiller Bros Road
- Tames Road
- The Peak Road
- Varenes Road
- Walan Creek Road
- Weir Road
- Weitzels Road
- Welshs Road
- Wiembilla Road
- Wildflower Road
- Willetts Road