

Traffic and transport



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Go back to contents ▶



Contents

11	Traffic and transport	11-1
11.1	Introduction	11-1
11.2	Regulatory context	11-1
11.3	Assessment methodology	11-2
11.4	Environmental values	11-3
11.4.1	Baseline traffic conditions	11-3
11.4.2	Impacted transport network	11-4
11.4.3	Existing traffic volumes	11-6
11.4.4	Traffic growth and cumulative traffic volumes	11-6
11.4.5	GFD Project traffic generation	11-6
11.5	Potential impacts	11-7
11.5.1	Pavement impact assessment	11-7
11.5.2	Intersection assessment	11-7
11.5.3	Road link volume assessment	11-8
11.5.4	Potential impacts in relation to environmental values	11-11
11.6	Mitigation measures	11-12
11.6.1	Infrastructure agreement for works to connect to State-controlled roads	11-12
11.6.2	Santos GLNG protocols for working within regional communities	11-12
11.6.3	Management plans	11-12
11.7	Significance assessment	11-14
11.8	Conclusions	11-16

Tables

Table 11-1	Regulatory context of the GFD Project – traffic and transport	11-1
Table 11-2	Road type definitions	11-2
Table 11-3	State-controlled roads expected to be used by GFD Project traffic	11-4
Table 11-4	GFD Project use of State Controlled roads under the EIS maximum development scenario	11-6
Table 11-5	Intersections that may require upgrade during GFD Project operations	11-8
Table 11-6	Potential impacts to environmental values – traffic and transport	11-11
Table 11-7	Mitigation measures – traffic and transport	11-12
Table 11-8	Significance values pre and post-implementation of management strategies	11-15
Table 11-9	Residual significance – traffic and transport	11-16

Figures

Figure 11-1	Existing traffic volumes on State-controlled roads	11-5
Figure 11-2	Roads potentially requiring rehabilitation within ten years due to background traffic	11-9
Figure 11-3	Roads and intersections potentially requiring Santos GLNG contribution to rehabilitation	11-10

11 Traffic and transport

11.1 Introduction

This section addresses the traffic and transport values of the area in and surrounding the GFD Project and its potential impacts and mitigation measures.

The GFD Project area is administered by four local government areas (LGAs) (Banana Shire and Central Highlands, Maranoa and Western Downs) and is serviced by an extensive transport network including road, rail and aviation facilities that link the region internally and to surrounding regions. This transport network supports community connectivity and a diverse regional economy based primarily on agriculture, resources, tourism and construction.

Regional towns are connected by a network of highways, regional and rural roads, with rural access to isolated properties. Roads are used for local trips, tourism, heavy vehicle traffic moving bulk agricultural and extractive resources products and resource project inputs (such as fuel, equipment and materials), school buses and vehicles transporting resources sector workforce.

The potential impacts arising from the GFD Project EIS maximum development scenario activities on traffic and transport values are described and mitigation measures identified. Full details of the traffic and transport assessment are provided in Appendix M: Traffic and transport.

This section has been prepared in accordance with section 4.3 of the *Terms of reference for an environmental impact statement* issued March 2013. The index to locate where each ToR requirement is met within this EIS is included in Appendix B: Terms of reference cross-reference.

11.2 Regulatory context

This EIS has been prepared in accordance with the State and Commonwealth regulatory requirements as described within Appendix C: Regulatory framework. The legislation, policies and guidelines that apply specifically to the traffic and transport values and potential impacts of the GFD Project are outlined within Table 11-1.

Table 11-1 Regulatory context of the GFD Project – traffic and transport

Legislation, policy or guideline	Relevance to the GFD Project
<p><i>Petroleum and Gas (Production and Safety) Act 2004</i> (Qld) (P&G Act)</p> <p>The P&G Act regulates petroleum activities with the aim of developing a safe, efficient and viable petroleum and fuel gas industry in Queensland. Petroleum tenure is granted under the P&G Act.</p>	<p>Under the P&G Act, holders of petroleum authorities must not use a public road for a notifiable road use without engaging with the road authority to obtain consent and or agree to compensation. The Queensland Department of Transport and Main Roads (TMR) may require the GFD Project to undertake a road impact assessment (RIA) to assess the potential impacts of a notifiable use.</p>
<p><i>Transport Infrastructure Act 1994</i> (Qld)</p> <p>The Act forms part of the Queensland Government's framework for the integrated planning and management of transport (road, rail and air) infrastructure. Approvals under the Act are required for activities that will interfere with a State-controlled road or railway.</p>	<p>This Act establishes the powers TMR has in relation to managing the State-controlled road network.</p> <p>GFD Project vehicles carrying plant and material over State-controlled roads and local roads will have to comply with the vehicle mass limit requirements set out in the Transport Infrastructure Act.</p>

Legislation, policy or guideline	Relevance to the GFD Project
<i>Transport Operations (Road Use Management) Act 1995 (Qld)</i> The Act provides for the management of vehicles and road use including mass, loading and dimension requirements for heavy vehicle transport.	The GFD Project may be required to obtain approval for permanent or temporary road closure or transport of dangerous goods during the construction phase. Necessary permits for excess mass or over-dimensional loads associated with the GFD Project may also be required under the Act.
<i>Guidelines for Assessment of Road Impacts of Development (GARID)</i> These guidelines provide developers with advice on how to assess the traffic and pavement impacts of a proposed development on State-controlled roads.	These guidelines were used in the assessment of impacts of the GFD Project on road traffic and infrastructure.

The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project. It will be adapted to manage the potential impacts of the GFD Project.

Santos GLNG will continue to engage with TMR and regional councils in the application of existing infrastructure agreements to the GFD Project.

11.3 Assessment methodology

This assessment describes the traffic and transport values and assesses the potential impacts of the GFD Project's EIS maximum development scenario on these values. Impacts were assessed using the significance assessment methodology, which considers the sensitivity of the underlying environment and the magnitude of a potential impact to assess its level of significance.

The significance assessment defines roads according to their function as shown in Table 11-2.

Table 11-2 Road type definitions

Road type	Definition
Highway	A high order road of a high standard facilitating connectivity between regional centres.
Regional connecting road	A high order road of a high standard facilitating connectivity between townships.
Rural connecting road	Lower order road facilitating connectivity between higher order roads.
Rural access road	Low order road predominately facilitating access to local uses.

A RIA has also been undertaken according to the GARID (TMR, 2006), and is provided in Appendix M: Traffic and transport. The potential for the GFD Project to generate traffic was determined through modelling. The model incorporates learning from the GLNG Project and has applied them as assumption to the activities associated with the construction, operations and decommissioning of the GFD Project.

The modelling process determined the volume of GFD Project traffic on each road link over the GFD Project life including the annual average daily traffic (AADT) volume and a peak year AADT volume. This process estimated the incremental increase of GFD Project traffic on the road network.

The RIA has been undertaken for State-controlled roads only. RIAs will be undertaken on local roads identified for potential project use during field development planning. This process has been used successfully for the existing GLNG Project.

The full description of the significance assessment methodology is described in section 5.6.3 of Section 5: Assessment framework. The RIA is explained further in Appendix M: Traffic and transport.

11.4 Environmental values

The following values demonstrate sensitivity to increased traffic volumes by road type:

- **Efficiency** – the aspects of the road network that contribute to function and accessibility, which facilitate the efficient operation of the network. This includes consideration of the function of road links, the overall volume of traffic using road links and intersection forms. State road authorities and councils have made significant capital investments in developing road infrastructure. Therefore, it is important that road infrastructure is managed and used in a manner that maximises its service life and maintains the level of quality expected by road users
- **Safety** – the aspects of the road network relating to the location and provision of physical infrastructure. Physical infrastructure incorporates components such as bridges, rail crossings, cattle grids, pavement and road construction standard
- **Amenity** – the sensory experience of those who are located near the road network. This primarily includes nearby residents and other land users. Receptors that are sensitive to changes in amenity include dwellings, schools, hospitals and churches. These adjacent users can be affected through issues such as light nuisance, dust nuisance and noise due to changes in traffic volumes or road functionality.

11.4.1 Baseline traffic conditions

On a regional level, the primary north-south highway corridors are the Leichhardt Highway, Carnarvon Highway and Fitzroy Developmental Road. Key east-west highway corridors are the Warrego Highway and Dawson Highway. These State-controlled highways carry the highest traffic volumes in the region, with comparatively high heavy vehicle (freight) traffic volumes. Traffic volumes on these are between 300 and 5,300 vehicles per day, with heavy vehicles accounting for between 15% and 50%. Highways provide relatively efficient connections for light and heavy vehicle movements between regional towns and to surrounding regions. The importance of these State-controlled roads makes them a particular focus of the GFD Project transport assessment, provided in full in Appendix M: Traffic and transport.

A network of regional connecting roads provides access between minor towns. These roads are usually sealed, and generally carry fewer than 500 vehicles per day. Regional connecting roads are generally State-controlled, or controlled by local government with assistance from the State government. Supporting the regional network are rural connecting roads, which link the higher order roads and also provide property access. These roads are both sealed and unsealed and generally carry a maximum of 350 vehicles per day.

Rural access roads generally provide property access only to isolated properties. These roads carry a maximum of 200 vehicles per day, and are usually unsealed.

Santos GLNG has a demonstrated commitment to managing its impact on the regional road network by entering into infrastructure agreements with TMR and regional councils.

11.4.2 Impacted transport network

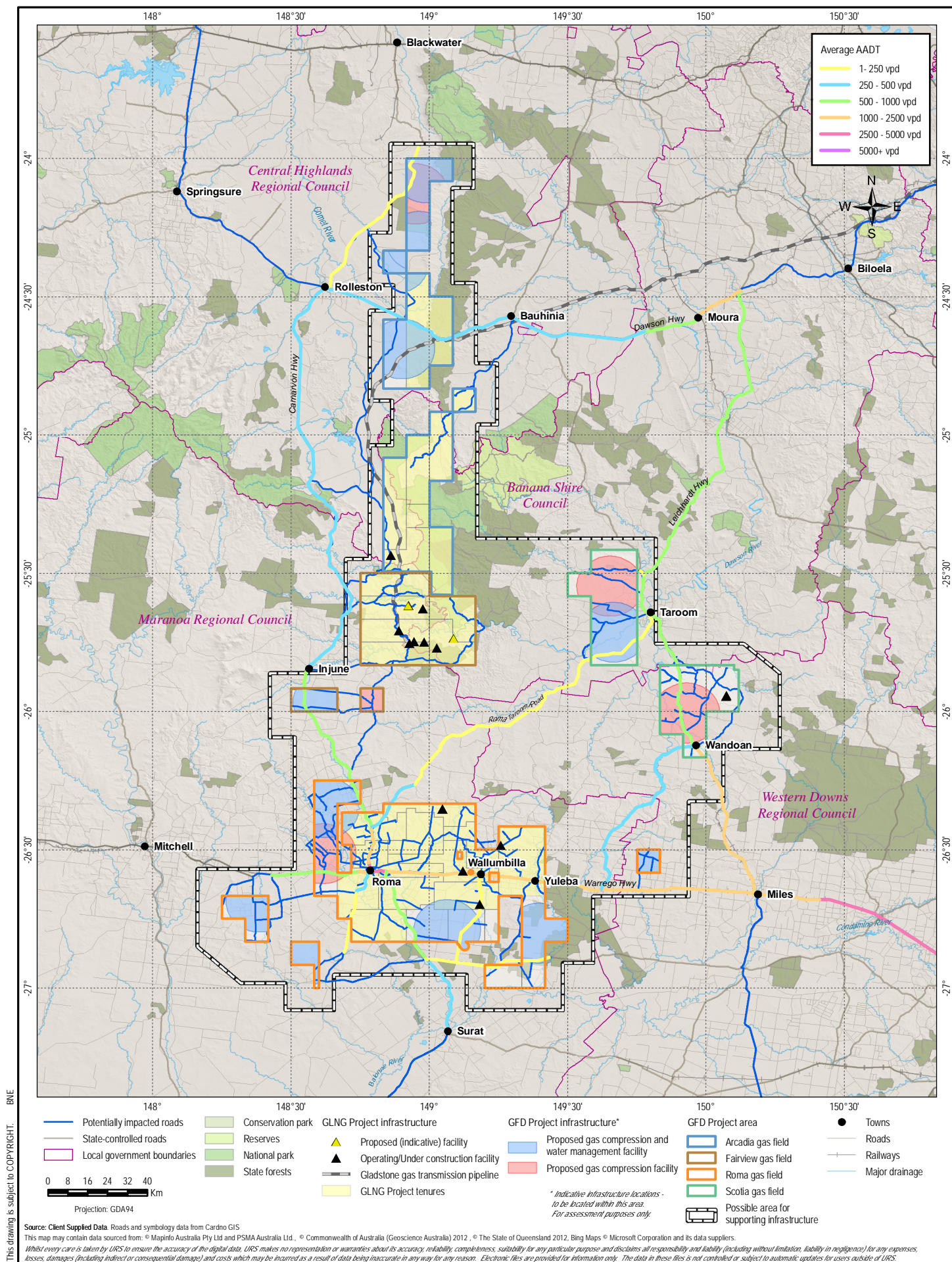
This assessment considers impacts to State-controlled roads for the EIS maximum development scenario. When the gas field development plans are finalised by Santos GLNG, an assessment of GFD Project vehicle impacts on council roads will be undertaken once project designs are further progressed and individual areas of development are internally sanctioned by the GFD Project. These impacts will be addressed in RIAs submitted to each local council.

Table 11-3 provides a description of each of the State-controlled roads that are expected to be used by the GFD Project. The locations of State-controlled roads in the GFD Project area are shown on Figure 11-1.

Table 11-3 State-controlled roads expected to be used by GFD Project traffic

Road (TMR Code)	Typical form	Urban speed limit (km/h)	Rural speed limit (km/h)	2012 AADT (vpd)	Heavy vehicles (%)
Blackwater-Rolleston Road (469)	Two lane, undivided, sealed	60	100	127-4,935	9-63
Carnarvon Highway (24C) Surat - Roma	Two lane, undivided, sealed	60	100	482-542	24
Carnarvon Highway (24D) Roma - Injune	Two lane, undivided, sealed	60	100	900-2,820	25
Carnarvon Highway (24E) Injune-Rolleston	Two lane, undivided, sealed	60	100-110	415-473	33
Dawson Highway (46C) Banana - Rolleston	Two lane, undivided, sealed	60	100	280-2,190	12-34
Fitzroy Development Road (85B) Bauhinia-Duaringa	Single lane, undivided, sealed, unsealed shoulders	60	100	67-409	14-16
Jackson-Wandoan Road (4302)	Single lane, undivided, sealed, unsealed shoulders	60	100	139-635	27-28
Leichhardt Highway (26A) Westwood - Taroom	Two lane, undivided, sealed	60	100	690-1,000	20-37
Leichhardt Highway (26B) Taroom - Miles	Two lane, undivided, sealed	60	100	830-1,310	20-36
Roma-Condamine Road (4397)	Single lane, undivided, sealed, unsealed shoulders	60	100	132-464	24-35
Roma Southern Road (3501)	Single lane, undivided, sealed, unsealed shoulders	60	100	97-470	17-32
Roma Taroom Road (4397)	Two lane, undivided, sealed	-	100	135-462	25-36
Wallumbilla South Road (3441)	Two lane, undivided, sealed	60-80	100	33-134	12-26
Warrego Highway (18B) Toowoomba - Dalby	Two lane, undivided, sealed	60-80	100-110	5,979-22,175	17-25
Warrego Highway (18C) Dalby - Miles	Two lane, undivided, sealed	60-80	100-110	2,979-8,502	17-27
Warrego Highway (18D) Miles - Roma	Two lane, undivided, sealed	60-80	100	1,550-5,498	23-35
Warrego Highway (18E) Roma - Mitchell	Two lane, undivided, sealed	60-80	100	941-6,497	20-30

vpd: vehicles per day



The assessment has assumed that certain intersections will be used to access the gas fields from the State-controlled network, based on current understanding of field development activities. These locations may be changed as Santos GLNG gathers information through the exploration and appraisal phase and finalises development plans. Appropriate access standards will be sought in order to maintain a safe and efficient road network.

An overview of each of the State-controlled intersections assessed as part of this EIS is included in Appendix M: Traffic and transport. In addition, information on multi-combination vehicle routes, school bus routes, rail crossings, airports, stock routes, pedestrian, cycle and public transport networks, motorist rest areas are presented in sections 3.7 and 9.3 of Appendix M: Traffic and transport.

11.4.3 Existing traffic volumes

The background daily two-way traffic volumes on each of the road sections were determined based upon existing AADT volumes and intersection counts provided by TMR and relevant councils. The available count data is typically from years 2011 and 2012. The daily traffic volumes on impacted roads are shown on Figure 11-1.

11.4.4 Traffic growth and cumulative traffic volumes

A background vehicle growth rate of three percent per annum (compounded annually) has been applied to road segments within the GFD Project area to establish future background traffic volumes. This rate represents the growth in traffic not contributable to major resource projects. This growth rate has been derived from historic AADT traffic growth rates of between 2% and 10% per annum. Those roads where a higher growth rate has been experienced have had significant major resource project activity in recent years, and so a rate at the lower bound of this range has been selected.

Growth attributable to major resource projects has then been considered separately by collating the cumulative traffic generated by projects selected for cumulative impact assessment (refer to Section 26: Cumulative impacts). Cumulative traffic volumes have then been added to the background traffic for each relevant road link to form the assessed baseline traffic volumes (i.e. the volumes without the GFD Project). The term background or existing traffic is used to describe traffic not related to GFD Project traffic.

11.4.5 GFD Project traffic generation

A forecast of the total road transport need of the GFD Project has been based on the assumed trip generation rates and trip origins/destinations. The total road transport need represents the total number of vehicle kilometres likely to be travelled by traffic associated with the GFD Project on the State-controlled road network, which is detailed in Table 11-4.

Table 11-4 GFD Project use of State Controlled roads under the EIS maximum development scenario

Vehicle	Vehicle kilometres travelled (millions)
Light vehicle	890.6
Heavy vehicle including buses	2,346.6
Total	3,237.2

The traffic predicted to occur over the life of the GFD Project on each State-controlled road segment is shown on a volume duration graph in appendix A of Appendix M: Traffic and transport. Summary tables of the expected traffic generation for each GFD Project component are contained in Appendix C of Appendix M: Traffic and transport.

11.5 Potential impacts

The overall impact of the GFD Project on the traffic and transport network was determined by creating a geographic information system-based traffic model using the traffic generation and distribution assumptions outlined in section 6 of Appendix M: Traffic and transport. The traffic model outputs are then used to assess the impact of GFD Project traffic on the road network and identify mitigations required. The outcomes of the assessments are discussed below.

11.5.1 Pavement impact assessment

Analysis has been conducted to identify the potential impacts of GFD Project heavy vehicles in the EIS maximum development scenario on the pavement of State-controlled roads.

Pavement impacts may be separated into two categories: maintenance and rehabilitation.

Pavement maintenance is the regular maintenance performed by TMR, consisting of repairing potholes, shoving and other minor defects. An increase in traffic on a road would generally result in an increased need for maintenance.

According to GARID (TMR, 2006), the GFD Project would be required to assist TMR in meeting a funding shortfall for maintenance of a certain road due to unforeseen increase in traffic. For each year where GFD Project traffic is modelled to be greater than 5% of background traffic on State-controlled roads, regular maintenance is proposed for roads expected to be significantly impacted by GFD Project vehicles. Maintenance will be in proportion to GFD Project traffic usage. This maintenance is in addition to that undertaken routinely by the road authority. As per GARID (TMR, 2006), contributions to road maintenance from the GFD Project are only sought for the first 10 years of use so that TMR can adjust funding levels to cater for the increase in traffic. This is what is referred to as the mitigation timeframe. Figure 11-2 shows the sections of road that may require maintenance within the mitigation timeframe.

Pavement rehabilitation is the reconstruction of a pavement performed at the end of its structural life (approximately 20 years). An unforeseen increase in traffic due to a major project could result in rehabilitation works having to be performed sooner than forecast. Due to inflation, the real cost of performing these works is increased by performing the works sooner. According to GARID (TMR, 2006), the GFD Project would be required to assist TMR in meeting this cost.

The preliminary pavement impact assessment results are also summarised on Figure 11-2, which indicate State-controlled roads where maintenance and rehabilitation costs are potentially payable by Santos GLNG as a result of the GFD Project.

11.5.2 Intersection assessment

A preliminary intersection assessment was performed to determine the potential level of impact the GFD Project would have on the intersections within the GFD Project area. Table 11-5 and Figure 11-3 summarise the turn treatment mitigations that may be required at each intersection both as a result of existing traffic volumes and potential GFD Project traffic. This table indicates that there are a number of intersections that may require mitigation to ensure appropriate operation during GFD Project activities.

Table 11-5 Intersections that may require upgrade during GFD Project operations

Intersection	Existing form and provision		Potential GFD Project upgrade requirement
Leichhardt Highway/ Dawson Highway	3-way, priority	Auxiliary left/auxiliary right turn lane	Channelised right turn lanes
Warrego Highway/ Duke Street (Roma Southern Road)	4-way, priority	-	Auxiliary left turn lane (east, south leg)
Warrego Highway/ Leichhardt Highway	3-way, priority	Auxiliary right turn lane/ left slip lane	Channelised right turn lanes
Warrego Highway/ Yuleba Surat Road	3-way, priority	-	Channelised right turn lanes

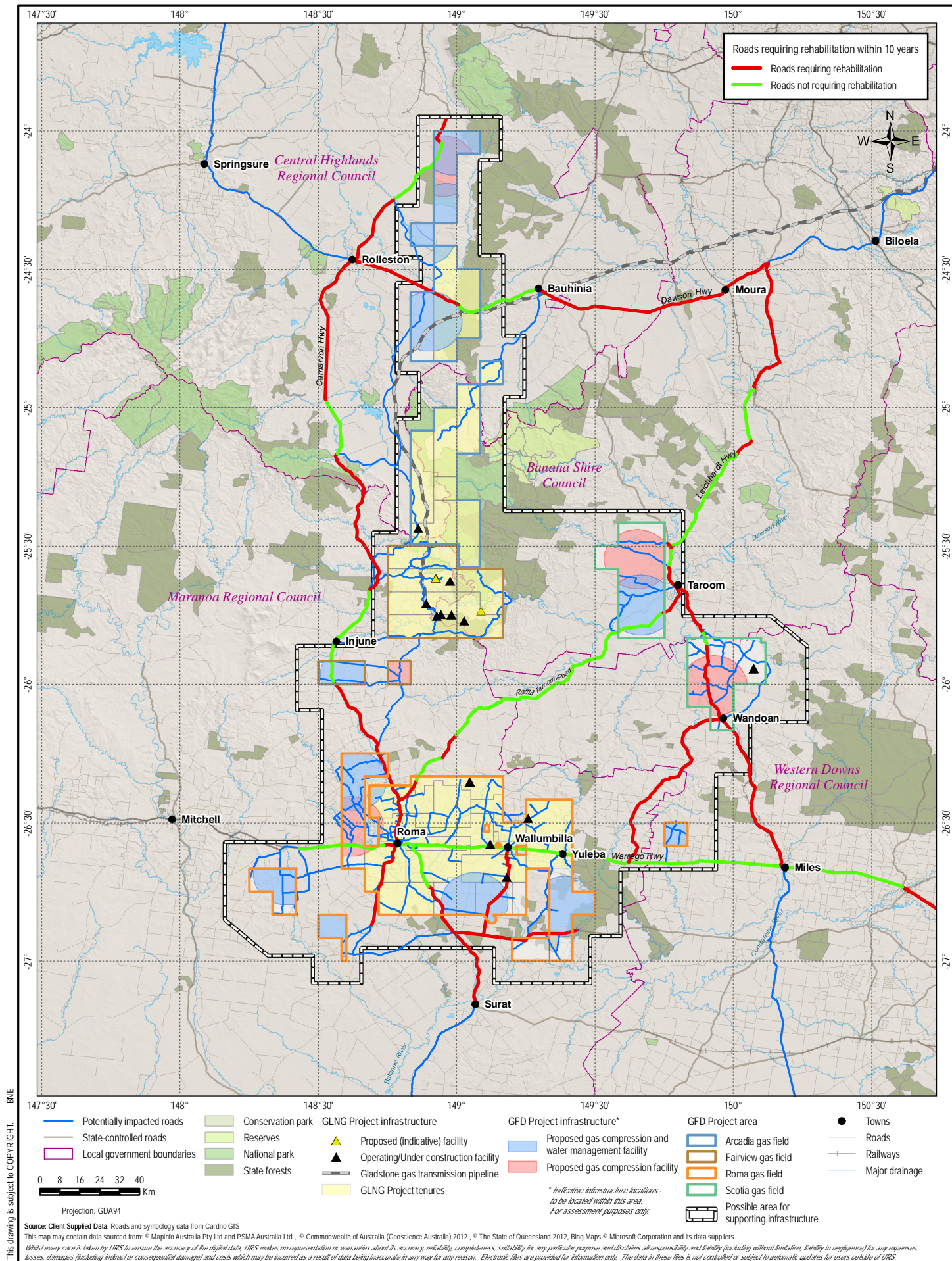
11.5.3 Road link volume assessment

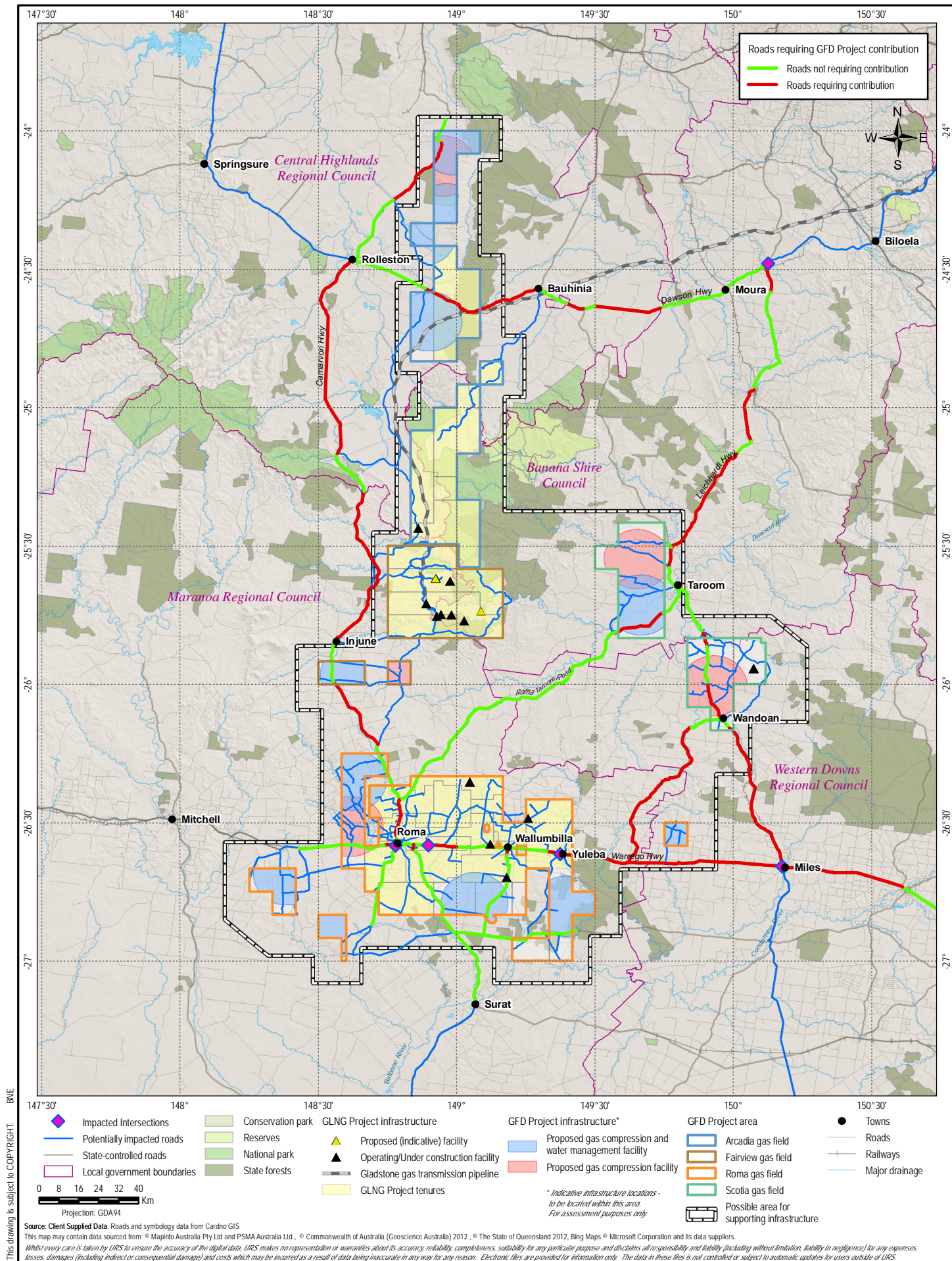
An assessment of the impact on each road link (defined as the coloured State-controlled roads presented in Figure 11-3) has been undertaken. A review of the background plus potential GFD Project volumes revealed that no road links reached the capacity threshold because of the potential GFD Project traffic. Further detailed examination of the critical road sections was carried out to determine if the capacity breakpoint was reached earlier due to addition of potential GFD Project traffic. This exercise serves to determine the “bring forward” cost responsibility of the GFD Project on road segments.

Bring forward cost contributions are recommended on road sections where the GFD Project creates the need to bring forward upgrades by one year or more, i.e. greater than 5% of the design life of a road upgrade, as outlined in GARID (TMR, 2006).

As shown in the model outputs in appendix F of Appendix M: Traffic and transport, cross section upgrades are not brought forward by more than a year for sections of road where the potential GFD Project traffic is significant. The only exception to this is the Warrego Highway between Oakey and Dalby. This section of road has had additional overtaking lanes constructed in the year 2013-2014 according to the Queensland Transport and Roads Investment Program, which occurred after assessment data was collected. As a result, it will meet the required formation to cater for both existing (background) and potential GFD Project traffic.

Therefore, the potential GFD Project traffic does not impact significantly on the road width requirements of State-controlled roads.





11.5.4 Potential impacts in relation to environmental values

The potential impacts that may occur as a result of the GFD Project's traffic EIS maximum development scenario as they relate to the traffic and transport values are outlined in Table 11-6. The assessment of potential impacts considers a range of characteristics that may change on each functional road type (highway, regional connecting road, rural connecting road and rural access road) in response to development of the GFD Project. A significance assessment has been performed based on the sensitivity of these environmental values, and the magnitude of the impacts which are described further in section 11.5. The results of the assessment are presented in Table 11-9.

Table 11-6 Potential impacts to environmental values – traffic and transport

Environmental value	Potential impact
Efficiency	Reduced efficiency related to increased traffic volumes and reduced standard of pavement and intersection control.
Safety	Reduced safety related to increased traffic volumes on bridges, cattle grids, rail crossings, school bus routes, traffic composition and driver fatigue controls.
Amenity	Reduced amenity related to stock route co-location, sensitivity of adjacent land uses, potential for dust nuisance and light glare issues.

The incremental increase in the traffic due to the GFD Project is not expected to reduce the accessibility to the existing transport network, in particular no changes to transport infrastructure that cater to people with disability is expected to change due to the GFD Project.

Transport impacts associated with the GFD Project in relation to amenity, dust, noise and vibration have been assessed and are detailed in Appendix L: Landscape and visual amenity, Appendix P: Air quality and Appendix Q: Noise and vibration.

Impacts on water values due to transport infrastructure have been assessed in Appendix N: Surface water. The GFD Project Environmental protocol for constraints planning and field development provides for buffer zones around water courses. Mitigation measures in relation to construction of linear infrastructure, including roads, on or near water courses and detailed in Appendix N: Surface water.

11.6 Mitigation measures

Santos GLNG has developed an effective management framework, discussed in Section 6: Management framework, to be implemented for the GFD Project. Specific to traffic and transport, the management framework includes a range of standards within the Environment, Health and Safety Management System to reduce the risk associated with traffic. This is detailed in section 6.3.3 of Section 6: Management framework.

The framework incorporates the potential for a GFD Project infrastructure agreement and workforce traffic and behaviour management as discussed below.

11.6.1 Infrastructure agreement for works to connect to State-controlled roads

These agreements specify financial and other obligations of Santos GLNG and infrastructure operators (TMR or regional councils) in relation to road infrastructure works required to be carried out on the road network by Santos GLNG to mitigate impacts associated with the GLNG Project. These agreements demonstrate that Santos GLNG has a framework for mitigating its impacts on the transport network. Santos GLNG will continue to engage with TMR and regional councils in the application of existing infrastructure agreements to the GFD Project.

11.6.2 Santos GLNG protocols for working within regional communities

Santos GLNG's commitment to communities is demonstrated through the application of the 'Regional Rules', which govern the behaviour of Santos GLNG employees and contractors when working in regional areas.

Rule 5 relates to vehicle movements and requires that vehicle movements be planned, monitored and consolidated. Vehicle branding is being implemented in the region with a toll-free 1800 number for the community to comment on drivers' conduct. This branding appears on Santos GLNG and contractor vehicles and a real-time in-vehicle monitoring system is being used in Santos GLNG vehicles. The Regional Rules will be adopted and applied to the GFD Project. These initiatives ensure drivers working on the GLNG Project comply with the speed limits and display safe driving behaviours.

11.6.3 Management plans

The management plans that apply to the protection of traffic and transport values in the GFD Project area are outlined in Table 11-7.

Table 11-7 Mitigation measures – traffic and transport

Management plan	Mitigation measures
Road-use management plan	<p>The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project. It will be adapted to manage the potential impacts of the GFD Project. The objectives of the plan include:</p> <ul style="list-style-type: none"> • Manage the efficiency of the road network impacted including State-controlled roads and local government roads • Ensure user safety and safe operation of vehicles • Minimise impacts on road infrastructure condition • Minimise traffic related complaints and incidents to maintain community amenity. <p>This plan will be revised for the GFD Project, as appropriate and is not included in this EIS. The Road-use management plan will be prepared in consultation with government agencies as required including TMR and QPS.</p>

Management plan	Mitigation measures
Road impact assessments (RIA)	<p>RIAs will be developed to identify:</p> <ul style="list-style-type: none"> • Potential transport routes for use by the GFD Project that are State and Local Government controlled roads • Assessment of the condition of the identified roads • Estimated forecast of GFD Project traffic for construction, operations, decommissioning and rehabilitation • Thresholds for mitigation intervention • Mitigation required as a result of GFD Project activities to adequately prepare and/or maintain the condition of the road for GFD Project and public use and the proportion of the required mitigation attributable to the GFD Project.
Infrastructure agreement (IA)	<p>Infrastructure agreements have been established with the TMR and all relevant regional councils impacted by the Santos GLNG Project.</p> <p>The IAs:</p> <ul style="list-style-type: none"> • Establish a framework for negotiating road impact mitigation • Conducting RIAs • Establish the forward work schedule to confirm costs and timing of road treatments • Managing variations and disputes.
Social impact management plan (SIMP)	<p>The SIMP established for the GLNG Project will be implemented across the GFD Project. The plan outlines the roles, responsibilities and rights of Santos GLNG, the government, impacted communities and other stakeholders in relation to the GFD Project. In particular, it outlines the framework for community engagement, management strategies to avoid, mitigate or minimise potential impacts and to maximise opportunities and benefits arising throughout the life of the GFD Project, as well as a monitoring and reporting process.</p> <p>The GLNG Project SIMP will be supplemented by issue action plans relating to the GFD Project that focus on the following key areas as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office:</p> <ul style="list-style-type: none"> • Water and environment • Community safety • Social infrastructure • Community wellbeing and liveability • Local industry participation and training • Aboriginal engagement and participation. <p>The SIMP is an operational document that is updated to reflect the ongoing needs of Santos GLNG and the communities it operates in. It is available on the web at: http://www.santosglng.com/resource-library/community/social-impact-management-plan-community-handbook.aspx</p>
Pest and weed management plan (PWMP)	<p>The PWMP details how to minimise the potential spread of pest and weed species as a result of Santos GLNG activities. The PWMP provides a framework for Santos GLNG to:</p> <ul style="list-style-type: none"> • Identify, monitor and prioritise the appropriate management of pest and weed species present at, or that pose a threat to, Santos GLNG assets and/or activities • Prevent and minimise the introduction and dispersal of pest and weed species into Santos GLNG locations and neighbouring properties • Engage stakeholders including landholders and local communities in assisting Santos GLNG in the identification and management of pests and weeds at Santos GLNG assets and activities • Develop asset / activity specific pest and weed management procedures as required during the GFD Project lifetime.
Waste management plan (WMP)	<p>The WMP details the strategy, methods and controls for managing waste generated by Santos GLNG activities. The plan identifies the types of wastes generated by Santos GLNG activities, and describes the waste management framework and how the waste management hierarchy is applied to generated waste.</p>

Management plan	Mitigation measures
Erosion and sediment control management plan (ESCMP)	<p>The ESCMP identifies erosion and sedimentation risk and provides an erosion and sediment control strategy that incorporates understanding of the risk inherent to local land resource characteristics.</p> <p>The ESCMP is supported by the Erosion and Sediment Control Manual, which provides erosion, sediment and drainage controls in line with best practice guidelines.</p>
Contingency plan for emergency environmental incidents (Contingency plan)	<p>The Contingency plan details the management practices in place within Santos GLNG to minimise environmental harm during an emergency environmental incident. The plan identifies potential incidents, and provides response actions, including escalation, communication, reporting and monitoring.</p>
Emergency response plan (ERP)	<p>The ERP forms part of Santos GLNG's overall emergency response. It is supplementary to the Queensland incident management plan and provides the necessary information to deal with emergencies at the asset level.</p> <p>This is an operational document and is not included in this EIS.</p>

11.7 Significance assessment

As discussed in section 11.3, impacts were assessed using the significance assessment methodology. As the GFD Project area covers a large geographical area, the general nature of potential impacts to environmental values associated with GFD Project activities are identified and assessed within this section.

Table 11-8 summarises the assessment undertaken for the potential impacts of the GFD Project on traffic and transport values. For each identified potential impact, the assessment considered:

- The potential pre-mitigated significance, which that only the Constraints protocol has been applied and the potential impacts are at their greatest
- The mitigation measures that will be used to manage the potential impacts on traffic and transport values. These measures will reduce the significance of the potential impacts
- The residual significance of the potential impact after the implementation of mitigation measures. The residual significance takes into account the potential for impact that remains after the mitigation measures are applied.

Table 11-8 Significance values pre and post-implementation of management strategies

Potential Impact	Value	Pre-mitigated significance			Mitigation and management measures	Residual significance		
		Sensitivity	Magnitude	Significance		Sensitivity	Magnitude	Significance
Reduced efficiency related to increased traffic volumes and reduced standard of pavement and intersection control	Highway	Low	Low	Negligible	<ul style="list-style-type: none"> Implementation of the Road-use management plan to reduce number of trips Preparation of RIA to identify impact of project and potential mitigations. 	Low	Low	Negligible
	Regional connecting road	Moderate	High	High		Low	High	Moderate
	Rural connecting road	High	Moderate	High		Moderate	Moderate	Moderate
	Rural access road	High	Moderate	High		Moderate	Moderate	Moderate
Reduced safety related to increased traffic volumes on bridges, cattle grids, rail crossings, school bus routes, traffic composition and driver fatigue controls.	Highway	Low	Low	Negligible	<ul style="list-style-type: none"> Preparation of RIA to identify impact of project and potential mitigations Implementation of the Road-use management plan identifying routes to drivers Implementation of the Road-use management plan to manage vehicle trips Implementation of Road-use management plan and hazard and safety management framework. 	Low	Low	Negligible
	Regional connecting road	Moderate	High	High		Low	High	Moderate
	Rural connecting road	High	Moderate	High		Moderate	Moderate	Moderate
	Rural access road	High	Moderate	High		Moderate	Moderate	Moderate
Reduced amenity related to stock route co-location, sensitivity of adjacent land uses, potential for dust nuisance and light glare issues.	Highway	Low	Low	Negligible	<ul style="list-style-type: none"> Preparation of RIA to identify impact of project and potential mitigations Implementation of Road-use management plan to address additional measures. 	Low	Low	Negligible
	Regional connecting road	Moderate	High	High		Low	High	Moderate
	Rural connecting road	High	Moderate	High		Moderate	Moderate	Moderate
	Rural access road	High	Moderate	High		Moderate	Moderate	Moderate

11.8 Conclusions

The assessment of traffic and transport impacts identified the significance values shown in Table 11-9. The significance assessment shows that the residual impacts over the life of the GFD Project are considered to range from negligible to moderate after the effective implementation of management and mitigation strategies.

Table 11-9 Residual significance – traffic and transport

Environmental value	Potential impact	Residual significance			
		Highway	Regional connecting road	Rural connecting road	Rural access road
Efficiency	Reduced efficiency related to increased traffic volumes and reduced standard of pavement and intersection control.	Negligible	Moderate	Moderate	Moderate
Safety	Reduced safety related to increased traffic volumes on bridges, cattle grids, rail crossings, school bus routes, traffic composition and driver fatigue controls.	Negligible	Moderate	Moderate	Moderate
Amenity	Reduced amenity related to stock route co-location, sensitivity of adjacent land uses, potential for dust nuisance and light glare issues.	Negligible	Moderate	Moderate	Moderate