

13. Transport

This section addresses the transport requirements for the Project and the potential transport impacts during the construction and operational phases of the Project.

13.1 Existing road network

13.1.1 General

The existing road network in the Gladstone/Calliope area is shown in Figure 13.1. The existing roads that are likely to be directly impacted by the Project are outlined below according to their location within the overall project area.

13.1.2 Major roads

The project area is adequately serviced by the existing road network, comprising local, State and National road elements.

Bruce Highway

The Bruce Highway, which extends north from Brisbane to Cairns, is part of the Australian National Highway Network and major traffic carrier in Queensland. The Bruce Highway is under the control of the Queensland Department of Main Roads (DMR) Central District Office.

Adjacent to the project area the Bruce Highway is a high standard arterial road (two lane, two way carriageway with auxiliary overtaking lanes for increased capacity) linking the township of Miriam Vale and Rockhampton via the township of Mount Larcom.

The Bruce Highway traverses the project area and provides for direct access to sections of the Moura Link.

DMR are currently undertaking concept level planning to determine long term requirements with respect to the Bruce Highway. The planning shall identify the corridor requirements and typical arrangements for future upgrades, inclusive of four lane divided carriageways.

Dawson Highway

The Dawson Highway is a State controlled road under the control of the DMR Central District Office. The road commences within the centre of Gladstone, at the junction of Hanson Road and Glenlyon Road with a four-way signalised intersection, and crosses the Bruce Highway to the south of Gladstone, passing through the town of Calliope before continuing west. The Dawson Highway currently carries between 4,400-5,500 vehicles per day between the Bruce Highway and the urban area of Gladstone (intersection of Kirkwood Road and Don Young Drive).

The Dawson Highway functions are:

- A regional highway linking the hinterland in the west to the Bruce Highway and Gladstone, typically comprising a two lane, two way carriageway.
- An arterial road between the town of Calliope (Bruce Highway) and Gladstone, servicing the expanding urban centre of Calliope as well as the rural residential precincts of Burura and Beecher, and typically comprising a two lane, two way carriageway with auxiliary overtaking lanes for increased capacity.
- An urban arterial within the Gladstone city limits, currently constructed to four lane divided carriageway as far south as the intersection with Chapman Drive (current outer limit of the urban area).

Current planning allows for the upgrading of the Dawson Highway to a four lane divided carriageway between the Bruce Highway and Gladstone, to principally meet expected demand from urban growth in the Calliope, Beecher and Buruka areas.

Gladstone Regional Council (GRC), in consultation with DMR, are currently undertaking a Calliope Traffic Study which includes consideration of the long term requirements for the Dawson Highway through the town and approaches to the town, inclusive of the grade separation of the Bruce Highway/Dawson Highway intersection.

Hanson Road

Hanson Road is a State controlled road under the control of the DMR Central District Office. The road extends in a westerly direction from the intersection of the Dawson Highway/Glenlyon Road within the Gladstone Central Business District through to the junction with the Gladstone-Mount Larcom Road and Landing Road. Although Hanson Road is part of Gladstone-Mount Larcom Road it has been discussed separately below. The section of road west of the Calliope River was originally constructed in 1980 to service the development of the Cement Australia Fisherman's Landing Plant, and was subsequently handed over to DMR as part of Port Curtis Way (comprises both Gladstone-Mount Larcom Road and Hanson Road) becoming an intercity link and having regional significance.

Hanson Road comprises a four lane divided carriageway west through to the intersection with Tranberg Street, and then continues as a two lane, two way carriageway. West of the Calliope River, Hanson Road currently carries approximately 6,500 vehicles per day.

Hanson Road functions are:

- An intercity link between Gladstone and Rockhampton, and areas further north and west of Rockhampton, typically comprising a two lane, two way carriageway.
- An industrial arterial road servicing the GSDA and Port of Gladstone for freight and commuter movements.

The Gladstone Integrated Regional Transport Plan (GIRTP) identified the need to progressively extend the four lane divided carriageway west for the entire length of the road. DMR has undertaken planning to develop concepts for the upgrade of the road and its intersections with connecting roads, inclusive of Blain Drive/Alf O'Rourke Drive, Red Rover Road, Reid Road, Gladstone-Mount Larcom Road/Landing Road (refer Figure 13.1 and Figure 13.2).

Gladstone-Mount Larcom Road

Gladstone-Mount Larcom Road is a State controlled road under the control of the DMR Central District Office. The road extends in a western direction from the junction with Hanson Road/Landing Road, and connects to the Bruce Highway at the township of Mount Larcom. The road was originally constructed in the 1980s to provide a more direct connection between Gladstone and Rockhampton than the Dawson Highway/Bruce Highway route, as well as servicing the rural areas of Yarwun and Targinie. The Gladstone-Mount Larcom Road currently carries approximately 2,700 vehicles per day.

Gladstone-Mount Larcom Road functions are:

- An intercity link between Gladstone and Rockhampton, and areas further north and west of Rockhampton, typically comprising a two lane, two way carriageway with auxiliary overtaking lanes for increased capacity.
- An industrial arterial road servicing the GSDA and Port of Gladstone for freight and commuter movements.
- A road linkage between the remaining rural areas and villages/towns west of Gladstone (ie Yarwun and Mount Larcom townships with Gladstone).

As part of planning being undertaken under the Gladstone Land, Port, Rail and Road Infrastructure (GLPRRI) Study for the Department of Infrastructure and Planning (DIP), of which DMR are part of the Steering Committee, it has been identified that Gladstone-Mount Larcom Road will need to be upgraded to a four lane divided carriageway to meet future demand. The upgrade will be primarily linked to industrial growth within the GSDA, and will progressively extend west from the intersection with Hanson Road/Landing Road. Concept planning has been undertaken with respect to the major intersections to be developed, inclusive of Calliope River Road/Targinie Road and Aldoga Road.

Calliope River Road

The Calliope River Road is a local authority road under the control of GRC. The road extends from the Bruce Highway in the south through to the Gladstone-Mount Larcom Road in the north. Immediately south of the Gladstone-Mount Larcom Road it passes through the town of Yarwun, with speed reduction of 60 km/hr applying. The road comprises a high standard two lane two way carriageway to highway standards. The road currently carries approximately 750 vehicles per day.

The original form and function of the road was as a minor road servicing the rural areas west of the Calliope River.

The GIRTTP identified the need for the provision of a major freight route from the south via the Bruce Highway into the GSDA and northern precincts of Port of Gladstone, clear of the urban area of Gladstone (ie an alternative to the Dawson Highway/Hanson Road route). It was also identified that an alternative route was required in the long term to provide for worker movements from the Boyne, Tannum and Calliope areas into the GSDA, as an alternative to Benaraby Road and linking roads through Gladstone.

On this basis the former Calliope Shire Council sought funding assistance to upgrade the existing minor road to a suitable standard to provide the function identified under the GIRTTP. Federal funding was provided on a 50/50 basis, which allowed the road to be upgraded by Council to highway standard in the early 2000s.

Calliope River Road functions are:

- An industrial arterial road servicing the GSDA and Port of Gladstone for freight and commuter movements from the south and west.
- A service road for the township of Yarwun and other rural residential and farming properties within the area.

There are no current plans to upgrade the existing road, given current low traffic volumes and residual life as a two lane, two way roadway. As background traffic volumes increase, there shall be a reduction in amenity through the town of Yarwun.

Minor roads

All declared minor roads within the vicinity of the project area are under the control of the GRC.

The Narrows Road

The Narrows Road is currently a local road that extends from the Bruce Highway at the township of Mount Larcom to The Narrows at Ramsay Crossing. The section of road within the township is a two lane, two directional bitumen sealed road, and principally provides access from the southern side of the Bruce Highway/NCL to community facilities on the northern side, inclusive of Bowls Club, swimming pool and showgrounds.

The intersection with the Bruce Highway is constructed to a high standard, comprising auxiliary turn lanes, raised central medians and street lighting. The crossing of the NCL comprises a controlled crossing, with flashing lights and boom gates.

Outside the town limits, the road comprises a high standard, formed gravel road, servicing a number of rural residential and farming properties located to the west of the Mount Larcom Ranges. The road connects to the area east of the Mount Larcom Range via Nichols Road/Targinie Road.

Under the GLPRRI Study, a major transport/infrastructure corridor is proposed to be established around The Narrows Road, identified as the Northern Boundary Corridor.

Flynn Road

Flynn Road is an unsealed road which is accessed from Gladstone-Mount Larcom Road, approximately 2 km west of Yarwun township. The first 1 km of Flynn Road provides access to a number of rural residential properties and is constructed to a formed, gravel standard with approximately 60 km/hr design speed. West of the above through to the boundary of the Aldoga North Precinct of the GSDA, a distance of approximately 1 km, the road standard deteriorates to a narrow formed road with a speed environment of less than 40 km/hr. This section of road provides access to the Aldoga North Precinct of the GSDA.

The existing intersection with the Gladstone-Mount Larcom Road comprises a minor T-intersection with no auxiliary turn lanes. However, Gladstone-Mount Larcom Road has been widened to accommodate for west bound through traffic to bypass traffic entering Flynn Road.

Cullen Road

Cullen Road is an unformed road that is a continuation of the Flynn Road reserve within the Aldoga North Precinct of the GSDA. The road corridor extends from Flynn Road north – west for a distance of approximately 7 km, where it then turns west for a distance of approximately 1.5 km to intersect with The Narrows Road. This last section provides access from The Narrows Road into a residence on what was the Cullen property located within the northern extent of the Aldoga North Precinct, and is a formed gravelled road.

The road corridor provides access to the western side of Mount Larcom Ranges, Powerlink's 275 kV power easement and proposed substation location, as well as the Lintpark grazing lease. The existing track that provides access is generally not located within the road corridor.

Quarry Road

Quarry Road is a high standard, formed gravel road which provides access to a quarry located to the south of the NCL and to the west of Yarwun township. The road also provides access to the NCL and adjacent services. The Quarry Road corridor also comprises part of the Mount Larcom-Yarwun Road.

The road intersects with Gladstone-Mount Larcom Road approximately 2.5 km west of Yarwun township, and immediately west of the existing NCL road overpass.

Mount Larcom-Yarwun Road

Mount Larcom-Yarwun Road is an unformed access track which joins the southern edge of the NCL in the vicinity of the Aldoga Rail Yard deviation area. The road is accessible via the Gladstone-Mount Larcom Road (near the NCL rail over road pass) or adjacent to Mylrea Road and provides access to a rural residential property in addition to the NCL and adjacent services. To the south of Gladstone-Mount Larcom Road the road is known as Quarry Road.

Targinie Road

Targinie Road is a two lane formed road with a 3.6 m sealed width (single lane), which extends in a northerly direction from Gladstone-Mount Larcom Road, servicing the township of Targinie and rural residential and farming properties to the east of the Mount Larcom Ranges (eg Targinie Valley).

With the inclusion of the Targinie Precinct within the GSDA and the resumption of private properties, the traffic generated on the road has been substantially reduced.

The intersection with Gladstone-Mount Larcom Road comprises a four way, at grade intersection with Calliope River Road as the fourth leg. The intersection was upgraded in conjunction with upgrades to the Calliope River Road, to provide for auxiliary right and left turn movements from Gladstone-Mount Larcom Road.

Under the GLPRRI Study, a major transport/infrastructure corridor is proposed to be established around Targinie Road, identified as the Targinie Valley Corridor. The planning allows for the upgrade of Targinie Road to a high standard, two lane, two way sealed road, capable of servicing future industrial development within the Targinie Precinct of the GSDA, and connecting with the Northern Boundary Corridor to provide connectivity to the Aldoga North Precinct. The final alignment of Targinie Road has not been confirmed to date, and will be developed at future stages of planning within the GLPRRI Study to suit development constraints identified at that time.

Lindherr Road

Lindherr Road (south) is a formed gravel road within the town of Yarwun, which commences at Calliope River Road and terminates at the NCL. It provides access to a number of residential properties within the township of Yarwun.

Lindherr Road (north) is a formed road, commencing at the Gladstone-Mount Larcom Road and terminating at the NCL. It originally provided access to a fronting property and the Yarwun waste disposal site. The establishment of the Aldoga Materials Transportation and Services Corridor (AMTSC) resulted in resumption of the property and closure of the waste disposal site. The road is currently unused.

The road reserve is continuous across the NCL.

Access Tracks in GSDA

A number of minor tracks were also identified within the project area. These are predominantly used by the local graziers, however some tracks do provide access to infrastructure such as Powerlink's 275 kV power easement and a mobile phone tower located adjacent the proposed Aldoga Rail Yard at Mount McCabe.

A number of unsealed tracks provide access from the Bruce Highway to the GSDA and are generally utilised by local graziers (ie currently having existing grazing leases over the properties). However, the tracks also provide access to linear infrastructure and services, including the Queensland Gas Pipeline, water lines and power easements, and are subsequently used by the respective parties. A weed eradication programme is also being implemented within the GSDA and the unsealed tracks provide the weed contractors with access while undertaking weed control.

Daetz Road

Daetz Road is formed gravel road, located off the Dawson Highway approximately 15 km west of the township of Calliope. The road crosses the MSL south of the Dawson Highway and provides access to a number of rural residential and farming properties. The road is also currently used by QR personnel to gain access from the Dawson Highway to the MSL.

Corry Road

Corry Road is a formed gravel road, located off the Dawson Highway approximately 17 km west of the township of Calliope. The road crosses the MSL south of the Dawson Highway and provides access to four isolated rural residential/farming properties.

Potters Road

Potters Road is a formed gravel road, located off the Dawson Highway approximately 20 km west of the township of Calliope. The road crosses the MSL south of the Dawson Highway and provides access to a number of rural residential and farming properties. The road is also currently used by QR personnel to gain access from the Dawson Highway to the MSL.

Mt Alma Road

Mt Alma Road is a formed gravel road which provides a link between the Bruce Highway (approximately 2 km south of the Larcom Creek crossing) and the Dawson Highway via Old Station Road and Duck Holes Road approximately 25 km and 35 km west of the township of Calliope, respectively.

Wycheproof Road

Wycheproof Road is a private access for the Wycheproof property. The access is currently unsealed and extends in a south easterly direction from Mt Alma Road. Alternative access tracks are located off the Dawson Highway, however at this time there is no direct access from the Bruce Highway. The road corridors located on the northern and eastern boundary of Wycheproof have no direct access to the Bruce Highway. The corridors are currently used to move cattle between paddocks and as a fire break.

Fairview Road

Fairview Road is a private access for the Fairview property. The access is currently unsealed and extends in a southerly direction from the Bruce Highway.

Minor tracks along Moura Link

A number of tracks were also identified within the project area. These tracks are predominantly private tracks used by local landowners, such as the two main tracks which extend north from the Dawson Highway and provide alternative access to Wycheproof.

13.2 Transport methods and routes

13.2.1 General

A detailed assessment has been undertaken with respect to the movement of equipment and materials to and from the project area, for both construction and operational phases, and proposed staging of the works. The assessment also recognises the linear nature of the Project, the probable origin and destination of the deliveries, and the different access points required along the length of the Project.

The Moura Link and Aldoga Rail Yard – Traffic Report prepared by Cardno Eppell Olsen will be supplied to relevant State agencies. This report was developed in consultation with representatives of DMR who identified key issues, including the requirement to meet relevant DMR standards and compatibility with the current Road Implementation Programme for the area.

The Traffic Report contains details with respect to:

- Construction and operational tonnages, origin, destination and routes
- Construction and operational workforce, origin, destination, travel assumptions and routes

This information is summarised in the sections below.

13.2.2 Site access

Moura Link

The Moura Link extends from the Dawson Highway in the south to the township of Mount Larcom in the north. During construction multiple access points are required along the Moura Link to provide an adequate level of service. It is proposed that some of these access points be retained for operation and maintenance activities.

Access shall be from the principal road elements comprising the Bruce Highway and the Dawson Highway, with access from these elements to the project area via the existing Council road and private accesses. The details of this will be negotiated with relevant landholders and government agencies as part of the development of Traffic Management Plan for the Project. This will also include consultation with local emergency services to identify potential emergency access points and tracks and any potential constraints.

Aldoga Rail Yard

Stage 1

Primary access during Stage 1 is likely to be Flynn Road.

However, the final route of the proposed quadruplication of the existing NCL to the east of the Aldoga Rail Yard towards Yarwun township will directly effect whether Flynn Road – originates off the existing Gladstone-Mount Larcom Road or the proposed Aldoga North Service Road through the Aldoga Bank Deviation area; will be utilised as the primary road access to the proposed Aldoga Rail Yard during Stage 1 of construction and beyond.

An assessment of Flynn Road/Gladstone-Mount Larcom Road intersection has identified that the existing priority intersection will require upgrading. This preliminary analysis indicates that at a minimum 180 m lanes would most likely be required for both right and left turn vehicle movements as part of the proposed upgraded intersection on the Gladstone-Mount Larcom Road. In this configuration, the intersection will have sufficient capacity to cater for the Project demands during all the specific construction and operational phases of the Project.

Furthermore, to allow for an all weather type road access and to maintain the amenity for adjoining residences in this area, it is proposed that Flynn Road be upgraded to a higher standard, formed gravel road within the current road reserve, with routine watering and maintenance to avoid dust and nuisance during all construction and operational phases of the Project.

However, should the planned quadruplication of the existing NCL not be along the existing NCL alignment, other road access options to the Aldoga Rail Yard, such as the Aldoga North Service Road through the Aldoga Bank Deviation area will be investigated. The GLPRRI Study has only identified the provision and necessity of such a primary access road, but future investigation in this respect is needed.

Stage 2 to 4

Primary access

Given the Project's current design it is proposed to upgrade the existing Flynn Road to a suitable full level of service for both construction and operational activities to service the Aldoga Rail Yard. The road will typically comprise a two lane, two way sealed roadway. The intent is to undertake the upgrade within the existing road reserve, to negate impact on existing properties.

The western end of the existing road corridor, clear of the existing rural residential properties, shall be realigned and extended within the Aldoga Precinct in accordance with planning for undertaken under the GLPRRI Study, such that the works can be incorporated into planned long term infrastructure.

The increased traffic volumes for both construction and operational vehicles to service the Aldoga Rail Yard would result in the proposed upgrading of the Flynn Road/Gladstone Mount-Larcom intersection to accommodate increased turning movements through the existing intersection. Based on a DMR-100 km/h road design speed, required vehicle queue storage lengths as well as increasing turning movements as mentioned above; it is estimated that the existing short passing lane configuration would need upgrading and increased in length up to 180 m (minimum). With the proposed upgrading of the intersection completed and no foreseen enlargement of the proposed construction and operational scope of works of the Project, this intersection should have sufficient capacity to accommodate Project traffic.

Alternative primary access

Planning undertaken under the GLPRRI Study had previously identified the provision of a public road within the Larcom Creek Corridor, located on the western side of the Mount Larcom Range and connecting the Gladstone-Mount Larcom Road north through the Aldoga Precinct to the proposed Northern Boundary Corridor. The "Aldoga North Service Road" referred to above was proposed to intersect with the Gladstone-Mount Larcom Road as a four way intersection with Aldoga Road (a road that extends south of the Gladstone-Mount Larcom Road and services development within the Aldoga South and Central Precincts of the GSDA).

Under the current stage of planning within the GLPRRI Study, which accounts for the current planned Aldoga Rail Yard as well as other future infrastructure planned to service the area, the ability to provide the Aldoga North Service Road from the above intersection has been seriously compromised and is no longer the preferred option.

The current planning under the GLPRRI Study allows for the provision of the Aldoga North Service Road via a connection to Targinie Road in the east, aligned through the area known as Aldoga Bank within part of a planned infrastructure corridor. The planning allows for the utilisation of the Targinie Road/Calliope River Road/Gladstone Mount Larcom Road intersection as the major intersection to service both the Targinie and Aldoga Precincts of the GSDA, with upgrading of the intersection to meet traffic demand.

Analysis has been undertaken for the Targinie Road/Calliope River Road/Gladstone-Mount Larcom Road intersection for background and with development scenarios. It has been assumed that this intersection will be used as the main access to the project area from Stage 2 onwards subject to the Aldoga Bank Deviation¹ proceeding. The intersection assessment suggest that the existing intersection form has sufficient capacity to accommodate development traffic up to and including full development at 2020, but that additional capacity would be required for the 2030 design horizon.

¹ The Aldoga Bank Deviation is not part of the EIS's scope of works and will be addressed in the a separate study

With minor upgrades, including an additional short lane on Calliope River Road, the intersection would have sufficient capacity for the 2030 design horizon with the Aldoga Rail Yard operating at full capacity. The intersection would not require any upgrades without the development.

Secondary access

A secondary access is proposed to be established to connect the western end of the Aldoga Rail Yard to The Narrows Road. The second access is deemed necessary to provide for an emergency access to and from the Aldoga Rail Yard in the situation where the primary access is blocked/out of service. Under normal operations the access shall be closed to the public and general operational staff.

The utilisation of this access as a route for construction freight movements from the north into the Aldoga Rail Yard is also proposed as an alternative to the Gladstone-Mount Larcom Road/Flynn Road route.

If the accommodation village was to be established within the property on the corner of the Gladstone-Mount Larcom Road and Bruce Highway (Lot 8 on RP620660 (refer Figure 2.3)), discussions would be progressed with both DMR and GRC for the use of The Narrows Road for access from the village to the Aldoga Rail Yard site.

The traffic analysis assumes that operation staff and the majority of non village construction staff would access via the main access at Targinie Road.

Assessment has been undertaken for a scenario where the construction village would be located on the Bruce Highway. The road peak (background traffic only) at this intersection of the Bruce Highway/The Narrows Road occurs outside of the construction peak, with an AM peak between 8:00 am and 9:00 am and a PM peak between 2:15 pm and 3:15 pm. The background demand at the time of the construction peaks (5:00-6:00 am and 4:00-5:00 pm) is reduced and even with the additional demand from the development, the critical intersection peak would occur at the road peak (ie outside of the peak of construction movements).

This was confirmed in the analysis which suggests a higher volume to capacity ratio during the background traffic scenario (road peak) than during the construction peak. The intersection is expected to operate well, with spare capacity during construction, during both the road and construction peak.

Dependent on the outcomes of the above and the volume of traffic that may be generated on The Narrows Road, it is proposed that an agreement be entered into between QR and GRC with respect to increased maintenance and rehabilitation that may be required as a result of the Project traffic.

13.2.3 Construction

Freight

The construction of the rail elements for the Project is discussed below.

Clearing and earthworks

These operations are unlikely to generate a significant amount of external traffic, as the earthworks operations shall be contained within the footprint of the works (ie there is no requirement to dispose of excess material, or import material from external to the site). Impact on the supporting road network should be limited to the movement of equipment on and off site, which shall be controlled movements if the equipment is over-dimensional.

Drainage and bridging

These operations are likely to generate some traffic impact on the external road network, associated mainly with the movement of the larger precast elements associated with bridge deck units and other materials. Precast elements shall typically be sourced from existing precasting yards within the region, with the closest located within Rockhampton. Allowance has been made to source precast elements from both north and south of the project area, with transport along the major road network of Bruce Highway, Dawson Highway, Gladstone-Mount Larcom Road and Calliope River Road.

As the number of elements is not large, and delivery is over an extended period, the daily freight traffic volumes are likely to be low and not impact significantly on traffic movements. Standard procedures exist for the movement of over-dimensional loads and no additional procedures are anticipated to be put in place for this Project.

Ballast

Ballast is likely to be sourced from existing quarry operations under existing contractual arrangements between the quarry operators and QR. Ballast shall be delivered to the project site via rail, and shall have no impact on the road network.

Sleepers

Sleepers shall be precast concrete sleepers manufactured within existing precast yards under contract to QR. Transport to site shall be via trucks on the road network, principally the Bruce Highway, Dawson Highway, Gladstone-Mount Larcom Road and Calliope River Road. Whilst the total tonnage of material to be transported is considerable, due to the linear and staged nature of construction, delivery to site will be continuous over a prolonged period, resulting in an insignificant increase in daily traffic movements.

Rail track

Rail track is likely to be sourced and delivered to site via rail, with no impact on the road network.

Overhead line electrification

The Moura Link is not proposed to be electrified at this stage of the Project, based on the use of non electric locomotives for coal deliveries from the west (ie the MSL is not electrified).

Rail elements within the Aldoga Rail Yard and the NCL shall be electrified, and allowance has been made in the assessment of road impact associated with the transport to site of these elements (ie masts and cable).

Aldoga Rail Yard facilities

The construction tonnages associated with the buildings to be established within the Aldoga Rail Yard are relatively small and spread over a number of stages of construction. Allowances have been made for the sourcing of these materials from within the immediate region as well as externally. Delivery shall be via major road elements comprising the Bruce Highway, Gladstone-Mount Larcom Road, Hanson Road and Calliope River Road.

Workforce

The construction workforce is proposed to be resourced from the existing community as well as from external to the region, reflective of the competing demands for resources anticipated throughout the development of the Project.

Section 2.8 contains details on proposed housing/accommodation of the construction workforce.

The preferred construction accommodation village location is located adjacent to Calliope River Road approximately 1 km north of the Bruce Highway. The Traffic Impact Study undertaken has been based on this village location, with access from the village to site via Calliope River Road/Gladstone-Mount Larcom Road for the Aldoga Rail Yard, and Calliope River Road/Bruce Highway for the Moura Link.

The Traffic Impact Study for the Project has allowed for movements of construction workers from the village to and from the site.

The impact, if any, of the traffic generated by the village associated with servicing of the village and for worker movements from areas external to and from the village, are to be addressed under the approval process for the village under the *Integrated Planning Act 1997*, as they are not part of this EIS.

13.2.4 Operations

Freight

Operational freight movements are limited to the Aldoga Rail Yard, and comprise fuel, sand, spares and other miscellaneous consumables associated with train provisioning and maintenance.

The predominate routes for freight movements shall utilise Hanson Road, Gladstone-Mount Larcom Road, Calliope River Road and the Bruce Highway.

Workforce

Operational workforce movements are again limited to the Aldoga Rail Yard, and comprise maintenance and provisioning staff, administrative staff as well as train crew changeovers.

The predominate routes for worker movements will utilise Hanson Road, Gladstone-Mount Larcom Road, Calliope River Road and the Bruce Highway.

It has been assumed that the workforce shall be sourced locally and housed within current and future residential accommodation within the Gladstone region. It is also assumed that the workforce shall drive from their residence to the site.

13.3 Potential impacts and mitigation measures

13.3.1 General

A Traffic Report has been undertaken as part of this EIS to identify and address impacts in accordance with the requirements of the DMR's "Guidelines for Assessment of Road Impacts of Development" (April 2007).

The Traffic Report takes into consideration:

- Capacity of the road link elements
- Capacity of the road intersections
- Pavement impact associated with increased freight movements

These issues have been addressed in the context to accommodate traffic, both with and without development, for the duration of the Project development and for a period of ten years post the last stage of development.

13.3.2 Moura Link

The Traffic Report identified that the Moura Link element of the Project did not generate significant impacts on the existing road network, due to the relatively low construction workforce and tonnages of materials transported to the site, and minimal operational maintenance traffic generated. The impacts of the construction of the Moura Link does not warrant assessment in its own right, however impacts have been considered for elements of the network that are included in the scope of assessment for the Aldoga Rail Yard.

13.3.3 Aldoga Rail Yard

For the Aldoga Rail Yard component of the Project, the scoping test suggests that key potential impacts would be associated with the following road elements:

- Mid-block capacity:
 - Hanson Road
 - Gladstone-Mount Larcom Road
- Intersection capacity (preferred accommodation village location):
 - Gladstone-Mount Larcom Road/Calliope River Road/Targinie Road intersection
 - Gladstone-Mount Larcom Road/Hanson Road/Landing Road intersection
 - Hanson Road/Red Rover Road intersection
 - Hanson Road/Blain Drive/Alf O'Rourke intersection
- Intersection capacity (Bruce Highway accommodation village):
 - As above plus
 - Bruce Highway/Gladstone-Mount Larcom Road
 - Bruce Highway/The Narrows Road
- Potential pavement impacts:
 - Bruce Highway
 - Gladstone-Mount Larcom Road
 - Hanson Road

These potential impacts are discussed below.

Mid-block capacity

Assessment of potential mid-block impacts suggests that four lanes would be required on Hanson Road between Red Rover Road and Blain Drive by 2029 with or without development. Consequently the Project is unlikely to impact the proposed timeframe for the upgrade of Hanson Road to four lanes.

Intersection capacity

Analysis of the intersection capacity was undertaken using SIDRA Intersection. DMR turn warrants were also considered for priority intersections.

Assessment of the intersections listed above suggests that the following intersection will have sufficient capacity in the existing form for all scenarios assessed up to and including the full development at the ten year design horizon (2030):

- Bruce Highway/The Narrows Road
- Bruce Highway/Gladstone-Mount Larcom Road
- Gladstone-Mount Larcom Road/Hanson Road/Landing Road intersection

The access intersections, including Flynn Road and Targinie Road will require upgrades for the with development scenarios to mitigate the traffic impacts of the Aldoga Rail Yard component. Works include a short turn lane on the Calliope River Road approach at the Targinie Road/Calliope River Road/Gladstone-Mount Larcom Road intersection in the later stages of development sometime before 2030. The Flynn Road access would require at a minimum 180 m left and right turn lanes to satisfy DMR turn warrants and safety aspects related to the intensification in use.

Works are also required at the Blain Drive/Alf O'Rourke/Hanson Road and Red Rover Road/Hanson Road intersections. These works are driven by the background demand and the development does not impact on the timing of works or the required future intersection forms. The Hanson Road/Red Rover Road roundabout would need upgrading to accommodate two circulation lanes by 2015 with background traffic and with development traffic.

A dual lane roundabout would also be required at the Blain Drive/Hanson Road intersection by 2013 with or without the development. The road peak, rather than the development peak is critical and further works are required by 2030 as a result of background traffic alone.

It is noted that DMR has prepared concept plans for a four lane configuration on Hanson Road with either dual lane roundabouts or signals at the Blain Drive and Red Rover Road intersections. The proposed configurations are consistent with these plans and should be sufficient to accommodate the increased demand at the 2030 design horizon.

Potential pavement impact

Potential pavement impacts have been considered for the Bruce Highway, Gladstone-Mount Larcom Road and Hanson Road. Potential impacts have been considered significant if the bring forward of rehabilitation is greater than 1 year or if the ESA (Equivalent Standard Axle) load is greater than 5% of the background demand.

The warrant for contribution was not triggered for either the bring forward costs of pavement rehabilitation or increased maintenance activities along any of the assessed road sections.

13.4 Road infrastructure alterations

13.4.1 Road/rail crossings

This section deals with the direct conflicts between the Project works and the existing road network. The basis for the rail design is that all public road and rail interfaces are constructed mostly as grade separated crossings, providing for the highest level of safety to both road and rail traffic.

The new rail elements of the Project cross a number of existing roads, as well as planned road upgrades to the existing roads (ie future four lane divided carriageways), plus known planned road infrastructure (ie the extension of the Aldoga Road south west to intersect with the Bruce Highway).

Potential impacts will occur to the road user during the construction of the rail/road crossings, requiring temporary partial road closures, side tracking and/or works under traffic controllers. Details with respect to each of the proposed road/rail crossings are provided below, with drawings of the proposed structures and road deviations (if required) contained within Appendix B1.

Moura Link

The proposed Moura Link crossings of highways and existing rail infrastructure are summarised below:

- Two crossing (road over rail) structures over the Dawson Highway for both the Moura Link Eastern and Western Options.
- A road over rail bridge under the existing Bruce Highway for both the Moura Link Eastern and Western Options.
- Two crossings (road over rail) over Gladstone-Mount Larcom Road and the NCL. The proposed structures will allow for the future duplication of the Gladstone-Mount Larcom Road.

East End Mine Branch Line duplication

A new double lane road bridge over the railway is proposed for the connection of the duplicated EEMBL with the existing NCL. Gladstone-Mount Larcom Road will need to be diverted during the construction of the new bridge. A decision on the diversion will be made during the detailed design phase of the Project.

NCL quadruplication

The NCL quadruplication will cross a number of major roads including:

- A new road over rail bridge structure is proposed along the NCL north of the existing Gladstone-Mount Larcom Road bridge. The proposed structure will accommodate the construction of two future additional rail lines for the NCL, as well as to incorporate any future planning by DMR in the area.
- A new rail bridge structure is proposed over Calliope River Road, near the township of Yarwun. The proposed structure will be located along the NCL to the south of the existing rail bridge.

The construction of the proposed road over rail bridge structure (Gladstone-Mount Larcom Road) will result in the deviation of the existing Gladstone-Mount Larcom Road. In addition, the existing Gladstone-Mount Larcom Road /Flynn Road/ intersection will require upgrading. This intersection is likely to be upgraded as a result of the Project independent to the construction of the bridge structure (refer Section 13.2.2).

13.4.2 Aldoga Rail Yard – road access

Main site access

The main site access from the public road network will be located towards the eastern end of the yard. Construction and operational access is currently envisaged to be via the existing Flynn Road which has a current at grade connection to the existing Gladstone-Mount Larcom Road. The intersection may require some upgrade depending on the lifespan and expected traffic load on the intersection. This will be subject to further discussion with DMR and GRC during the detailed design phase of the Project.

Flynn Road is currently an unsurfaced track of varying width and quality. The road will be upgraded to provide construction access into the site during Stage 1 (improved unsurfaced access) and later for operational access (possibly surfaced, but dependant on expected lifespan, refer “Aldoga Bank” below). Options for the route of the quadruplicated NCL may require the re-routing of part of the road, otherwise the road will follow the current alignment. Access needs to be maintained for the use of adjacent land and lease holders and for access to Powerlink’s proposed Larcom Creek Substation.

A proposed T-junction on the Flynn Road corridor (the junction also being the boundary from public to private QR road) will connect a dedicated rail access road to the rail yard area. The access road to the Aldoga Rail Yard leading off Flynn Road will be a standard QR surfaced, access road. A grade separated crossing of the rail line leads to the boundary of the site. Gated roads then branch off to the various areas of the rail yard, whilst a road northwards remains accessible for the use of potential third party operators.

Aldoga Bank Deviation

A possibility does exist for the development of a major rail/road and pipeline/conveyor corridor through the adjacent Aldoga Bank Deviation area (refer Figure 2.1). This option is currently under consideration as part of the GLPRRI Study and has been discussed in Section 13.2.2.

Emergency site access

An emergency access to the public road network will be provided at the west end of the yard. It is considered that this access will be used infrequently and in emergencies. This access would use The Narrows Road which leads to the Mount Larcom township. This makes use of an existing level crossing in Mount Larcom township to cross the NCL. A T-junction on The Narrows Road would connect the public road to a 6 m wide unsurfaced access track which would lead into the yard site and connect into the site road network.

A gate at the T-junction will be locked to control access. Other rail crossings within the site would be at grade, but these have been minimised and sited in areas with minimal chance of blockage.

13.4.3 Maintenance tracks

Road access will be provided along the rail infrastructure to accommodate future maintenance activities. These roads will initially provide access to the construction site and necessary roads will be retained for use during operation. Construction roads not required for operation will be restored where practically possible to previous condition if not required by adjacent land uses.

The maintenance tracks will generally run parallel to the rail infrastructure (minimising the necessary footprint) and will include designated access points. The proposed access points are likely to include:

Moura Link

- Along the Dawson Highway at the proposed Moura Link Eastern Option or Moura Link Western Option
- Along the Bruce Highway
 - North and south of where the Moura Link crosses the Bruce Highway
 - North and south of the EEMBL
- Gladstone-Mount Larcom Road
 - Duplicate existing access track along the EEMBL
 - Proposed connection between the Moura Link and NCL

NCL Quadruplication

There are existing access tracks along the NCL, and where practical, these tracks will be retained. However, it is likely that the access points will need to be upgraded, including:

- Gladstone-Mount Larcom Road
 - Mount McCabe (existing operational crossing and access point)
 - Yarwun-Mount Larcom Road (existing access point)
 - Proposed Moura Link/NCL connection
- East and west of the Calliope River Road (existing access point)
- Quarry Road (existing access point)

Other access points may be identified during detailed design in consultation with relevant landowners and stakeholders.

13.5 Coal haulage

13.5.1 Queensland coal transport

QR's coal rail network is discussed in Section 1.6.

13.5.2 Projected coal haulage

All of Queensland's export coal is transported to port via the coal rail network operated by QR. The Port of Gladstone is critical to this logistics supply chain servicing QR's Blackwater and Moura systems. The projected coal haulage to meet Queensland's export demand along the Blackwater, Moura and Surat (Southern Missing Link) rail systems is shown in Figure 13.3.

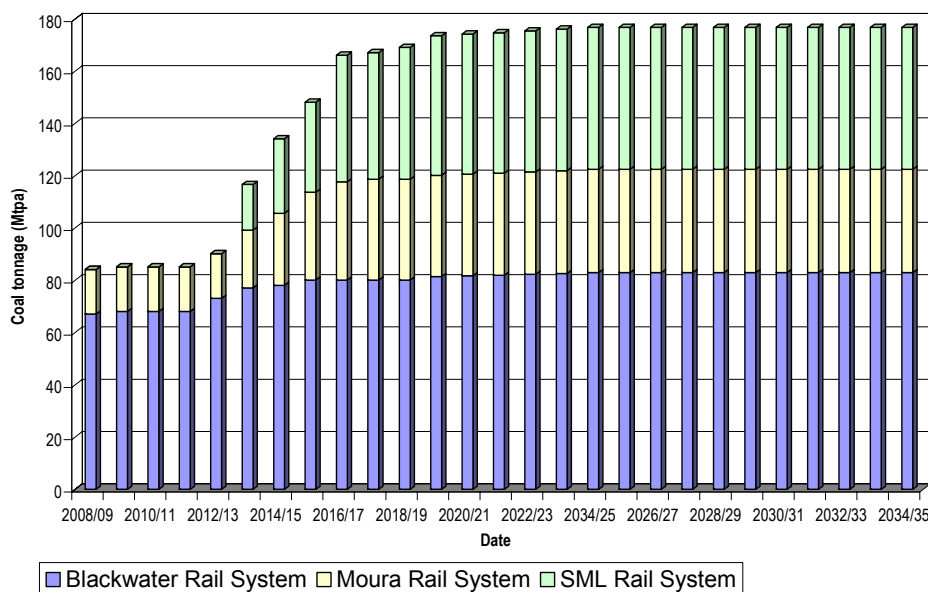


Figure 13.3 Projected export and domestic coal haulage tonnages for the Blackwater, Moura and Surat (Southern Missing Link) rail systems

Source: QR 2008

13.5.3 Project coal transport

The Project will provide additional coal traffic along the Blackwater and Moura/Surat rail systems.

The majority of loaded trains are expected to bypass Aldoga Rail Yard and access the proposed WICT directly via the NCL and/or the Moura Link. Loaded coal traffic along the Moura Link will bypass the Aldoga Rail Yard by accessing the NCL via the EEMBL. Unloaded coal traffic from the Aldoga Rail Yard will continue along the NCL to the Blackwater system or access the Moura Line via the Mount Larcom turnout.

Only a small proportion of the coal train consists currently using the NCL may require provisioning at the Aldoga Rail Yard.

The rail facilities at the Aldoga Rail Yard will provide for both non electrified and electrified trains. The Aldoga Rail Yard will be designed to handle future train lengths (ie 2.5 km in length).

13.5.4 Existing rail

The existing rail network in the vicinity of the Project comprises the NCL and EEMBL in the northern section of the project area and the MSL in the southern section of the project area.

The existing rail network in the Gladstone/Calliope area is shown in Figure 13.1.

North Coast Line

The NCL system (South) incorporates two other systems, the Blackwater system (between Rocklands and Gladstone) and the Brisbane Metropolitan system (between Roma Street and Nambour). This single line section of track (425 km in length) provides the strategic link between north and south with an annual tonnage in excess of 8 Mt hauled over the corridor.

The system, overall, caters for all traffic tasks from heavy haul trains to high speed tilt train and commuter services. Within the Central Queensland region, the NCL also caters for coal trains from the Blackwater system which currently travel to the RG Tanna Coal Terminal, Gladstone Power Station, Barney Point Coal Terminal and other destinations in Gladstone. Both non electric and electric trains are used to haul coal trains from Blackwater.

Between Yarwun and Mount Larcom townships the NCL consists of electrified track. This section of track caters for freight, coal and mineral (heavy haul) transport, locomotive hauled passenger services and Tilt Train passenger services. The rail traffic along this section of the NCL consists of approximately 250 trains per week (QR 2008).

Along Gladstone-Mount Larcom Road section of the NCL two occupational crossings (private access-sign) have been installed to provide access to grazing land and other infrastructure to the north of the NCL.

Moura Short Line

The MSL is a single-line system which connects the lower Bowen Basin (eg Callide Coalfields, Moura Mine) to the Port of Gladstone. The system runs west parallel to the Dawson Highway from Parana where it connects with the NCL.

The track is not electrified, with only non electric trains (eg diesel electric locomotives) being used to haul coal and freight. The current traffic volume, including coal and freight is approximately 122 trains per week. No passenger trains currently use this track (Connell Hatch 2006).

Along the MSL within the vicinity of the project area an occupational crossing (private access- sign) has been installed on Daetz Road.

It is proposed to link this system approximately 20 km west of the township of Calliope to the NCL near Aldoga via the proposed Moura Link.

East End Mine Branch Line

QR constructed a rail link loop via the NCL from Cement Australia's East End Mine² to their operation at Fisherman's Landing. The EEMBL is a single track which branches off the NCL to the west of Aldoga and continues in a south westerly direction to the East End Mine loop. Freight trains transport raw material from East End Mine to the Fisherman's Landing plant daily (Cement Australia website).

² East End Mine was developed in 1964 and is situated approximately 24 km west of Gladstone near the township of Mount Larcom. It is Queensland's largest limestone mine operation and supplies raw material to the plant at Fisherman's Landing.

The EEMBL can be accessed from the Bruce Highway or from Gladstone-Mount Larcom Road via an occupational crossing (private access- signed) located near the NCL/EEMBL junction. An occupational crossing (private access- unsigned) has also been provided to allow the local graziers to move cattle between paddocks.

This section of track will be duplicated as part of the Project and will traffic coal train consists from the Moura Link to the WICT rail infrastructure.

13.5.5 Potential rail network impacts

The rail track constructed as part of this Project is designed to have minimal impact on the existing rail network. Coal trains from Moura and the Surat Basin will diverge from the existing MSL that runs adjacent to the Dawson Highway approximately 15 km west of the township of Calliope. Inbound trains from Moura which require access to the Aldoga Rail Yard will cross over the EEMBL and join onto the NCL just south east of the Mount Larcom township. These trains will then enter the yard from the west as do the trains from Blackwater system. It is estimated that a further 27 train movements per day (operating 24-hours per day) due to coal transport to the WICT will occur at the ultimate stage along the MSL (QR 2008).

To accommodate the Moura Link a rail under the EEMBL will be constructed, in addition to a number of angles (north and south of the EEMBL). The height of the rail bridge will allow for acceptable vertical clearances between the top of the existing rail to the underside of the proposed new rail bridge structure in accordance with QR standards. In addition a rail bridge will also be required over the Gladstone-Mount Larcom Road and the NCL to link the Moura Link to the Aldoga Rail Yard (refer Section 13.4.1). The proposed structure will comply with QR standard rail bridge details.

Construction activities associated with these structure may impact on existing train movements along the EEMBL and NCL. However, these impacts are likely to be short term and intermittent

Trains travelling from Blackwater into the proposed WICT will travel south along the existing NCL. Coal traffic travelling into the WICT will have little impact on existing traffic on the NCL. It is estimated that a further 20 train movements per day (operating 24-hours per day) due to providing coal into the WICT will occur along the NCL at the ultimate stage (QR 2008).

Locomotive and wagon maintenance facilities and provisioning facilities will be constructed as part of the Project. These will support trains accessing the WICT with minimal interaction with the existing Rollingstock Maintenance Facilities at Callemondah envisaged. The Aldoga Rail Yard will accommodate train lengths of approximately 2.5 km in length.

In addition, the design of the Project also considers the potential use of the Aldoga Precinct by third party operators (ie access from the NCL to the area north of the Aldoga Rail Yard is considered).

During construction, ballast, rails, turnouts, overhead electrical equipment, signalling and communications equipment will be delivered by rail and may contribute a number of additional trains per day for delivery purposes. Impacts of additional train traffic are being addressed by QR and additional infrastructure required will be finalised during subsequent detailed design stages.

The operation of the Project will be undertaken in accordance with existing QR standards and procedures. This includes potential operational constraints associated with natural disasters such as flooding and storms. During detailed design the rail infrastructure and Aldoga Rail Yard will be designed to accommodate an appropriate flood event which should maintain operational efficiency.

13.6 Conclusions

An analysis has been carried out of construction and operational traffic flows for the Project, and proposed mitigation measures have been designed to improve road and rail safety at the site.

Quantities of construction materials have been estimated with corresponding numbers of vehicle trips required for haulage. Potential construction traffic impacts will be mitigated by implementing a Traffic Management Plan. Agreements will also be developed with DMR and GRC on road and rehabilitation requirements as a result of the Project construction phase.

The rail track constructed as part of this Project is designed to have minimal impact on the existing rail network. Impacts of additional train traffic during construction are being addressed by QR and additional infrastructure required will be finalised during subsequent detailed design phases.

Conflict points between road and rail are expected to be removed mostly by grade separation, improving safety and traffic flow around the site and its access points. Access will be regulated with signage, gates and fencing where practicable.

13.7 Commitments

The relevant transport commitments for the Project include:

- Develop and implement a Traffic Management Plan during construction.
- Develop agreements with DMR and GRC on road maintenance and rehabilitation requirements as a result of the Project construction phase.