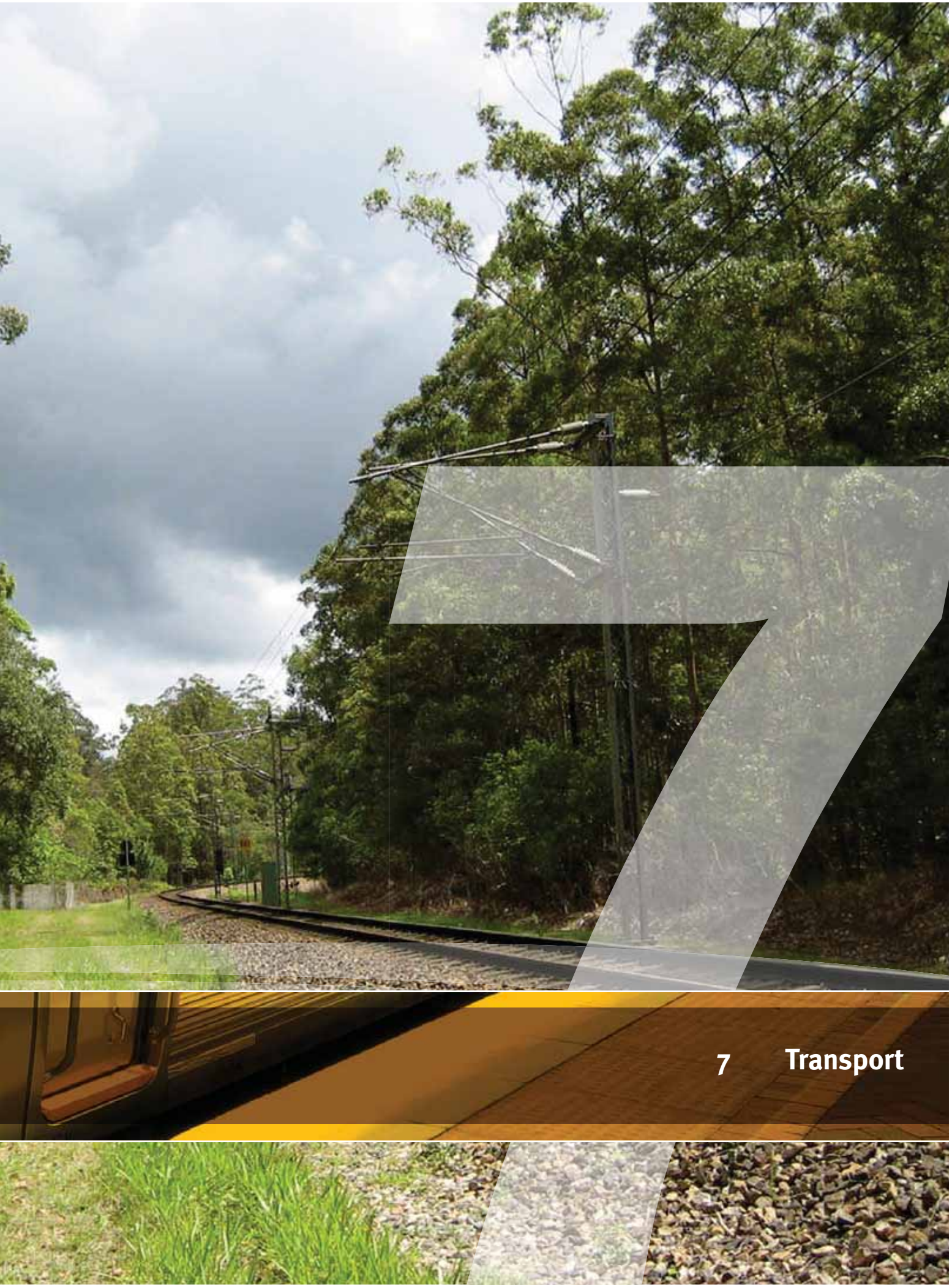


7 Transport

7 Transport

7.1 Introduction

This chapter discusses the various transport aspects and issues associated with the Landsborough to Nambour Rail Project.

The overall objective of this project is to provide an improved rail service between Landsborough and Nambour. As the north coast line (NCL) is the key rail corridor north of Brisbane, there is high demand for its use both for passenger and freight services. As a result of this high demand and the winding and undulating nature of the existing single track between Landsborough and Nambour, the capacity along this section is severely restricted. This results in lower speeds and reduced operational efficiencies, as discussed in detail in **Chapter 2, Description of the project**. An upgrade of this section of the NCL would deliver passenger and freight transport benefits, which in turn may offset the need for future investment in the road network, and therefore reducing greenhouse gas emissions. This is discussed further in **Chapter 16, Air quality**.

The project is highlighted in both the South East Queensland (SEQ) Regional Plan and the SEQ Infrastructure Plan and Program, and is anticipated to form part of a significant integrated transport system across the Sunshine Coast and SEQ, which is a 'desired regional outcome'. Other projects such as the Caboolture to Landsborough upgrade, CAMCOS (Beerwah to Maroochydore), CoastConnect and Nautilus projects will also be required to achieve this integrated transport system. These projects are discussed further in **Chapter 2, Description of the project**. This chapter provides descriptions and assessments of the following:

- existing road and rail infrastructure
- existing public transport and freight services
- projected public transport and freight service levels
- the transport objectives and benefits of the project
- construction impacts of the project to the existing road network and mitigation measures
- operational impacts of the project to the existing road network and mitigation measures
- future reuse of the decommissioned existing rail corridor for recreational trails.

7.1.1 Relevant legislation and policy

Table 7.1.1 outlines legislation and policy relevant to the transport aspects of the project.

Table 7.1.1: Relevant legislation and policy

Legislation/Policy	Relevance
Transport Infrastructure Act 1994	This Act aims to provide a regime that allows an effective management and planning of transport infrastructure. It also governs specific road and rail implementation programs that are relevant to the project.
Transport Planning and Coordination Act 1994	This Act aims to achieve the effectiveness and efficiency of the transport system to improve the lifestyle of Queenslanders, as well as the economy, trade and development of Queensland. This is relevant to the project as it encourages having a strong integration between land use and transport.
Transport Operations (Road Use Management) Act 1995	This Act aims to provide a safe and efficient road system in Queensland. It is relevant to the project as it would provide guidance on how the road network can efficiently move road users, goods and services not only within the project area but throughout the State.
South East Queensland Infrastructure Plan and Program 2008-2026	SEQIPP supports the Government's SEQ Regional Plan by outlining the long-term planning of infrastructure in SEQ. It includes the rail upgrade between Landsborough to Nambour to upgrade connectivity and increase the capacity of the NCL.
Integrated Regional Transport Plan for South East Queensland	The IRTP sets out a 25-year vision for the transport system and is 'a blueprint for the transport system which meets the region's looming transport challenges'. This is relevant to the project as it establishes targets for increased use of public transport, ride sharing, walking and cycling. It also has specific targets set for the proportion of trips made by public transport, including targets for trips from the Sunshine Coast.
Rail Network Strategy for Queensland	The aim of the RNSQ is to identify specific strategies relating to policy and planning for the future of Queensland's rail infrastructure and corridors.

Table 7.1.1: continued

Legislation/Policy	Relevance
The former Department of Main Roads Guidelines for Assessment of Road Impacts of Development (2006)	The underlying principles of this document are summarised by the Department as follows: The Department of Transport and Main Roads must ensure a safe and efficient road system The Department uses its best endeavours to plan and invest in the road network for expected growth Only significant road impacts are considered (i.e. where projects or proposals are likely to increase traffic on State controlled roads by more than 5%) The Department only requires development proponents to adopt intervention levels that the Department would use Consistent development should not cause significant impacts Inconsistent development may cause significant impacts and require development conditions Development impacts may not require infrastructure solutions Developers will provide all road works required to specifically connect to the State controlled network The 'bring forward' methodology is only a tool to quantify development impacts. The Department will negotiate the use of this methodology with the developer. The scope of this guideline covers: ▪ impacts on the local community ▪ road safety considerations ▪ extent of potential impacts ▪ whole of government objectives ▪ Department of Transport and Main Roads strategic documents and investment strategies ▪ local government planning schemes and instruments, as well as the land use implications flowing from these schemes and instruments.

7.2 Methodology

7.2.1 Review of existing information

An assessment of the existing transport network was undertaken using available traffic and public transport operator data. These were from the former Department of Main Roads (DMR), QR Limited and TransLink websites. The SCRC (the former Caloundra City, Noosa and Maroochy Shires) were also consulted to provide relevant traffic and road network information. The SCRC were given the opportunity to comment on the project at several stages of the design development. In particular, the SCRC agreed on the road layout for Eudlo School Road, Beech Lane and Ash Lane.

The following reports relevant to the project area and the delivery of integrated regional transport outcomes were reviewed and used for general background information:

- *SEQ Infrastructure Plan and Program* 2008 – 2026
- *Rail Network Strategy for Queensland* 2001 – 2011
- Landsborough to Nambour Rail Corridor Study Route Identification Report (2008), undertaken for Queensland Transport, now the Department of Transport and Main Roads
- Former Department of Main Roads (now Department of Transport and Main Roads) 'Roads Implementation Program' (RIP) 2008–09 to 2012–13.

A desk-top review of the following data was undertaken to document and map the existing transport infrastructure:

- cadastre (Department of Environment and Resource Management, 2008)
- 2007 aerial photography
- SEQ Regional Plan (2005)
- Brisways (2008).

7.2.2 Field investigations

In order to describe and assess the current condition of the road and rail infrastructure in the project area, field investigations were undertaken.

7.2.3 Consultation

The study team has met with representatives of the SCRC and the former Department of Main Roads (now Department of Transport and Main Roads) on several occasions during preliminary design development, to review the progress of the project, and discuss transport objectives and outcomes.

In addition to these meetings, a workshop was held in July 2008 with officers of the SCRC, the former Department of Main Roads (now Department of Transport and Main Roads), the Coordinator-General, QR Limited and Queensland Transport (now Department of Transport and Main Roads). This involved

the consideration of land use and transport scenarios for the townships of Mooloolah, Eudlo, Palmwoods and Woombye. The workshop gave an indication of the current issues, constraints and opportunities in the project area from each agency's perspective. Feedback was mostly related to access issues which have been incorporated into the project.

7.2.4 Rail operational analysis

Systemwide Pty Ltd was engaged to undertake the following analysis for the project:

Travel Time and Energy Consumption	The travel time and energy consumption of each type of train utilising this section of the NCL was modelled, using Train Performance Calculator, and preliminary engineering design and corridor alignment information for both the current and future scenario. This includes track gradient, curve data, station location, type of track and rollingstock characteristics.
Capacity Analysis	The capacity benefits of the future double track railway have been compared to the existing single track layout. This was achieved by: ▪ building a timetable for the entire day and adding services until capacity was reached for the current and future layouts ▪ providing an estimate of the longevity of the solution ▪ identifying if/ when further capacity enhancements would be required.

Information derived from these analyses has been used in other sections of this EIS, namely the carbon and climate assessment contained in **Chapter 16, Air quality**, and has been used as the basis for future demand forecasting.

7.2.5 Demand forecasting

The purpose of the demand forecasting is to outline the high level strategic transport modelling and demand forecasting for the upgrade of the NCL between Landsborough and Nambour. The demand forecasts are intended to provide an indication of the likely patronage along the corridor as a result of the proposed upgrade and not for the purposes of a detailed economic assessment.

A key focus of the report is to provide an understanding of the pertinent factors in future demand along the corridor rather than quantitative results. However, a number of scenarios have been modelled.

Full details of the demand forecasting are included in Appendix F.

A number of demand forecasting tools were available for the purposes of this study. These ranged from spreadsheet models (created specifically for the study) to more complex transport models. Given the timeframes and need for consistency with previous planning work undertaken in the region, it was decided, in consultation with the Department of Transport and Main Roads, to base the current Landsborough to Nambour forecasting task on previous sketch transport modelling work undertaken for the Department of Transport and Main Roads in the region.

From the documentation supplied, the transport model for the Sunshine Coast region has not been rigorously validated against base conditions, but was deemed a sufficient tool for forecasting demand for Landsborough to Nambour at this stage of project feasibility.

All assumptions made by Arup in using this model have been agreed with the Department of Transport and Main Roads and TransLink to ensure they were satisfied that the approach taken does not bias the results.

The model deals with public transport by assigning a hierarchy to 'corridors'. It identifies primary corridors, such as the NCL and CAMCOS, and secondary corridors, such as bus routes between the coastal and inland townships. Assumptions such as frequency and speed are applied network wide based on this hierarchy.

Table 7.2.4a outlines the scenario modelled as part of the demand forecasting review.

Table 7.2.4a: Scenarios modelled

Scenario Number	Year	Demographics	PT Network
1	2026	High	Without Rail Upgrade
2	2026	High	With Rail Upgrade
3	2051	High	Without Rail Upgrade
4	2051	High	With Rail Upgrade
5	2051	High Access	Without Rail Upgrade
6	2051	High Access	With Rail Upgrade
7*	2026	High	With Rail Upgrade
8*	2051	High	With Rail Upgrade
9*	2051	High Access	With Rail Upgrade

** Sensitivity modelling undertaken with updated fare structure*

Table 7.2.4b outlines the Public Transport (PT) frequencies and speeds modelled in each scenario. For the purposes of the modelling, it has been assumed that the average speed for the existing alignment is 60 km/hr (in reality it is closer to 50km/hr) and the proposed alignment is taken to be 90km/hr, as the operational analysis undertaken by Systemwide, outlined in **Section 7.5**, highlights that speeds of between 90 and 130 km/h are likely between stations.

Table 7.2.4b: Scenarios modelled

Scenario	PT Frequency (Peak / Off-Peak) (min)			Speed (km/hr)		
	Landsborough to Nambour	Primary Corridor	Secondary Corridor	Landsborough to Nambour	Primary Corridor	Secondary Corridor
1	30/60	15/30	15/30	60	80	60
2	15/30	15/30	15/30	90	80	60
3	30/60	15/30	15/30	60	80	60
4	15/30	15/30	15/30	90	80	60
5	10/20	10/20	15/30	60	80	60
6	10/20	10/20	15/30	90	80	60

The frequency assumptions for the 2051 high access modelling scenario have been assumed at 10 minute peak and 20 minute off-peak frequencies for the NCL and also for the Primary PT corridors. This has been changed from the five minute peak and 10 minute off-peak frequencies that were supplied as it was thought to be unrealistic and not allow for other uses of the corridor. The secondary corridors operating parameters have been retained as per the supplied model.

Table 7.2.4c shows the total patronage numbers for the boarding and alighting at each of the station on the Landsborough to Nambour corridor. This has been undertaken for a 24 hour period.

Table 7.2.4c: Boardings/alightings at Landsborough to Nambour Stations

Station	Boarding/ Alighting	2005 (24H)	2026 (24H)			2051 (24H)			2051 High Access (24H)		
			S1	S2	S7*	S3	S4	S8*	S5	S6	S9*
Nambour	Boarding	4,000	6,800	7,300	7,300	8,600	9,200	9,000	28,700	32,800	30,800
Nambour	Alighting	4,000	6,900	7,400	7,300	8,600	9,200	9,000	26,100	30,200	28,100
Woombye	Boarding	100	300	300	300	400	400	400	700	700	700
Woombye	Alighting	100	200	200	200	300	300	300	700	700	700
Palmwoods	Boarding	400	700	700	700	800	800	800	1,600	1,400	1,300
Palmwoods	Alighting	400	600	600	600	700	700	700	1,600	1,400	1,400
Eudlo	Boarding	100	100	100	100	100	100	100	500	500	400
Eudlo	Alighting	100	100	100	100	200	200	200	400	500	400
Mooloolah	Boarding	0	100	100	100	100	100	100	500	500	500
Mooloolah	Alighting	0	100	100	100	100	100	100	600	600	600
Landsborough	Boarding	8,400	11,300	11,800	11,700	13,300	13,900	13,800	14,200	18,700	17,600
Landsborough	Alighting	8,200	11,500	11,900	11,900	13,400	13,900	13,900	14,200	18,800	17,500

S1 to S9 refer to the modelled scenarios 1 through 9, listed in Table 7.2.4a

** Changed Fare File Sensitivity Models*

Source: Model supplied by Department of Transport and Main Roads

The key findings from the high level review of the sketch transport model include the following:

- Patronage is likely to increase by approximately 5%-10% as a result of the Landsborough to Nambour upgrade with further significant increases possible if intensification and greater levels of public transport service are provided in combination with road network strategies.
- Nambour station appears to benefit most of the stations along the corridor from higher service frequency and development intensification.
- Long distance (to Brisbane) home based work trips are currently a significant proportion of the travel along the rail line. Forecast modelling indicates this proportion is likely to reduce, implying people with have shorter journeys to work, however further investigation is required.
- Telecommunications companies are currently targeting these long distance trips for use of mobile devices (internet and mobile telephones). Should take up of these services be significant, it is reasonable to assume that the 'attractiveness' of using rail for long distance commuter trips will remain strong.

For more information on the demand forecasting modelling, see **Appendix F**.

7.2.6 Assumptions and limitations

The most recent available versions of datasets and aerial photography have been used for this assessment; and the information presented in this chapter represents a 'point in time' assessment.

Existing traffic survey data was sourced from SCRC and the Department of Transport and Main Roads. Existing road network modelling data was also sourced from SCRC officers. The assumptions and assessments in this chapter rely on this information.

Assumptions and limitations associated with demand forecasting and rail operational analysis are listed in **Section 7.5**.

Chainages for both the existing and proposed railway are quoted in this chapter. Existing chainages are derived from the Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007). Chainages for the project have been determined during the preliminary design process.

Peak hours assumed for this corridor take into account the travel time between the project area and Central station. Therefore for this project, the morning peak extends from 6.00 am to 9.00 am, and the evening peak 3.00 pm to 6.00 pm.

7.2.7 Impact significance

The impact of the project on each aspect of transport considered has been described, and mitigation or management measures are defined. Where there is a residual impact (i.e. an impact remains after the mitigation or management strategies have been applied) the significance of the impact is assigned, in accordance with the approach outlined in **Table 7.2.6**.

Table 7.2.6: Method for assessing impacts for purpose of transport chapter

Significance	Criteria
High Adverse	Permanent road closures causing loss of access with resulting detrimental impacts to the regional road network
	Permanent loss of public transport service in the community
	Permanent loss of pedestrian and cycling network in the project area
	Permanent road closures
	Permanent loss of access to one or more properties
Moderate Adverse	Relocation of the railway station away from the township
	Infrequent, inefficient and ineffective public transport service
	Long-term closure of some roads and long-term impediments to local or regional access
	Relocation of roads affected by the project
	Adverse impact on the pedestrian and cycling network
	Adverse impact on the road network
	Adverse impact on the public transport network

Table 7.2.6: continued

Significance	Criteria
Low Adverse	Impact recognisable but acceptable
	Localised and limited change to the road, rail, pedestrian and cycle network
	Temporary disruption and alteration of public transport routes and timetables
	Temporary access alterations of roads/footpaths/cycle paths during construction
	Temporary rail and bus service alteration during construction
	Temporary and short term disruption to traffic on some roads during construction
Negligible	Minimal change
	Very little change in the current transport infrastructure situation
	Momentary disruption to traffic on some roads during construction
Beneficial	Impact beneficial
	Noticeable improvements to the operation of public transport services
	Improved access throughout the local area (vehicle, pedestrian, cyclists, others)
	Improved road network
	Improved access to public transport, including local and regional connections
	Noticeable improvements to the project area's traffic

7.3 Description of existing conditions

7.3.1 The existing rail corridor and infrastructure

The existing NCL between Landsborough and Nambour is approximately 22.3 km long. It passes through two tunnels, one to the south of Mooloolah Station (at Rose Road) and one to the south of Eudlo Station at The Pinch Lane. These are shown on **Figure 7.3a**.

Stations

There are six stations in the project area:

- Landsborough
- Mooloolah
- Eudlo
- Palmwoods
- Woombye
- Nambour.

Landsborough Station has recently undergone an upgrade, and has ramp and lift access to platforms.

Mooloolah, Eudlo, Palmwoods and Woombye stations are generally not fully compliant with disabled access requirements, lacking platform tactile markers, lifts, or low ticket counters. These stations have single platforms only making crossing of stopping passenger trains a complex manoeuvre requiring reversing of one train. Mooloolah, Palmwoods and Woombye stations have platforms that can accommodate three car trains, with Eudlo only able to accommodate one car at the platform. **Table 7.3.1a** describes some of the existing station characteristics.

Figure7.3a: Road Network with Existing Rail Infrastructure

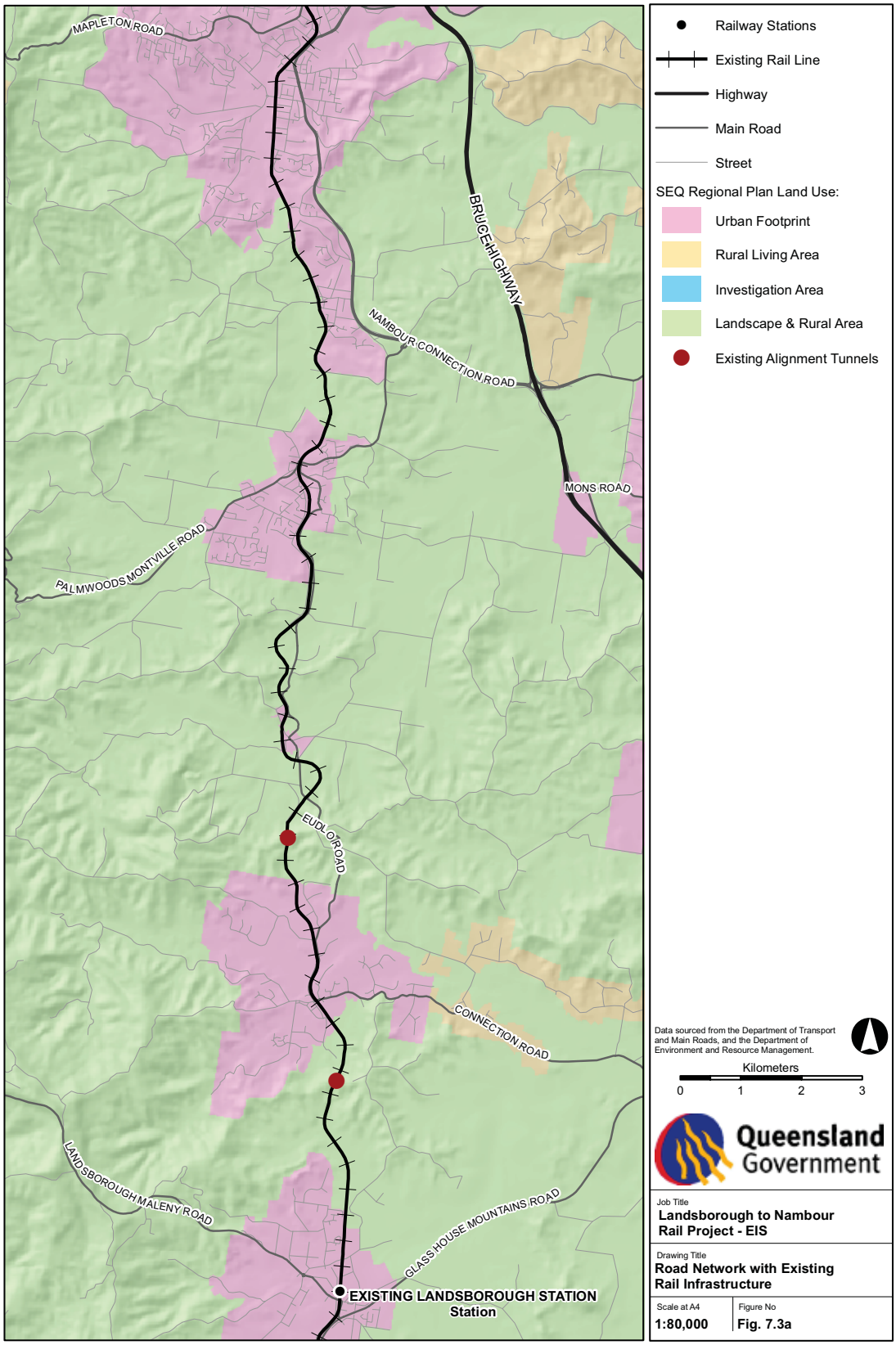


Table 7.3.1a Station characteristics

	Platforms	Platform Length	Car Parking Spaces	Disabled Access to Platform	Staffed/ Unstaffed	Bus Access	Phone	Toilets	Help Point	Bike Lockers	Camera
Landsborough	2 – east and west	150 m 6 railcar length	76 – partially sealed	Lifts	Staffed (limited hours)	Bus access to station building. Turn around facilities.	✓	✓	✓	✓	×
Mooloolah	1- east	80 m 3 railcar lengths	20 –sealed.	Ramps (assisted access)	Unstaffed	Bus access via station car park, north of platform.	✓	×	×	×	×
Eudlo	1- east	30 m 1 railcar length	20 - sealed	Ramps (assisted access)	Unstaffed	Bus stop on Rosebed street, in close proximity to the station.	✓	×	×	×	×
Palmwoods	1- east	100 m 3 railcar + 1st door of 4th	20 – sealed	Ramps (assisted access)	Staffed (limited hours)	Bus stop on Main Street, in close proximity to the station	✓	✓	×	×	×
Woombye	1- east	100 m 3 railcar + 1st door of 4th	20 sealed – plus significant areas of unsealed, informal areas nearby used for parking	Ramps (assisted access)	Unstaffed	Bus access via station car park	✓	✓	×	×	×
Nambour	2- east and dock road (stubb platform)	Dock road- 147 m Main face- 300 m Full 6 railcar length	80- sealed	Lifts (also Accessible toilet)	Staffed (24 hours)	Major bus interchange adjacent to platforms (on eastern side)	✓	✓	×	×	✓

Open level crossings

There are three open level crossings (OLCs), one occupational level crossing, ten private crossings for use by QR Limited only and two pedestrian crossings (at Palmwoods and Woombye) in the project area. OLCs have various operational and safety issues which include potential conflicts with pedestrians, cyclists and motor vehicles. Traffic issues are also associated with open level crossings, particularly where they occur within a town centre and adjacent to a station and associated passing loops. **Table 7.3.1b** describes the three open level crossings within the project area.

Table 7.3.1b: Open level crossings

Location	Road	Existing Railway Chainage*	Crossing Control	Number of Tracks
North of Landsborough	Gympie Street North	83,035 m	Flashing Lights and boom gates	Two tracks, one of which is currently a passing loop which will become a running track upon completion of the Beerburrum to Landsborough Rail Upgrade
Mooloolah	Mooloolah Connection Road/ Bray Road	87,613 m	Flashing Lights and boom gates	Two tracks, one of which is a passing loop
Palmwoods	Palmwoods Station Entrance to car park	97,481 m	None	One track, on passing loop

**The chainages listed in* Table 7.3.1b *relate to the existing alignment chainages from the Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007)*

An assessment of the OLCs has been undertaken in VISSIM, a transport micro-simulation software program, in order to analyse the current and future traffic delays associated with the operation of the OLCs. **Table 7.3.1c** shows the modelled train frequencies for the existing scenario based on data collected in April 2005, supplied by QR Limited.

Table 7.3.1c: Service times during peak hour (existing)

	Southbound	Northbound
AM Peak	8:27	8:57
	8:43	
PM Peak	17:55	17:32
	18:00	17:56
	18:19	18:02

Source: QR Limited

It was assumed that the duration of closure of the railway crossing would be approximately 60 seconds for southbound trains and 100 seconds for northbound trains. All trains were assumed to stop at the Mooloolah station for the purposes of this analysis.

Only current traffic volumes are available from the Deparment of Transport and Main Roads for the Mooloolah OLC, which are illustrated in **Figure 7.6c**, hence only this OLC was analysed for current conditions.

The VISSIM model for each scenario was run three times with different seed values. **Table 7.3.1d** shows the results of the analysis which includes average delay, maximum delay and maximum queue length. Screenshots of the VISSIM model taken for each scenario run are in **Appendix F**.

Table 7.3.1d: Mooloolah OLC analysis results (2005 traffic volumes)

		AM			PM		
Approach	**Direction**	**Average Delay (s)**	**Max Delay (s)**	**Queue (m)**	**Average Delay (s)**	**Max Delay (s)**	**Queue (m)**
Bray Road	Eastbound	1	95	25	6	158	74
Neill Road	Southbound	12	120	38	21	197	52
Mooloolah Connection Road	Westbound	3	98	112	12	162	143

The queuing and delays modelled in VISSIM are deemed to be representative of the current situation based on on-site observations.

The Palmwoods OLC has not been assessed as it is located in the station car park and the rail line is a passing loop used infrequently by trains to allow faster services through on the main line, hence there is very limited demand for either the rail or the road.

Rail and road bridges

Rail bridges were typically initially constructed to cross waterways, floodplains or gullies. In the project area, several roads have been developed, following the path of least resistance or constraint. Where these roads are associated with a watercourse of floodway, they can be subject to periodic inundation. The alignments, vehicle clearances and sight distances at these crossing points under the railway bridges are less than recommended.

There are several road bridges over the existing railway, generally where the rail is in steep cutting or in tunnel. Several of these road bridges are single lane and of poor construction, with axle load constraints.

Table 7.3.1e below shows the existing rail and road bridges in the project area.

Table 7.3.1e: Bridge locations and descriptions

Location	Rail	Road/ River	Existing Railway Chainage*	Road Details
South of Mooloolah	Over	South Mooloolah River	86.2 km	-
South of Mooloolah	Over	South Mooloolah River	86.350 km	-
North of Mooloolah	Over	Mooloolah River and Mooloolah-Eudlo Road (adjacent to intersection with Neill Road)	87.350 km	Road Clearance 3.2 m
South of Eudlo	Under	Mooloolah-Eudlo Road	90.360 km	Single Lane
South of Eudlo	Under	Mooloolah-Eudlo Road	91.280 km	Single Lane
South of Eudlo	Over	Acrobat Creek and Highlands Road	91.580 km	Road clearance 3.1 m
Eudlo	Over	Eudlo School Road and Eudlo Creek	91.930 km	Road clearance 2.4 m
Palmwoods	Over	Woombye – Palmwoods Road	96.880 km	Road clearance 3.9 m
Palmwoods	Over	Creek	96.880 km	-
Woombye	Over	Back Woombye Road and Paynter Creek	100.95 km	Road clearance 2.9 m
North of Woombye	Under	Blackall Range Road	101.0 km	Single Lane
Nambour	Over	Arundell Ave	103.3 km	Road clearance 4.6 m

The chainages listed in* Table **7.3.1e *relate to the existing alignment chainages from the Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007)*

It is noted that all of the road clearances noted do not meet the minimum clearance requirement for roads as outlined in the Road Planning and Design Manual (former Department of Main Roads). For new roads or road upgrades, the absolute minimum vertical clearance (depending on road use) ranges from 4.8 metres to 6.0 metres. The minimum clearance standard established for this project is 5.5 metres, as advised by the Department of Transport and Main Roads.

Passing loops

Passing loops are located at each station in the project area. Passing loops are provided to allow express services, or services travelling in opposite directions the opportunity to pass. When passing loops are located at stations and in association with an OLC, congestion can be generated due to the need for trains to wait in the passing loops to allow other faster, through running trains to pass. The boom gates would close for the first service to pass through, and remain closed until the second service had cleared the passing loop (if the passing loop was located at the OLC, such as in Mooloolah). Road traffic delays of up to seven minutes have been observed in Mooloolah.

Additionally, the track configuration and platform arrangements mean that some north bound passenger trains enter the passing loop to allow southbound stopping passenger services to pass. The northbound train then backtracks to the south, re-enters the main track and accesses the platform, which involves service delays and longer travel times.

Passing loop details are listed in **Table 7.3.1f**.

Table 7.3.1f: Passing loops summary

Station/ Passing Loop Location	Details	Length of Passing Loop
Landsborough	Passing loop with turnout loop off passing loop- adjacent to station on eastern side	720.1 m
Mooloolah	Passing loop	727.0 m
Eudlo	Passing loop	952.9 m
Palmwoods	Two passing loops (either side of through track)	686.0 m 679.9 m
Woombye	Passing loop	716.1 m
Nambour	Passing loop and CityTrain loop (either side of through track) Siding off passing loop	782.3

7.3.2 Citytrain services

Service frequency[1]

The timetables in tables **Table 7.3.2a - Table 7.3.2j** show the frequency of the train services and the train services supplemented by bus services between Brisbane and Nambour.

1 based on a review of timetable information (October 2008, checked against April 09)

Table 7.3.2a: Citytrain services only, Monday to Friday (Brisbane to Nambour)

Central Station Departing	5.50 am	8.00 am	8.43 am	11.02 am	12.46 am	4.03pm	4.34 pm	5.16 pm	5.44 pm	6.07 pm	7.27 pm	9.28 pm	11.02 pm
Landsborough	7.14 am	9.23 am	10.16 am	12.24 am	2.04 pm	5.25 pm	5.59 pm	6.35 pm	7.02 pm	7.32 pm	8.45 pm	10.46 pm	12.20 pm
Nambour	7.53 am	9.49 am	10.47 am	12.49 am	2.36 pm	5.50 pm	6.27 pm	7.07 pm	7.30 pm	7.58 pm	9.10 pm	11.11 pm	12.45 pm

Table 7.3.2b: Citytrain services only, Saturday (Brisbane to Nambour)

Central Station Departing	6.29 am	8.15 am	11.15 am	5.45 pm	846 pm
Landsborough	7.59 am	9.33 am	12.31 pm	7.03 pm	10.10 pm
Nambour	8.24 am	9.57 am	12.55 pm	7.29 pm	10.39 pm

Table 7.3.2c: Citytrain services only, Sunday (Brisbane to Nambour)

Central Station Departing	8.00 am	9.45 am	11.15 am	5.43 pm
Landsborough	9.19 am	11.09 am	12.38 pm	7.04 pm
Nambour	9.34 am	11.37 am	1.09 pm	7.30 pm

Table 7.3.2d: Citytrain services only, Monday to Friday (Nambour to Brisbane)

Nambour	4.35 am	5.26 am	6.00 am	6.27 am	7.03 am	8.23 am	10.04 am	11.11 am	2.10 pm	3.08 pm	4.57 pm	6.37 pm	8.15 pm (F)
Landsborough	5.00 am	5.51 am	6.25 am	6.54 am	7.30 am	8.50 am	10.29 am	11.36 am	2.37 pm	3.34 pm	5.24 pm	7.19 pm	8.41 pm
Central Station	6.19 am	7.09 am	7.42 am	8.16 am	8.48 am	11.03 am	11.49 am	1.33 pm	3.42 pm	4.41 pm	6.55 pm	8.39 pm	9.51 pm

Table 7.3.2e: Citytrain services only, Saturday (Nambour to Brisbane)

Nambour	5.56 am	6.56 am	10.25 am	8.20 pm	8.49 pm	10.19 pm
Landsborough	6.21 am	7.21 am	10.50 am	8.46 pm	9.16 pm	10.46 pm
Central Station	7.40 am	8.40 am	12.09 pm	10.09 pm	10.39 pm	12.09 am

Table 7.3.2f: Citytrain services only, Sunday (Nambour to Brisbane)

Nambour	7.01 am	10.20 am	4.51 pm
Landsborough	7.26 am	10.46 am	5.17 pm
Central Station	8.45 am	12.08 pm	6.40 pm

Table 7.3.2g: Citytrain services and Railbus (Nambour to Landsborough express), Monday to Friday (Brisbane to Nambour)

Central Station	7.11 am	8.08 am	9.07 am	11.07 am	-
Landsborough	9.04 am	10.07 am	10.55 am	12.55 pm	4.12 pm
Nambour	9.30 am	10.37 am	11.22 am	1.22 pm	4.33 pm

Table 7.3.2h: Citytrain services and railbus (Nambour to Landsborough express), Monday to Friday (Nambour to Brisbane)

Nambour	7.15 am	9.40 am	10.45 am	12.00 noon	1.35 pm
Landsborough	7.40 am	10.07 am	11.09 am	12.27 pm	2.04 pm
Central Station	9.33 am	-	1.03 pm	2.33 pm	4.03 pm

Table 7.3.2i: Citytrain services and Railbus (All Stops), Monday to Friday (Brisbane to Nambour)

Central Station	-	6.22 am	10.07 am	1.07 pm	2.07 pm	3.07 pm	5.42 pm
Landsborough	6.30 am	8.10 am	11.57 am	3.07 pm	3.57 pm	5.02 pm	7.30 pm
Nambour	7.15 am	8.55 am	12.42 pm	3.52 pm	4.42 pm	5.47 pm	-

Table 7.3.2j: Citytrain services and railbus (All Stops), Monday to Friday (Nambour to Brisbane)

Nambour	7.45 am	9.00 am	12.55 pm	2.20 pm	4.21 pm	5.30 pm	6.00 pm
Landsborough	8.28 am	9.44 am	1.37 pm	3.03 pm	5.04 pm	6.14 pm	6.44 pm
Central Station	10.33 am	11.33 am	3.32 pm	5.04 pm	7.01 pm	8.02 pm	8.32 pm

There are 12 weekday rail services travelling south from Nambour, two of which originate at Gympie North and Cooroy, respectively. An additional evening service runs on Fridays at 8.15 pm. The majority of these services are through running from Nambour to Central, however two services require passengers to change trains at Caboolture station. These services are supplemented by 12 Railbus services in each direction on weekdays. Of the supplementary Railbus services, five of these run express from Nambour to Landsborough. Service frequency (between 4.35 am and 6.37 pm Monday to Thursday), on this section is:

- CityTrain services only: approximately half hourly during the morning peak, then seven trains in 10 hours averaging a rate of one service every 85 minutes
- CityTrain and Railbus services (Nambour to Landsborough express): five between 7.15am and 1.35 pm averaging a rate of one every 76 minutes
- CityTrain and Railbus services (all stops between Nambour and Landsborough): two between 7.45 am and 9.00 am, then five services at a rate of almost one an hour between 12.55 pm and 6.00 pm

Between 6.00 am and 9.00 am, there are four CityTrain Services, with an average service frequency of 35 minutes. When considering the supplementary Railbus services (of which one is an express Nambour to Landsborough service), there are seven southbound services at an average frequency of 29 minutes between 6.00 am and 9.00 am. Currently, other parts of the suburban rail network in SEQ experience on average half-hourly off peak services, and more frequent services during the peak. For comparative purposes, the southbound Shorncliffe CityTrain service frequency between 6.00 am and 9.00 am is 20 minutes, with eight services travelling in this period.

There are 13 northbound weekday services running to Nambour. Two of these services continue north, to Cooroy and Gympie North respectively. The majority of these services are through running from central, however two services require passengers to change trains at Caboolture station. These services are supplemented by 11 Railbus services on weekdays (one of which starts at Caboolture with no prior connecting northbound rail service). Of the 11 supplementary Railbus services, five of these run express from Landsborough to Nambour. Service frequency (between 5.33 am and 11.02 pm Monday to Friday), on this section is:

- CityTrain services only: five services between 5.50 am and 12.46 pm approximately one every 86 minutes, then one almost every 30 minutes between 4.03 m and 6.07 pm followed by three services between 7.27 pm and 11.02 pm
- CityTrain and Railbus services (Landsborough to Nambour express, times quoted from Landsborough): approximately one an hour from 9.04 am to 10.55 am, followed by one at 12.55 pm and one at 4.12 pm
- CityTrain and Railbus services (all stops between Landsborough and Nambour, times quoted from Landsborough): five services between 8.28 am and 5.04 pm averaging a rate of one service every 102 minutes, followed by a 30 minute frequency between 6.14 pm and 6.44 pm

Between 3.00 pm and 6.00 pm, there are four CityTrain Services running from Central to Nambour, (with one connecting to a Railbus service at Caboolture) with an average service frequency of 42 minutes. There are two extra Railbus services running during this period, though these connect up with rail services that depart earlier than 3.00 pm. Currently, other parts of the suburban rail network in SEQ experience on average half-hourly off peak services, and more frequent services during the peak. For comparative purposes, the northbound Shorncliffe CityTrain service frequency between 3.00 pm and 6.00pm is 20 minutes, again with eight services travelling in this period.

The operational pressures and corridor deficiencies discussed in **Section 1.3.1** limits the capacity of the Landsborough to Nambour section of the NCL, and thus impacts on achievable service frequencies.

Travel time

Landsborough to Nambour

According to current timetables, travel times between Landsborough and Nambour for CityTrain services range from 24 to 45 minutes, for a distance of 22 km. This variation in travel time can be attributed to some services waiting in passing loops for express services or services travelling in the opposite direction to pass. Additionally, services travelling north in the morning peak have been observed to enter the Mooloolah passing loop to allow another service to pass, then turn back to the south, to re-enter the main line and access the platform (located on the east) at Mooloolah.

Operational analysis undertaken by Systemwide Pty Ltd for the Landsborough to Nambour project using the Train Performance Calculator (TPC) modelling suite (including 30 second dwell times where services stop) shows that modelled running times between Landsborough and Nambour are 26 minutes 42 seconds (down) and 27 minutes (up). The Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007) lists the running time between Landsborough and Nambour as 23 minutes for both up and down. It is important to note that the running times in the Brisbane Metropolitan System Information Pack, QR Limited Network Access do not cater for acceleration and deceleration of trains. The TPC modelling does make this allowance.

By comparison, using the RACQ trip planner, travel times by car between Landsborough and Nambour are estimated at:

- Via Steve Irwin Way, the Bruce Highway, and Nambour Connection Road: approximately 30 km, at 30 minutes. This is the less direct route, but quicker than the alternative road option due to the higher speeds road environments.

- Via the railway townships between Landsborough and Nambour: approximately 27 km, but at 37 minutes travel time. This is the more direct route, but slower than the road option, due to the use of roads with a lower speed environment.

Caboolture to Landsborough

Current timetables for services between Caboolture and Landsborough show travel times are on average 30 minutes, travelling approximately 32 km. By comparison, using the RACQ trip planner, travel times by car between Caboolture and Nambour are estimated at:

- Via Old Gympie Road and Steve Irwin Way: approximately 32 minutes.
- This trip estimation does not account for traffic congestion, travel at peak time, or parking.

Caboolture to Nambour

Current timetables for services between Caboolture and Nambour show travel times are on average one hour, travelling approximately 54 km. By comparison, using the RACQ trip planner, travel times by car between Caboolture and Nambour are estimated at:

- Via King Street, the Bruce Highway, and Nambour Connection Road: approximately 62 km, at 54 minutes. This is the less direct route, but quicker than the alternative road option due to the higher speed road environments travelled.
- Via the railway townships between Caboolture and Nambour: approximately 58 km, but at one hour 15 minutes travel time. This is the more direct route, but slower than the road option, due to the use of roads with a lower speed environment.

This trip estimation does not account for traffic congestion, travel at peak time, or parking.

Central to Nambour

Table 7.3.2k provides an indication of the average, minimum and maximum travel times between Nambour and Central Station, based on analysis of the current QR Limited timetable. This also includes connecting Railbus services. On a weekday, average travel times northbound and southbound are approximately one hour 55 minutes and one hour 58 minutes respectively. The longest travel time from Nambour to Central is two hours 40 minutes while the shortest is one hour 42 minutes. Travelling north from Central to Nambour, the longest travel time is two hour 29 minutes while the shortest is one hour 43 minutes.

During weekends, the average travel times northbound and southbound are approximately one hour 58 minutes and two hours respectively. The longest travel time southbound is two hours 26 minutes, while the shortest is one hour 44 minutes. The longest travel time northbound is three hours 19 minutes, while the shortest is one hour 40 minutes.

Table 7.3.2k: Citytrain travel time on weekdays and weekends (Nambour – Central)

Direction	Travel Time (minutes)					
	Weekday			Weekend (Saturday and Sunday combined)		
	Average	Minimum	Maximum	Average	Minimum	Maximum
Northbound (Central to Nambour)	1 hour 55 minutes	1 hour 43 minutes	2 hours 29 minutes	1 hour 58 minutes	1 hour 40 minutes	2 hours 26 minutes
Southbound (Nambour to Central)	1 hour 58 minutes	11 hour 42 minutes	2 hours 40 minutes	2 hours	1 hour 44 minutes	2 hours 26 minutes

For comparative purposes, the actual travel time between Brisbane (Central Station) and Nambour Station are as follows:

- Express service, Central to Caboolture (stopping only at Fortitude Valley, Bowen Hills, Northgate and Petrie), and all stops from Caboolture to Nambour: one hour 50 minutes
- All stops service Central to Nambour: two hours 12 minutes (including 13 minute wait at Caboolture station)
- Drive, Turbot Street (chosen to represent Central Station) to Mill Street, Nambour: one hour 44 minutes. This trip estimation does not account for traffic congestion, travel at peak time, or parking.

7.3.3 Railbus services

Railbus services (Route 649) are provided to supplement the existing rail services between Nambour and Caboolture railway stations, and were introduced in 1999. The Railbus runs on weekdays with headways (time between services) varying between 15 and 151 minutes. Each journey from Caboolture to Nambour generally takes more than one hour of travel time as it services railway stations and towns between Caboolture and Nambour as well as Australia Zoo. By comparison, current timetables for rail services between Caboolture and Nambour show travel times are on average one hour, travelling approximately 54 km. Travel time by car has been estimated between 54 minutes to one hour 15 minutes (subject to the route taken).

By comparison, using the RACQ trip planner, travel times by car between Caboolture and Nambour are estimated at:

- via King Street, the Bruce Highway, and Nambour Connection Road: approximately 62 km, at 54 minutes

This is the less direct route, but quicker than the alternative road option due to the higher speed road environments travelled.

- via the railway townships between Caboolture and Nambour: approximately 58 km, but at one hour 15 minutes travel time

This is the more direct route, but slower than the road option, due to the use of roads with a lower speed environment.

This trip estimation does not account for traffic congestion, travel at peak time, or parking.

To travel by an all stops Railbus between Landsborough and Nambour takes approximately 45 minutes, 20 minutes longer than to travel by rail. Travel times between the express Railbus service (those with no stops between Landsborough and Nambour) take between 27 and 35 mins, which is almost comparable with the rail service travel time, but does not benefit passengers from Mooloolah, Eudlo, Palmwoods or Woombye.

By comparison, using the RACQ trip planner, travel times by car between Landsborough and Nambour are estimated at:

- via Steve Irwin Way, the Bruce Highway, and Nambour Connection Road: approximately 30 km, at 30 minutes.

This is the less direct route, but quicker than the alternative road option due to the higher speeds road environments.

- via the railway townships between Landsborough and Nambour: approx 27 km, but at 37 minutes travel time.

This is the more direct route, but slower than the road option, due to the use of roads with a lower speed environment.

This trip estimation does not account for traffic congestion, travel at peak time, or parking.

Up to half of the scheduled Railbus services run express between Landsborough and Nambour, and therefore do not benefit passengers in Woombye, Palmwoods, Eudlo and Mooloolah.

The combined Railbus service between Brisbane and Nambour requires a transfer at Caboolture with passengers completing the journey by bus between Caboolture and Nambour. The total time of this service between Brisbane (Central) and Nambour is on average two hours and 15 minutes (express Railbus) or two hours and 45 minutes (all stop Railbus). By comparison, the direct rail trip (Central Station to Nambour Station) is estimated at one hour 50 minutes. To drive from the City (Turbot Street near Central Station) to Nambour (Mill Street near Nambour Station) would take one hour 44 minutes.

7.3.4 Long distance passenger services

The following longer distance passenger services utilise this section of the NCL:

- Sunlander – between Brisbane and Townsville/Cairns
- electric TiltTrains – between Brisbane and Bundaberg/ Rockhampton
- diesel TiltTrain – between Brisbane and Cairns
- Spirit of the Outback – between Brisbane and Longreach

The electric TiltTrain service to Bundaberg and Rockhampton stops at Nambour and Landsborough. The diesel TiltTrain service between Brisbane and Cairns stops only at Nambour. The Sunlander and Spirit of the Outback stop at Nambour. **Table 7.3.4** shows the weekly frequency of long distance passenger services using timetable information from QR Limited for 2008-2009.

Table 7.3.4: Long distance passenger services

TravelTrain Service	Frequency (weekly)	
	Northbound	Southbound
Sunlander	3	3
TiltTrains	15	15
Spirit of the Outback	2	2
Total services	20	20

7.3.5 Bus services

Bus services in the project area are concentrated in Nambour, with some services provided to Woombye and Landsborough. Limited services (other than the Railbus) are currently provided to Palmwoods, Eudlo and Mooloolah.

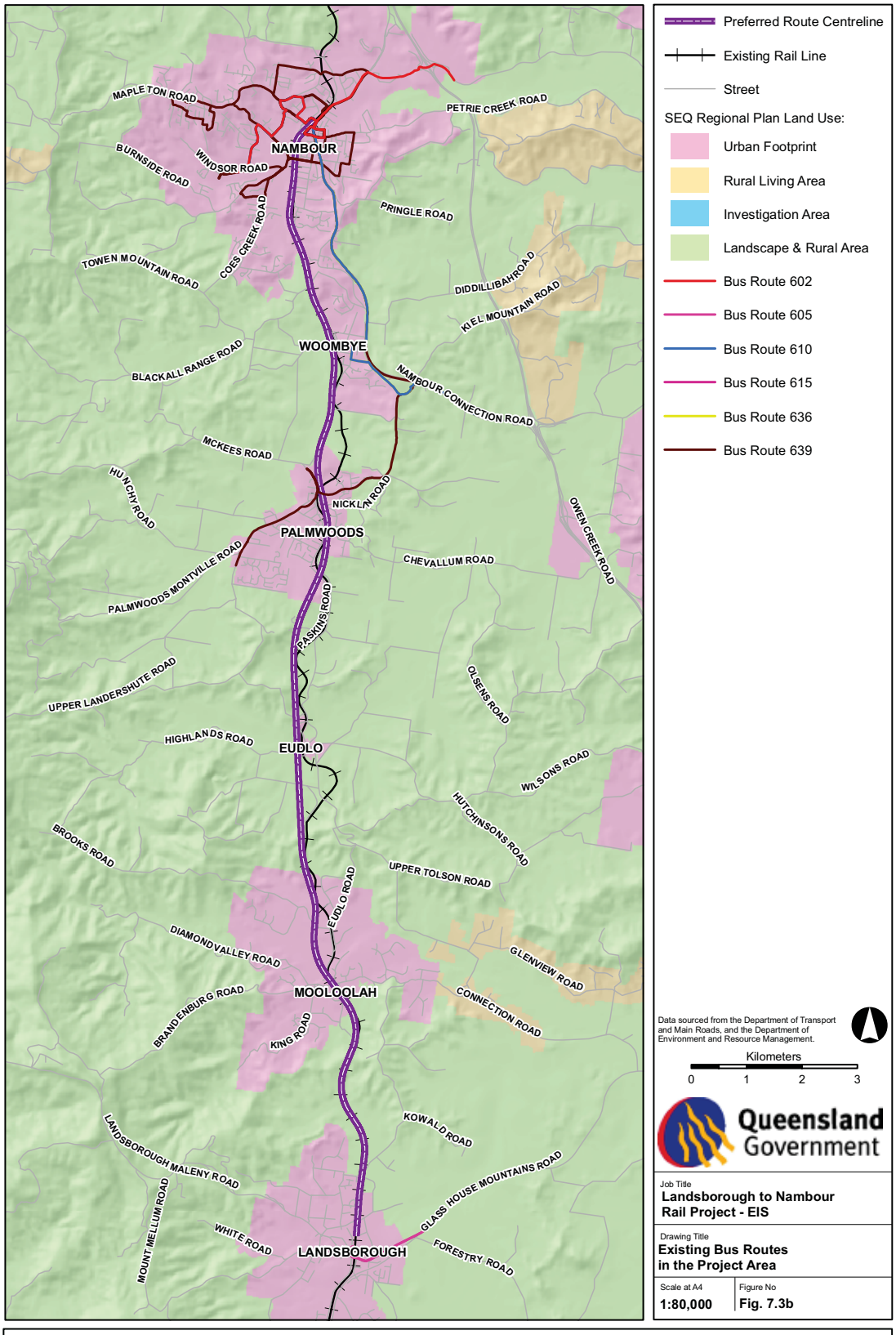
Sunbus and Railbus services operating within the project area are shown in **Table 7.3.5**, while **Figure 7.3b** shows the Sunbus routes in the corridor. Generally, bus services operate on an irregular frequency with headways (i.e. time between services) varying between 30 to 180 minutes.

Table 7.3.5: Bus services within the project area

Route	Description	Towns serviced within the project area	Head way (minutes)	Weekday services	AM 2-hour peak services (7-9am)	PM 2-hour peak services (4-6pm)	Saturday services	Sunday and Public Holiday service
602	Caloundra to Nambour via Maroochydore and Bli Bli	Nambour	60	30	6	4	28	28
605	Kawana to Landsborough	Landsborough	30-180	26	7	5	19	16
610	Nambour to Mooloolaba via Maroochydore	Nambour Woombye	60	29	5	5	26	26
615	Maroochydore to Landsborough	Nambour Landsborough	30-135	27	3	4	19	17
636	Nambour to University of Sunshine Coast	Nambour Woombye	60	24	4	4	0	0
639	Nambour town bus services loop	Nambour Woombye Palmwoods	100-140	6 with limited services at Palmwoods	2	1	0	0
649	Caboolture to Nambour Rail Bus	Nambour Woombye Palmwoods Eudlo Mooloolah Landsborough	15-151	25 with limited services in Woombye, Palmwoods, Eudlo and Mooloolah	6	4	0	0

Source: TransLink Transit Authority Website

Figure 7.3b: Existing Bus Routes in the Project Area



Other bus services operating in the project area include:

- Hinterland Connect (operated by Glass House Country Coaches) provides services between Nambour and Maleny, and Landsborough – Maleny- Montville – Mapleton - Nambour.
- Buslink operates school bus services on the Sunshine Coast. Buslink provides a morning and afternoon school bus service to all railway townships in the project area, connecting with primary and high schools in the project area, and outside the project area (ie Beerwah State High School, schools in the coastal areas).
- Greyhound buses operate a service travelling to Cairns, which stops at Nambour, three times a day in both directions.

There are a number of other private bus operators within the project area; however these do not operate to a regularly scheduled timetable.

7.3.6 Rail freight services

QR Limited and Pacific National are the two operators currently operating freight services on the existing rail corridor. These services are focussed on freight forwarding, sea freighting and livestock. Freight forwarding and sea freighting are quite regular in frequency, while livestock has some seasonal variation. Freight train rollingstock characteristics incorporated into the operational analysis for this project were:

- intermodal (containerised): 622 metres long, 1517 tonnes
- bulk (grain, livestock) 616 metres long, 1321 tonnes.

A typical weekday freight schedule was used to derive the number of daily freight services. **Table 7.3.6a** lists freight services passing through Landsborough station, the time, direction of travel, origin and destination. This does not identify the type of freight service. 21 freight services were identified from the review of the QR Limited Network Access Location Occupancy schedule (Landsborough 19/08/08).

Table 7.3.6a: Freight service origin and destination (19/08/08)

Time	Direction of Travel	Origin	Destination
12.49am	North (down)	Fishermans	Townsville
3.07am	South (up)	Rockhampton	Acacia Ridge
4.18am	North (down)	Clapham	Emerald
6.50am	North (down)	Acacia Ridge	Townsville
7.51am	South (up)	Rockhampton	Fishermans
7.53am	North (down)	Moolabin	Toll North (Townsville)
8.59am	South (up)	Woree	Moolabin
11.28am	South (up)	Mackay	Moolabin
1.09pm	South (up)	Merinda	Normanby
2.18pm	South (up)	Stuart	Dinmore
3.23pm	South (up)	Townsville	Acacia Ridge
3.59pm	North (down)	Moolabin	Mackay
4.52pm	South (up)	Toll North (Townsville)	Moolabin
5.40pm	North (down)	Acacia Ridge	Portsmith
7.31pm	South (up)	Townsville	Acacia Ridge
8.52pm	North (down)	Moolabin	Woree
9.10pm	North (down)	Acacia Ridge	Rockhampton
9.28pm	South (up)	Woree	Moolabin
10.09pm	North (down)	Fishermans	Rockhampton
10.24pm	South (up)	Portsmith	Acacia Ridge
11.40pm	North (down)	Acacia Ridge	Townsville

Source: QR Limited Network Access Location Occupancy schedule- Landsborough 19/08/08

A review of this schedule demonstrates the varied origins and destinations of freight services utilising this section of the NCL. Freight services are generally scheduled in and around existing passenger services.

Investigations undertaken for an earlier phase of the project identified the daily freight frequency shown in **Table 7.3.6b**.

Table 7.3.6b: Typical weekly freight services

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
No. of services	16	21	23	21	22	23	10

Source: Rail Upgrade Study Caboolture to Landsborough

Currently, freight operations through the area are constrained not only due to the substandard vertical and horizontal track geometry, but also due to the short length of passing loops between Caboolture and Landsborough and Landsborough and Palmwoods, as documented in **Table 7.3.1f**.

Freight operations on this section of the corridor are also constrained by operating hours at the various freight handling facilities to the north and south of the project area, and also by constraints on other parts of the rail network. According to a review of the QR Limited Network Access NCL (North and South), passing loops to the north of Nambour range between 680 and 900 metres. This also influences the length of freight trains, scheduling, and frequency of freight services, given that that the NCL is currently a single track between Beerburrum and Cairns (with limited exceptions).

7.3.7 The road network

The project area is located to the west of the Bruce Highway, which consists of four lanes between Caboolture and Cooroy. The Bruce Highway forms part of the National Highway network, and carries approximately 43,600 vehicles per day according to the former Department of Main Roads Traffic and Speed Census 2007 north of the Nambour Connection Road.

The railway townships within the project area are connected to each other and the Bruce Highway by two-lane roads of varying quality, traversing areas of steep terrain and floodplain. Some are characterised by poor pavement quality and poor horizontal and vertical alignment. Several single lane bridges are also present in the project area.

The following State controlled roads are located in the project area:

- Mooloolah Connection Road
- Neill Road to Eudlo Road (Palmwoods – Mooloolah Road)
- Rosebed Street
- Corlis Avenue
- Eudlo Road
- Chevallum Road
- Woombye - Palmwoods Road (Woombye Montville Road)
- Palmwoods - Montville Road (Woombye Montville Road)
- Nambour Connection Road (part of State Route 8).

The existing road network, including local and State controlled roads, is depicted in **Figure 7.3c**.

Mooloolah Connection Road is a major road that provides access from the Bruce Highway to the southern part of the project area. In 2007, according to the former Department of Main Roads Traffic and Speed Census, approximately 4,700 vehicles a day used Mooloolah Connection Road approaching Steve Irwin Way (formerly known as Glass House Mountains Road).

Eudlo Road provides access between Mooloolah and Palmwoods. In 2007, according to the former Department of Main Roads Traffic and Speed Census, approximately 2,300, 1,400 and 1,900 vehicles a day used Eudlo Road approaching Neill Road, Anzac Road and Chevallum Road respectively. Chevallum Road is used as a connection from Palmwoods to the Bruce Highway.

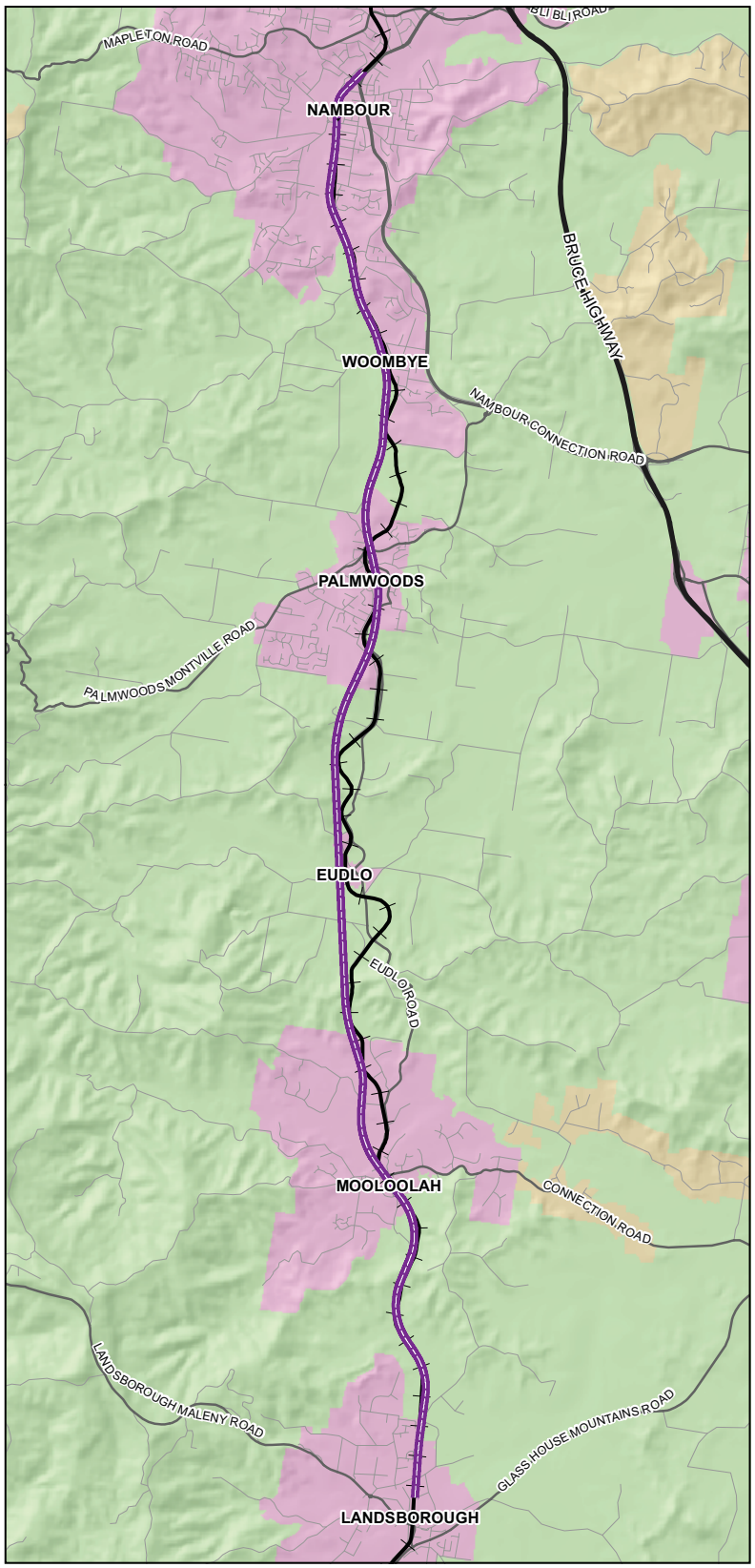
Woombye - Palmwoods Road (Palmwoods – Montville Road) is the major access road to Palmwoods and intersects with Nambour Connection Road at a grade separated interchange.

Nambour Connection Road is a four-lane road connecting to the Bruce Highway north and south of Nambour. It also forms part of State Route 8. At the Bruce Highway, Nambour Connection Road becomes Maroochydore Road and leads directly to Maroochydore.

Blackall Street is the main connection between the Nambour Connection Road and Woombye. The Department of Transport and Main Roads has recently modified the intersection of Blackall Street and Nambour Connection Road, directing right turns from Blackall Street along Pine Grove Road to the Woombye-Palmwoods/Nambour Connection Road grade separated interchange. Left turns from Blackall Street to Nambour Connection road and all movements from Nambour Connection Road to Blackall Street are still permitted.

New traffic lights have recently been installed at the intersection of Nambour Connection Road and Cobbs Road, to the north of Woombye.

Figure 7.3c: Road Network with Preferred Route



Preferred Route Centreline
Existing Rail Line
Highway
Main Road
Street

SEQ Regional Plan Land Use:

Urban Footprint
Rural Living Area
Investigation Area
Landscape & Rural Area

Data sourced from the Department of Transport and Main Roads, and the Department of Environment and Resource Management.

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Queensland Government

Job Title
Landsborough to Nambour Rail Project - EIS

Drawing Title
Road Network with Preferred Route

Scale at A4
1:80,000

Figure No
Fig. 7.3c

7.4 Community feedback relating to transport issues

Throughout the project there has been on-going community consultation. Details of activities and information releases is discussed in **Chapter 1, Section 1.9**. Issues raised to date and considered in both the route identification process and the assessment of the impact of the projects are summarised in **Table 7.4**.

Table 7.4 Issues raised during community consultation

Issues Raised	Response	Section
Reduction in carbon emissions with better public transport provision (particularly rail)	Emission modelling has been undertaken as part of the EIS process.	**Chapter 16, Air quality**
Develop a separate corridor for freight to the east, leaving the existing track for passenger trains only. This would also alleviate congestion at level crossings.	It is not feasible to develop a separate freight corridor, and continue to operate the existing track for passenger services only.	
Concern over Freight traffic and frequency.	Freight projections have been considered in this EIS.	**Chapter 7, Transport** **Chapter 15, Noise**
Concern over train frequency and speed – main concern over why the speed has been set at 160 k/hr, and associated infrastructure and operation costs.	The desirable design speed for the project is 160 km/hr. The average design speed is 120-140km/hr. Train frequency (passenger and freight) is considered in this EIS.	**Chapter 2, Description of the project,** **Chapter 7, Transport** and **Chapter 15, Noise**
Concern about how future recreational trails would be secured and fenced. In particular concerns were raised about access to these areas by motorbikes.	Access to future recreational trails will need to be managed by the responsible authority at the time. Access to the trail will be controlled, at visible locations, and the recreational trails will need to be fenced, in a way that still permits fauna movement.	**Chapter 21, Special management areas**
Suggestion that the old rail corridor is used for recreational trails between the hinterland towns. Provides opportunity to integrate heritage aspects of the towns into a tourism and recreational feature.	The existing rail corridor is recommended for reuse as a recreational trail as a preferred outcome for this project.	**Chapter 21, Special management areas**
Concern over grade separation options presented to the community in Mooloolah. In particular: ▪ Access for disabled persons, horse riders, pedestrians and cyclists ▪ Concern about the design speed of grade separation options for Mooloolah ▪ Concern about geometry, safety and visibility at intersections associated with both grade separation options ▪ Concern about the proposed pedestrian underpass (Option 1) being affected by noise and vehicle emissions ▪ Concern about the visual impact of the proposed overpass (Option 2) ▪ Both retention and grade separation of the current level crossing in Mooloolah were identified as issues for the town. It was suggested that crossing protection technology could be improved and therefore the level crossing could be retained. Concerns about the safety of level crossings were also raised ▪ Concern about moving through traffic away from the town centre ▪ Concern about the additional property impacts of Option 1.	The study team has revisited the options proposed for Mooloolah, and developed an alternative. This proposed grade separation option allows for a staged implementation at such time as risk and traffic congestion considerations determine the need for closure of the OLCs. Therefore preservation of an overpass option to the south utilising Jones Street has been identified for future implementation.	**Chapter 21, Special management areas** **Chapter 7, Transport, Section 7.6.1.2**
Concern about the impact of station access and car parking on the area known as Federation Walk.	This area will be affected by the provision of station access. Opportunities to provide other areas for rehabilitation, along with sensitive design of station access (subject to CPTED principles) have been identified.	**Chapter 21, Special management areas**
The road network in Palmwoods is dangerous for pedestrian access, and severely constrained by the existing low height rail bridge.	The project provides a realigned railway to the east of this constraint, and provides the opportunity for this matter to be addressed by the relevant authorities.	**Chapter 21, Special management areas**

7.5 Travel time and capacity analysis

The rail operational analysis undertaken by Systemwide Pty Ltd has projected service levels for the double track railway. It has also analysed existing and projected travel times, as well as energy consumption of the project, compared to the existing single track.

7.5.1 Assumptions

Systemwide's analysis makes the following assumptions:

- The scope of the analysis has been extended to Caboolture (i.e. Caboolture to Nambour), to allow for consideration of CAMCOS services from Beerwah, as this will influence timetabling and therefore capacity to the south of Landsborough. It is assumed CAMCOS is constructed before any.
- The analysis assumes that the dual track will be in operation between Landsborough and Nambour by 2026.
- There will be a freight curfew with no peak-direction services in the AM and PM peak 2 hours.
- Stabling is assumed to be located to the north of Nambour and not in the project area.
- No overnight stabling at platforms is acceptable.
- The configuration of Nambour station in the model has been set to allow for access from both directions (i.e. Nambour station is not necessarily considered to be a terminus station).
- All trains have a recovery time of 15% applied on top of their running times.
- All passenger trains have a three minute minimum headway applied and freight trains have a four minute minimum headway.
- Station stop times for CityTrain services will be 30 seconds.
- Stop times for tilt and TravelTrains will be 60 seconds at Landsborough station.
- Stop times for tilt and TravelTrains will be three minute at Nambour station.
- Dwell time at intermediate stations (between Landsborough and Nambour) for trains passing on the single track alignment (via a passing loop) is six minutes.
- Minimum turnback time at Nambour is eight minutes.
- CityTrain services are assumed to be six car sets. In the future, varying mixes of three and six car sets (or even longer trains) may be considered, but this has not been factored into this analysis.

The operational analysis looks at the situation with both the project and CAMCOS in place. It does not take into consideration the timing of these projects and the operational implications of one being constructed before the other.

7.5.2 Travel times

Table 7.5.2a summarises the outcomes of Systemwide's travel time analysis. This includes the following:

- run times between stations, as documented in the Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007)
- simulated run times, based on original alignment drawings, with track geometry (vertical and horizontal) and station locations interpreted from drawings supplied by QR Limited
- simulated run times, based on the preliminary design for the project, two track configuration.

The travel time analysis was carried out using the TPC modelling suite, and includes 30 second dwell times where services stop. The TPC is a tool used to calculate accurate travel times. It treats trains as distributed loads (rather than point loads), and handles curve resistance as part of its rolling resistance calculations. It results in a smoother speed profile than modelling using RailSys, and therefore has been utilised by Systemwide for the Landsborough to Nambour project.

Discrepancies were identified in the supplied chainage information for Mooloolah and Eudlo stations. This resulted in different station locations and therefore different distances between stations, which resulted in different run times between stations for the existing – simulated and the existing – documented scenarios. However, this does not affect the overall run time (i.e. travel time comparisons) and is not considered to influence the findings of this analysis.

Run times provided in the Brisbane Metropolitan System Information Pack, QR Limited Network Access (September 2007) have been compared to simulated run times for the existing track. For example, for CityTrain services, the simulated run times are three minutes 42 seconds (in) and four minutes (out) longer than the documented run times. This is due to the fact that the section run times identified in the QR Limited Network Access information pack are:

Pass to pass times for a running move and therefore do not reflect the acceleration and deceleration of the rollingstock.

The Train Performance Calculator simulations do allow for acceleration and deceleration. Therefore compared to the QR Limited Network Access information pack (i.e. existing-documented) the TPC travel times are longer for CityTrain services (which stop at all stations) and the Travel train (which stops at Nambour and does not have strong acceleration).

Table 7.5.2a: Travel time analysis – Citytrain and long distance passenger services

Section	Basis	CityTrain		TiltTrain (electric)		Travel Train		Intermodal freight		Bulk freight (1 loco)	
		In	out	In	out	In	out	In	out	In	out
Landsborough to Mooloolah	Existing- As Documented by QR Limited	5:00	5:00	4:00	6:00	6:00	6:00	5:00	5:00	5:00	5:00
	Existing- Simulated in TPC	3:23	3:43	2:45	2:49	3:15	3:15	3:40	4:47	4:14	4:00
	Proposed	4:08	3:17	3:24	3:41	3:54	3:54	4:09	4:32	6:51	5:42
Mooloolah – Eudlo	Existing- As Documented by QR Limited	6:30	6:30	5:00	7:00	7:00	7:00	6:00	6:00	4:00	4:00
	Existing- Simulated in TPC	5:52	5:57	3:58	3:57	5:49	5:48	6:01	6:04	7:09	7:22
	Proposed	3:41	3:44	2:13	2:19	2:55	3:13	3:28	3:54	5:47	6:11
Eudlo - Palmwoods	Existing- As Documented by QR Limited	3:30	3:30	4:00	4:00	4:00	4:00	5:00	5:00	5:00	5:00
	Existing- Simulated in TPC	8:25	8:17	5:56	5:50	8:11	8:15	8:28	8:32	10:02	9:44
	Proposed	3:29	3:37	2:02	1:59	2:46	2:55	3:08	3:35	4:36	5:32
Palmwoods – Woombye	Existing- As Documented by QR Limited	3:30	3:30	4:00	4:00	4:00	4:00	4:00	4:00	6:00	6:00
	Existing- Simulated in TPC	4:11	4:30	2:41	2:53	3:28	3:48	3:34	3:51	4:03	4:03
	Proposed	2:58	2:57	1:29	1:30	2:20	1:54	2:39	2:12	3:54	3:06
Woombye – Nambour	Existing- As Documented by QR Limited	4:30	4:30	4:00	2:00	2:00	2:00	5:00	5:00	6:00	6:00
	Existing- Simulated in TPC	4:51	4:33	3:41	3:41	5:35	5:29	5:37	4:34	7:11	4:25
	Proposed	3:07	3:44	3:00	2:52	4:11	5:44	3:30	3:11	3:59	4:46
Total	Existing- As Documented by QR Limited	23:00	23:00	21:00	21:00	23:00	23:00	25:00	25:00	26:00	26:00
	Existing- Simulated in TPC	26:42	27:00	19:01	19:10	26:26	26:35	27:20	27:48	32:39	29:39
	Proposed	17:24	17:20	12:09	12:21	15:33	17:39	16:53	17:24	25:08	25:19
Travel time comparison Time	Existing Simulated compared to Existing Documented	3:42	4:00	-1:59	3:26	3:35	3:35	2:20	2:48	6:39	3:34
	Proposed compared to Existing Documented	5:36	5:40	8:51	7:27	5:21	5:21	7:05	6:36	0:52	0:42
	Proposed compared to Existing Simulated	9:18	9:40	6:52	6.49	10:53	8:56	10:27	10:24	7:31	4:15
Travel time comparison % Time saving	Existing Simulated compared to Existing Documented	24%	25%	-9%	15%	16%	16%	9%	11%	26%	14%
	Proposed compared to Existing Documented	16%	17%	42%	32%	23%	23%	30%	28%	3%	3%
	Proposed compared to Existing Simulated	35%	36%	36%	36%	41%	34%	38%	37%	23%	14%

Source: Systemwide Pty Ltd

All times quoted are minutes and seconds (mm:ss).

'In' and 'out' refer to direction of travel being either inbound or outbound from Brisbane.

Table 7.5.2a identifies that the project should deliver travel time savings for CityTrain Services and electric TiltTrain services, of up to 36% (a saving of nine minutes 40 seconds for CityTrain and six minutes 52 seconds for TiltTrain), based on the comparison of the simulated existing and simulated proposed track configurations. Savings of up to 41% (a 10 minutes 53 seconds time saving) have been identified, for the diesel Travel Trains (diesel TiltTrain has not been modelled). Savings of up to 38% (a 10 minute 27 seconds saving) have been identified for intermodal freight and, depending on the direction of travel, savings of 14 to 23% (savings of four minutes 15 seconds and seven minutes 31 seconds) identified for bulk freight (with one locomotive). With two locomotives, bulk freight services could be reduced to 19 minutes, providing a 26% improvement on the existing- simulated scenario.

When considering the travel time benefits of the project, it is also important to consider the travel time savings of the Caboolture to Landsborough rail upgrade. This upgrade, located to the south of the Landsborough to Nambour Rail Project, is anticipated to deliver travel time savings of up to eight minutes for a CityTrain service travelling between Caboolture and Landsborough. Currently this journey takes on average 32 minutes. With the completion of the Caboolture to Landsborough rail upgrade, this journey should take 24 minutes. **Table 7.5.2b** indicates the potential travel time savings resulting from both the Caboolture to Landsborough and Landsborough to Nambour Rail Project.

Table 7.5.2b: Travel times, Caboolture to Nambour (Citytrain service)

Alignment	Caboolture to Landsborough	Landsborough to Nambour	Caboolture to Nambour
Existing Documented*	24:00	23:00	47:00
Existing Simulated (average)*	28:00	27:00	55:00
Proposed	20:00	17:20	37:20
Time saving of Proposed compared to Existing Documented	4:00	5:40	9:40
Time saving of Proposed compared to existing simulated	8:00	9:40	17:40

*The documented times are 'Pass to pass times for a running move and therefore do not reflect the acceleration and deceleration of the rollingstock.' Whereas the simulated times do allow for acceleration and deceleration.

Table 7.5.2b indicates that the combined travel time savings of the Caboolture to Landsborough and Landsborough to Nambour project could result in up to 17 minutes and 40 seconds on a trip between Caboolture and Nambour, bringing the travel time town from 55 minutes to 37 minutes.

Reductions in travel time resulting from the dual track, improved alignment can lead to:

- quicker services for passengers
- potential for improved capacity on the corridor, allowing additional train paths to be inserted, and thus the potential for additional services
- reduced energy consumption and Greenhouse gas production (e.g. from power stations and diesel engines)

7.5.3 Capacity analysis

Future service levels have been determined by Systemwide's capacity analysis. This has compared the existing single track to the proposed dual track and included the following steps:

- define business rules for scheduling
- model infrastructure and rollingstock - model, calibrate infrastructure and train types between TPC and RailSys to ensure the capacity analysis in RailSys is based on most accurate travel time information from TPC
- build current (single track, current alignment) and future (dual track, proposed alignment) timetables with a regular service pattern in order to determine capacity improvements and longevity of the proposed layout
- determine capacity benefit for current and proposed layout- calculate the number of train services able to the operated on the current and proposed infrastructure and determine the available capacity benefit and longevity of the solution.

The theoretical maximum capacity (i.e. total number of train paths available) on a rail corridor is only determined by the minimum headway required between train services (e.g. a four minute operational headway would allow 15 trains per hour).

In reality, the maximum achievable capacity on that rail corridor is reduced by a number of factors including dwell times, incidents, exit/entry arrangements (e.g. platforms at Nambour for turnbacks and time to turnback), plus single line railway sections north of Nambour.

For these reasons, the following issues are considered:

- recovery

It is recommended that a number of paths are set aside for the purposes of recovery. This can help to avoid reductions in reliability due to cascading delays across services run close together. This principle is of particular importance to the current single track layout.

- regular service pattern.

Keeping trains to a regular service pattern, in particular for passenger services is highly desirable and beneficial for customer and operators.

Furthermore, constraints outside the project area constrain the capacity of this section of the NCL, including operating hours and other demands at freight handling nodes outside the project area. Therefore conservative limitations, similarly to the Inner City Rail Capacity Study (Systemwide, 2008) have been applied (i.e. not more than six service freight paths per hour).

Projected CityTrain service levels are presented in **Table 7.5.3a**.

Table 7.5.3a: Service levels

Day	Northbound	Southbound
Current CityTrain services (2008) Monday to Friday	13	12 (13 on Friday)
Proposed CityTrain services	45	45

The proposed service level assumes a service frequency of 15 mins during the AM and PM peak (assumed two hours) and 30 mins during all other operating hours (assumed 18 hour operating period).

Current freight services are listed in **Table 7.5.3b**. Further detail on typical freight services for a day is included in **Table 7.3.6.**

Table 7.5.3b: Current freight services

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
No. of services	16	21	23	21	22	23	10

The current weekly total of freight services is 136, on average 19 freight services per day.

The same freight forecasting assumptions used for the Inner City Rail Capacity Study (Maunsell, PB, Systemwide 2008) have been adopted for this project. High growth forecast has been set at 5% compounded per year for intermodal freight, and 1% compounded for bulk freight. The high growth freight forecast indicates that freight demand on the section of the NCL between Northgate and Nambour, could grow to up to 348 services weekly by 2026. This equates to approximately 50 services per day. The high growth forecast shows significant growth of freight transport on the NCL. It also assumes that the length of freight trains (currently no longer than 622 metres) does not vary. Freight train length is currently limited by the lengths of passing loop available on the NCL. Should the following occur, it may be possible for longer freight trains to operate on the NCL, and thus reduce the number of freight services required:

- duplication of the NCL between Nambour and freight destinations to the north
- significant upgrades to passing loop lengths between Nambour and freight destinations to the north.

Systemwide tested two scenarios for the future freight capacity analysis:

- The extrapolated scenario is the ultimate capacity for the future infrastructure, based on current times when freight services are run (i.e. accounting for existing freight curfews).
- The spread scenario assumes that freight can be spread through the day, except for the peak.

The capacity analysis considered the capacity between Nambour and Caboolture to ensure that the Nambour to Landsborough capacity does not impact services further towards the city.

Table 7.5.3c outlines the freight capacity for the dual track between Landsborough and Nambour, for both the extrapolated and spread scenarios.

Table 7.5.3c: Freight capacity projections

Current	Intermodal	Bulk
Current- extrapolated	17	3
Current- spread	33	3
Proposed- extrapolated	39	5
Proposed- spread	53	6

It is important to note that whilst this EIS documents freight forecasts and freight capacity, the demand for freight transport via rail will be market driven.

The operational analysis undertaken by Systemwide found:

The single track alignment will support an hourly passenger train service pattern, and freight growth up to 2024, providing freight transport is excluded from the corridor between 6.00 am until 10.00 am, and is restricted to southbound only between 4.00 pm and 7.00 pm. The main capacity constraints of the current alignment are the turnback times at Nambour station, and the delays associated with passing requirements at stations (i.e. trains waiting in passing loops for express or services travelling in the opposite direction) to pass.

Under this scenario, the existing single track rail line between Landsborough and Nambour will reach capacity by 2024. However, if it is possible to spread freight services throughout the day (and all other assumptions are correct), the single line section only provides an additional two years capacity.

The introduction of the double track railway allows for a significant increase in train paths, enabling up to four times more passenger services and twice as many freight services to operate within this section of the NCL.

7.6 Assessment of potential impacts and mitigation measures

The potential impacts to the transport infrastructure associated with the construction and operation of the project include:

- impacts to rail services and improvement to public transport services and facilities
- impacts on road and rail traffic during construction
- impacts to other public transport
- road network impacts
- station upgrades
- transport-related environmental issues.

Figure 7.3c shows the project in relation to the existing road network.

7.6.1 Rail infrastructure

Stations

Potential impacts

No changes are proposed at Landsborough station, which has recently undergone refurbishment and upgrading.

Mooloolah station will be rebuilt, close to its current location, with car parking and pedestrian access.

Eudlo, Palmwoods and Woombye stations will be relocated, and require new station buildings, car parks and pedestrian access.

Nambour station has been identified for a significant upgrade; however the existing station is proposed to be incorporated into this upgrade. The station footprint identified allows for car park upgrading, in accordance with the TransLink Transit Authority's Park and Ride Strategy, additional platforms and access provisions. Further work will be undertaken during the detailed design stage to determine the exact station layout and design.

Proposed mitigation - design

Feedback from the community consultation process has identified that the design of stations is a very important consideration for local communities. Where stations are proposed to be rebuilt or relocated, strict urban design controls will need to be applied to ensure that the stations are not out of context with the scale or character of the surrounding townships. The recent redevelopment of Landsborough station is a good example of how to achieve a heritage station look, whilst complying with the requirements of the Disability Discrimination Act (DDA compliance) and Crime Prevention Through Environmental Design (CPTED principles). The outcomes of the master planning activities undertaken by the SCRC, will also help to inform the future detailed design phase, when station design will be completed.

The potential for integration of pedestrian thoroughfares into station buildings and precincts should be further investigated during council master planning and detailed design.

Proposed mitigation – construction

No mitigation is required for Landsborough station, as the project begins to the north of the station and should not affect access or function of the station.

As Mooloolah station is proposed to be rebuilt close to its current location, the construction process is likely to affect access and function of the station. Temporary platforms and car park arrangements may be required. The current construction staging for Mooloolah station is proposed as following:

- build new platform on western side of the existing railway
- build new western track to service this platform

This western track will require the demolition/ removal of the existing timber pedestrian bridge.

- build new eastern platform

It may be possible to relocate the existing waiting shed to a location close to its existing site. Further structural and heritage architecture analysis would be required to determine its suitability for relocation.

- install second and third tracks between the western track and the eastern platform

As discussed in **Chapter 2, Description of the project**, allowance for a fourth track is provided to the east of the eastern platform, however this track is not proposed for construction as part of the project. This has been planned so as to delay the need to impact commercial property on the northern side of Mooloolah Connection Road, until the demand for the fourth track is established.

- build lifts and pedestrian overbridges, new station building, car park and bus interchange.

The new Eudlo station is located to the west of the existing station, on the other side of the area known as 'Federation Walk'. A new station building, lifts and a pedestrian overbridge would also be constructed. Access and car parking for this station will have to be carefully staged, and temporary arrangements may be required as the existing station footprint forms part of the proposed future car parking and access areas. Therefore the access for the new Eudlo station would be temporary until the existing rail corridor is decommissioned.

The new Palmwoods station is located to the east of the existing station. Construction of the project, including the new station will impact on existing car parking and station access on the eastern side, via Chevallum Road. As the project is to be constructed in close proximity to the existing operational railway, detailed staging plans will be required to ensure impacts to existing services and passenger access is minimised. A new station building, lifts and a pedestrian overbridge would

also be constructed. Access to the new Palmwoods station would be initially provided from Chevallum Road. However, in the longer term it is envisaged that access and car parking would be provided via Main Street. Until the existing railway is decommissioned, temporary access from Chevallum Road would be required.

The new Woombye station is located to the west of the existing station. The proposed overpass over both the existing and new railway (extending from Blackall Street to Back Woombye Road) should be constructed first, to assist in the provision of passenger access to the station. Similarly for Palmwoods and Eudlo stations, the permanent car parking and access requirements for Woombye station will not be constructed until after the decommissioning of the existing railway.

At Nambour, significant improvements to the station are proposed, as follows:

- a new island platform, to the west of the existing platform

This may be initially developed as a single sided platform, facing the east.

- lifts and pedestrian overbridge
- car parking in accordance with the TransLink Transit Authority Park and Ride Strategy.

These station improvements will require the demolition of several industrial properties on Price Street. Construction will have to be carefully staged to maintain access to station cark parks and platforms.

Proposed mitigation – operation

No mitigation would be required during operation.

Open level crossings

Potential impact

The project traverses existing OLCs on Gympie Street North in Landsborough, Bray Road/ Mooloolah Connection Road in Mooloolah and the passing loop crossing in Palmwoods station car park.

The Gympie Street North and Bray Road/ Mooloolah Connection Road OLCs will require temporary closures during construction, which will affect the accessibility and traffic in Landsborough, Mooloolah and surrounding areas. Access to and from Landsborough (via Tunnel Ridge Road) and to the west of Mooloolah (via Bray Road) will be affected due to the closure of the two OLCs.

Proposed mitigation - design

The Palmwoods OLC will become obsolete as the proposed alignment bypasses this section of track.

Retention of the existing level crossings at Gympie Street North and Bray Road/ Mooloolah Connection Road is not desirable in the longer term due to risk and traffic congestion considerations. The Queensland Government has a preference for the replacement of open level crossings where made possible by concurrent rail upgrade programs.

Therefore, preservation of a grade separation option for Gympie Street North (Landsborough) and to the south of the open level crossing utilising Jones Street (Mooloolah) have been identified as part of this EIS for future implementation at such time as risk and traffic congestion considerations determine the need for closure of the OLCs. As part of the project, two rail tracks will be constructed at Gympie Street North and three rail tracks constructed at Mooloolah Connection Road/ Bray Road. The development of the grade separation options for these locations is further discussed in **Chapter 2, Description of the project**, and **Chapter 21, Special management areas**.

Proposed mitigation - construction

Presently the timing of the construction of these grade separation options is unknown. Ideally, these should be constructed prior to the construction of the duplicated railway. Otherwise, traffic using these routes would be disrupted twice, once by the construction of the duplicated railway, and again by the construction of the grade separation if and when it is required.

Two scenarios are considered:

1. Grade separation options preserved, open level crossings retained

This scenario will result in the identification of the future land requirements and vehicle, cyclist, pedestrian and equestrian access requirements at both Gympie Street North and Mooloolah Connection Road/ Bray Road, and the need for temporary road traffic, cyclist, pedestrian and equestrian detours whilst construction across these roads is undertaken.

As Gympie Street North has a wide road reserve, traffic could be redirected on the side of the street (with appropriate signage, traffic control and safety barriers). This will provide a temporary access for vehicles that travel to and from Landsborough via Gympie Street North. Another option is by lane closures to allow one lane for the traffic to flow during construction. The road reserve of Mooloolah Connection Road is not as wide as Gympie Street North and therefore lane closures or temporary detours would be required whilst railway construction work occurs across the road. As the Mooloolah Connection Road/ Bray Road is the primary and most direct route for traffic to the west of the existing railway in Mooloolah, diverting traffic along Eudlo

Road to access services and the road network to the north and east is not a desirable outcome. A comparison of alternative routes has been undertaken between the Bray Road side of the open level crossing and the intersection of Old Gympie Road and Mooloolah Connection Road to the east. The existing distance between these two points is approximately 2.8 km:

- Bray Road- Brandenburg Road - Hovard Road - Landsborough Maleny Road - Gympie Street North - Tunnel Ridge Road - Mooloolah Connection Road - a distance of approx 19 km, traversing unsealed sections of road, cattle grids, and steep areas (unsuitable for caravans and large vehicles)
- Bray Road – Eudlo Road - Old Gympie Road – a distance of 7 km.

For the second route, access for high vehicles is constrained by the low height rail bridge over Eudlo Road and the Mooloolah River, and therefore commercial deliveries to businesses on the western side of the existing railway would be affected.

Re-directing traffic along a detour from the western side of the railway is not preferable, as these routes are significantly longer, with road geometry and/or vehicle clearance constraints. Therefore, the provision of a temporary at grade crossing point (level crossing, controlled with signals and supervised by construction traffic management staff) would be preferred over traffic diversions if the proposed grade separation option is not constructed prior to or at the time of railway construction.

2. Grade separation prior to, or at the time of railway construction

This scenario would result in the least disruption to road traffic, cyclists, pedestrian and equestrians. Construction of the Gympie Street North grade separation could occur whilst the open level crossing remains open to traffic, as it has a wide road reserve. Construction of the Mooloolah grade separation option would affect access to the existing Mooloolah station car park, as it follows Way Street. Access to the car park and bus stop would need to be reconfigured during construction of the grade separation option, and temporary car parking areas may be required. However once constructed, this would provide an unimpeded route from east to west once the level crossing is closed, and construction of the railway is underway.

Principles and objectives for the construction traffic management plan are included in **Chapter 22, Environmental management plans**.

Proposed mitigation - operation

Two open level crossing scenarios have been considered in this assessment. These are the interim retention of the existing level crossings at both Gympie Street North and Mooloolah Connection Road/ Bray Road, or construction of these grade separation options prior to or at the time of the railway construction. As outlined, early construction (i.e. prior to commencement of the railway construction) would limit traffic disruption at Gympie Street North and Mooloolah Connection Road/ Bray Road, once the railway is operational. Should the grade separation options be constructed at a later date, traffic at Gympie Street North would be disrupted at a later date. Construction of the Mooloolah grade separation option will have less disruption to through traffic, however it would still affect access to Hatten Street and Jones Street. This assessment assumes that the ultimate station layout for Mooloolah is adopted at the time of railway construction, and that station access and bus access are in their final position prior to grade separation.

VISSIM analysis has been undertaken to analyse the future traffic delays associated with the operation of the OLCs in years 2026 and 2046. AM and PM peaks were analysed with and without the preferred route. Traffic volumes are shown in **Figures 7.6a, 7.6b, 7.6d** and **7.6e**.

An assumption was made that there would be four services in each direction for the With Rail Upgrade scenarios. The assumed frequencies are shown in **Table 7.6.1a** below. The Without Rail Upgrade scenarios use the existing service times reported in **Table 7.3.1c**.

Table 7.6.1a: Service times during peak hour (2026 and 2046)

	Southbound	Northbound
AM Peak	8:05	8:07
	8:20	8:22
	8:35	8:37
	8:55	8:52
PM Peak	17:35	17:37
	17:50	17:52
	18:05	18:22
	18:20	18:37

It was assumed that the duration of closure of the railway crossing would be approximately 60 seconds for southbound trains and 100 seconds for northbound trains. All trains were assumed to stop at Mooloolah and Landsborough stations for the purposes of this analysis. However, the delay experienced at Mooloolah during the day can occasionally exceed five minutes depending on the rail operations, for example a freight train passing.

The VISSIM model for each scenario was run three times with different seed values. **Table 7.6.1b** to **Table 7.6.1i** show the results of the analysis which includes average delay per vehicle, maximum delay and maximum queue length in Mooloolah and Landsborough OLCs. Screenshots of the VISSIM model taken for each scenario run are in **Appendix F**.

Table 7.6.1b: Mooloolah OLC analysis results (2026 AM)

2026 AM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Bray Road	EB	1	97	19	6	106	70
Neill Road	SB	15	119	62	31	167	90
Mooloolah Connection Road	WB	4	98	106	13	124	91

Table 7.6.1c: Mooloolah OLC analysis results (2026 PM)

2026 PM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Bray Road	EB	5	132	38	6	106	32
Neill Road	SB	21	169	65	19	142	52
Mooloolah Connection Road	WB	12	135	133	11	124	98

Table 7.6.1d: Mooloolah OLC analysis results (2046 AM)

2046 AM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Bray Road	EB	1	95	58	8	107	71
Neill Road	SB	59	194	159	161	397	162
Mooloolah Connection Road	WB	6	101	114	18	137	134

Table 7.6.1e: Mooloolah OLC analysis results (2046 PM)

2046 PM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Bray Road	EB	7	161	12	7	107	11
Neill Road	SB	58	367	118	118	246	68
Mooloolah Connection Road	WB	17	170	105	105	134	70

Table 7.6.1f: Landsborough OLC analysis results (2026 AM)

2026 AM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Gympie Street North	EB	1	44	34	2	46	37
Gympie Street North	WB	1	44	30	3	44	25

Table 7.6.1g: Landsborough OLC analysis results (2026 PM)

2026 PM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Gympie Street North	EB	3	44	35	2	46	15
Gympie Street North	WB	2	44	33	3	44	21

Table 7.6.1h: Landsborough OLC analysis results (2046 AM)

2046 AM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Gympie Street North	EB	1	44	34	2	45	35
Gympie Street North	WB	1	44	39	3	44	39

Table 7.6.1i: Landsborough OLC analysis results (2046 PM)

2046 PM		Without Rail Upgrade			With Rail Upgrade		
Approach	Direction	Average Delay (s)	Max Delay (s)	Queue (m)	Average Delay (s)	Max Delay (s)	Queue (m)
Gympie Street North	EB	2	44	41	2	46	40
Gympie Street North	WB	2	43	46	3	44	39

Tables 7.6.1b to **7.6.1d** show that there is a significant increase in queuing and delay with the upgrade in place in the 2026 and 2046 AM Peak for the Mooloolah OLC, while the 2026 PM Peak has similar levels of delay with and without the rail upgrade, but greatly increase delay with the upgrade in the 2046 PM Peak.

The increase in the delay and queuing modelled in the AM Peak for Mooloolah is as a result of the increase in train services from three trains in the AM Peak for the Without Rail Upgrade to eight trains in the With Rail Upgrade. The PM Peak increases from six services in the current arrangement to eight services as a result of the upgrade. The current services are currently concentrated so that the OLC barrier is called four times in seven minutes (as in **Table 7.3.1c**). This means that there is currently a high probability of a vehicle being stopped at the OLC by more than one train, but with the double track railway and train services at regular intervals there is the potential for smaller queues which occur more frequently, as is reported in **Tables 7.6.1c** to **7.6.1e**.

Tables 7.6.1f to **7.6.1h** show that there is very little difference between the results for With and Without the Rail Upgrade at Landsborough. This is because the volume of traffic using this crossing is relatively small, as shown in **Figures 7.6a** and **7.6b**.

The results show that there would be the benefit of less queuing and delay from replacing the OLCs with a grade-separated solution. However, they also highlight that the biggest increase in delay is not as a result of the project, but as a result of traffic growth. The traffic growth between 2026 and 2046 of 2% per annum, as explained in **Section 7.6.3**, increases the maximum delay in Mooloolah by 238% in the AM Peak (from 167 seconds in 2026 to 397 seconds in 2046) and 217% in the PM Peak (from 169 seconds in 2026 to 367 seconds in 2046).

Once the construction of the project and the grade separation of Gympie Street North and Mooloolah Connection Road/ Bray Road have been completed, no further mitigation methods will be required during the operation of the railway. No open level crossings would remain on this section of the NCL.

Rail and road bridges

Potential impact

The preliminary design for the project has established the following:

- minimum 5.5 metres headroom (vehicle clearance) for rail over road crossings (with the exception of Arundell Avenue).

The exception to this standard is at Arundell Avenue, where a height of 4.6 metres is achieved. This is consistent with the current clearance at this location.

- minimum 6.7 metres clearance, road over rail crossings.

The project provides for vehicle clearance of minimum 5.5 metres for the following rail over road bridges:

- the realigned section of Neill Road south, Mooloolah (**Drawing C008**, **SK003a** and **SK003b**)
- Logwoods Road, Eudlo (**Drawing C012**)
- Highlands Road, Eudlo (**Drawing C013**)
- Chevallum Road (6 metres), Palmwoods. Chevallum Road will be realigned, as shown in **Drawing C019** and **SK009**. The road remains within the existing road reserve, and also requires the realignment of Nicklin Road, also within existing road reserve.
- Woombye – Palmwoods Road, Palmwoods, **Drawing C019**
- Spackman Lane, Palmwoods- the northern end of Spackman Lane will require realignment, and is currently proposed to pass under the new railway at the northern extent of the Palmwoods rail bridge, shown in **SK010**
- Arundell Avenue, Nambour- a new rail bridge to the west of the existing rail bridge, at 4.6 metres, which is consistent with the current Arundell Avenue clearance of 4.6metres.

The proposed bridge over Chevallum Road and Woombye Palmwoods Road at Palmwoods is a significant structure of approximately 800 m abutment to abutment, also over duck

ponds in Kolora Park. This is shown in **Drawings C019** and **C020**. It will be a significant feature in the town, and will therefore require particular care and aesthetic considerations in its detailed design.

The detail design in Spackman Lane is to include consultation with the landowners, to confirm design requirements for the farm equipment and trucks using Spackman Lane.

A new property access underpass (rail bridge) will be provided at the southern end of Paskins Road, providing access to properties to the west of the new railway. This is shown in **Drawing C015** and **SK005**.This also provides for reconnection of Paskins Road with the Culgoa road reserve. Clearance at this crossing point would be around five metres.

The project will be crossed by the following new road bridges:

- Neill Road, Mooloolah (north) – the railway passes under Neill Road in a cutting, with a proposed bridge consistent with the existing terrain (**Drawing C009**)
- Eudlo School Road, Eudlo (cut and cover construction approach proposed) (**Drawing C014**)
- Leeons Road, Palmwoods (bridge on embankment, providing access to Toby Court) (**Drawing C016** and **SK006**)
- Back Woombye Road/ Old Palmwoods Road, Woombye (extension of Blackall Street, connecting to Back Woombye Road) (**Drawing C023** and **SK011**)
- Blackall Range Road - replacement of existing single lane structure with a two lane bridge (**Drawing C024** and **SK012**).

These proposed crossings will remove the following substandard existing road/rail crossing points:

- Highlands Road – replacing the existing 3.1 metres clearance underpass with a 5.5 metres clearance bridge
- Eudlo School Road- replacing the existing 2.4 metres clearance underpass with a road over rail bridge
- Back Woombye Road- replacing the existing 2.9 metres clearance underpass with a road over rail bridge
- Blackall Range Road bridge- replacing the existing single lane bridge with a two lane bridge.

These road bridges will also provide for pedestrian and cyclist access. The proposed grade separation overpasses (road over rail) are discussed in **Section 7.6.1**.

The project does not include the removal or upgrade of road or rail bridges on the current railway. In some places, the removal of these structures could have beneficial environmental or road network effects. However, the removal or upgrade of these structures would need to be carried out so as to not preclude the future use of the existing railway for recreational trails.

Proposed mitigation – design

The preliminary design of road bridges has been carried out with the following considerations:

- quick construction and commissioning, particularly where side-tracking and detours may be required
- minimising the footprint of earthworks and additional land requirements
- compliance with current design standards for road design
- safety and access provisions for pedestrians and cyclists.

Detailed design to consider:

- aesthetics of bridge structures, particularly in residential and high visibility areas
- construction materials and the use of sustainable products
- use of prefabricated/ precast structures
- safety in design principles, to allow for safe construction and operation of the facilities.

The preliminary design of rail bridges has been carried out with the following considerations:

- environmental obligations and mitigation measures as specified in **Chapters 11–13**, particularly in relation to creek and river crossings and areas identified as significant habitats for threatened species
- minimising the footprint of earthworks and land requirements
- compliance with current design standards for rail design.

The detailed design of rail bridges should consider the following:

- environmental obligations for design and spill containment, particularly in relation to creek and river crossings and areas identified as significant habitat for threatened species
- aesthetics - particularly at river and creek crossings, and the significant bridge section through Palmwoods (discussed further in **Chapter 6, Landscape and visual)**
- Noise mitigation, particularly on the rail bridge section through Palmwoods (discussed further in **Chapter 15, Noise)**.

Proposed mitigation - construction

A number of new rail over road, and road over rail bridges are proposed as part of the project. These bridges are listed in **Table 7.6.1j**, along with potential construction issues and traffic management strategies.

Table 7.6.1j: Proposed rail and road bridges

Location	Rail	Road/ River	Comments
Mooloolah	Under	Mooloolah Connection Road	The proposed overpass option allows for the staged implementation of the grade separation in line with risk and traffic congestion considerations.
Mooloolah	Over	Realigned Section of Neill Road	The realignment of Neill Road would need to be carried out as part of the early works for the project construction. Construction of the rail bridge over this section of Neill Road should be planned so as to minimise road closures. Temporary diversions from Neill Road North may be required during construction. Access to Lornal Court will need to be maintained throughout the realignment works.
North of Mooloolah	Under	Neill Road, north	The construction of the Neill Road overpass over the new rail will need to be staged, to maintain access to properties west of this crossing point. A temporary realignment of Neill Road during construction may be required. Detailed design and construction planning would determine the location of this temporary road realignment.
Eudlo	Over	Logwoods Road	The construction of the new rail over Logwoods Road may require temporary closure of Logwoods Road, during the installation of the bridge structure. Logwoods Road traffic could be diverted via Highlands Road (using the unsealed section of Mossybank Road). This would require staged construction of the Logwoods and Highlands Road rail bridges, so as to maintain at least one of these crossing points open at all times. Additionally, Highlands Road is constrained by the low height existing rail bridge, therefore high vehicle access would be limited during the construction of the Logwoods Road bridge.
Eudlo	Over	Highlands Road	The construction of the new rail over Highlands Road may require temporary closure of Highlands Road, during the installation of the bridge structure. Highlands Road traffic could be diverted via Logwoods Road (using the unsealed section of Mossybank Road). This would require staged construction of the Logwoods and Highlands Road rail bridges, so as to maintain at least one of these crossing points open at all times.
Eudlo	Under	Eudlo School Road	A cut and cover tunnel is currently proposed to allow the new rail to pass under Eudlo School Road. The construction method for this section of the project is not yet determined, however should cut and cover methods be utilised, it may be necessary to provide a temporary realignment of Eudlo School road around this crossing point, and stage the construction of the cut and cover tunnel so as to allow east-west access to remain at all times. Alternate directional bore tunnel construction methods (boring partially from one end, then completing tunnelling from the other end) could allow for less traffic disruption, however construction methods are yet to be determined.
North of Eudlo	Over	Paskins Road (property access)	A small section of rail bridge over road is proposed at the southern end of Paskins Road, to maintain property access, and retain the connection of Paskins Road and Culgoa Road. Construction of this access may temporarily restrict access to properties in these areas, therefore alternate access may be required. Culgoa Road, whilst unformed, could be investigated to provide access via Eudlo.
Palmwoods	Under	Leeons Road	Leeons Road will cross over the top of the rail, requiring the construction of earthworks and bridge structure. The construction of the Leeons Road- Toby Court extension should be completed prior to the construction of the railway cutting through this area, so as to maintain access for properties to the west (Leeons Road and Toby Court) via Palmwoods (Paskins Road and Main Street to the North). The Leeons Road bridge section should be completed prior to construction works occurring that impact on the alignment of Eudlo Road.
Palmwoods	Over	Chevallum Road	The realignment of Chevallum Road should occur prior to the construction of the Palmwoods Rail bridge. This realignment could occur with minimal impact to through traffic, as it will occur within existing road reserve. As the realigned section of the road will also be regraded (lowered by approximately 1m to achieve vehicle clearance of 6 m), property accesses will also need to be regraded. There is likely to be some disruption to property access during this time, and the construction management plan should be developed for this area in association with requirements of residents.

Table 7.6.1j: continued

Location	Rail	Road/ River	Comments
Palmwoods	Over	Woombye-Palmwoods Road	Construction of the rail bridge over Woombye Palmwoods Road should have minimal impact to traffic, as it does not require realignment of this road. It may be possible to maintain access at all times in this area, subject to the future location of bridge pylons. Should road closures be required, single lane closures may be appropriate during the installation of bridge decking and associated works. It will be important to maintain access on this road at all times, however traffic delays during construction are likely.
Palmwoods	Over	Spackman Lane	Closure of Spackman Lane is not possible as it is the only point of access to some properties. It may be possible to maintain the existing access until the bridge and abutments are constructed, at which point the existing Spackman Lane alignment can be switched to the proposed alignment. However, if it is not possible to maintain Spackman Lane during construction of the bridge, a temporary road can be built along the proposed rail alignment to serve the affected properties on Spackman Lane.
Woombye	Under	Back Woombye Road	Construction of the rail bridge over both the existing and new railway should occur as part of early works, as the proposed station will impact on Back Woombye Road. Construction of this road overpass would impact traffic travelling on Old Palmwoods Road, and a temporary sidetrack may be required. Construction of the eastern side of the overpass may affect access to the station car park, and alternate traffic circulation around the park may need to be established.
North of Woombye	Under	Blackall Range Road	The replacement of the single lane Blackall Range Road will be complex, as it will require removal of the existing bridge, resulting in temporary closure. Alternative routes will need to be provided. The bridge will need to be designed for the ultimate four track requirement, and allow for construction of the project. It may be necessary to close the bridge for the duration of the railway construction, and then install the new bridge. This could result in a lengthy closure of Blackall Range Road, and require traffic to detour via the proposed Back Woombye Road overpass. This would result in additional traffic through Woombye for the duration of the Blackall Range Road closure. It will be essential for the Back Woombye Road overpass to be constructed and operational prior to the closure of the Blackall Range Road bridge over the railway.
Nambour	Over	Arundell Ave	A new rail bridge is proposed to the west of the existing rail bridge over Arundell Avenue. It may be possible to maintain a single lane of access during construction, except for short closure periods.

Table 7.6.1j does not include the proposed grade separation options for Gympie Street North or Mooloolah Connection Road/ Brays Road as these are discussed under open level crossings. **Table 7.6.1j** also does not include rail bridges over waterways. These are discussed in **Chapter 2, Description of the project**, and **Chapter 13, Aquatic ecosystems**.

Proposed mitigation – operation

No further mitigation is proposed for the operational phase of the project.

Passing loops

The passing loops discussed in **Section 7.3.1** are necessary for the existing railway to function, as it is a single track, and without these, rail traffic would only be able to travel in one direction at any time.

The duplication of the track means that passing loops will no longer be required. However, QR Limited has recommended a freight refuge (or passing loop) be included as part of the two track construction, and this is currently proposed for inclusion in the vicinity of Mooloolah, as shown in **Drawings C107** to **C110**. The inclusion of this passing loop in this location is a result of the optimisation of the track layout through Mooloolah, which is discussed further in **Chapter 2, Description of the project**.

Decommissioning of existing railway

Decommissioned sections of the rail corridor, discussed in **Chapter 3, Land use and infrastructure** and **Chapter 21, Special management areas**, may be utilised as recreational trails or cycle paths. In particular, the need for cycle linkages between townships has been identified as a desired outcome during community consultation for the project.

If the existing rail corridor is used for a recreational trail after decommissioning, it may be appropriate to consider the retention or relocation of station buildings and accesses (with the exclusion of Landsborough, Mooloolah and Nambour stations) as part of the recreational trail infrastructure. These old station sites could be used as access points to the recreational trail and provide for interpretation stations and easy access into the townships along the corridor.

The decommissioning of the existing rail corridor could also result in the removal of some bridges for safety, environmental, or maintenance minimisation reasons. These decisions should take into consideration the future potential use of the decommissioned rail corridor for recreational trails. Improved crossing points, designed for the purpose of the future use of the existing corridor (i.e. recreational trails) should be considered where the removal of a bridge provides an environmental benefit or removes a traffic constraint. These decisions will need to be jointly taken by the authority responsible for the decommissioning of the existing railway and the local council, and the future development and operation of the recreational trails.

7.6.2 Potential benefits for passenger and freight rail services

The provision of a double track railway and improved alignment will result in a significantly improved rail service between Landsborough and Nambour, for both travel time and service frequency (capacity). These benefits are compounded when considering the planned upgrading between Caboolture and Landsborough, as discussed in **Section 7.5.2**.

CityTrain services

According to the operational analysis undertaken by Systemwide for this project, existing CityTrain services running between Landsborough and Nambour (all stops) take around 26-27 minutes. With the project, CityTrain services running between Landsborough and Nambour (all stops) are projected to take around 17 minutes. Further travel time information is contained in **Table 7.5.2a**.

Combining this travel time saving with the travel time savings identified for the Caboolture to Landsborough Section of the corridor, this results in up to 17 minutes reduction to a 55 minute trip, resulting in travel times between Caboolture and Nambour of approximately 37 minutes.

Currently, there are 12 northbound services (13 on Fridays) and 13 southbound services running between Landsborough and Nambour daily. These rail services are supplemented by 12 northbound Railbus services (five of which run express Landsborough to Nambour) and 11 southbound Railbus services (five of which run express Nambour to Landsborough).

The capacity of this section of the NCL will also be improved as a result of the project. This will result in more frequent CityTrain services. It is unlikely that Railbus services would be required to supplement the rail service.

Operational modelling undertaken for the project has identified that 45 daily services per direction could be supported by the proposed rail line to allow a service frequency of 15 mins during the AM and PM peak (assumed two hours) and 30 mins during all other operating hours (assumed 18 hour operation). The dual track would allow for this projected increase in CityTrain passenger services, as well as the projected increases for freight traffic discussed in **Sections 7.5.2 and 7.6.2**, however no increase in TravelTrain/TiltTrain is forecast. The rail operational analysis identifies that the project has the capacity to deliver this level of service. However, it is likely that there will be a stepped increase in service frequency building up to the 45 trains per direction, as demand for the services will build over time.

TravelTrain and TiltTrain

Operational modelling undertaken identified the following:

- Current travel times for the TravelTrain (diesel) between Landsborough and Nambour were modelled at around 26 minutes (26 minutes and 35 seconds northbound, and 26 minutes and 26 seconds southbound). These services only stop at Nambour. Projected travel times resulting from the project are 15 minutes 33 seconds northbound and 17 minutes and 33 seconds southbound.
- Current travel times for the TiltTrain (electric) between Landsborough and Nambour were modelled at around 19 minutes. These services stop at both Landsborough and Nambour, but not the intervening stations. Projected travel times resulting from the project are 12 minutes and nine seconds southbound and 12 minutes and 21 seconds northbound.

No increase in services has been modelled for the TiltTrain or TravelTrain.

Freight

Operational modelling undertaken identified the following:

- The majority of freight services travelling on this section of the NCL are intermodal freight (i.e. containerised freight). Travel times have been modelled between 16 minutes 53 seconds and 17 minutes 24 seconds for the existing railway (depending on direction of travel).
- Bulk freight (i.e. livestock, grain) existing travel times for the existing railway have been modelled at 32 minutes and 39 seconds and 29 minutes and 34 seconds, depending on direction of travel.

The increased freight capacity will be provided by the upgrade. This has been identified as:

- current: 22 freight movements a day
- projected capacity for 2026: 44 freight movements a day

This basic freight projection has been determined using the parameters established for the Inner City Rail Capacity Study, which is 5% compound growth for intermodal freight, and 1% compound growth for bulk freight (livestock, grain). Using these projections, the dual track corridor is expected to provide sufficient capacity for the projected freight and passenger service levels until 2039 assuming current train lengths and freight

operating hours. It is expected that the introduction of longer freight trains would substantially extend the capacity of the dual track corridor. After this time, additional freight refuge/ passing loops may be required should increased capacity be required.

7.6.3 Potential impacts and mitigation measures

Rail services (passenger and freight)

During construction, passenger and freight rail services are likely to experience some disruptions.

For CityTrain passenger services, disruptions may be due to station closures, changes to station access and parking, and short term replacement of some CityTrain services with Railbus services. Similarly, TiltTrain and TravelTrain services that stop at Landsborough and or Nambour station may be disrupted, or require temporary alternate stops.

All passenger and freight services may be disrupted by scheduled track possessions (temporary closures), particularly when construction of sections of track close to the existing track are underway. These areas include the section between Landsborough and Dularcha National Park, south of Mooloolah station to north of Mooloolah Connection Road/ Bray Road, the approach to the existing Palmwoods station, and the approach to Nambour. The windows for track possession are extremely limited, and usually occur on weekends, primarily affecting freight service scheduling.

Proposed mitigation - design

The railway alignment for the project has been developed so as to minimise the number of crossings of the existing railway. Where crossings have been included, these are either at a similar grade and height as the existing track, or at the appropriate clearance above the existing railway (i.e. at least 6.7 metres above the existing). This approach provides realistic opportunities for construction staging and commissioning of sections of track, rather than waiting for completion of the entire corridor between Landsborough and Nambour. This has been a key objective for the project, as construction of new railway in close proximity to operational railways carries significant construction cost and time penalties. Construction staging scenarios are discussed in **Chapter 2, Description of the project.**

Proposed mitigation - construction

Station staging and station construction requirements are discussed under **Section 7.6.1**. It would be appropriate to progress the construction of sections of the project, along with new stations so that stations remain operational for as long as possible. During construction of stations, the following temporary arrangements may be feasible:

- Landsborough- no change
- Mooloolah – provide bus connection between Landsborough Station and Mooloolah Station
- During the staged reconstruction of Mooloolah Station (in a similar location to the existing Mooloolah Station) it may be appropriate to develop the western track initially and run services to a western platform
- Eudlo- provide replacement bus connection between Landsborough and Eudlo Station (or Mooloolah, depending on the timing of construction). The frequency of these services would need to match the level of service at the time of construction. Temporary access to the new station would be required, as discussed in **Section 7.6.1**.
- Palmwoods- provide bus connection between Landsborough (or Woombye). The frequency of these services would need to match the level of service at the time of construction. Temporary access to the new station would be required, as discussed in **Section 7.6.1**.
- Woombye- provide bus connection between Nambour and Palmwoods. The frequency of these services would need to match the level of service at the time of construction. Temporary access to the new station would be required, as discussed in **Section 7.6.1**.
- Nambour- it is anticipated that at least one platform will remain open during upgrade works at the station, accommodating CityTrain, TiltTrain and TravelTrain services.

Proposed mitigation - operation

Once the project is completed, no further mitigation measures are expected to be required. The upgrade should significantly improve both passenger and freight rail services, as discussed in **Section 7.5** and **7.6.2**.

Bus services

The project will result in short term increased local demand for Railbus Services during construction. Some bus stops may be temporarily relocated during construction, or permanently relocated as part of improved station precincts. Road network impacts may also influence some bus routes or travel times.

Particular routes that may be affected during construction include the Sunbus 369 (western and eastern loops that travel on Arundell Avenue, and the south western loop that travels on Arundell Avenue and the Woombye Palmwoods Road).

As various low height rail bridges will be removed as part of the project, it may be possible to introduce additional local bus services travelling to:

- the west of Woombye (via the proposed Back Woombye Road overpass)
- the west of Eudlo (via Eudlo School Road, or Highlands Road).

The low height bridge at Palmwoods (over the Woombye Palmwoods Road) would still be a height constraint to the provision of bus services (depending on the size of the bus) and

benefits of the removal or replacement of this bridge, as discussed under **Section 7.6.1**, to bus services should be considered.

For the longer term, the improved capacity for passenger services should result in the Railbus service no longer being required to supplement rail services between Landsborough and Nambour.

The provision of additional feeder bus services to railway stations from Landsborough to Nambour should be considered to help achieve the strategic objectives of the Translink Transit Authority Network Plan discussed in **Chapter 1** of this EIS. These objectives include:

- making services connect
- making services fast, frequent and reliable
- filling the gaps
- making it easy, comfortable and safe.

Proposed mitigation – design

Where roads are impacted by the project, provisions for their reinstatement or improvement are made. Bus connection within the station precincts has also been considered as part of the preliminary design process. Provision for bus services at the railway stations will need to be further developed during future stages of detailed design.

Proposed mitigation - construction

During the construction of the project and new road or rail bridges over roads, temporary alterations to bus routes and timetables may be required. These will need to be considered in the construction traffic management plan. **Chapter 22, Environmental management plans** outlines the principles and objectives for the construction traffic management plan.

Proposed mitigation - operation

Once the construction of the project is completed, no further disruption to existing bus routes is anticipated. As outlined, it may be possible to introduce new bus routes travelling to the west of Eudlo and Woombye, however demand for such services would drive these considerations. Furthermore, timetables for existing and future bus services should integrate with the future rail timetable to help deliver a more efficient and reliable public transport system.

Railbus services

Railbus services should no longer be necessary once the upgrade is completed and the improved rail services are operational. This will result in simplification of timetabling, and clarity of services, as currently, if rail passengers are not familiar with the timetabling their journey times between Landsborough and Nambour may vary significantly.

The road network (pedestrians, vehicles, cyclists, equestrians)

As discussed in **Sections 7.6.1** the project will ultimately result in the construction of new rail over road, and road over rail bridges between Landsborough and Nambour, including:

- Gympie Street North (road over rail)
- Mooloolah Connection Road/ Bray Road (grade separation option, road over rail, Way Street to Jones Street)
- Neill Road, rail over realigned road
- Neill Road, road over rail
- Logwoods Road (rail over road)
- Highlands Road (rail over road)
- Eudlo School Road (road over rail, rail in cut and cover tunnel or similar)
- Paskins Road property accesses (rail over road)
- Leeons Road (road over rail)
- Chevallum Road (rail over road)
- Woombye-Palmwoods Road (rail over road)
- Spackman Lane (rail over road)
- Back Woombye Road (road over rail, existing and future)
- Blackall Range Road (road over rail, replacing existing single lane bridge with two lane bridge)
- Arundell Avenue (rail over road).

In addition to these rail/road crossings, the following road realignments are proposed:

- Neill Road, from the intersection with Bray Road (also slight realignment of the Lornal Court intersection on Neill Road)
- Paskins Road- minor realignment within the existing rail corridor, shown on **Drawing C015**)
- Eudlo Road- realigned to the east of the project, shown on **Drawing SK005**, **C018** and **C019**)
- Chevallum Road, shown on **Drawing C019** and **SK008**
- Spackman Lane, shown on **Drawing C020**
- Back Woombye Road, shown on **Drawing C023** and **SK009.**

Table 7.6.1j lists the considerations for most of these realignments and road crossings, in terms of staging and timing of construction.

The following roads affected by the project are State controlled roads:

- Mooloolah Connection Road
- Neill Road to Eudlo Road (Palmwoods – Mooloolah Road)
- Palmwoods- Mooloolah Road
- Chevallum Road
- Woombye-Palmwoods Road (Woombye Montville Road).

All other roads impacted by the project are Local Government roads, maintained by the SCRC.

During construction, temporary road closures or detours are likely to be required for the roads listed. Permanent reprovision of these roads has been addressed in the project design, also listed and shown in **Drawings SK001** to **SK010**. Furthermore, some properties may temporarily lose access to roads that they use as their primary access, particularly the properties in Eudlo School Road, Toby Court, Leeons Road and Spackman Lane. A construction traffic management plan will be required, and ongoing consultation with the SCRC, local residents, business operators, transport operators, and the local community will be required to ensure up to date information about road network issues is widely available.

In terms of traffic generation, the project is not expected to significantly increase road traffic volumes, that is, all the road based traffic attracted to use the rail line is already on the road but will simply change destination, so that there will only be localised traffic volume changes around the rail stations.

Therefore, forecast road demand has been primarily derived from output from the Sunshine Coast Travel Forecasting Model (SCTFM), which is an EMME/2 model that covers the entire Sunshine Coast municipality. The model was interrogated by SCRC officers with volumes extracted for areas in and around the seven towns. 2026 traffic volumes were supplied for the two hour AM peak, the two hour PM peak, and the 24 hour total. SCRC gave a factor of 0.56 to convert the two hour volumes to a one hour volume for the purpose of this analysis.

The EIS is required to forecast for 2026 and 2046, however, the SCTFM does not provide such a long range forecast. The TransLink Network Plan identifies population growth for The Sunshine Coast from 285,000 in 2005 to 380,000 in 2014, which equates to approximately 3.25% growth per annum. However, the plan goes on to explain that most of the development is expected on the coastal corridor, not in the area affected by the proposed rail upgrade. Therefore, a 2% growth per annum has been applied to the 2026 model outputs as an estimate of what 2046 demands may be.

The former Department of Main Roads undertook a turning volume count in Mooloolah at the Bray Road/ Neill Road intersection in 2005. A comparison of this 2005 count and the 2026 SCTFM flows for this intersection shows that the AM peak shows a 25% overall growth, with the PM showing an overall volume reduction of 1%. These inconsistencies in traffic growth highlight that there may be weaknesses in the SCTFM for the project area.

Figures 7.6a to **7.6q** show the future traffic levels at certain points in the project area.

Figure 7.6a: Landsborough – Gympie Street North 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

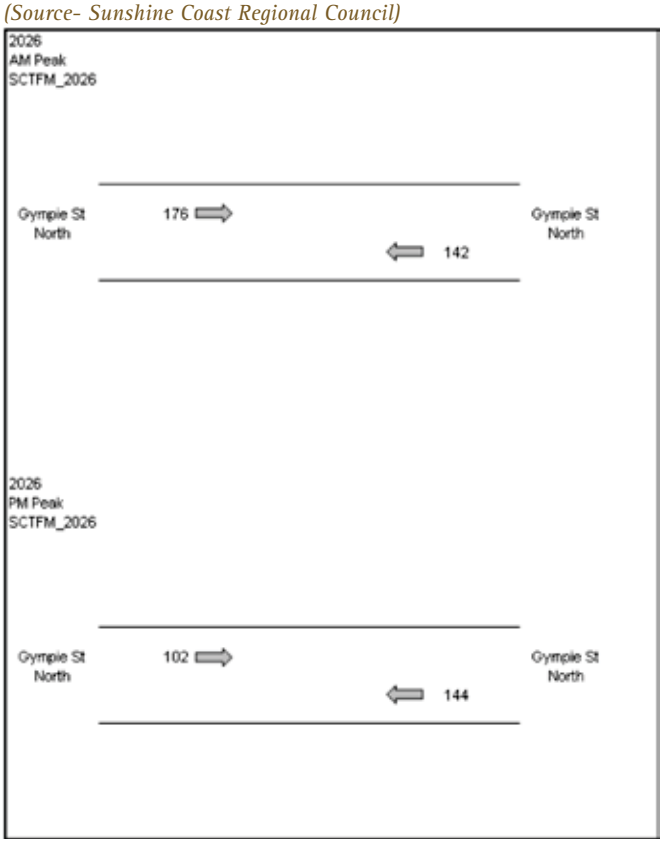


Figure 7.6b: Landsborough – Gympie Street North 2046 Forecast Flows

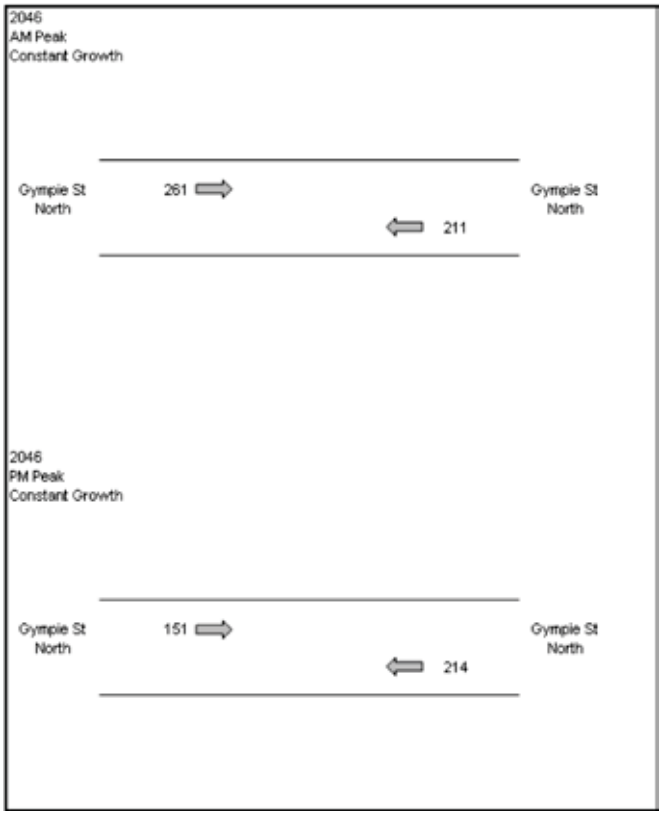


Figure 7.6c: Mooloolah – Bray Road/ Neill Road 2005 (Source – Department of Transport and Main Roads)

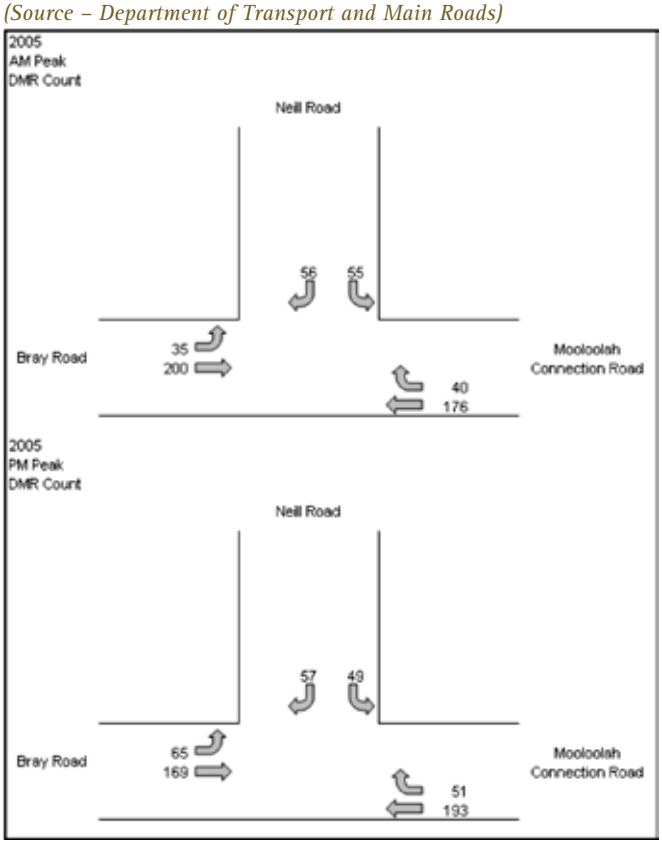


Figure 7.6d: Mooloolah – Bray Road/ Neill Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

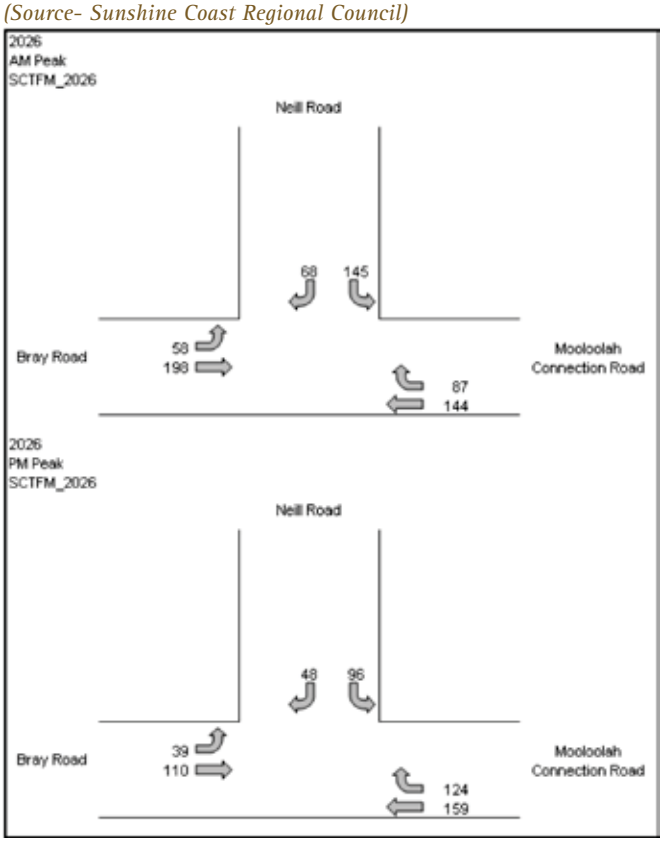


Figure 7.6e: Mooloolah – Bray Road/ Neill Road 2046 Forecast Flows

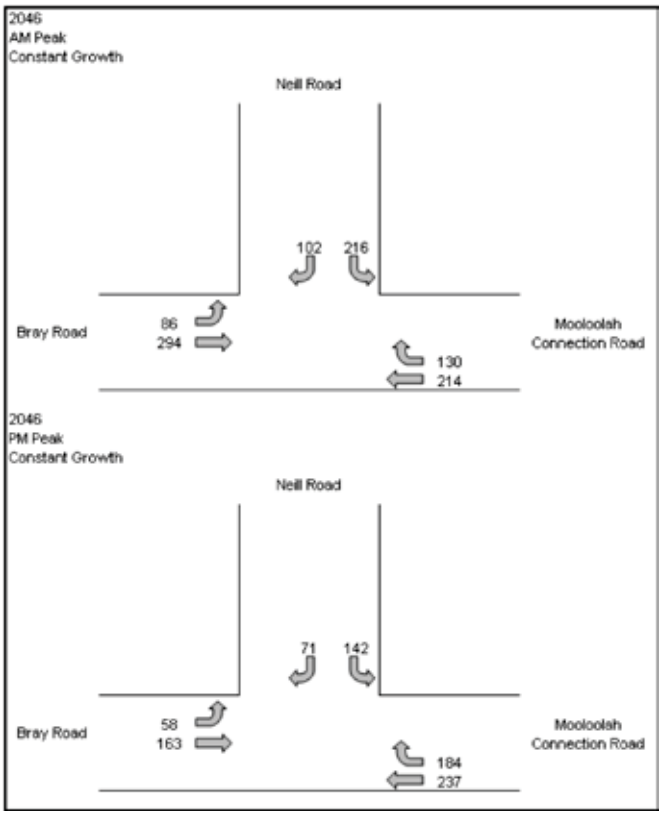


Figure 7.6f: Mooloolah – Neill Road/ Knox Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

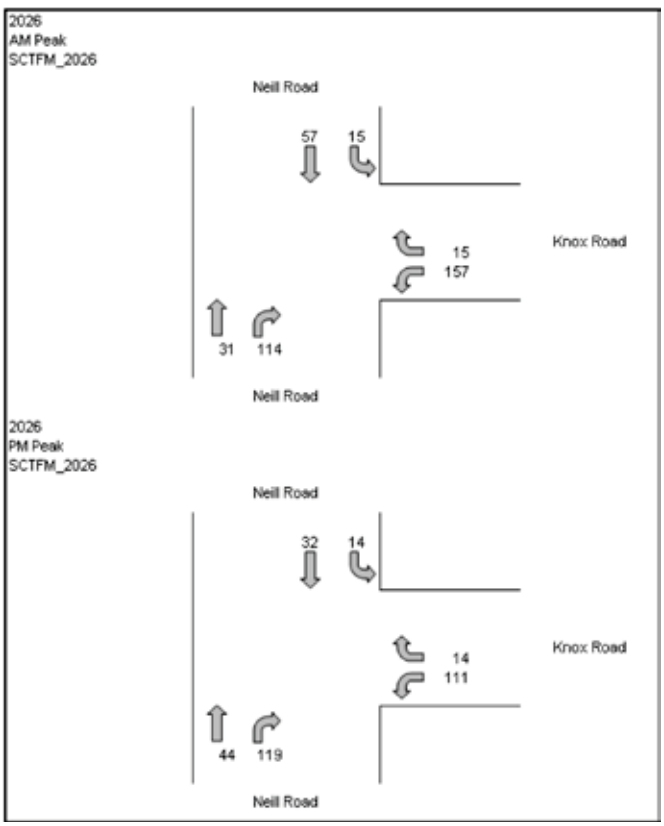


Figure 7.6g: Mooloolah – Neill Road/ Knox Road 2046 Forecast Flows

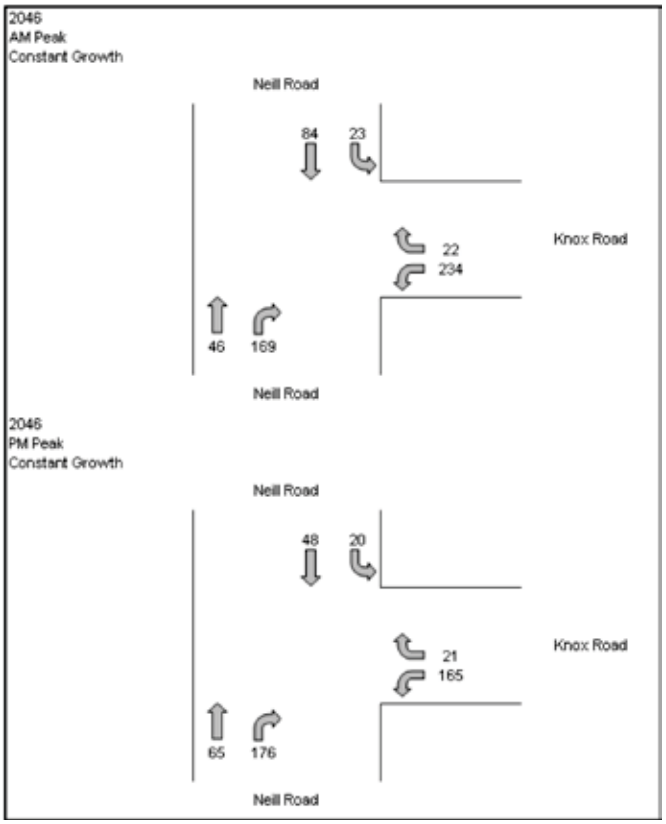


Figure 7.6h: Eudlo – Highlands Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

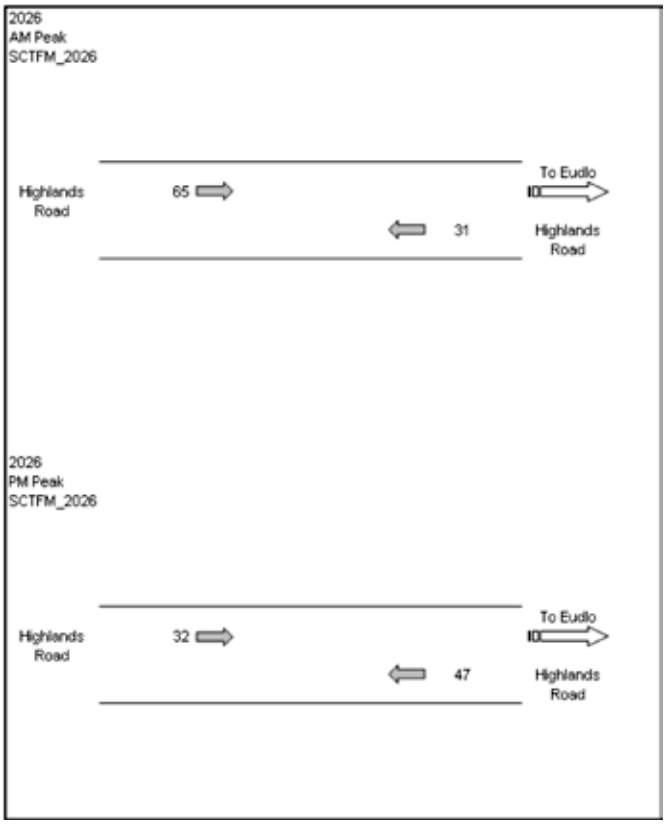


Figure 7.6i: Eudlo – Highlands Road 2046 Forecast Flows

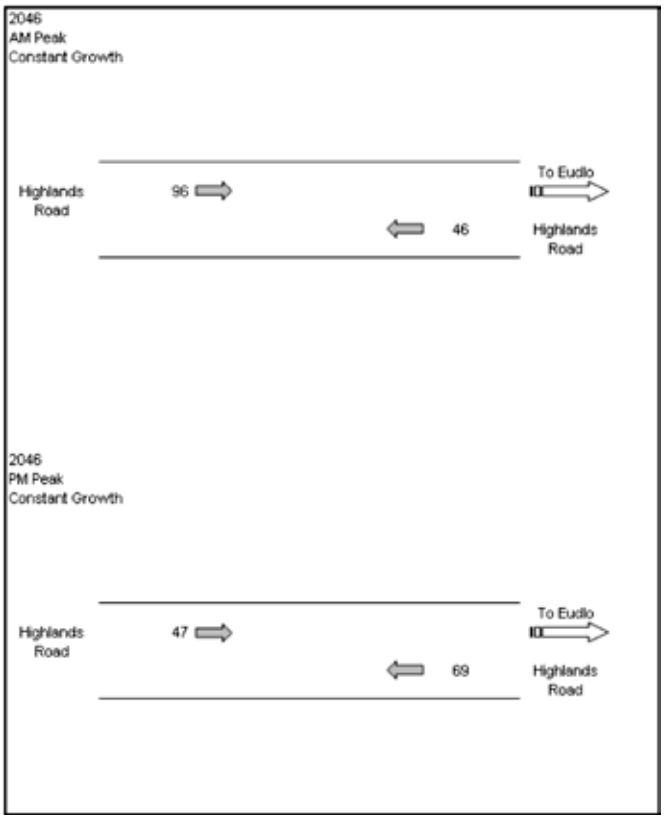


Figure 7.6j: Eudlo – Eudlo School Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

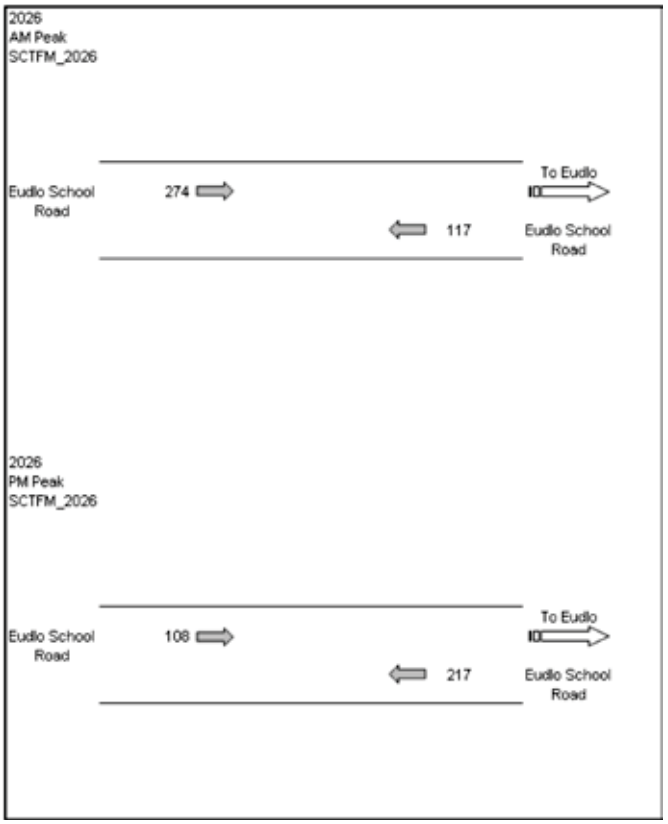


Figure 7.6k: Eudlo – Eudlo School 2046 Forecast Flows

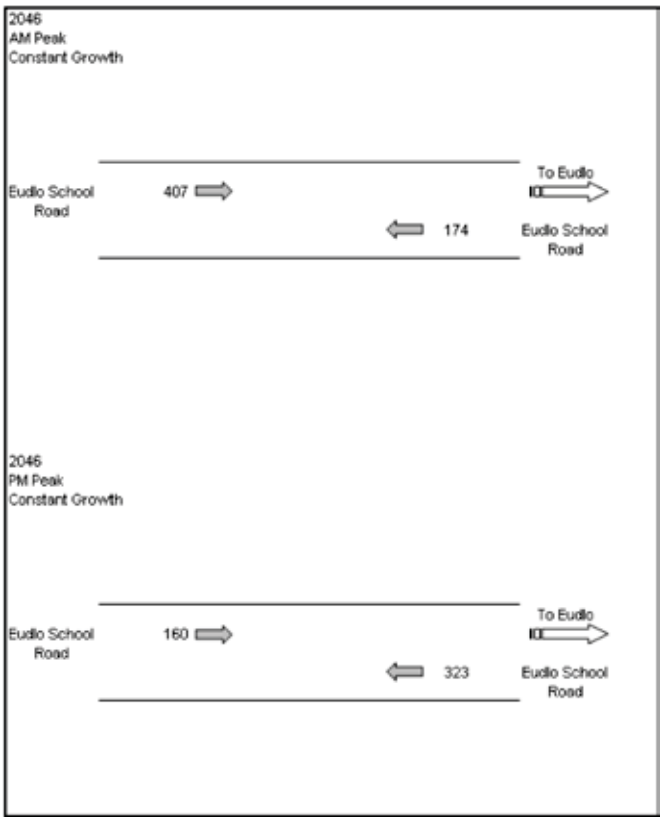


Figure 7.6l: Palmwoods – Palmwoods Mooloolah Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

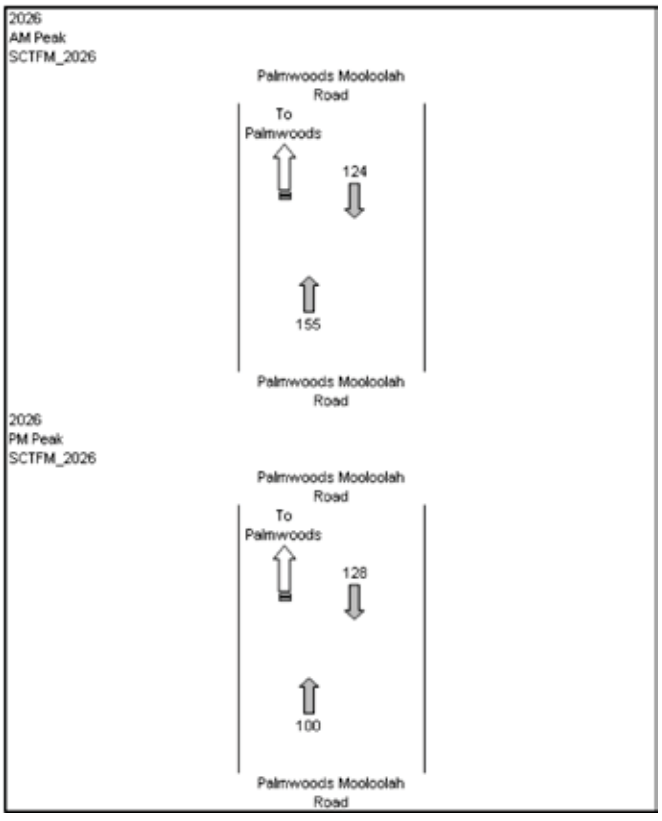


Figure 7.6m: Palmwoods – Palmwoods Mooloolah Road 2046 Forecast Flows

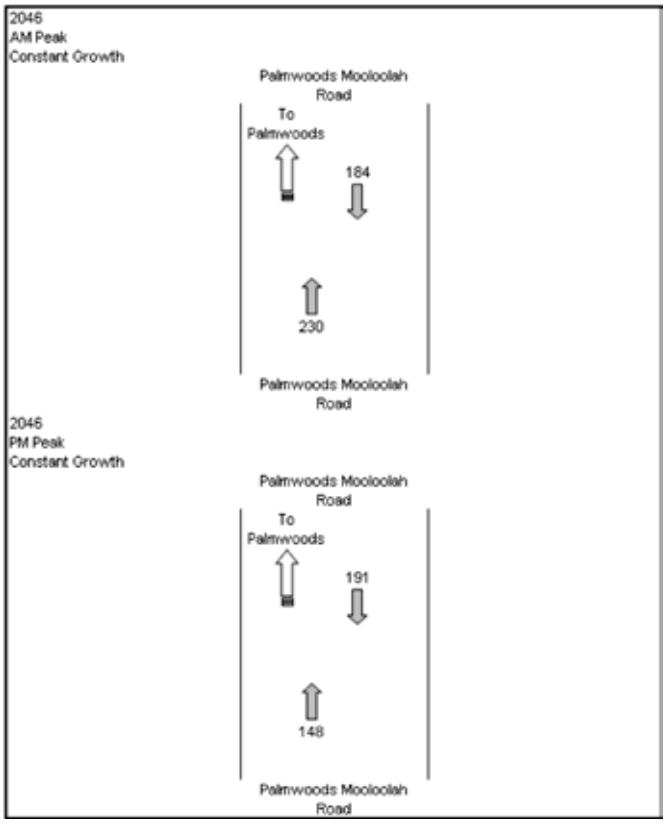


Figure 7.6n: Woombye – Back Woombye Road 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)

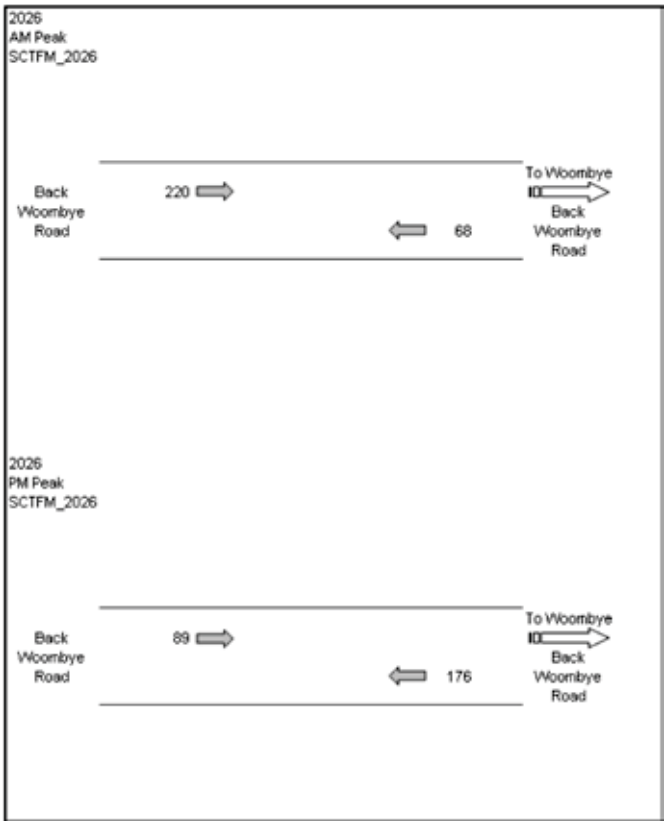


Figure 7.6o: Woombye – Back Woombye Road 2046 Forecast Flows

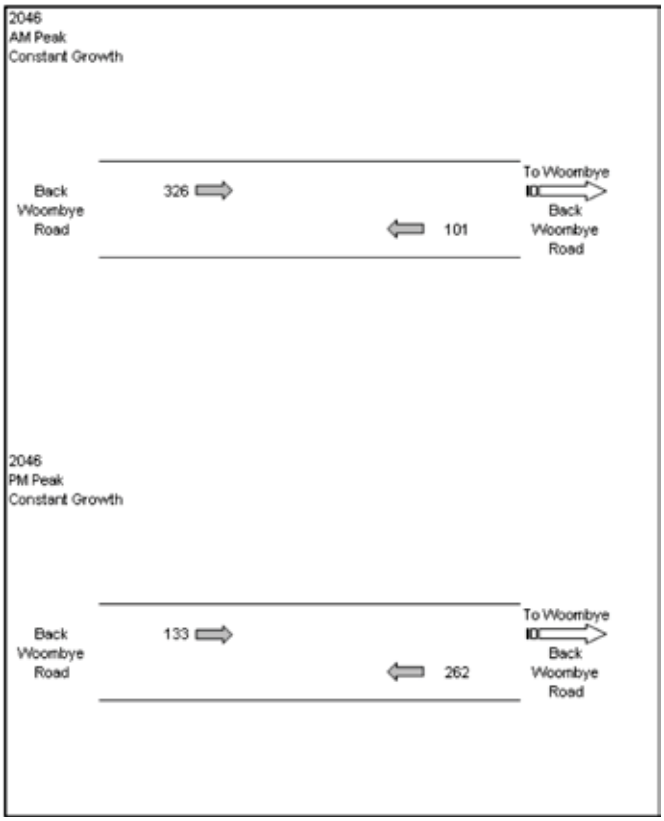


Figure 7.6q: Nambour – Arundell Avenue 2046 Forecast Flows

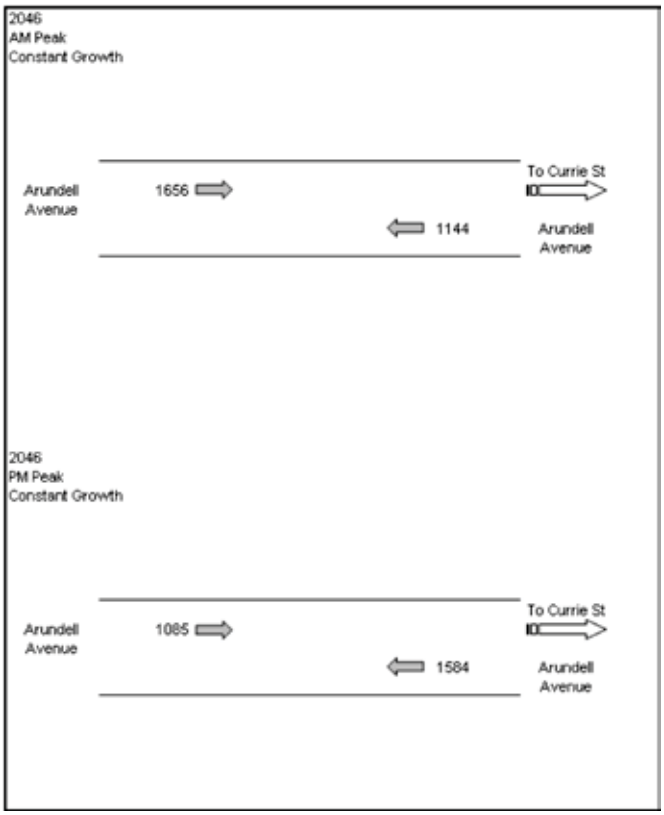
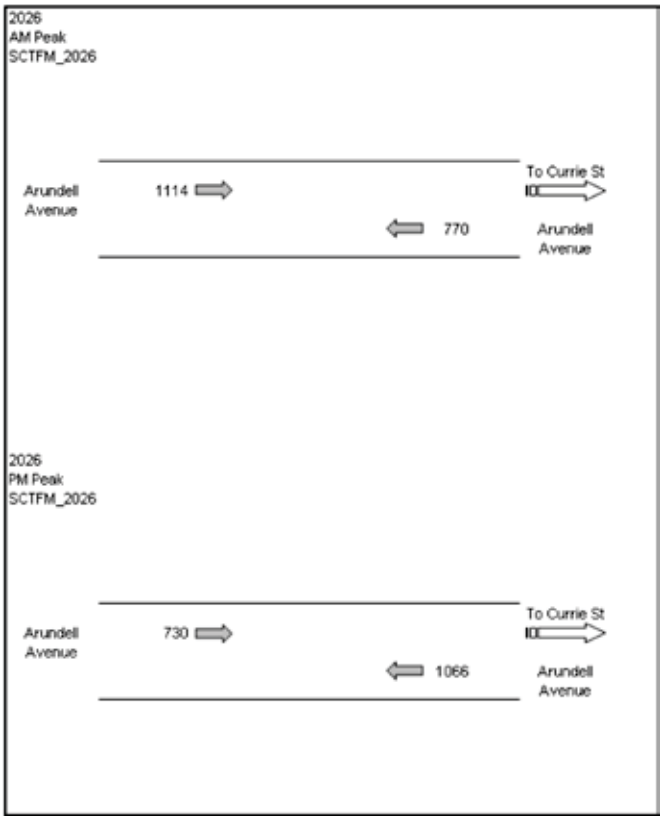


Figure 7.6p: Nambour – Arundell Avenue 2026 SCTFM Flows (Source- Sunshine Coast Regional Council)



7.6.4 Proposed mitigation

Design

The proposed grade separation options are described in **Section 7.6.1**. Whilst these have been identified for preservation until such time that risk and traffic congestion determines their need, their overall benefit to the functionality of the local road network should not be overlooked, and early construction should not be ruled out. Alternate grade separation options considered during the preparation of the EIS are discussed in **Chapter 2, Description of the project** and **Chapter 21, Special management areas**.

The proposed road and rail bridges are discussed in **Section 7.6.1**. Staging opportunities associated with these crossing points are discussed in **Table 7.6.1j**.

Construction

During construction, it may be preferable to create a temporary road to the side of the construction work in order to maintain traffic flow, and maintain a safe worksite. Specific construction traffic management measures would be contained in a Construction Management Plan that would need to be agreed with Council, the Department of Transport and Main Roads, and the construction authority prior to the commencement of construction.

During the construction of the project, the following mitigation methods should be undertaken:

- Temporary roads and alternative routes will be provided as road closures will occur on some roads during construction of the preferred route.
- Construction of new road connections will also commence to provide new permanent access for affected properties on Mooloolah Connection Road, Toby Court, Leeons Road and Palmwoods Mooloolah Road.
- Temporary access will be provided on roads with wide road reserves (using safety barriers, appropriate signage and traffic control).
- Temporary lane closures will allow one lane to remain open for traffic during construction.
- Alternative routes will be provided for roads with limited road reserve during the construction of road-over-rail crossings.
- Machinery, vehicles and equipment used during construction should be kept as close to the preferred route as possible.
- Evaluation of road pavements prior to construction will determine suitability for construction access and act as a baseline for monitoring for acceleration of rehabilitation and maintenance.

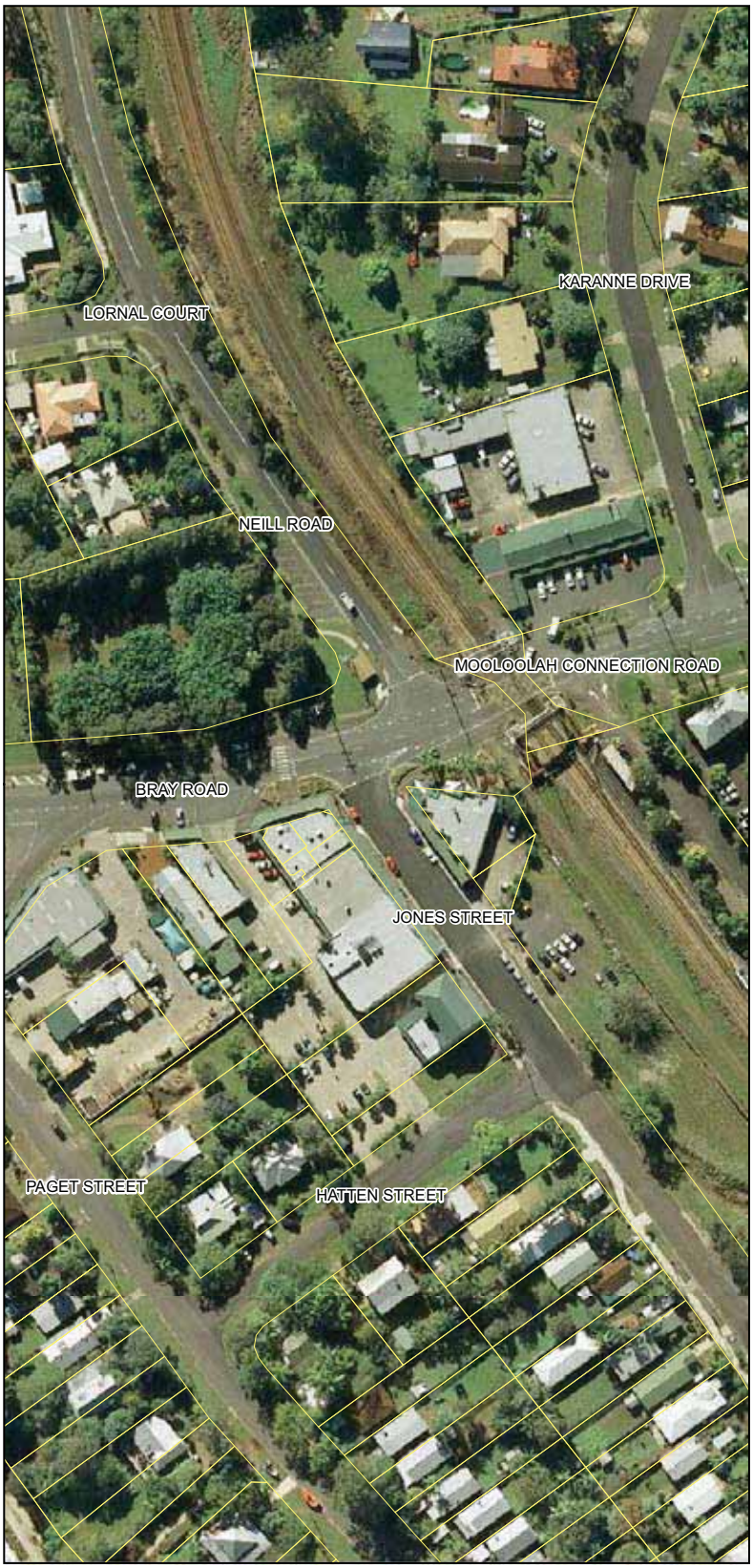
Operation

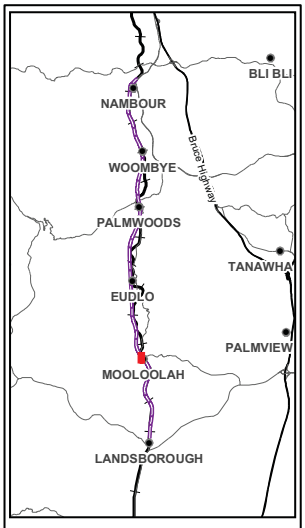
Once the rail and grade separated crossings have been constructed, there will be no further disruption to the road network. Therefore in the longer term, the road network will benefit as a result of the provision of improved road and rail crossings.

The project has been designed with access roads for maintenance crews and emergency services. These access roads are not provided on bridges/structures or where sufficient access can be gained from the existing road network (e.g. Mooloolah town centre, where land uses constrain the corridor width). Access from public roads, private property, and public areas will be managed by secure fencing.

Only one intersection is proposed to be altered by the rail upgrade. That intersection is the existing Bray Road/ Mooloolah Connection Road/ Neill Road priority controlled intersection. The current arrangement can be seen in **Figure 7.6r**.

Figure 7.6r: Bray Rd, Neill Rd and Mooloolah Connection Rd Intersaection





Preferred Route Centreline
Existing Rail Line
Cadastre
Creek

Data sourced from the Department of Transport and Main Roads, and the Department of Environment and Resource Management.

Meters
0 10 20 30 40 50

Queensland Government

Job Title
Landsborough to Nambour Rail Corridor Study - EIS

Drawing Title
Bray Road, Neill Road and Mooloolah Connection Road Intersection

Scale at A4
1:1,500

Figure No
Fig. 7.6r

The model used for the demand forecasting is not detailed enough to enable the likely car based trips to the railway stations. However, it is likely that traffic demand will only change at the immediate location of the entrance into station car parks, hence there is no difference in traffic volumes crossing the OLCs for 'with and without' development scenarios, even in the case of Mooloolah where the station is adjacent to the OLC.

Tables 7.6.4a and **7.6.4.b** show the result of the intersection analysis for the current intersection layout, based on a count undertaken in 2005 by the former Department of Main Roads.

Table 7.6.4a: 2005 AM peak existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	176	5.1	0.093	0.0	LOS A	0
Right	40	5.0	0.066	9.5	LOS A	2
Approach	216	5.1	0.093	1.8	LOS A	2
Neill Road						
Left	55	5.5	0.047	7.3	LOS A	2
Right	56	5.4	0.059	8.7	LOS A	2
Approach	111	5.4	0.059	8.0	LOS A	2
Bray Road						
Left	35	5.7	0.125	6.5	LOS A	0
Through	200	5.0	0.126	0.0	LOS A	0
Approach	235	5.1	0.126	1.0	LOS A	0
All Vehicles	562	5.2	0.126	2.7	Not Applicable	2

Table 7.6.4b: 2005 PM peak existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	193	5.2	0.102	0.0	LOS A	0
Right	51	5.9	0.085	9.5	LOS A	3
Approach	244	5.3	0.102	2.0	LOS A	3
Neill Road						
Left	49	4.1	0.041	7.2	LOS A	1
Right	57	5.3	0.060	8.7	LOS A	2
Approach	106	4.7	0.060	8.0	LOS A	2
Bray Road						
Left	65	4.6	0.125	6.5	LOS A	0
Through	169	4.7	0.125	0.0	LOS A	0
Approach	234	4.7	0.125	1.8	LOS A	0
All Vehicles	584	5.0	0.125	3.0	Not Applicable	3

The degree of saturation statistic is defined as the ratio of demand (arrival) flow to capacity (also know as volume/ capacity, v/c, ratio). Degrees of saturation above 1.0 represent oversaturated conditions (demand volumes exceed capacity), and degrees of saturation below 1.0 represent undersaturated conditions (demand flows are below capacity).

Therefore, as can be seen from the analysis for the existing situation, there are no current capacity problems at this intersection.

Tables 7.6.4c and **7.6.4d** show the results of the analysis for the existing physical layout with traffic demand as per the 2026 SCTFM flows, shown earlier in **Figure 7.6d**.

Table 7.6.4c: 2026 AM peak SCTFM existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	144	4.9	0.076	0.0	LOS A	0
Right	87	4.6	0.161	10.7	LOS A	6
Approach	231	4.8	0.161	4.0	LOS A	6
Neill Road						
Left	145	4.8	0.123	7.4	LOS A	5
Right	68	4.4	0.072	8.8	LOS A	3
Approach	213	4.7	0.123	7.9	LOS A	5
Bray Road						
Left	58	5.2	0.137	6.5	LOS A	0
Through	198	5.1	0.137	0.0	LOS A	0
Approach	256	5.1	0.137	1.5	LOS A	0
All Vehicles	700	4.9	0.161	4.3	Not Applicable	6

Table 7.6.4d: 2026 PM peak SCTFM existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	159	5.0	0.084	0.0	LOS A	0
Right	124	4.8	0.185	9.0	LOS A	7
Approach	283	4.9	0.185	3.9	LOS A	7
Neill Road						
Left	96	5.2	0.081	7.0	LOS A	3
Right	48	4.2	0.049	8.6	LOS A	2
Approach	144	4.9	0.081	7.5	LOS A	3
Bray Road						
Left	39	5.1	0.081	6.5	LOS A	0
Through	110	5.4	0.081	0.0	LOS A	0
Approach	150	5.3	0.081	1.7	LOS A	0
All Vehicles	577	5.0	0.185	4.2	Not Applicable	7

As the 2026 SCTFM shows little difference in traffic flow from the 2005 counts, it is understandable that there are still no capacity problems in the future year.

As previously stated, the 2046 analysis is based on a 2% growth per annum from the 2026 SCTFM outputs, as per **Figure 7.6e**. **Table 7.6.4e** and **Table 7.6.4f** contain the results of the intersection analysis for 2046.

Table 7.6.4e: 2046 AM peak SCTFM existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	214	5.1	0.113	0.0	LOS A	0
Right	130	5.3	0.323	15.3	LOS A	14
Approach	345	5.2	0.323	5.8	LOS A	14
Neill Road						
Left	216	5.1	0.204	8.0	LOS A	8
Right	102	4.9	0.136	10.3	LOS A	5
Approach	318	5.0	0.204	8.8	LOS A	8
Bray Road						
Left	86	4.7	0.204	6.5	LOS A	0
Through	294	5.1	0.204	0.0	LOS A	0
Approach	380	5.0	0.204	1.5	LOS A	0
All Vehicles	1043	5.1	0.323	5.1	Not Applicable	14

Table 7.6.4f: 2046 PM peak SCTFM existing layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Through	237	5.1	0.126	0.0	LOS A	0
Right	184	4.9	0.320	11.0	LOS A	14
Approach	421	5.0	0.320	4.8	LOS A	14
Neill Road						
Left	142	4.9	0.120	7.2	LOS A	5
Right	71	5.6	0.090	9.8	LOS A	3
Approach	213	5.2	0.120	8.1	LOS A	5
Bray Road						
Left	58	5.2	0.119	6.5	LOS A	0
Through	163	4.9	0.119	0.0	LOS A	0
Approach	221	5.0	0.119	1.7	LOS A	0
All Vehicles	855	5.0	0.320	4.8	Not Applicable	14

The 2046 analysis shows that all movements in the AM and PM peak operate well within capacity.

Table 7.6.4g and **Table 7.6.4h** show the results of the analysis for the proposed layout of the grade-separation, with alternative priorities and a 60 m turning slot for left turning traffic from Bray Road to Neill Road and right turning traffic from Neill Road to Bray Road, with traffic demand as per the 2026 SCTFM flows, shown earlier in **Figure 7.6d**.

Table 7.6.4g: 2026 AM peak SCTFM proposed layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Left	144	4.9	0.126	8.4	LOS A	0
Through	87	4.6	0.126	0.0	LOS A	0
Approach	231	4.8	0.126	5.2	LOS A	0
Neill Road						
Through	145	4.8	0.077	0.0	LOS A	0
Right	68	4.4	0.059	9.4	LOS A	2
Approach	213	4.7	0.077	3.0	LOS A	2
Bray Road						
Left	58	5.2	0.057	9.1	LOS A	2
Right	198	5.1	0.388	15.2	LOS A	20
Approach	256	5.1	0.388	13.8	LOS A	20
All Vehicles	700	4.9	0.388	7.7	Not Applicable	20

Table 7.6.4h: 2026 PM peak SCTFM proposed layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Left	159	5.0	0.154	8.4	LOS A	0
Through	124	4.8	0.154	0.0	LOS A	0
Approachw	283	4.9	0.154	4.7	LOS A	0
Neill Road						
Through	96	5.2	0.051	0.0	LOS A	0
Right	48	4.2	0.045	9.6	LOS A	2
Approach	144	4.9	0.051	3.2	LOS A	2
Bray Road						
Left	96	5.2	0.041	9.4	LOS A	0
Right	48	4.2	0.210	12.9	LOS A	2
Approach	144	4.9	0.210	12.0	LOS A	2
All Vehicles	577	5.0	0.210	6.2	Not Applicable	8

This analysis shows that this arrangement would have plenty of spare capacity in 2026.

Table 7.6.4i and **Table 7.6.4j** contain the results of the intersection analysis for 2046.

Table 7.6.4i: 2046 AM peak SCTFM proposed layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Left	214	5.1	0.189	8.4	LOS A	0
Through	130	5.3	0.189	0.0	LOS A	0
Approach	345	5.2	0.189	5.2	LOS A	0
Neill Road						
Through	216	5.1	0.114	0.0	LOS A	0
Right	102	4.9	0.102	10.0	LOS A	4
Approach	318	5.0	0.114	3.2	LOS A	4
Bray Road						
Left	86	4.7	0.093	9.7	LOS A	3
Right	294	5.1	0.788	31.1	LOS C	67
Approach	380	5.0	0.788	26.2	LOS C	67
All Vehicles	1043	5.1	0.788	12.3	Not Applicable	67

Table 7.6.4j: 2046 PM peak SCTFM proposed layout analysis results

Turn	Demand Flow (veh/h)	%HV	Degree of Saturation (v/c)	Average Delay (sec)	Level of Service	95% Back of Queue (m)
Mooloolah Connection Road						
Left	237	5.1	0.230	8.4	LOS A	0
Through	184	4.9	0.230	0.0	LOS A	0
Approach	421	5.0	0.230	4.7	LOS A	0
Neill Road						
Through	142	4.9	0.075	0.0	LOS A	0
Right	71	5.6	0.079	10.5	LOS A	3
Approach	213	5.2	0.079	3.5	LOS A	3
Bray Road						
Left	58	5.2	0.068	10.1	LOS A	2
Right	163	4.9	0.406	18.5	LOS A	20
Approach	221	5.0	0.406	16.3	LOS A	20
All Vehicles	855	5.0	0.406	7.4	Not Applicable	20

The proposed intersection arrangement shows that the degree of saturation for the Bray Road right turn movement in the 2046 AM Peak is higher than any degree of saturation for the same design year with the existing layout retained. A degree of saturation of 0.788 still has sufficient spare capacity to operate beyond 2046. However, providing additional capacity is not the primary design criteria of the intersection improvement. Rather, it has been designed to significantly improve the safety of vehicles and pedestrians using the intersection, as it has removed the risk associated with a level crossing.

7.6.5 Construction access and construction traffic

The construction phase of the project will generate the most noticeable impacts to the provision of public transport services, the local road network, and the movement of traffic, pedestrians and cyclists within the project area. Whilst these impacts are not permanent, it is important to consider them in the context of future planning and implementation of the construction process, as the construction process can run for several years. The various elements of construction considered include:

- geotechnical investigations (requiring site access for drill rigs, usually mounted on small trucks or utility vehicles)
- clearance of vegetation
- earthworks (excavation of cuttings and construction of embankments
- construction of bridges
- excavation of tunnels
- track laying (including foundations, ballast, tracks)
- station construction (including platforms, station buildings, lifts, pedestrian over bridges, car parks, bus interchange and pedestrian accesses)
- electrification, and installation of signalling
- commissioning.

The extent of disruption to the local community can be minimised, but not removed, through careful planning and staging of construction activities. **Chapter 2, Description of the project** outlines several construction staging options for future consideration.

Construction access

Wherever possible, construction access should be routed within the project area. **Figure 7.6s** and **Table 7.6.5** identifies where construction access may be considered. Further access points may be identified as the project nears construction, and as land required for the project is protected and acquired.

Traffic and transport management

A negative impact on local traffic and transport during the operational phases is highly unlikely. However, if maintenance or repair works requires excavation or additional construction, then the management plan as described for 'Construction' will be applicable.

Table 7.6.5: Construction access requirements

ID	Route Description	Area Accessed	Issues, Constraints, Construction Elements
A	Via Steve Irwin Way, Caloundra Street, Tytherleigh Avenue, Gympie Street North	Landsborough to southern portal of Rose Road tunnel (to the north)	This construction route allows for access from the south. As the majority of construction in this area will be conducted in close proximity to the existing operational rail, there will be limits to the type of construction plant that can be accommodated via this route. It is not likely that tunnelling equipment could be brought in via this route.
B	Via Mooloolah Connection Road, crossing over the level crossing, passing down Jones Street, and entering the area identified for the project to the south of Mooloolah Station, on the western side of the existing railway.	Mooloolah station to southern portal of Rose Road tunnel (to the south)	This construction route is constrained by the overhead wiring at the open level crossing on Mooloolah Connection Road/ Bray Road. If the proposed grade separation option was constructed as an early component of the project, this constraint could be alleviated; however construction traffic would possibly then have to travel down Paget Street. A timber bridge to the south on Paget Street has also been identified from a heritage perspective, and is not likely to be suitable for construction traffic access. Refer to **Chapter 10, Cultural heritage** for further information. Tunnelling equipment would need to be brought in via this route, to construct the tunnel under Rose Road. Temporary crossings of the south branch of the Mooloolah River may also be required. These could be developed to utilise the permanent bridge requirements for the project in this area.
C	Via Mooloolah Connection Road	Mooloolah Connection Road to the Mooloolah River (to the north)	This short length of construction route would require the early construction of the Neill Road realignment, and provide for the installation of the southern footings of the Mooloolah River bridge. It is also likely that bridge decking and other bridge elements would be brought in from this direction.
C	Via Mooloolah Connection Road, crossing over the level crossing, turning north onto Neill Road, and accessing and constructing the area to the south, prior to the railway cutting being constructed under Neill Road.	Mooloolah River, to northern section of Neill Road (to the south)	This construction route requires the early realignment of Neill Road. It also involves a low height single lane bridge, which is prone to inundation during flood events. It may be necessary to consider replacement or improvement of this bridge, in consultation with the SCRC. This construction approach would also require temporary realignment of Neill Road (northern crossing point) to the north of its existing location to allow construction of the railway cutting to proceed. This would allow access to the northern footings of the Mooloolah River bridge.
D	Via Mooloolah Connection Road, crossing over the level crossing, turning north onto Neill Road, and accessing and constructing the area to the north, after the railway cutting is constructed under Neill Road.	Northern section of Neill Road to the northern portal of The Pinch Lane tunnel, Eudlo (to the north)	As for above. This construction route will also require the movement of tunnelling equipment, to construct the tunnel under The Pinch Lane.
E	Nambour Connection Road, Woombye Palmwoods Road, Chevallum Road, Eudlo Road. Toby Court extension, south of Paskins Road AND temporary at grade crossing of the existing railway, between Paskins Road and Eudlo Road	Palmwoods south to northern portal of the Pinch Lane tunnel, Eudlo (to the south)	This construction route benefits from the early construction of the Toby Court extension, and a temporary at grade crossing point of the existing railway. Early realignment of the section of Eudlo Road would also provide traffic and road safety benefits. This access would be used to construct between Palmwoods and Eudlo, including the transport of machinery for the two (proposed) cut and cover tunnels, and the materials for the construction of Eudlo station. The construction route would follow the area identified for the project. This route is constrained by the overhead wires at the proposed temporary at grade crossing point, and the existing and planned high voltage powerlines that cross the project area north of Eudlo. Safety measures and procedures would be required if the temporary at grade crossing point was to be implemented as part of the construction. Some of these areas are prone to inundation during flood events, particularly where bridge elements are proposed.

Figure 7.6s: Possible Construction Access

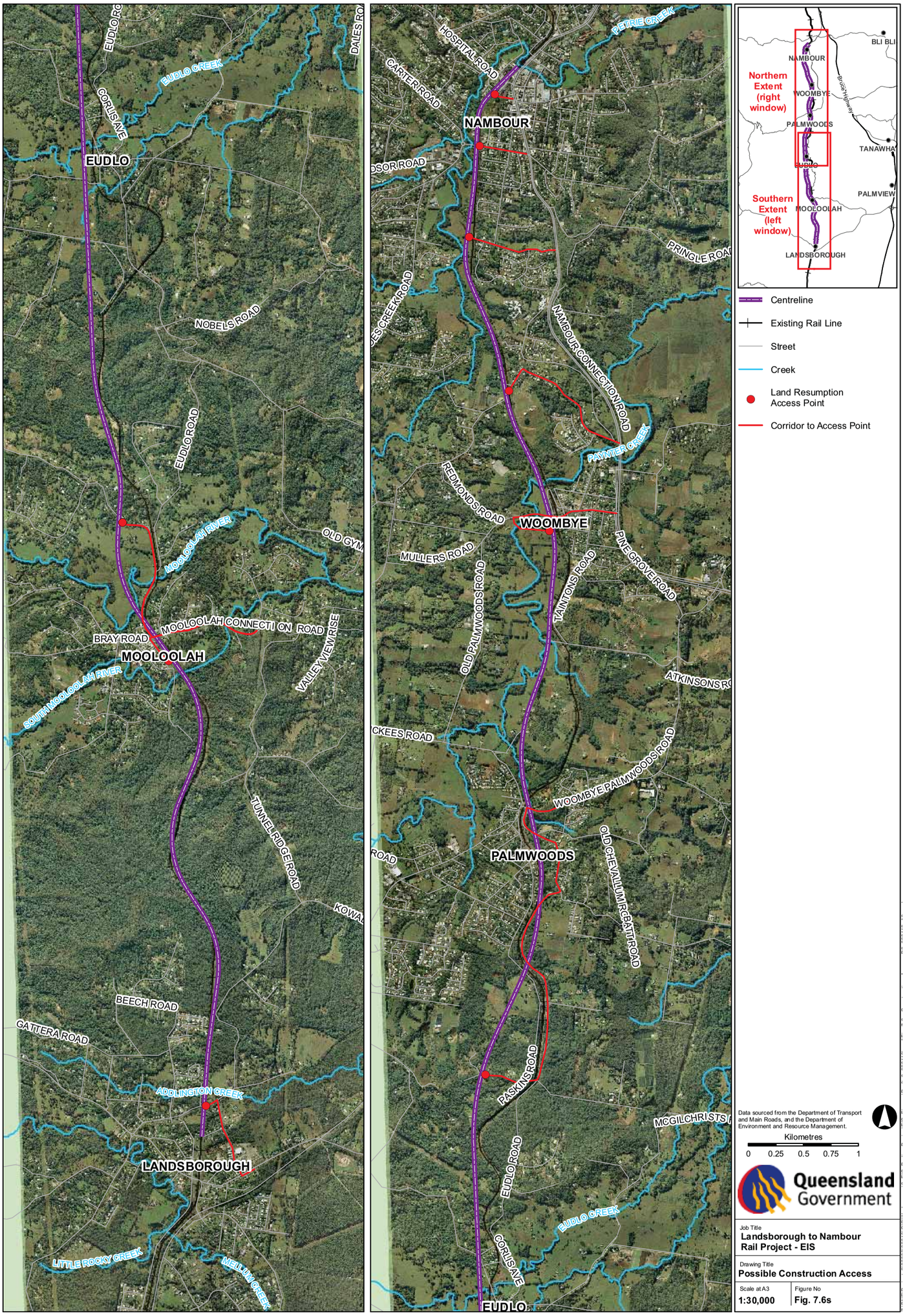


Table 7.6.5.1: continued

ID	Route Description	Area Accessed	Issues, Constraints, Construction Elements
F	Nambour Connection Road, Woombye Palmwoods Road, Chevallum Road.	Palmwoods bridge and station elements (to the north and south)	This construction route would benefit from the early realignment of Chevallum Road.
G	Nambour Connection Road, Blackall Street, new Back Woombye Road overpass over rail	Woombye to the northern extent of the Palmwoods bridge (to the south)	This construction route would require the early construction of the Back Woombye Road overpass, replacing the existing low height underpass. The construction route would follow the area identified as required for the project. This construction route would also be used to construct Woombye station, and the southern section of the proposed Paynter Creek rail bridge.
H	Nambour Connection Road, Cobbs Road, Blackall Range Road	Blackall Range Road	This access route would be used to construct some elements of the replacement Blackall Range Road bridge over the railway. There is the potential for this road bridge to be closed fur the duration of the rail construction (at this location proposed for the full four track requirement due to construction complexities) therefore it is essential that the Back Woombye Road overpass is constructed prior to the closure of this bridge. Safety and road traffic considerations may however dictate the earlier replacement of this road bridge, and if so, consultation with council will be required to determine how best to replace the bridge, and still construct the project.
I	Nambour Connection Road, Erbacher Road Or Nambour Connection Road, Lamington Terrace, and Arundell Avenue	Area between Nambour station, and north of Paynter Creek	Access to this area is significantly constrained due to the close location of the project to the existing operational railway, and the terrain on the western side of the project area. A temporary access may be required from Erbacher Road to the corridor, to allow for construction works to occur. Alternatively, access may be obtained down the western side of the project area via Arundell Avenue, though the existing rail bridge has a clearance of 4.6 metres. This may also be used for construction access for areas to the west of Nambour station, in the Price Street area. Areas to the west of the existing railway are prone to inundation and may not be trafficable during wet weather. Additionally, Petrie Creek will be a significant constraint on movement in this area.
J	Nambour Connection Road, Lamington Street, Currie Street Mill Street and	Eastern side of Nambour Station	Access to this area for construction of elements of Nambour station on the eastern side.

Prior to construction, access to the project area will be required for geotechnical investigations, and ground survey.

Access will also be required for vehicles and workers involved in decommissioning the existing railway, once the project is commissioned.

Overdimensional loads

The Transport Infrastructure (Rail) Regulation 2006 requires approval from QR Limited Network access prior to any 'overdimensional loads' being moved across QR Limited Infrastructure. According to the QR Limited Network access website[1], 'overdimensional loads' include:

- overweight loads where
  - the axle mass for any single axle of the vehicle is over 12 tonnes
  - the total of all axle masses for any 9 metres of the vehicle's length is over 48 tonnes
  - the total of all axle masses for the vehicle is over 105 tonnes
- overheight loads where
  - the vehicle is higher than existing height barriers associated with electrified tracks or height restrictions of 5.2 metres
- long loads where
  - a vehicle is over 35 metres long
- wide loads where
  - a vehicle is wider than 5.5 metres
  - a vehicle is wider than the distance between the posts of a height barrier for a rail crossing.

It is likely that some construction machinery will exceed these dimensions, and therefore require further planning and consideration with QR Limited Network Access.

1 *http://www.networkaccess.Queensland Rail.com.au/customer/overdimensional/overdimensional.asp*

Construction materials

Construction of the project will require the movement of the following materials:

- fill and spoil
- crushed rock ballast
- steel rail and electrification masts
- concrete sleepers
- station building materials (timber, steel, concrete, glass, plastics)
- bridge deck components (assumed to be pre-cast concrete)
- blockwork for retaining walls
- cleared vegetation
- topsoil
- water
- pre-cast culverts
- materials for pavement construction (road bridges and realignments)
- noise barrier materials
- conduits and cables for communications, signalling and electrification of the line.

Chapter 5, Geology and soils discuss potential sources of fill from within the project area, that is, areas where preliminary geotechnical observations have identified ground conditions may be suitable. Based on preliminary construction estimates, the earthworks balance shows 900,000 m^3 of material to be removed, and 650,000 m^3 of fill required. **Chapter 5, Geology and soils** indicates that approximately two thirds of the project area consists of material potentially suitable for reuse as fill. Further geotechnical investigations will be required to determine this suitability, however it could be possible to source the majority of construction fill material from within the project area.

Potential sources for ballast have been identified to the north east of Nambour, at the Parklands blue metal reserve, or railed in from distant quarry sources. Steel rail will be delivered in long welded lengths by rail. Pre-stressed concrete sleepers will be railed to local sidings and unloaded for final delivery to track by truck, or alternatively delivered direct to track laying machine by rail (depending on proposed track laying technique at the time).

Other materials identified will need to be sourced at the time of construction. These are likely to come from outside the project area, and the Sunshine Coast region. Therefore long distance movement of materials is likely to be required via the Bruce Highway.

The transport of these materials will impact on the local and Sunshine Coast regional road network including:

- the Bruce Highway
- Steve Irwin Way
- Mooloolah Connection Road
- Nambour Connection Road.

It may be feasible in some areas to consider the movement of construction materials via rail. This would however require special scheduling of services, and provision of adequate loading/ unloading facilities within the project area. Although desirable from a road network perspective, it is likely to be less desirable from a rail operator perspective.

Suitability of the road network for construction site access

The construction access routes identified in **Table 7.6.5** indicate several locations where low height bridges, overhead wiring and single lane bridges may act as constraints to the movement of construction vehicles and materials. In addition, the following north- south road links have been identified as potentially unsuitable for use by construction traffic, due to their steep grade, or winding and undulating conditions:

- Tunnel Ridge Road (movement of construction materials and construction plant)
- sections of Eudlo Road (Mooloolah Eudlo Road) particularly south of Eudlo where it is winding, and single lane bridges.

Other roads providing east-west access that have been identified as less desirable for construction traffic movements include:

- Old Gympie Road, Mooloolah
- Ilkley Road
- Chevallum Road (eastern section).

Construction traffic types

The following construction traffic types are considered likely for this project:

- track laying equipment
- dozers, excavators, loaders, scrapers for earthmoving
- excavators for trenching
- crusher for materials processing
- ADTs (Articulated Dump Trucks), trucks and trailers for hauling materials
- compressors and drill rigs for rock excavation (blasting)
- road headers or tunnel boring machines (TBMs)
- graders for trimming and placing materials
- rollers, water carts and pumps for earthworks compaction
- cranes
- concrete mixers, trucks, pumps and vibrators for concrete works

- generators and lighting plants
- water trucks (e.g. for dust suppression)
- pavement laying machinery
- site worker vehicles.

Volume of traffic generated by the workforce

At this early stage of the project it is not possible to accurately estimate the volume of construction traffic, as the exact construction methods and staging are not yet known. As a guide, based on the volume of excess fill that will need to be removed, (900,000 m^3 excavated – 650,000 m^3 fill required = 250,000 m^3 excess material), then a single dump truck with a 12.5 m^3 capacity would require 20,000 movements, which could be potentially halved by using truck and trailer to remove the excess fill. However, the utilisation of the project area for north-south construction traffic movements has been identified as a desirable outcome for the construction phase of the project. Additionally, major access points have been defined in **Table 7.6.5**. A construction traffic management plan will need to be implemented, allowing for the management of these additional traffic flows, particularly where existing level crossings are located.

Wherever possible, it would be appropriate for construction workers to be encouraged to use rail transport. However, depending on their work schedules, and their place of residence, this may not be a realistic objective.

Due to the volume of materials that can be excavated and re-used, a mitigation of the construction traffic generation would be to stockpile the materials at strategic locations in the project area, so that construction traffic movements are limited to on-site movements.

Climate considerations

Implications of the project on the State's emission profile have been considered as part of **Chapter 16, Air quality.** Generally, the provision of improved public transport infrastructure is envisaged to significantly offset carbon emissions produced in Queensland.

7.6.6 Transport-related environmental issues

The following transport related environmental issues have been identified:

- Noise and dust generated during construction and operation (addressed in **Chapter 15**) are expected to have a **negligible/ moderate adverse** and **low adverse** residual impact respectively.
- Vegetation clearing in road and rail reserves (addressed in **Chapter 12)** is a potential impact that has been assessed as a **moderate adverse** impact (short-term) and **low adverse** impact (long term).
- The risks of weed invasion and fire in road and rail reserves (addressed in **Chapters 13** and **19**) have been assessed as a **low adverse.**
- The potential for Greenhouse gas reductions due to mode shift (private vehicle to rail) (addressed in **Chapter 16**) is assessed as a **beneficial** impact.
- The potential for spills of fuels or dangerous goods (addressed in **Chapter 19**) is a risk, however it can be readily managed through health and safety management systems.

7.7 Summary and conclusions

The transport impacts and benefits of the project have considered the following:

- existing and projected passenger and freight rail services
- existing and proposed rail infrastructure
- the existing road network, and upgrades or modifications to the road network
- existing and projected demand for public transport and road based transport across the Sunshine Coast region
- construction traffic (access, types and materials) and its impact to road traffic, and public transport
- decommissioning and proposed reuse of the existing railway for recreational trails.

Strategies have been proposed to mitigate the impacts of construction and operation, and their residual impacts have been evaluated in **Table 7.7**.

Table 7.7: Summary of impacts and mitigation

Potential Impact	Description and Mitigation (where appropriate)	Residual Impact Significance
Design		
Rail services	The preferred route has been designed to minimise the need for crossings of the existing rail. Where crossings are designed, these are at the same grade, or at an appropriate clearance for constructability and staging. Track possessions should be limited.	Beneficial (local, regional, State, long-term)
Construction		
Passenger rail services	Replacement bus services may be required for passengers for connection between stations. Alternate station access will be required for some stations during construction.	Moderate Adverse (local, short-term)
Bus services	Temporary alteration of bus routes, and some bus stops, particularly at stations.	Low Adverse (short-term, local)
Effects on road network	The impacts of the project during the construction phase will be mitigated by the following measures: Provide temporary roads or alternative routes Lane closures to allow one lane to open Temporary access on the side of the road with wide road reserves Use of safety barriers, appropriate signage and traffic control during construction Machinery, vehicles and equipment used during construction should be kept as close to the construction site as possible.	Low Adverse (short-term, local)
Upgrade/Closure of existing Bridges	Alternative routes during construction of road-over-rail crossing on Blackall Range Road. Staging and timing will need to be carefully determined during detailed design and construction planning. Construction should be during off-peak hours when there is less traffic on roads Avoid closure of Arundell Avenue by closing one lane only Safety barriers, appropriate signage and traffic control should be provided.	Low Adverse (short-term)
Construction Access	Construction site access listed in **Table 7.6.5** to be reviewed as detailed design and construction planning progresses. Construction site access should be limited to these areas, and utilise the project area as much as possible for transport of construction vehicles, spoil, fill and construction materials. Investigate the potential for transport of construction materials via rail, subject to loading and unloading requirements, and operating schedules.	Low Adverse (short term)
Construction Traffic	Construction traffic volumes at this point in time are unknown. Construction traffic is likely to generate noise, air quality and traffic congestion impacts. Construction traffic volumes will be minimised. Routes will be determined to limit traffic on residential streets and on roads subject to congestion. Where unavoidable, construction traffic will be limited to appropriate times on residential streets and on roads subject to congestion.	Low Adverse (short term)

Table 7.7: continued

Potential Impact	Description and Mitigation (where appropriate)	Residual Impact Significance
Operation		
Rail service capacity frequency and travel times	The project will significantly improve rail capacity, travel times and allow for increased service frequencies between Landsborough and Nambour. Combined with proposed upgrades between Caboolture and Landsborough, these projects have the potential to deliver more than a 17 minute travel time saving, bringing the current Caboolture-Nambour travel time down from 55 minutes to 37 minutes and 20 seconds.	Beneficial
Freight rail services	The project should provide for increased freight capacity, and thus allow for a greater proportion of north-south freight movements to travel via rail.	Beneficial (regional, State, long term)
Bus services	Permanent relocation of some bus stops where associated with new stations. Improved Interchange Some of the improved road/ rail crossings may present opportunities for more bus routes travelling west of Nambour and Eudlo, however this would be subject to demand.	Negligible and Beneficial (long-term, local and regional)
Effects on road network	Grade separation of existing level crossings Improved connectivity (i.e. replacement of low height bridges or substandard road underpasses).	Beneficial (long-term, local, regional)
Open Level Crossings (OLCs)	Grade separation options have been identified for Gympie Street North (Landsborough) and Mooloolah Connection Road/ Bray Road (Mooloolah). The timeframe for their implementation will be subject to risk and traffic congestion considerations. Two scenarios have been considered: Grade separation prior to, or at the time of railway construction Grade separation options preserved, open level crossings retained If these grade separation options are constructed prior to or during the project construction, this may alleviate some of the construction traffic related issues discussed in **Section 7.6**. The interim retention of existing level crossings may provide perceived access benefits in the short term, however the micro-simulation analysis in Section 7.6.1 shows that as road and rail transport tasks grow delays and congestion to road traffic increase.	Grade separation- long term beneficial (though some short term benefits may be realised with the interim retention of these crossings, subject to future road traffic and rail traffic growth).
Decommissioning		
Opportunities for recreational trails and cycle paths.	Decommissioning of the existing rail corridor offers the opportunity to redevelop the rail corridor as a recreational or cycle path. Further consideration of: Removal and replacement of existing low height or poor quality bridges (that are constraints on the road network or are creating environmental issues) Disposal, treatment or management of contaminated soil issues Security and safety of the facility and control of accesses to adjoining properties.	Beneficial- subject to further decisions on connectivity and maintenance priorities