Central Queensland Coal Project

Chapter 6 – Traffic and Transport

Environmental Impact Statement

CDM Smith

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Central Queensland Coal Project

Chapter 6 – Traffic and Transport

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6 Traffic and Transport

This chapter provides details of the proposed use of both existing infrastructure and future planned infrastructure to transport materials, products and wastes to and from the Central Queensland Coal Project, as well as proposed transport for site personnel.

The purpose of this chapter is to assess the current and potential traffic and transport impacts associated with the construction and operation of the Project. The required supplies and services will access the site through the existing road transport network which will provide access to the mine via new entry roads. The transport of product coal will be by existing rail infrastructure to the Dalrymple Bay Coal Terminal (DBCT) then by sea. Site personnel will largely be drive in drive out. Any information provided for rail, port or offsite accommodation facilities are outside of the Environmental Impact Statement (EIS) scope and is indicative only and should be treated as such.

The chapter is developed in accordance with the Project's Final Terms of Reference (ToR) and includes descriptions of the existing infrastructure, as appropriate, and an assessment of potential traffic and transport impacts associated with the construction and operation of the Project. Mitigation measures to manage any potential adverse impacts over the life of the mine are also provided. The chapter is a summary of the Traffic and Transport report prepared by GTA in Appendix A4a – Road Impact Assessment and the Geotechnical report prepared by AMEC in Appendix A4b – Geotechnical Assessment of Open Cut Mining Adjacent to the Bruce Highway. Note that Appendix A4a – Road Impact Assessment references the original proponent; Styx Coal Pty Ltd, and the original Project name, Styx Coal Mine Project; however, the Central Queensland Coal Pty Ltd is the new Proponent for the Project and the Project has been renamed as Central Queensland Coal Project to better reflect the change of Proponent. This proponent and title change does not affect the technical studies.

6.1 Project Overview

The Project is located 130 km northwest of Rockhampton in the Styx Coal Basin in Central Queensland. The Project will be located within Mining Lease (ML) 80187 and ML 700022, which are adjacent to Mineral Development License (MDL) 468 and Exploration Permit for Coal (EPC) 1029, both of which are held by the Proponent.

The Project will involve mining a maximum combined tonnage of up to 10 million tonnes per annum (Mtpa) of semi-soft coking coal (SSCC) and high grade thermal coal (HGTC). Development of the Project is expected to commence in 2018 and extend for approximately 20 years until the current reserve is depleted.

The Project consists of three open cut operations that will be mined using a truck and shovel methodology. The run-of-mine (ROM) coal will ramp up to approximately 2 Mtpa during Stage 1 (Year 1-4), where coal will be crushed, screened and washed to SSCC grade with an estimate 80% yield. Stage 2 of the Project (Year 4-20) will include further processing of up to an additional 4 Mtpa ROM coal within another coal handling and preparation plant (CHPP) to SSCC and up to 4 Mtpa of HGTC with an estimated 95% yield. At full production two CHPPs, one servicing Open Cut 1 and the other servicing Open Cut 2 and 4, will be in operation.

A new train loadout facility (TLF) will be developed to connect into the existing Queensland Rail North Coast Rail Line. This connection will allow the product coal to be transported to the established coal loading infrastructure at the DBCT.

The Project is located within the Livingstone Shire Council (LSC) Local Government Area (LGA). The Project is generally located on the "Mamelon" property, described as real property Lot 11 on MC23, Lot 10 on MC493 and Lot 9 on MC496. The TLF is located on the "Strathmuir" property, described as real property Lot 9 on MC230. A small section of the haul road to the TLF is located on the "Brussels" property described as real property Lot 85 on SP164785.

6.2 Environmental Objectives and Performance Criteria

6.2.1 Environmental Objectives

The environmental objective of the Project in relation to traffic and transport is to protect the safety, health and well-being of the existing community, Project employees and visitors using State, local and mine-site road networks.

6.2.2 Performance Criteria

The performance criteria adopted for traffic management are:

- No public road users or mine personnel are injured because of traffic or traffic related impacts from the Project's construction or operation;
- No intersections, roads or other traffic related components associated with the Project present a safety hazard to the public or mine staff / contractors; and
- Road users are not significantly delayed or affected due to the construction or operation of the Project.

6.3 Relevant Legislation and Guidelines

Traffic and transport is governed by several legislative acts, policies and guidelines which are briefly outlined in Chapter 1 – Introduction and described further below.

6.3.1 State Legislation

6.3.1.1 Transport Infrastructure Act 1994

The *Transport Infrastructure Act 1994* encourages effective integrated planning and efficient transport infrastructure management for the planning and management of road, rail and air infrastructure. The Department of Transport and Main Roads (DTMR) is responsible for maintaining State Controlled Roads (SCR), of which the Bruce Highway divides the Project and will be used for access. Approvals under this Act will be required for any upgrades to SCRs and SCR intersections.

6.3.1.2 Transport Operations (Road Use Management) Act 1995

The *Transport Operations (Road Use Management) Act 1995* manages vehicles on Queensland roads by:

- Identifying vehicles, drivers and other road users and the establishment of performance standards;
- Establishing rules for road behaviours;
- Monitoring compliance with the Act;

- Mandating approvals for over dimension vehicles;
- Managing non-performing vehicles, drivers and other road users;
- Controlling access to the road network; and
- Managing traffic to enhance safety and transport efficiency.

6.3.1.3 Land Act 1994

The *Land Act 1994* provides a framework for the allocation of State land as leasehold, freehold or other tenure and their subsequent management. Approvals relating to the use or development of infrastructure on unallocated state land, leasehold land, road or reserve may need to be obtained by the Central Queensland Coal for road and intersection upgrades.

6.3.2 Guidelines

6.3.2.1 Road Planning and Design Manual

The DTMR Road Planning and Design Manual (2010) provides the policy and framework for the planning and design of new and upgraded roads in Queensland. It is an agreed set of corporate standards that includes consideration of local circumstances.

6.3.2.2 The Guidelines for Assessment of Road Impacts of Development

The Guidelines for Assessment of Road Impacts of Development (GARID) (DTMR 2006) provide information about the processes involved to assess road impacts triggered by a proposed development. Assessable impacts are defined by the DTMR as any development which has a material increase of 5 per cent (%) or greater of traffic over existing levels measured in either the annual average daily traffic (AADT), peak hour traffic or equivalent standard axles (ESAs).

6.4 Assessment Methodology

6.4.1 Road

Road impacts have been assessed in accordance with DTMRs 'Guidelines for Assessment of Road Impacts of Development' (GARID).

Consistent with the requirements set out in GARID, the methodology adopted for the Road Impact Assessment (RIA) is as follows:

- Review existing road conditions and operations, and establish a baseline condition (i.e. road operation without the Project);
- Prepare estimates of Project generated traffic based on the intended haul routes of heavy vehicles and workforce requirements;
- Prepare scenarios for the traffic assessment which consider baseline and Project traffic generation estimates at critical Project milestones (referred herein as design horizons);
- Determine anticipated road impacts of the Project for each of the identified design horizons, in accordance with threshold levels and rationale provided within GARID. Specifically, the following impacts have been considered:

- Impact of the proposed vehicular access intersection on the existing road network provided as part of the Project;
- Impact of Project related traffic on existing road link capacity for key haul routes; and
- Impact of Project related heavy vehicle movements on existing pavement condition.

- Where impacts were identified as exceeding GARID defined threshold levels, recommendations to mitigate or offset these impacts have been provided.

The adopted methodology is further detailed in Table 6-1.

Table 6-1 Road impact assessment methodology

Assessment Type	RIA Methodology
Access Intersection Assessment	Undertake a Turn Warrant Assessment using the methodology provided within DTMR's 'Road Planning & Design Manual' (RPDM) to determine appropriate turn treatments and associated intersection geometry at the proposed access intersection. These initial design considerations will inform the development of the mine plan to be detailed further as the Project progresses. The analysis is provided in Appendix A4 – Road Impact Assessment.
Link Impact Assessment	In accordance with GARID defined threshold levels, identify road sections where Project generated traffic is expected to exceed 5% of baseline traffic volumes. The scope of the link impact assessment has included the Bruce Highway between Rockhampton and Mackay (the intended haul route). Where impacts of greater than 5% were identified, an analysis of theoretical link capacity was undertaken in accordance with the methodology outlined within Austroads (2009) 'Guide to Traffic Management Part 3: Traffic Studies and Analysis'. Comparison of anticipated link performance against a minimum operational Level of Service (LOS) threshold 'D' was undertaken. The analysis is provided in Appendix A4 - Road Impact Assessment.
Pavement Impact Assessment	The DTMR Northern Region 'Assessment of Road Impacts of Development Proposals – Notes for Contribution Calculations' was developed as a supplement to GARID and specifically identifies the methodology to calculate pavement impacts on SCRs. The Pavement Impact Assessment has been undertaken in accordance with the formulas and parameters provided in this document, and includes assessment of the Bruce Highway between Rockhampton and Mackay (the intended haul route). The analysis is provided in Appendix A4 - Road Impact Assessment.

6.4.2 Rail

Product coal will be stockpiled and loaded onto trains and transferred via the Queensland Rail (QR) North Coast Line (NCL) and then a short section of the Aurizon Goonyella rail corridor to an east coast port, most likely DBCT at Mackay. The northern boundary of the TLF abuts the QR NCL. Works within the adjacent NCL corridor to connect the Central Queensland project rail loop to the existing NCL at the project boundary, will be carried out by QR as separate works to those authorised by this EIS.

The loaded train will comprise one diesel-electric locomotive hauling 40 coal wagons with a load limit of 20 tonne per axle due to the QR NCL characteristics.

QR will be providing the piece of rail infrastructure that connects the Central Queensland rail loop to the QR NCL mainline rail infrastructure. In providing this connecting rail infrastructure, QR will make any necessary changes to the signalling system that currently exists on its NCL for the safe working of coal trains on and off the Central Queensland rail loop.

Minimal impacts on the environment from coal dust deposition from the use of the rail network during coal haulage has the potential to occur. Coal dust impacts and mitigation strategies are identified in Sections 6.7 and 6.8 respectively.

6.4.3 Air

It is not expected that any of the Project workforce will be fly-in fly-out and use air transport. As such, it is not anticipated that there will be any impact to the capacity or scheduling of flights to or from Mackay or Rockhampton Airports. Air transport is therefore not considered further in this study.

6.4.4 Sea

Product coal will be loaded onto ships at an east coast port, most likely DBCT at Mackay. A port allocation will be secured to export coal from the Project separately to the EIS process. DBCT has a nominal capacity of 85 Mtpa and in 2012 to 2013 had a throughput of 62.4 Mtpa. As Central Queensland Coal's throughput will be contained within existing approved capacities at DBCT, no new coastal works, dredging or materials handling infrastructure would be required because of the Project. All ship transportation will be undertaken in accordance with extant legislation and standard operating procedures at the DBCT and travel through designated shipping areas. Based on this, impacts on shipping and the coastal and marine environments are not considered further within this EIS.

6.5 Existing Transport Infrastructure and Values

This section provides details on the existing infrastructure proposed to be used to transport materials, products and people to and from the Project site. The proposed transport infrastructure to be used is roads and rail.

6.5.1 Road Network

6.5.1.1 Bruce Highway

All traffic associated with the Project is assumed to access the site via a single vehicular access point proposed on the Bruce Highway, with Project traffic anticipated to be generally limited to the Bruce Highway between Rockhampton and Mackay. Characteristics of the Bruce Highway proximate to the Project (and at the proposed access location) are described in Table 6-2.

Table 6-2 Bruce Highway road characteristics (proximate to the Project site)

Characteristic	Description
Direction	Northwest – Southeast
Jurisdiction	DTMR
Cross-Section	Two-lane / Two-way / Undivided
Pavement	Sealed
AADT	~2,000
Speed Limit	110 km/h

The typical cross-section of the Bruce Highway proximate to the Project site is presented in Figure 6-1.

Figure 6-1 Bruce Highway (typical cross-section)

The geometry of the Bruce Highway varies to the south of the Project, with provision for overtaking lanes available on approach to Rockhampton and a four-lane / two-way / divided arrangement available south of Yeppoon Road.

In terms of future planning, reference has been made to DTMR's 'Queensland Transport and Roads Investment Program 2016-2017 to 2019-2020' (QTRIP) which outlines State road network projects for Queensland. A summary of works from QTRIP relevant to the Project are presented in Table 6-3. As described a number of capacity improvement projects are planned on the Bruce Highway, generally within close proximity to the regional centres of Mackay and Rockhampton. These works are planned to be undertaken prior to 2020.

Table 6-3 QTRIP works schedule

Project Location	Location Description	Works Description
Bruce Highway (Rockhampton – St Lawrence)	Various intersections	Improve intersections
Bruce Highway Four Laning (Stages 1 and 2) Planning Study	Yeppoon Road – Ramsay Creek	Undertake transport project planning
Bruce Highway (St Lawrence – Mackay)	Kalarka Road and Colonial Drive South	Construct overtaking lane/s
	Spider Creek and Three Mile Creek	Construct overtaking lane/s
	Lagoon Street	Improve intersection/s
	Sarina Northern Access	Construct roundabout/s
	Hay Point Road intersection	Construct roundabout/s
	Hay Point Road – Temples Lane	Undertake transport project planning

6.5.1.2 Baseline Traffic Volumes

Background traffic volumes have been sourced from DTMR, by way of 2015 and 2016 AADT segment reports (obtained 2 February and 12 June 2017 respectively) for the Bruce Highway between Rockhampton and Mackay. A copy of these segment reports is located in Appendix A of Appendix A4 – Road Impact Assessment, with a summary of data provided in Table 6-4.

For the purposes of converting AADT volumes to peak hour volumes (for the link and intersection assessments), a peak-to-daily ratio of 15% has been assumed, in accordance with guidance for rural roads provided in the RPDM 1st Edition – Chapter 5.

Growth rates obtained from historic data detailed within the AADT segment reports indicate that the Bruce Highway has experienced negative growth for various road sections over the past five to ten years. This could be attributable to a slowdown in mining sector projects occurring within the region, and the conclusion of construction activities associated with large project development. As such, a growth rate of 2% per annum (compound) has been adopted to inform the basis of future traffic forecasts, to reflect typical background traffic growth in the absence of major project development. This assumption is considered conservative and therefore appropriate for determining a worst-case scenario for the RIA.

It is further noted that a review of the Coordinator-General projects currently available online indicates that there are no major projects planned near the Project. Should any such projects become apparent in the future, these should be considered in the context of a cumulative impact assessment.

Table 6-4 Baseline traffic volumes - Bruce Highway 2015/2016

Road Name	Segment	AADT						Historic Growth	
		NBD	HV%	SBD	HV%	Total	HV%	5 Yr	10 Yr
Bruce Highway (Rockhampton – St Lawrence)	Archer St (lights)	9,388	11.9	6,996	10.4	16,384	11	-6.7%	-
	100m Sth Knight St	16,118	8.5	17,462	8.8	33,580	9	0.0%	0.5%
	Boland St	12,153	7.8	12,411	7.8	24,564	8	0.6%	0.4%
	800m Sth Rton-Yeppoon Rd	8,194	10.4	8,516	10.1	16,710	10	0.7%	1.2%
	200m Sth Mason Ave (Parkhurst)	5,969	12.7	5,862	13.6	11,831	13	1.4%	2.0%
	150m North Terra Nova Dr	3,785	19.3	3,710	14.4	7,495	17	-0.8%	0.4%

Road Name	Segment	AADT						Historic Growth	
		NBD	HV%	SBD	HV%	Total	HV%	5 Yr	10 Yr
	200m North 14 Mile Ck Rd	2,022	27.7	2,048	21.7	4,070	25	-1.3%	0.2%
	40m Sth Mountain Ck (Kunwarara)	1,332	24.2	1,295	24.7	2,627	24	-0.3%	1.2%
	1km south of Montrose Creek	1,163	28.6	1,117	29.3	2,280	29	-1.9%	0.0%
	South of Waverley Creek	956	31.4	1,001	30.3	1,957	31	-3.3%	-1.4%
Bruce Highway (St Lawrence – Mackay)	North of Clairview	1,060	28.0	1,099	31.0	2,159	30	-2.3%	-0.9%
	WiM Site Koumala	1,755	21.9	1,721	23.5	3,476	23	0.1%	0.8%
	South of Armstrong's Beach Turnoff	2,053	19.7	2,057	32.9	4,110	26	-0.8%	0.2%
	Sichter Street - Broad Street	4,638	15.7	2,458	9.2	7,096	13	-11.7%	-6.4%
	Between Sarina and Sarina - Homebush TO	3,641	29.7	3,837	26.6	7,478	28	-3.7%	-0.9%
	Sarina - Homebush Road to Hay Point TO	3,204	10.3	3,342	27.2	6,546	19	-4.1%	-1.2%
	North of Macks Truck Stop	5,205	17.8	5,171	16.9	10,376	17	-3.0%	-0.4%
	Broadsound Road Permanent Counter	6,900	12.4	6,845	12.3	13,745	12	-2.0%	-0.9%
	City Gates to Lagoon Street	12,562	15.7	11,856	11.6	24,418	14	-2.1%	3.3%
	Lagoon St to Bridge Rd	9,327	19.2	9,167	11.6	18,494	15	-4.4%	0.5%
	George Street Pedestrian Crossing	10,011	8.5	9,693	8.7	19,704	9	-8.3%	-6.2%

6.5.1.3 Road Crash History

Analysis of the recorded accidents on the Bruce Highway, proximate to the Project and specifically its frontage, indicates the following:

- There was a single recorded accident proximate to the Project frontage in the preceding five year period;
- This accident did not result in a fatality; and
- The accident involved a single vehicle colliding with an object, causing the vehicle to veer off the carriageway.

It is considered that this type of crash is typical for the use, type and function of the Bruce Highway within the area, and therefore the crash data suggests that the Bruce Highway proximate to the Project does not pose any atypical safety risks or hazards that need to be factored into the access design. Notwithstanding, this would need to be confirmed with detailed site inspections during the detailed design phase for the access intersection.

6.5.1.4 Mount Bison Road

A realignment of Mount Bison Road and a corresponding new intersection with the Bruce Highway is currently being investigated outside of the scope of this EIS. Mount Bison Road is located directly south of Tooloombah Creek and south of the proposed Project access (refer Figure 1-2 in Chapter 1 – Introduction).

This realignment and new intersection is intended to provide public access to existing agricultural uses on the western side of the Bruce Highway. It may also provide access to a potential onsite accommodation camp for the project. This camp is currently being investigated as an overflow option and has not been considered available for use within this RIA. It is understood that the planning and approvals for the proposed accommodation camp (should it proceed) would be subject to its own separate Development Application and transport assessment.

6.5.2 Rail Network

6.5.2.1 Rail Lines

The Project is anticipated to utilise the nearby NCL rail line. This line is a principal regional freight and passenger line with the QR network, running the length of coastal Queensland between Nambour in the south and Cairns in the north. Long distance passenger and high-speed Tilt Train services also operated in the line servicing central and north Queensland.

6.5.2.2 Level Crossings

Several level crossings have been identified on the Bruce Highway between Rockhampton and Mackay. An inspection of aerial photography and publicly available QR network details, indicate that most of the train lines associated with these level crossings are minor, single track lines, typically servicing the localised land uses. As a result, train services are not expected to be frequent and therefore unlikely to be significantly impacted by anticipated Project road volumes. Notwithstanding, QR has advised that this would need to be confirmed following lodgement of the EIS. There are also several level crossings associates with the NCR rail line, particularly within Rockhampton.

Central Queensland project has submitted access proposals to both QR and Aurizon for below rail access for the transport of product coal to the Dalrymple Bay Coal Terminal (DBCT). Both rail operators have confirmed that adequate capacity exists in the existing rail networks to facilitate the requested haulage requirements.

Central Queensland project is also in discussions with an above rail operator to transport the coal by its diesel hauled coal wagon train. The operator will work with QR to schedule and operate the trains to minimise any impacts on road transport particularly at road/rail level crossings.

6.5.3 Environmental Values

Potential impacts on environmental values due to the Project's traffic generation are generally described throughout this Chapter and other Chapters of the EIS. Several Environmental values have been identified and assessed. The assessment of impacts on natural environmental values are generally within other Chapters of the EIS (refer to Table 6-5).

Table 6-5 Environmental values

Environmental value	Description	Chapter
Air Quality	Emissions from vehicles. Dust from haul road usage. Coal Dust from TFL facility. Coal dust from construction and upgrading of roads and intersections.	Chapter 12 – Air Quality
Noise and Vibration	Noise from construction and operational traffic. Noise from construction activities associated with upgrading of roads and intersections.	Chapter 13 – Noise and Vibration
Surface Water	Contamination of water ways from traffic associated with the Project, including spills and contaminated run-off.	Chapter 9 – Surface Water
Health and Safety	Road use and safety. Traffic collisions.	Chapter 20 – Health and Safety
Hazard and Risk	Spills, accidents and emergency response plans.	Chapter 21 – Hazard and Risk

The main environmental value relevant to this chapter is landholder access. Landholder access will primarily be an issue during realignment of Mount Bison Road and the corresponding new intersection with the Bruce Highway (See Section 6.5.1.4).

6.6 Traffic Generation and Distribution

Project traffic volumes have been estimated based on operational assumptions and forecasts for the Project for the following project phases (Table 6-6). These project phases have been determined with respect to the requirements set out in GARID, and represent the critical design years when considering likely Project traffic generation associated with forecast workforce requirements (see Appendix A4 – Road Impact Assessment for more information.

Table 6-6 Project phases

Project Phase	Project Year	Year
Construction commencement and peak construction	1	2018
Construction of western MIA and operation of eastern MIA	9	2026
Peak of operational phase	12	2029
Decommissioning and 20-year design horizon	20	2037

6.6.1 Workforce Traffic Generation

A construction workforce for the Project of approximately 200 people will be required at peak construction period. The workforce will be a combination of local workers and Drive in/Drive out (DiDo). A proposed workforce of between 250 to 500 employees will be required during the mine operations. The Project's labour resources will be sourced from within the local area (Marlborough, Ogmore, St Lawrence, whilst regional workers are assumed to reside in either Mackay or Rockhampton) as a DiDo workforce. A workforce of approximately 25 will be required during decommissioning.

Estimates of workforce generated traffic are detailed in Table 6-7 based on information provided in Appendix A4 – Road Impact Assessment.

Table 6-7 Workforce traffic generation summary

Design year	Bruce Highway Eastern Access				Bruce Highway Western Access				Total (vpd)
	AM Peak (vph)		PM Peak (vph)		AM Peak (vph)		PM Peak (vph)		
	In	Out	In	Out	In	Out	In	Out	
2018	201	102	102	201	0	0	0	0	606
2026	119	100	100	119	70	30	30	70	638
2029	119	100	100	119	119	100	100	119	876
2037	8	0	0	8	8	0	0	8	32

vph – vehicles per hour, vpd – vehicles per day

6.6.2 Heavy Vehicle Traffic Generation

All materials, plant and equipment are intended to be delivered to the Project via road-based transport. It is expected that construction traffic will primarily involve a mix of rigid trucks, articulated vehicles (i.e. semi-trailers) and B-Doubles. Some oversize loads are also expected, particularly during the CHPP, dump station, stacker / reclaimer and heavy mining equipment construction and installation phase. These loads will be hauled from either the Port of Brisbane, Port of Mackay, or the Port of Gladstone.

Quarry materials for the construction of the access road and haul road base materials will be sourced from existing offsite quarries. Once access to site is established, materials will be sourced from a combination of on-lease deposits where possible and licensed offsite quarries. It is not anticipated that forestry materials will be required by the Project.

All ROM and product coal will be hauled internally through the site to the TLF, using private infrastructure and will not require access to any Council or SCRs. As such, the Bruce Highway will not be affected by any internal haul movements associated with moving product coal around the mining lease.

A summary of anticipated two-way heavy vehicle movements for the entirety of the Project is provided in Table 6-8.

Table 6-8 Total Project heavy vehicle movements

Project Phase	Vehicle Type	Origin / Destination			
		Local	Regional	State	Port
Construction	Rigid Truck	320	380	9	1
	Semi-Trailer	1,015	96	122	170
	B-Double	-	250	50	-
	Oversized	-	-	-	70
	Sub-total	**1,335**	**726**	**181**	**241**
Operations	Rigid Truck	4,575	37,005	-	845
	Semi-Trailer	-	2,176	-	-
	B-Double	-	9,518	-	-
	Oversized	-	-	-	272
	Sub-total	**4,575**	**48,699**	**-**	**1,117**
Project Total	Rigid Truck	4,895	37,385	9	846
	Semi-Trailer	1,015	2,272	122	170
	B-Double	-	9,768	50	0
	Oversized	-	-	-	342
	Total	**5,910**	**49,425**	**181**	**1,358**

The directional distribution assumptions used within the RIA are provided in Table 6-9.

Table 6-9 Assumed directional proportions of heavy vehicle movements

Project Phase	Source of Heavy Vehicle	Direction of Origin	
		From the North	From the South
Construction	Local	50%	50%
	Regional	25%	75%
	State	50%	50%
	Port[1]	40%	60%
Operation	Local	50%	50%
	Regional	25%	75%
	State	-	-
	Port[1]	40%	60%

1 Ports are assumed to be Mackay (north of the Project Site) and Brisbane (south of the Project Site).

The total Project volumes provided in Table 6-8 have been disaggregated into annual projections based on the following rationale:

- Heavy vehicle generation associated with construction has been separated into two distinct time horizons as discussed in Section 6.6.2. The first construction phase will occur over a period of 18 months between the last quarter of 2018, and the first quarter of 2020. The second construction phase will occur over a four-year period between the first quarter of 2025 and the last quarter of 2028;
- Approximately one third of the construction effort will be required during the first construction phase, and the remaining two thirds will be required during the second construction phase; and
- The annualised heavy vehicle operations profile has been approximated based on the work force projections for the operations phase. It has been assumed that the heavy vehicle generation for each year is directly proportional to the employee requirements for that same year.

A summary of the estimated annual heavy vehicle haul movements for each of the identified design phases is provided in Table 6-10.

Table 6-10 Annual heavy vehicle movements

Project Phase	Vehicle Type	Heavy Vehicle Movements (Annual)			
		2018	2026	2029	2037[1]
Construction	Rigid Truck	40	118	-	-
	Semi-Trailer	77	233	-	-
	B-Double	17	50	-	-
	Oversized	4	12	-	-
	Sub-Total	138	413	-	-
Operation	Rigid Truck	1,063	3,319	6,637	-
	Semi-Trailer	54	170	340	-
	B-Double	239	745	1,489	-
	Oversize	8	21	43	-
	Sub-Total	1,363	4,255	8,509	-
Project Total	Rigid Truck	1,103	3,437	6,637	-
	Semi-Trailer	131	403	340	-
	B-Double	256	795	1,489	-
	Oversize	12	33	43	-
	Total	**1,502**	**4,668**	**8,509**	**-**

[1]Heavy vehicle movement projections have not been scoped by the Proponent for the decommissioning phase. However, the volume of any heavy vehicle haul movements associated with decommissioning are expected to be smaller in magnitude when compared to the construction or operational phases.

The hourly heavy vehicle traffic generation summarised in Table 6-11 has been converted to projected hourly heavy vehicle movements by using the following rationale:

- There are approximately 320 operational days per year;
- Haul movements would generally be undertaken in a 12-hour period;
- The distribution of haul movements is flat for the 12-hour period; and
- The split between IN/OUT movements is 50/50.

Using the above rationale, hourly heavy vehicle volumes typically results in less than 3 vehicles per hour (total IN/OUT). To allow for a conservative estimate, a nominal heavy vehicle volume of 10 vehicles per hour (total IN/OUT) has been adopted for a worst-case assessment for the link and turn warrant assessments.

Table 6-11 Hourly heavy vehicle movements

Design year	Bruce Highway Eastern Access				Bruce Highway Western Access			
	AM Peak (vph)		PM Peak (vph)		AM Peak (vph)		PM Peak (vph)	
	In	Out	In	Out	In	Out	In	Out
2018	5	5	5	5	0	0	0	0
2026	5	5	5	5	5	5	5	5
2029	5	5	5	5	5	5	5	5

vph – vehicles per hour

6.7 Traffic Impact Assessment

This section assesses anticipated Project impacts on the proposed haul routes (Bruce Highway from Rockhampton to Mackay) with due consideration of forecast traffic volumes "with" and "without" the Project. This assessment has been undertaken in accordance with the principles outlined in GARID which states:

"Traffic operation impacts need to be considered for any section of state controlled road where the construction or operational traffic generated by the development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements."

6.7.1 Projected Increases in AADT

Coal mines are key generators of traffic in the local area. Traffic volumes in central Queensland have seen a marked decrease in recent years as the construction phase of the mining boom evolved into the production phase. From a review of several regional roads between Townsville and Gladstone, traffic volumes appear to have decreased progressively by between 10-30% p.a. during 2012 and 2014.

The comparison of baseline traffic to the Project traffic, to determine whether the 5% traffic impact threshold is exceeded, is summarised in Table 6-12.

Table 6-12 Estimated AADT

Road Name	Road Section	% Increase of AADT			
		2018	2026	2029	2037
Bruce Highway (Rockhampton – St Lawrence)	Yeppoon Road – Terra Nova Drive	6.2%	5.8%	7.3%	0.2%
	Terra Nova Drive – Vass Road	9.8%	9.1%	11.6%	0.3%
	Vass Road – Caves-Barmoya Road	18.1%	16.7%	21.3%	0.6%
	Caves-Barmoya Road – Ogmore Road	39.3%	36.3%	46.2%	1.4%
	Ogmore Road – Rockhampton and Mackay Regional Shire Boundary	41.0%	37.9%	48.2%	1.7%
	Rockhampton and Mackay Regional Shire Boundary – St Lawrence Connection Road	47.7%	44.1%	56.2%	1.5%
Bruce Highway (St Lawrence – Mackay)	St Lawrence Connection Road – Carmila	44.1%	40.8%	51.9%	0.3%
	Carmila – Oonooie	7.2%	6.7%	8.5%	0.2%
	Oonooie – Armstrong Beach	6.1%	5.6%	7.2%	0.1%
	Armstrong Beach – Broad Street	3.5%	3.3%	4.2%	0.1%
	Broad Street – Sarina Homebush Road	3.4%	3.1%	3.9%	0.1%
	Sarina Homebush Road – Hay Point Road	3.8%	3.5%	4.5%	0.1%
	Hay Point Road – Homebush Road (Rosella)	2.4%	2.2%	2.8%	0.1%
	Homebush Road (Rosella) – Archibald Street	1.8%	1.7%	2.1%	0.1%
	Archibald Street – Webberley Street	1.0%	0.9%	1.2%	0.0%
	Webberley Street – Bridge Street	1.4%	1.3%	1.6%	0.0%
	Bridge Street – Gordon Street	1.3%	1.2%	1.5%	0.0%

* Based on potential increase in output from current 8.8 Mpta to 10 Mtpa

Based on the summary provided in Table 6-12, the impact of forecast Project traffic exceeds 5% for the following road segments:

- Yeppoon Road – Terra Nova Drive;
- Terra Nova Drive – Vass Road;
- Vass Road – Caves-Barmoya Road;
- Caves-Barmoya Road – Ogmore Road;
- Ogmore Road – Rockhampton and Mackay Regional Shire Boundary;
- Rockhampton and Mackay Regional Shire Boundary – St Lawrence Connection Road;
- St Lawrence Connection Road – Carmila;
- Carmila – Oonooie; and
- Oonooie – Armstrong Beach.

A theoretical link capacity assessment for these affected roads has been calculated in accordance with Austroads GTM: Part 3 for two-lane, two-way roads (See Appendix A4a – Road Impact Assessment). It was found that the level of service (LOS) of Terra Nova Drive – Vass Road may decrease because of Project traffic. It is noted that the estimated capacity of this road section is anticipated to be greater than that calculated, noting that overtaking lanes are currently available

on this road section. As detailed in Section 6.5.1, Qtrip identifies several planned upgrades to the Bruce Highway which are expected to increase road link capacity. Relevant works include:

- The undertaking of a planning project, to increase the Bruce Highway to four lanes from Yeppoon Road to Ramsay Creek (aligns with Yeppoon Road – Terra Nova Drive section);
- The construction of overtaking lanes between Kalarka Road and Colonial Drive South (aligns with St Lawrence Connection Road – Carmila section); and
- The construction of overtaking lanes between Spider Creek and Three Mile Creek.

6.7.2 Access Intersection Analysis

The Project proposes to gain vehicular access to both sides of the Bruce Highway as discussed in Section 6.5.1.1. To achieve this access, a new intersection is proposed. It is noted that the location of the intersection is still currently being scoped, and as such, site specific geometric design considerations (e.g. site distances) have been excluded from the RIA at this preliminary stage. A detailed assessment of the locational aspects will be undertaken in due course as the Project is further developed.

A turn warrant assessment has been undertaken in accordance with the methodology provided in the RPDM Volume 3: Part 4A for the proposed Project access. The following scenarios have been assessed:

- 2018: Eastern access only; and
- 2029: Eastern and western access.

These scenarios constitute the requirements for the anticipated year of opening (i.e. eastern access only) and ultimate (i.e. both eastern and western access with peak Project traffic).

A summary of the results of this assessment are outlined in Table 6-13 with detailed results available at Appendix A4a – Road Impact Assessment.

Table 6-13 Turn warrant results

Major Road	Required Turn Treatment	
	Left Turn Movement	Right Turn Movement
2018		
Bruce Highway (North approach)	Auxiliary Lane (Short) – AUL (S)	N/A
Bruce Highway (South approach)	N/A	Channelised Right Turn -CHR
2029		
Bruce Highway (North approach)	Auxiliary Lane (Short) – AUL (S)	Channelised Right Turn -CHR
Bruce Highway (South approach)	Auxiliary Lane (Short) – AUL (S)	Channelised Right Turn -CHR

The results of the turn warrant assessment indicate that AUL(S) and CHR turn treatments are required for both the eastern and western access points. These provisions will be incorporated in the design of the access intersection, to be progressed pending the confirmation of location.

The required form for the access intersection is provided in Figure 6-2 and Figure 6-3, which is based on the requirements set out in Austroads GRD: Part 4A. Due to the four-way nature of the proposed access intersection, the left and right turn treatments will be provided for both directions of travel.

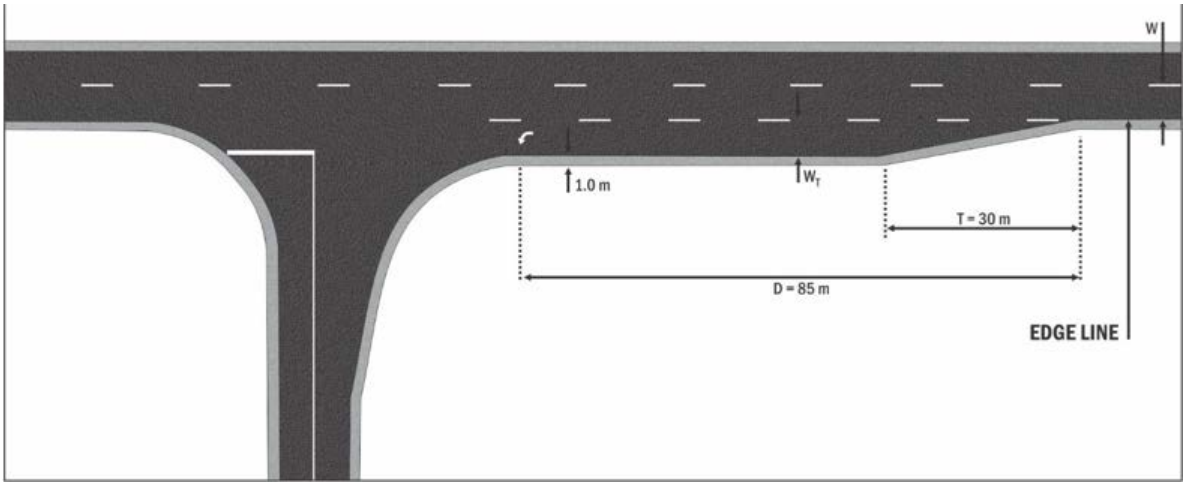


Figure 6-2 Auxiliary left turn treatment – general form

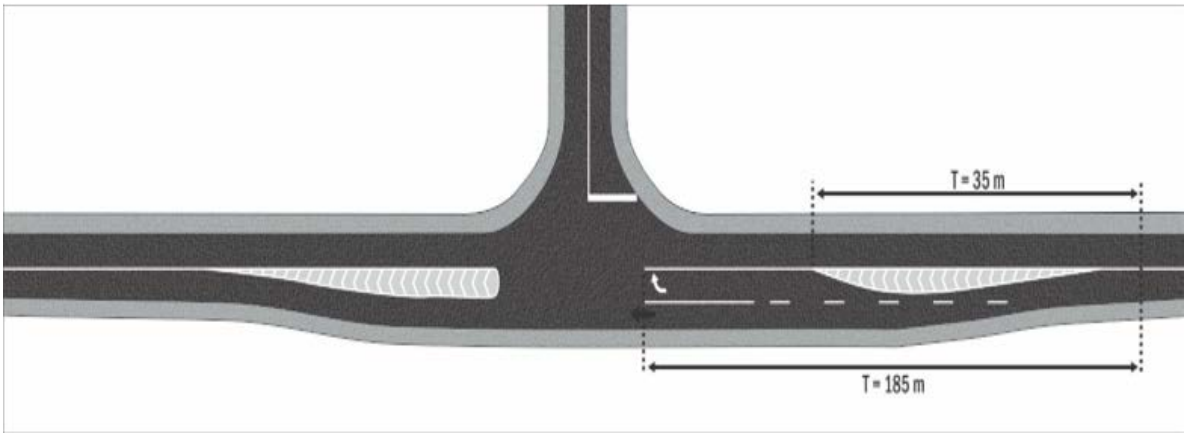


Figure 6-3 Channelised right turn treatment - general form

6.7.3 Pavement Impacts

The impact of traffic can deteriorate road pavements over time, resulting in surface wear and small cracks, potentially allowing water to enter the underlying surface of the pavement. In combination with continual stress due to traffic flow, this water infiltration can weaken the pavement, causing potholes, major cracks, deformation and ultimately road failure. This impacts speed, efficiency and safety of the traffic using the road and requires ongoing maintenance activities.

Equivalent Standard Axles (ESA) conversion factors have been calculated using the methodology provided by the TMR, which is based on the Austroads GPT: Part 2. The adopted ESA conversion factors are as detailed in Table 6-14.

Table 6-14 ESA conversion factors

Vehicle Type	ESA Conversion Factor	
	Unloaded	Loaded
Bus/Truck	0.54	2.98
Semi-Trailer	0.51	4.93
B-Double	0.53	6.30
Oversized	0.54	7.66

A 50/50 split has been assumed between loaded and unloaded heavy vehicles entering and exiting the site. This assumes that there will be deliveries to the site as well as removal of material to the site. A summary of the Project generated heavy vehicle movements (and ESAs) on each haul segment is provided in Appendix A4a – Road Impact Assessment. Based on the calculated development ESAs, impacts of greater than 5% have not been identified for any section of the Bruce Highway. On this basis, and as per the methodology detailed in GARID, assessment of contributions has not been undertaken, with the pavement impacts of the Project considered insignificant.

6.7.4 Oversized Vehicles

The Project is likely to utilise oversized vehicles for some of the transport activities as part of construction and operations. The use of these vehicles will be undertaken in accordance with the National Heavy Vehicle Regulator guidelines, and be subject to permit applications and TMR approvals for the use of such vehicles. The use of these vehicles will be assessed as part of these permit applications.

6.7.5 Rail Crossings

Preliminary liaison with QR indicates that the requirement to undertake an ALCAM assessment for impacts to rail level crossings will be determined following lodgement of the EIS.

6.7.6 General Impacts Summary

Increased traffic and transport activities in the area has the potential to impact upon the existing transport infrastructure and values described in Section 6.5 if they are not appropriately managed. The potential impacts from the Project traffic and transport activities include:

- Potential for traffic accidents resulting in property damage or serious injury and fatality;
- Delays in public and school transport activity;
- Road delays on the Bruce Highway;
- Increase incidence of spills, fires or explosions because of the transportation of hazardous and dangerous goods;
- Small cracks and surface wear in the road because of increased traffic allowing water to enter the underlying surface of the pavement; and
- Damage to property and collision because of poor pavement or deteriorating pavement as a result of Project vehicles.

6.8 Geotechnical Impact Assessment of the Bruce Highway

6.8.1 Open Cut Excavations

Open cut excavations adjacent to the Bruce Highway require safety factors of greater than 1.5, which is the minimum requirement for civil engineering projects. Slope stability analyses for rotational failure have been completed for voids batters adjacent to the Bruce Highway. Shear strength values used in stability analyses are included in Table 6-15.

Table 6-15 Shear strength values

Material	Density (t/m³)	Friction (°)	Cohesion (kPa)
Overburden (soil and weathered rock)	2.0	25	40
Spoil	1.9	34	0
Mudstone, Fr	2.4	35	100
Sandstone, Fr	2.5	40	200
Mudstone / Sandstone, Fr, composite	2.45	37.5	150

Stability analyses have been completed for saturated slopes. Safety factors for 1 (horizontal) on 1 (vertical) and 0.5 (horizontal) on 1 (vertical) batters are included in Table 6-16.

Table 6-16 Safety factors for batters

Material	Batter Angle	Safety Factor
Spoil and weathered rock	1 on 1	2.4
Mudstone / Sandstone, Fr, composite	2.45	37.5

North east of the Bruce Highway the box cut low wall will undercut coal seams bedding planes (see Figure 6-4). Translational failures of low walls occur when there are sheared, intraformational mudstone bands and bedding dips are greater than 10°. Sheared mudstone has a peak friction of 17°, peak cohesion of 25 kPa, residual friction of 9° and residual cohesion of 25 kPa. Geological investigations indicate that there are no sheared, intraformational bands adjacent to the Bruce Highway and bedding dips are to the east at less than 7°. In this area, the translational resisting force is greater than the actuating force by a safety factor well above 1.5. During mining the low wall will be regularly monitored. To further enhance the safety factor, it is proposed that box cut mining proceeds in blocks and buttress spoil is placed against the low wall immediately after coal extraction.

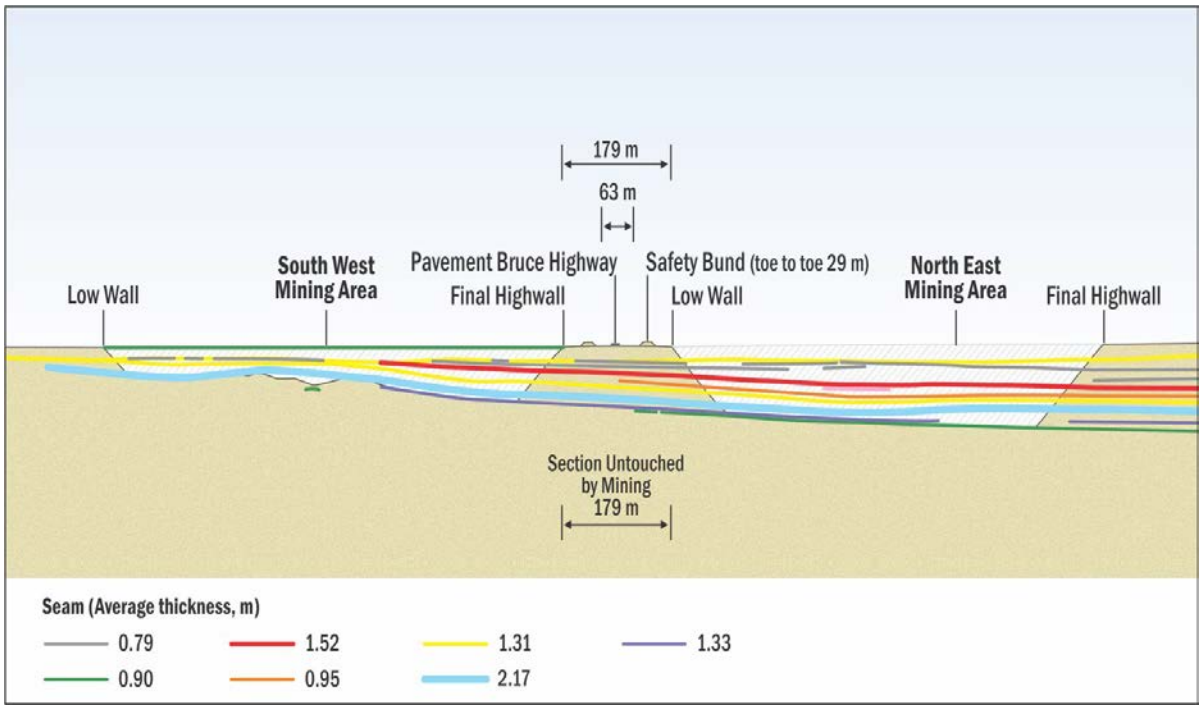


Figure 6-4 Mining sections across the Bruce Highway

The above safety factors indicate that the batters adjacent to the Bruce Highway will be stable with no impact on the highway. As well, 20 m wide safety berms have been included for additional safety (Figure 6-5). The distance between the edge of the pits and the Bruce Highway mining lease boundaries is 58 m. At this distance, it is anticipated that the pit batters will have no effect on the Bruce Highway.

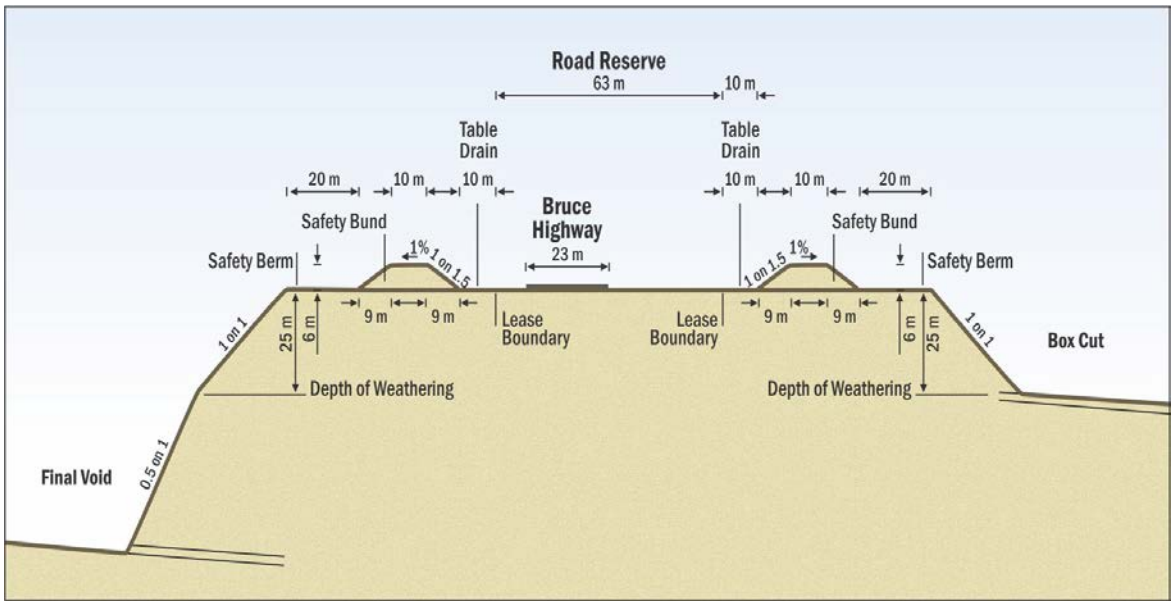
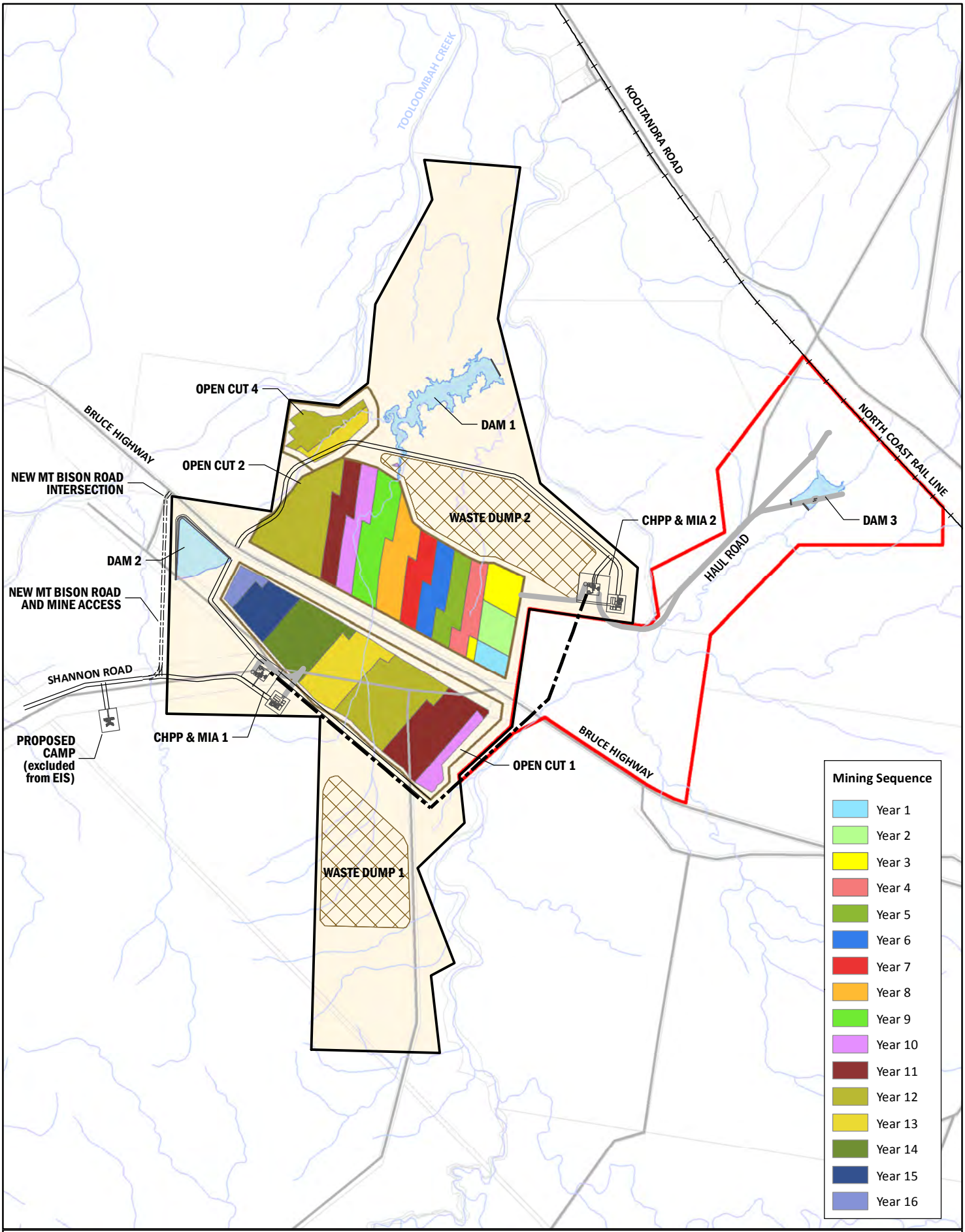


Figure 6-5 Geotechnical section across the Bruce Highway

During mining each pit will be opened, coal extracted and then backfilled. The south western pit will only have a 200 to 400 m section of highwall exposed to the Bruce Highway at any one time. The final void will be progressively infilled and a sediment trap will be constructed at the northern end. The box cut excavation on the north eastern side will be immediately backfilled after coal extraction using strip two spoil. The mine development sequence is shown in Figure 6-6. Open Cut 1 and Open Cut 2 sections per mining period are included in Appendix A4b. Because of the short durations for which the batters adjacent to the Bruce Highway will be open, batter deterioration will be minimised.

The open cut excavations can be free dug to a depth of about 25 m prior to drilling and blasting. Properly designed production blasts will be implemented to prevent any damage to infrastructure. Peak particle velocity from any blast shall not exceed 45 mm/sec, which will prevent damage to the Bruce Highway infrastructure. Blast energy will be reduced by increasing the delay sequence and reducing the charge per delay. Safe blasting procedures and monitoring will be implemented while open pit voids are present adjacent to the Bruce Highway. Regular survey monitoring will be completed to ensure ongoing stability of batters.



N

0 0.5 1 km

Scale @ A4 1:55,000
Date: 17/07/17
Drawn: Gayle B.

Legend

- ML 80187
- ML 700022
- Open-cut Mine Pit
- Dam Catchment
- Waste Dump Area
- Overland Conveyor
- North Coast Rail Line
- Haul roads
- Proposed mine infrastructure
- Watercourse
- Main road
- Cadastral boundary

Figure 6-6
Mine development sequences

DATA SOURCE
QLD Open Source Data, 2017

CDM Smith

BRUGGEMANNGD B:\BES150160 Styx Coal\GIS\DATA\MXD\FINAL\.03 EIS Preparation\BES150160.03-061 R2 Mine Schedule.mxd 7/17/2017

6.8.2 Safety Bunds

Safety bunds are required to prevent access to pits, screen off mining operations from the Bruce Highway and control run off water, including any sedimentation. The proposed safety bunds are 6 m high with crest widths of 10 m. Batters are 1.5 (horizontal) on 1 (vertical) which is at the angle of repose. To reduce the potential for erosion, batters will be topsoiled and seeded to prevent scour and erosion. Crests will be formed to a slope at 1% towards the lease. Bunds will be constructed from track compacted, fresh spoil.

6.8.3 Drainage

Properly controlled drainage will be established to prevent run off water and sediment discharging off the mining lease onto the Bruce Highway road reserve and to prevent erosion of exposed excavated faces. A table drain area with a width of 10 m has been included between the Bruce Highway lease boundaries and the outside toes of the safety bunds (Figure 6-4). All run off water will be drained inside the lease boundaries and all sediment will be contained.

Sediment traps will be installed where required as part of mitigating potential mobilisation of sediments. Catch drains will be constructed along the highwall edge of the final void south west of the Bruce Highway and along the low wall edge of the box cut north east of the highway. These drains will prevent erosion of exposed faces prior to backfilling.

Any areas which will require topsoiling and seeding will be remediated as soon as possible to prevent scouring.

6.9 Mitigation Measures

The management measures recommended to reduce the potential impacts are discussed in the following sections. The management measures will be prepared and implemented in close consultation with DTMR and LSC and will be in accordance with relevant transport authorities; work programs, methodologies, guidelines and design manuals.

6.9.1 Road Use Management Plan

A Road-use Management Plan (RMP) will be developed for the Project in conjunction with relevant State and local road authorities. This will be adopted by the Project's management team and will be implemented by the workforce and contractors delivering goods to or removing goods from the site. The RMP will include consideration of:

- Public safety at worksites;
- Obstructions to road users;
- Workforce management strategies to reduce traffic generation;
- Management of driver behaviour to ensure that project traffic is driving in a safe manner;
- Driver fatigue management strategies; and
- Defining responsibilities and procedures for implementation, monitoring and RMP strategy management.

The outcomes of the RIA are intended to inform the development of the RMP, which will in turn influence the future transport strategies to be adopted. The impact mitigation strategies adopted within the RMP will form the basis upon which State and Local government will monitor and assess the construction and operational activities of the Project.

Based on the RIA findings, potential strategies to be considered as part of the RMP to offset road impacts are:

- Operation of a shuttle bus for the Project workforce, to reduce Project traffic;
- Implementation of a ridesharing scheme to reduce Project traffic; and
- Adjusting shift times and heavy vehicle movement scheduling such that Project traffic peaks do not coincide with the network peak period.

In accordance with Schedule 4 of the *Transport Operations (Road Use Management) Act 1995*, the Queensland Police Service will be consulted in relation to potential impacts and proposed mitigation measures to be put forward in the Road-use Management Plan that will be prepared for the Project.

6.9.2 DTMR Road Infrastructure

Road Sections

The Terra Nova Drive – Vass Road link section of the Bruce Highway currently incorporates overtaking lanes, which are expected to increase capacity beyond that of a typical road link, thereby improving the anticipated LOS. Further, it is proposed that transport management strategies are investigated as part of the RMP which could be used to reduce Project traffic and thereby mitigate impacts on this road link. These may include:

- Provision of a shuttle service for workers to reduce private vehicle usage and overall traffic generation as the number of personnel increases with the planned increases in production;
- Provision of a ride sharing scheme to increase worker vehicle occupancy and decrease overall traffic generation; and
- Scheduling shift times and heavy vehicle movements such that Project traffic does not coincide with network peak periods.

Intersections

Results of a turn warrant assessment indicate that the proposed site access require AUL(S) and CHR turn treatments, for both the eastern and western access points. These treatments will be incorporated into the access arrangements as access designs further progress.

Pavement Impacts and Contribution

Based on the calculated development ESAs, pavement impacts of greater than 5% have not been identified for any section of the Bruce Highway.

6.10 Cumulative Traffic Impact Assessments

Growth rates obtained from historic data detailed within the AADT segment reports indicate that the Bruce Highway as experienced negative growth for various road sections over the past five to ten years. This could be attributable to a slowdown in mining sector projects occurring within the region, and the conclusion of construction activities associated with large project development such as that at Curtis Island and Gladstone more generally. As such, a growth rate of 2% per annum (compound) has been adopted to inform the basis of future traffic forecasts, to reflect typical background traffic growth in the absence of major project development. This assumption is considered conservative and therefore appropriate for determining a worst-case scenario for the RIA.

A review of the Coordinator-General project currently available online indicates that there are no major projects planned near the Project. Should any such projects become apparent in the future, these should be considered in the context of a cumulative impact assessment.

6.11 Qualitative Risk Assessment

Potential impacts and risks to the surrounding environment from traffic and transport related activities have been assessed utilising the risk assessment framework outlined in Chapter 1 - Introduction as a basis.

For the purposes of risk associated with traffic and transport, risk levels are defined as follows:

- Extreme – Works must not proceed until suitable mitigation measures have been adopted to minimise the risk;
- High – Works should not proceed until suitable mitigation measures have been adopted to minimise the risk;
- Medium – Acceptable with formal review. Documented action plan to manage risk is required; and
- Low – Acceptable with review.

A qualitative risk assessment that outlines the potential impacts, the initial risk, control measures and the residual risk following the implementation of the control measures detailed in the previous sections is shown in Table 6-17. Risks represent pre-mitigated (potential) and post-mitigated (residual) risk levels. Further management and monitoring measures are identified in Section 6.8.

Table 6-17 Qualitative risk assessment

Issue and associated Project phase	Potential impacts	Potential risk	Mitigation measures	Residual risk
Traffic Collision with Injury or Property Damage (Construction and Operation)	Increased traffic has the potential to result in traffic accidents. The expected increase in traffic volume may result in additional accidents. Workers suffering from driver fatigue who are operating a vehicle on the surrounding roads have the potential to be involved in traffic incidents. Impacts can range from property damage to serious injury and fatality putting the safety of other road users in jeopardy.	Medium	A RMP will be produced and adopted. Operators will be licensed and trained appropriately. Any construction and maintenance road works will be undertaken by suitably qualified contractors and with the appropriate approvals in place. Central Queensland Coal will work with DTMR should any works be required. Speed will be monitored in work controlled vehicles and site speed limits enforced. Other mitigation measures to reduce the accident rate and severity may include: ▪ Driver fatigue will be managed and incorporated into the Safety and Health Management System; ▪ Driver education (local townships and mine staff) e.g. driver safety awareness, and not driving through flood waters; ▪ The haul road and mine area will be securely fenced so that farming and mining operations will be safely separated; and ▪ Buses will be provided to move the workforce around the Project area where appropriate.	**Low**

Issue and associated Project phase	Potential impacts	Potential risk	Mitigation measures	Residual risk
Impacts on School Bus Routes and Public Transport (Construction and Operation)	The Project is predicted to have negligible impacts on public and school transport activity. There are no known school bus stops along the Bruce Highway near the Project. The potential for accidents involving school buses and public transport is low, however, increased traffic because of the Project can potentially cause incidents including injury or death as a result of collision.	Medium	A RMP will be produced and adopted. This is further described in Section 6.8.1 The Plan will include a specific section on managing any potential impacts to the school and public bus system. Driver fatigue will be managed and incorporated into the Safety and Health Management System. Communities and schools will be notified of any changes to the road network. Where required, buses will be provided to transport workers between the Project area and accommodation facilities located in nearby townships, limiting the number of trips and driving by staff required. All heavy vehicle traffic movements will occur outside of school drop off/pick up times. Notification will be given to the bus operators indicating the construction program, activities and proposed transport routes.	Low
Impacts Associated with Traffic Delays (Construction and Operation)	It is not anticipated that the Project will result in significant traffic delays because of construction and operation. Short term delays will be associated with the construction of the Project and upgrading of the road network. These delays are short and will improve the safety of the roads.	Low	Operators will be licensed and trained appropriately. Any construction and maintenance road works will be undertaken by suitably qualified contractors with the appropriate approvals in place. Central Queensland Coal will work with DTMR should any works be required. Speed controls will be enforced on site and off site.	Low
Impacts Associated with the Transportation of Hazardous and Dangerous Goods (Construction and Operation)	Road transport with be the primary mode for the movement of hazardous and dangerous goods to and from the Project. The transportation of hazardous and dangerous goods has the potential to increase the incidence of spills, fires or explosions. Refer to Chapter 20 – Health and Safety and Chapter 21 – Hazard and Risk, for further information.	Medium	Hazardous materials will be managed in accordance with relevant Australian Standards. Transport activities will comply with requirement of the Australian Dangerous Goods Code. Operators will be licensed and trained appropriately. Speed controls will be enforced on site. This is discussed further in Chapter 20 – Health and Safety and Chapter 21 – Hazard and Risk.	Low

Issue and associated Project phase	Potential impacts	Potential risk	Mitigation measures	Residual risk
Impacts to Intersection (Construction and Operation)	The Bruce Highway access points to the site requires CHR and short AUL turn treatments (refer Section 6.7.2).	Medium	Central Queensland Coal will work with DTMR if any upgrading of the Bruce Highway associated with the project access road works. The access road intersection will be further assessed as part of the detailed design stage Intersections will be examined regularly to ensure any deterioration does not cause intersection failure.	Low
Pavement Impacts (Construction and Operation)	Analysis of potential pavement impacts predict impacts of less than 5% on the Bruce Highway for the entirety of the Project operation.	Medium	Pavement will be examined regularly to ensure any deterioration does not cause intersection failure. Where deemed necessary, Central Queensland Coal will work with RTCA and DTMR if any pavement upgrades to the surrounding road network are required.	Low
Impacts to Landholder Access (Construction and Operation)	The haul road crosses a single rural property (Strathmuir). This property is a cattle farm. This has the potential to cause access problems with the potential to cause collision with cattle, farm machinery and people.	Medium	The proponent will maintain access to Strathmuir. Should the haul road be fenced, options will be considered during the detailed project design for dedicated gates or box culverts. If gates are provided for local property access, advanced warning signage will be required to warn drivers of possible movements of cattle, farm machinery and people. An open line of communication between mine operators and farm owners will be maintained.	Low
Dust Deposition because of Rail Haulage (Operation)	Primary coal dust emission sources during the haulage includes: ▪ Coal dust wind erosion from loaded wagons in transit; ▪ Coal dust leakage from loaded wagons; and ▪ Coal dust wind erosion from spilled coal. Dust can lead to potential effects on plant function and impacts to human health. Impacts from coal dust generated during rail haulage is expected to be minimal. Impacts of dust are further discussed in Chapter 12 – Air Quality.	Low	Coal dust during haulage will be controlled through a number of measures, including: ▪ Compliance with Aurizon's Coal Dust Management Plan; ▪ Improved loading practices; ▪ Coal veneering; and ▪ Monitor coal dust, where possible. The proponent will implement the QR Network Coal Dust Management Plan (2010) requirements at the TLF, including the use of load profiling and coal wagon veneering load profiling, coal wagon veneering systems and associated support systems.	Low

6.12 Conclusion

Based on the analysis and discussions presented within this assessment, the following conclusions are made:

- Worst case traffic demands for the Project are expected to occur in:
  - 2018 (Project Year 1): Construction commencement and peak construction;
  - 2026 (Project Year 9): Construction of western MIA and operation of eastern MIA;
  - 2029 (Project Year 12): Peak of operational phase; and
  - 2037 (Project Year 20): Decommissioning and 20-year design horizon.
- Altogether, nine road links on the Bruce Highway are expected to have Project traffic volumes which have greater than 5% of baseline traffic volumes. Of these links, the Terra Nova Drive-Vass Road link section is exceeded to LOS E because of project generated traffic;
- The Terra Nova Drive – Vass Road link section of the Bruce Highway currently incorporates overtaking lanes, which are expected to increase capacity beyond that of a typical road link, thereby improving the anticipated LOS. Further, it is proposed that transport management strategies are investigated as part of the RMP which could be used to reduce Project traffic, and thereby mitigate impacts on this road link;
- A turn warrant assessment indicates that the proposed site access requires AUL(S) and CHR turn treatments, for both the eastern and western access points. These treatments will be incorporated into the access arrangements as site access designs further progress; and
- Based on the calculated development ESAs, pavement impacts of greater than 5% have not been identified for any section of the Bruce Highway.

6.13 Commitments

Central Queensland Coal's commitments, in relation to traffic and transport are provided in Table 6-18.

Table 6-18 Commitments – traffic and transport

Commitments
Develop, in conjunction with relevant State and local road authorities, a Road-use Management Plan.
Work with DTMR during Project design for the east and west site access roads from the Bruce Highway.
Implement a Safety and Health Management System that integrates risk management elements and practices to safety of workers, contractors and the community.
Report and investigate incidents and complaints in accordance with relevant traffic management legislation and guidance.
Implement the QR Network Coal Dust Management Plan (2010) requirements at the TLF, including the use of load profiling and coal wagon veneering load profiling, coal wagon veneering systems and associated support systems.

6.14 ToR Cross-reference Table

Table 6-19 ToR cross-reference

Terms of Reference	Section of the EIS
8.16 Transport	
The EIS should include a clear summary of the total transport task for the project, including workforce, inputs and outputs, during the construction and operational phases.	Section 6.6
Proponents should make appropriate choices for modes of transport to ensure efficiency and minimise impacts on the community.	Section 6.7
Undertake the impact assessment in accordance with the EHP's *EIS information guideline—Transport*. The methods used should include the following matters: ▪ for impacts on roads: a Road impact assessment (RIA) report in accordance with the *Guidelines for assessment of road impacts of development* (Department of Main Roads, 2006), with traffic data in Department of Transport and Main Roads (DTMR) suitable formats; and ▪ for impacts on rail level crossings: the *Australian Level Crossing Assessment Model* (ALCAM).	Sections 6.4.1 and 6.7.5
Present the transport assessment for each project-affected mode (road, rail, air and sea) as appropriate for each phase of the project.	Section 6.4
Provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level (e.g. local roads and state-controlled roads).	Sections 6.5, 6.6 and 6.7
Discuss how identified impacts will be mitigated for each transport mode. Mitigation strategies may include works, contributions or other strategies that can be documented in a *Road-use Management Plan* (RMP).	Section 6.9
The strategies should be prepared in close consultation with relevant transport authorities (including local government).	Section 6.9
Strategies should consider the transport authorities' works programs and forward planning, and be in accordance with the relevant methodologies, guidelines and design manuals.	Section 6.9