Vulcan South Project

Transport Impact Assessment

Prepared by: GTA Consultants (QLD) Pty Ltd for Vitrinite Pty Ltd

on 16/03/2022

Reference: Q175361

Issue #: A

GTAconsultants now Stantec

Vulcan South Project

Transport Impact Assessment

Client: Vitrinite Pty Ltd

on 16 March 2022

Reference: Q175361

Issue #: A

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	16/03/2022	Final	Andrew Tierney	Trish Robertson	Trish Robertson	

GTAconsultants now Stantec

Melbourne | Sydney | Brisbane
Adelaide | Perth

CONTENTS

Appendices

Figures

Tables

1. INTRODUCTION

01

1.1. Project Background

Vitrinite Pty. Ltd., owner of Qld Coal Aust No.1 Pty. Ltd. and Queensland Coking Coal Pty. Ltd. (Vitrinite) is the Proponent of the Vulcan South Project (the Project). As part of the Project, the Proponent proposes construction and mining operations at the Jupiter hard coking coal target within the Mining Lease Application (MLA) of approximately 3,819 hectares (ha), situated over multiple underlying tenures, including Exploration Permit Coal (EPC) 1732, EPC 1233 and EPC 1234. The Proponent is seeking Project approval for coal extraction over 8 years, extracting approximately 13.5 Million tonnes (Mt) of Run-of-Mine (ROM) hard coking coal at a rate of up to 1.95 Million tonnes per annum (Mtpa).

The Project is located north of Dysart and approximately 35 kilometres (km) south of Moranbah in Queensland's Bowen Basin, as shown in Figure 1.1. The Project lies to the immediate west of several established mining operations including the BHP Mitsubishi Alliance (BMA) Peak Downs and Saraji mines. It is also located to the immediate south of Vitrinite's initial mining project, the Vulcan Coal Mine (VCM), which is located on Mining Lease (ML) 700060. The Project's mining lease application area abuts ML700060, however, proposed activities will be implemented separately. The Project is located within the Isaac Regional Council Local Government Area (LGA).

The Project will include construction of permanent infrastructure associated with the mining operation, including a mine infrastructure area (MIA), a modular coal handling and preparation plant (CHPP), a rail loop and train load-out facility (TLO). This key infrastructure is to be constructed central to the site, with the internal road network proposed to connect with Saraji Road. Over the course of the mining duration, ongoing establishment of internal road networks, surface water management infrastructure and other ancillary infrastructure will continue to be developed as the pit and in-pit dump advance. ROM coal will be transported from the Project via the TLO.

A realignment of the existing Saraji Road and services infrastructure to the eastern boundary of the proposed MLA is currently being progressed as part of a separate approvals process (see Figure 1.2). The Saraji Road realignment is expected to be completed prior to the construction activities proposed as part of the Project.

Vitrinite is seeking an Environmental Authority (EA) to develop the Project. This Transport Impact Assessment (TIA) report will accompany the overarching EA application and forms part of the environmental assessment required for the Project.

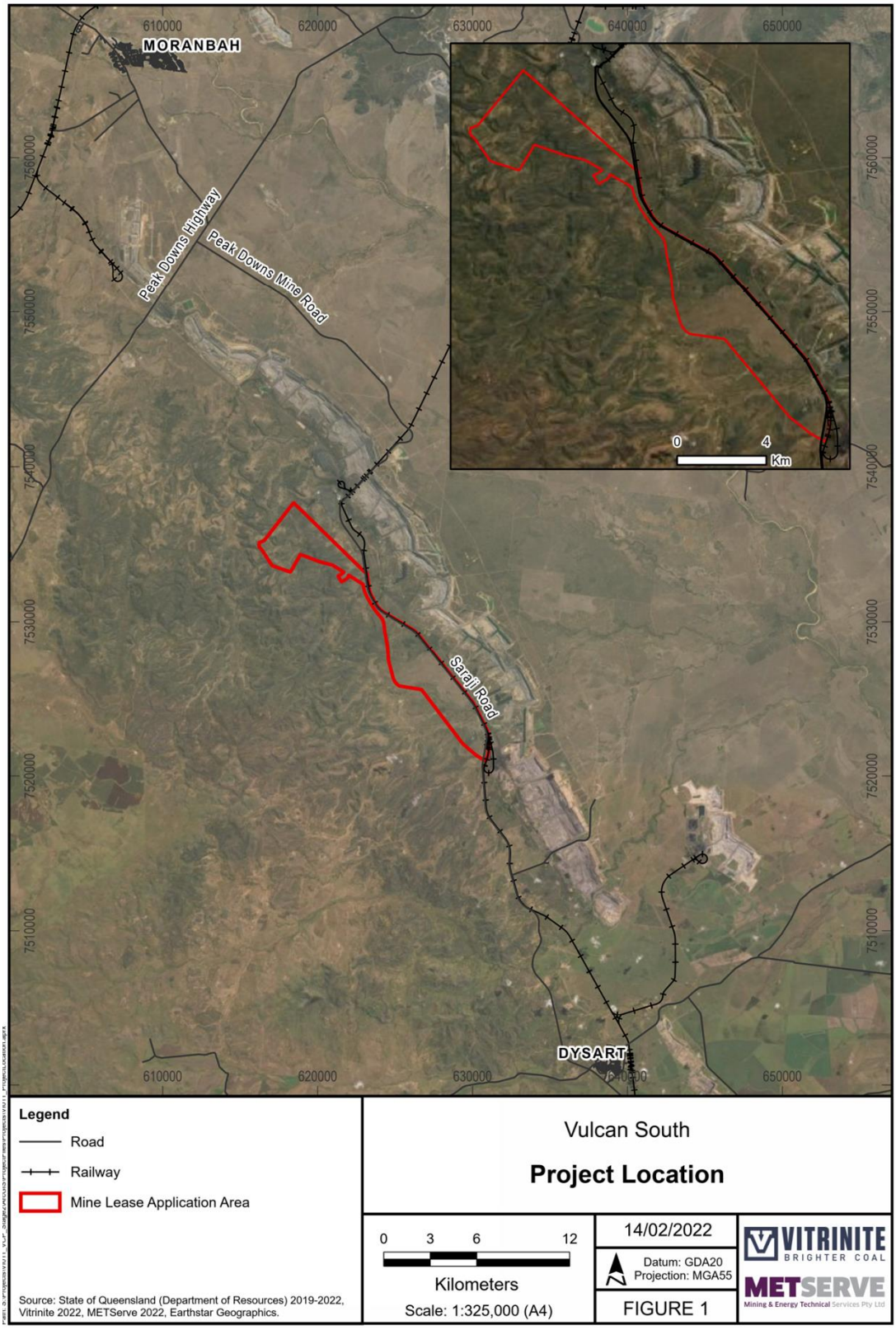
1.2. Purpose of this Report

This report sets out the assessment of the likely transport implications resulting from the construction, operation and decommissioning phases of the Project. Specifically, this report considers the following:

1. The existing traffic conditions proximate to the Project, including an assessment of the haul roads expected to service the Project.
2. The traffic generating characteristics of the Project, inclusive of that generated by the Bulk Sample Project (BSP) and VCM, where construction and operational activities may overlap.
3. The expected transport impact of the Project on the surrounding Local and State Controlled Road (SCR) network.
4. Proposed changes to road-related infrastructure required by the Project. This includes modifications to roads, access works and realignments of rail lines in the context of rail level crossings and services.

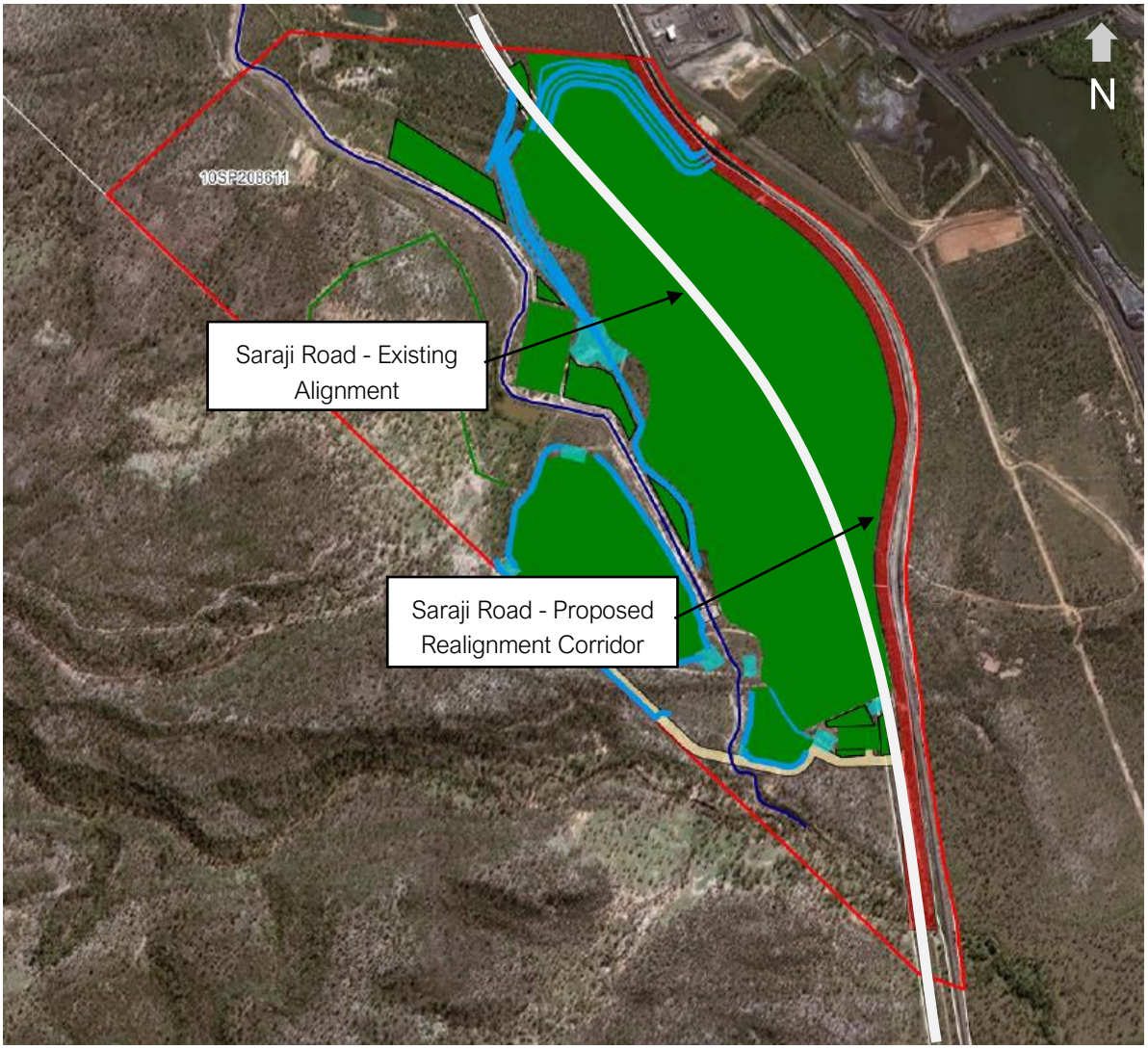
5. Expected traffic volume of heavy vehicle haul movements associated with the transport of materials, wastes and other goods for construction and operations phases of the Project.
6. Workforce journey-to-work traffic generated by Project activities, including anticipated traffic modes, volumes, composition, timing and routes.
7. Identification of methods and strategies to reduce any identified traffic impacts.

Figure 1.1: Project Location



Source: Vulcan South – Project Description (February 2022)

Figure 1.2: Saraji Road Realignment



Source: Vulcan Coal Mine – Preliminary Saraji Road Realignment Corridor (March 2020)

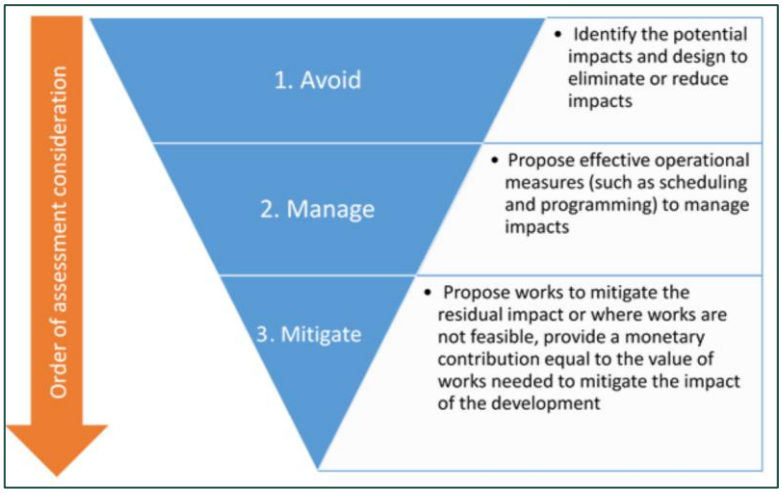
1.3. Study Methodology

This TIA has been undertaken in accordance with the requirements of the Department of Transport and Main Roads (TMR) *Guide to Traffic Impact Assessment* (GTIA), by way of the adoption of the following methodology:

- Review existing road conditions and operations and establish a baseline condition (i.e. transport operation without the Project).
- Prepare estimates of Project generated traffic based on the intended haul routes of heavy vehicles and workforce requirements.
- Review information provided by the Proponent in relation to the BSP and VCM, and source traffic generation estimates for use in the baseline assessment.

- Prepare scenarios for the traffic assessment which consider baseline and Project traffic generation estimates at critical Project milestones (referred herein as design horizons).
- Determine likely road impacts of the Project for each of the identified design horizons, in accordance with threshold levels and rationale provided within the GTIA. Specifically, the following impacts have been considered:
    - Impact of the proposed vehicular access intersection at the interface with the external road network and other key intersections on identified haul routes.
    - Impact of Project related traffic on existing road link capacity for key haul routes.
    - Impact of Project related heavy vehicle movements on existing pavement conditions.
- Where impacts were identified as exceeding GTIA defined threshold levels, recommendations to "avoid", "manage" or "mitigate" these impacts have been provided in line with the methodology detailed in GTIA and shown in Figure 1.3.
- Review and assess road safety risks that might arise as a result of the Project and identify mitigation measures to ensure no worsening of these risks.

Figure 1.3: Impact Mitigation Hierarchy



Source: Guide to Traffic Impact Assessment, Department of Transport and Main Roads (December 2018)

1.4. Reference Documents and Supporting Data

This TIA has been prepared with consideration of the following reference resources and documents:

- TMR (2018) *Guide to Traffic Impact Assessment* (GTIA)
- TMR (2004) *Road Planning and Design Manual (Edition 1) – Chapter 5 – Traffic Parameters and Human Factors*
- TMR (2004) *Road Planning and Design Manual (Edition 1) – Appendix 13A – Computation Analysis for Non-Signalised Intersections*
- TMR (2006) *Road Planning and Design Manual (Edition 2) – Volume 3* (RPDM Volume 3)

- TMR (2014) *Road Planning and Design Manual (2nd Edition) – Volume 3: Supplement to Austroads Guide to Road Design Part 4A* (RPDM Volume 3: Part 4A)
- TMR (2018) *Guide to Traffic Impact Assessment Practice Note: Pavement Impact Assessment* (GTIA PIA)
- TMR *Queensland Transport and Roads Investment Program 2018-19 to 2021-22* (QTRIP)
- Austroads (2009) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* (Austroads GTM: Part 3)
- Austroads (2010) *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (Austroads GRD: Part 4A)
- Annual Average Daily Traffic (AADT) data and Marginal Cost Spreadsheet for Peak Downs Highway road sections 33A provided by TMR in June 2020 and for Peak Downs Highway road section 33B provided by TMR in February 2019 and March 2019.
- Traffic count data for Peak Downs Mine Road and Saraji Road undertaken by the Proponent in June 2019 and referenced within the reports undertaken as part of the Bulk Sample Project, dated July 2019
- Site inspections undertaken by GTA Consultants on 4 March 2020 and 5 March 2020
- Other background data and Project input assumptions as agreed with the Proponent.

2. PROJECT DESCRIPTION

02

2.1. Project Location

The Project covers an area of approximately 3,819 ha, situated over multiple underlying tenures, including EPC 1732, EPC 1233 and EPC 1234. The Project is located approximately 165 km southwest of Mackay and 35 km south of Moranbah, within the Isaac Regional Council LGA. It is located to the immediate south of Vitrinite's VCM operation, which is located on Mining Lease (ML) 700060. The Project location in the regional context is shown in Figure 1.1.

2.2. Project Schedule

Construction of the Project is planned to be completed over 1 year between the years 2022 and 2023 following the on-road infrastructure upgrades of Saraji Road and overlapping with the haulage associated with the VCM. Mining operations for the Project will commence in 2023 and have an operations cycle of 8 years followed by decommissioning and rehabilitation. The mining schedule is summarised in Table 2.1.

Table 2.1: Project Schedule

Project Year	Project Activity	Year	Duration
Year 1	Construction	2022	1 Years
Year 2 – 9	Operations	2023 – 2030	8 Years

2.3. Workforce Projections

The Project's workforce will be primarily sourced from the regional area (i.e. Isaac and Mackay regions) and make use of the existing accommodation camp facilities and private housing at Moranbah and Dysart. Project related transport is anticipated to include a combination of Drive-in / Drive-out (DIDO) from Mackay and Fly-in / Fly-out (FIFO) from Moranbah Airport, with daily transport from the Moranbah and Dysart accommodation camps by way of shuttle buses (approximately 22 seat capacity). The Project will also utilise local residents from Moranbah and Dysart who are expected to drive to the site with their own private vehicles.

Projected workforce requirements are provided in Table 2.2.

Table 2.2: Project Workforce Projections

Project Year	Project Activity	Workforce Projection (Daily Persons)
Year 1	Construction	175
Year 2 – 9	Operations	110 [1]

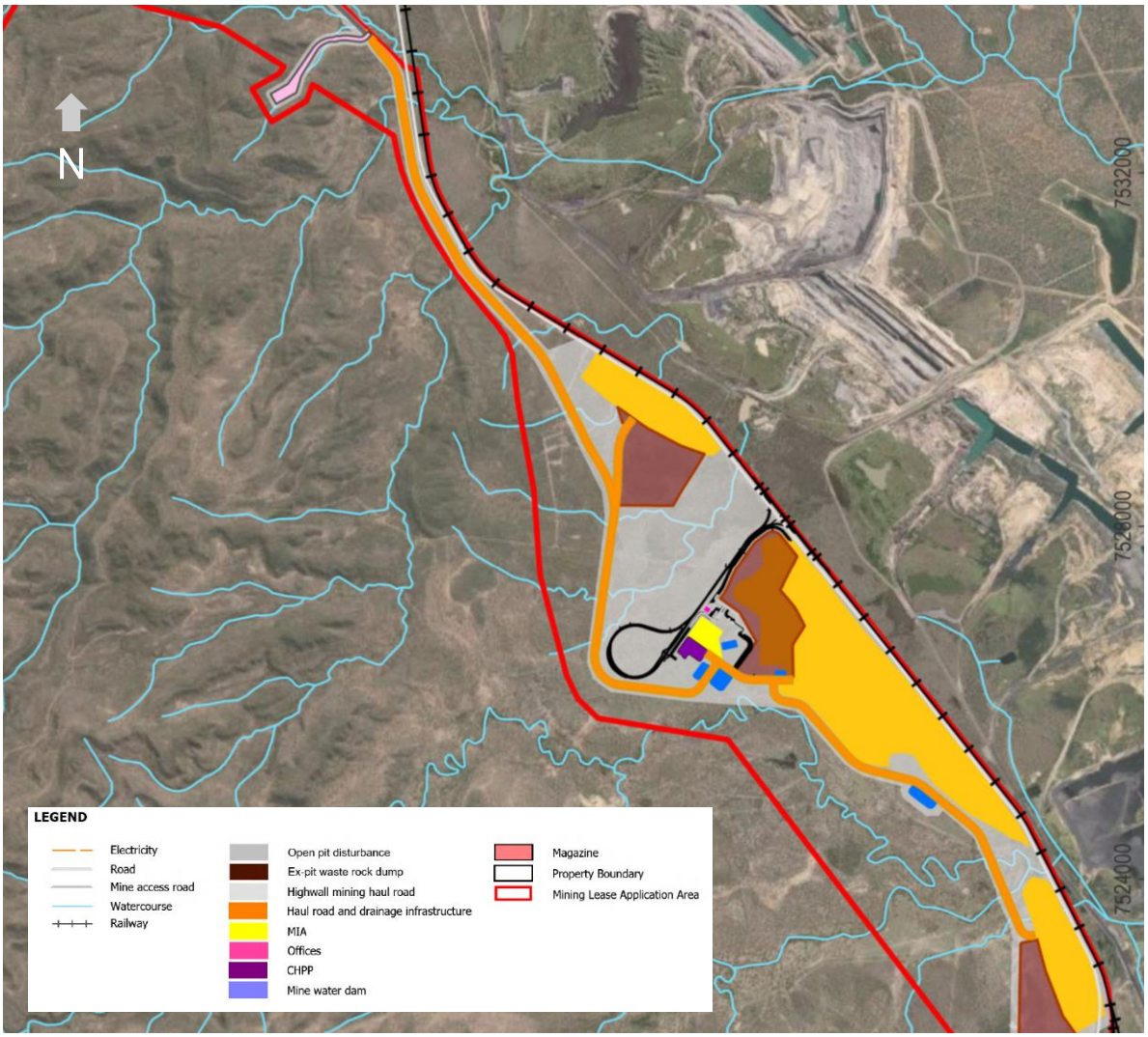
[1] Peak Operations workforce projection consists of 30 staff and 160 contractors split between two rotations resulting a peak demand at any one time of 110 persons per day.

2.4. Proposed Access Arrangements

The Project is to gain direct access to Saraji Road by way of an intersection located approximately 4 km south of the Saraji Road & Peak Downs Mine Road intersection. The Project access intersection will be located south of the Saraji Road alignment works. The suitability of the site access design and location in accordance with relevant design standards is discussed further in Section 9.

The indicative location of the proposed Project layout is shown in Figure 2.1.

Figure 2.1: Proposed Access Arrangements – Construction and Operations



Source: Vulcan South Project – Proposed Project Layout (Provided February 2022)

2.5. Proposed Parking Arrangements

Suitable and sufficient car parking for private vehicles will be provided on-site for workforce and visitors, such that vehicles are not parked on local roads or SCRs. The quantum and associated form of proposed parking facilities will be designed in accordance with *AS 2890.1:2004* and the *Austroads Guide to Traffic Management Part 11* and detailed further as the Project progresses through detailed design.

2.6. Heavy Vehicle Haul Movement Routes

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 and articulated vehicles (e.g. semi-trailer). Project infrastructure and other freight is expected to be transported to site from Mackay.

The Project will utilise an on-site CHPP, which is to be constructed as part of this EA. Details regarding the exact location for the CHPP are still subject to Proponent negotiations with other mine operators. The location

of the CHPP will have no impact on the external road network. Transport of ROM coal will be via the TLO and will not result in any external heavy vehicle movements.

Heavy vehicle movements associated with the construction and operations phases have been based upon projections provided by the Proponent and relate to best knowledge of the Project to date. Heavy vehicle traffic flows and associated vehicle types are not expected to vary significantly over the Project period. The types of heavy vehicle transport which have been considered in this assessment include:

Construction Phase

- Delivery of materials for construction, fuel, and supplies (likely to be sourced from Mackay);
- Movement of temporary buildings and other equipment for maintenance and construction facilities (likely to be sourced from Mackay);

Operations Phase

- Delivery of explosives (likely to be sourced from Mackay); and
- Transport and delivery of general freight including items such as fuel, waste, tyres, and general supplies (likely to be sourced to / from Mackay).

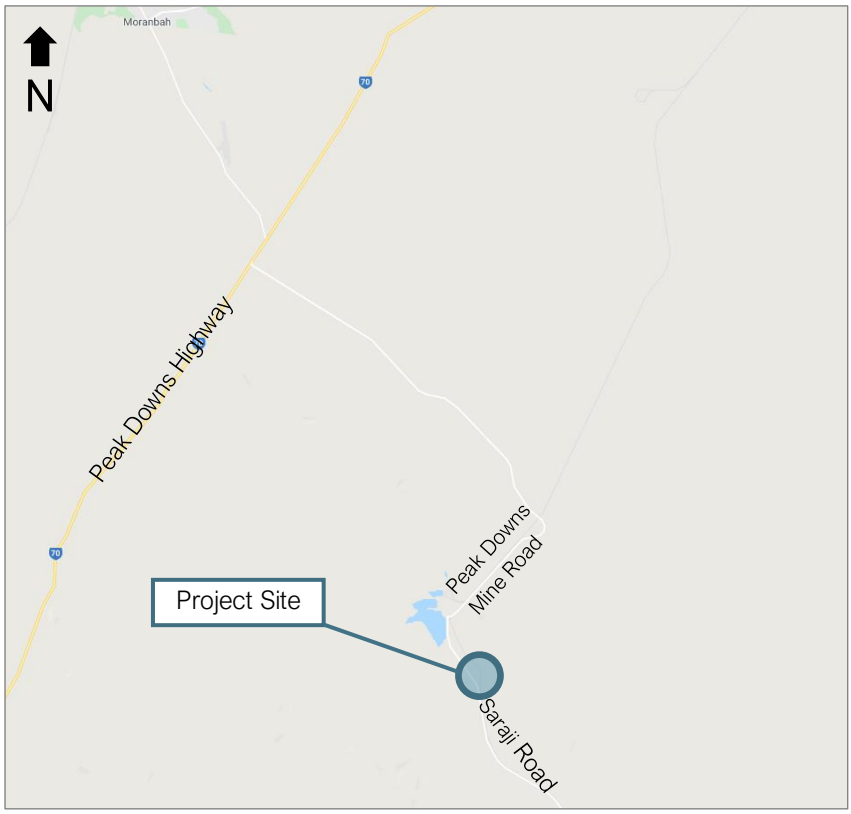
3. EXISTING CONDITIONS

03

3.1. Road Network

Key roads anticipated to service the Project include the Peak Downs Highway, Peak Downs Mine Road and Saraji Road. These roads are shown in Figure 3.1. The characteristics of these roads proximate to the Project are described in Table 3.1.

Figure 3.1: Vulcan South - Existing Road Network



Source: Google Maps (February 2020)

It is noted that at the time of preparing this report the Saraji Road realignment had not yet been completed and has not been reflected in Figure 3.1. This realignment will be completed prior to any on-site construction activities associated with the Project and is discussed further in Section 3.2.

Table 3.1: Road Network Characteristics

Characteristic	Peak Downs Highway	Peak Downs Mine Road	Saraji Road
Jurisdiction	TMR	Isaac Regional Council	Isaac Regional Council
Cross-Section	Two-lane / Two-way / Undivided	Two-lane / Two-way / Undivided	Two-lane / Two-way / Undivided
Pavement	Sealed	Sealed	Sealed
Daily Traffic	3,860 [1]	3,185 [2]	2,270 [2]
Posted Speed Limit	100 km/h	100 km/h	100 km/h

[1] *Based on TMR Road Asset Data for 2018 on Peak Downs Hwy between Peak Downs Mine Rd and Moranbah Access Road (provided 8 Jan 2020)*

[2] *Based on information available within the Traffic Impact Assessment for the 'Vulcan Project Bulk Sample' (QTT9045) (Cardno, 2 July 2019)*

Typical cross sections of the Peak Downs Highway, Peak Downs Mine Road and Saraji Road proximate to the Project are shown in Figure 3.2 to Figure 3.7.

Figure 3.2: Peak Downs Highway at Peak Downs Mine Road (Facing East)

Figure 3.3: Peak Downs Highway at Peak Downs Mine Road (Facing West)

Figure 3.4: Peak Downs Mine Road at Peak Downs Highway (Facing South)

Figure 3.5: Peak Downs Mine Road at Saraji Road (Facing North)

Figure 3.6: Saraji Road at Peak Downs Mine Road (Facing North)

Figure 3.7: Saraji Road near Peak Downs Mine Road (Facing South)

3.2. Road Network Upgrades

A review of TMR's QTRIP 2021-22 to 2024-25 has been undertaken with regards to future planning for the Peak Downs Highway. For the Peak Downs Highway between Clermont and Mackay the works identified in QTRIP are presented in Table 3.2.

Table 3.2: QTRIP Works Schedule

Project Location	Location Description	Works Description
Peak Downs Highway (Clermont - Nebo)	Wuthung Road – Caval Ridge	Widen pavement
Peak Downs Highway (Clermont - Nebo)	Various Locations	Rehabilitate and widen
Peak Downs Highway (Clermont - Nebo)	Eton to Mackay	Targeted road safety improvements
Peak Downs Highway (Nebo – Mackay)	Kirkup Bridge (Walkerston)	Replace timber bridge
Peak Downs Highway (Nebo - Mackay)	North Eton Road and Quatromanis Intersection	Improve safety

As described in Table 3.2, several road upgrade projects are planned for the Peak Downs Highway at locations between Clermont and Mackay. These works are planned to be undertaken prior to 2025. The identified upgrades are generally projects to improve road capacity, safety and intersection operations along the Peak Downs Highway, and therefore, are expected to have a net benefit to the Project. Details regarding the extent of these upgrade works are not currently known. On this basis, the additional capacity likely to be available from the upgrades has not been considered in this TIA to allow for a conservative (worst-case) assessment.

3.2.1. Saraji Road Realignment

The Proponent has undertaken negotiations with Isaac Regional Council which has resulted in the agreement of the Proponent to undertake realignment and improvement works on Saraji Road, tying into the existing Saraji Road alignment near Peak Downs Mine Road in the north, and between VCM and Vulcan South project in the South. The proposed realignment is shown in Figure 1.2. As discussed, these works are to be completed prior to the construction of the Project.

3.3. Baseline Traffic Volumes & Growth

3.3.1. State Controlled Roads

Background traffic volumes have been sourced from TMR, by way of Road Asset Data which reports directional Annual Average Daily Traffic (AADT) volumes for sealed roads for the Peak Downs Highway for segments between Clermont to Nebo and Nebo to Mackay. A copy of the AADT data is provided at Appendix A, with a summary of data provided in Table 3.3. For the purpose of converting AADT volumes to peak hour volumes (for the road link and intersection assessment), a peak-to-daily ratio of 15% has been assumed. The application of this ratio is in accordance with guidance for rural roads provided in the *RPDM 1st Edition – Chapter 5*.

A review of growth rates obtained from historic traffic data detailed within the AADT reports indicates that growth for the Peak Downs Highway ranges from -4.6% (negative growth) to 8.9% over the past five years (see Table 3.3). For this TIA, the reported 5-year traffic growth has been adopted for each individual road segment, with the exception of reported growth rates which fall outside of the lower and upper bounds of 1% and 5%. These bounds have been adopted on the basis of engineering judgement, with the lower bound

ensuring that baseline traffic continues to increase over time, and the upper bound limiting the impact of short term fluctuations in traffic growth which are generally unsustainable over a longer term design horizon.

Table 3.3: Baseline Traffic Volumes – Peak Downs Highway (2018 / 2019)

Road Name	Segment Description	Direction	Chainage Start [1]	Chainage End [1]	AADT	5 Year Growth [2]	HV% [3]
33A - Peak Downs Highway (Clermont - Nebo)	Peak Downs Hwy West of Dysart Turnoff[4]	Against Gazettal	0.0	89.1	292	1.0%	28%
		Gazettal	0.0	89.1	291	1.2%	37%
	33A Between Moranbah Turnoff & Dysart Turnoff[4]	Against Gazettal	89.1	90.4	1809	6.4%	19%
		Gazettal	89.1	90.4	1834	6.6%	20%
	Peak Downs Hwy 150 m West of Isaac River[4]	Against Gazettal	90.4	101.8	1675	8.8%	16%
		Gazettal	90.4	101.8	1712	8.8%	21%
	West of Coppabella[4]	Against Gazettal	101.8	128.0	2028	5.4%	55%
		Gazettal	101.8	128.0	1925	3.5%	15%
	East of Coppabella[4]	Against Gazettal	128.0	149.4	1820	5.8%	44%
		Gazettal	128.0	149.4	1799	5.8%	22%
	East of Bee Creek	Against Gazettal	149.4	163.6	2,101	2.3%	15%
		Gazettal	149.4	163.6	2,097	2.8%	56%
	North of Braeside Road	Against Gazettal	163.6	178.2	2,006	2.8%	32%
		Gazettal	163.6	178.2	1,977	3.1%	26%
33B - Peak Downs Highway (Nebo - Mackay)	Retreat Hotel Permanent Counter	Against Gazettal	0.0	44.8	1,989	0.7%	30%
		Gazettal	0.0	44.8	2,011	1.0%	18%
	Weigh in Motion Site Eton	Against Gazettal	44.8	62.0	1,803	-4.6%	28%
		Gazettal	44.8	62.0	1,796	-3.3%	18%
	West of Walkerston Township	Against Gazettal	62.0	76.0	2,954	1.3%	19%
		Gazettal	62.0	76.0	2,872	0.3%	18%
	East of Walkerston Cemetery	Against Gazettal	76.0	81.4	4,905	-1.0%	12%
		Gazettal	76.0	81.4	4,572	-1.2%	12%
	East of BSES	Against Gazettal	81.4	86.1	8,541	2.5%	26%
		Gazettal	81.4	86.1	8,587	1.7%	8%
	West of Bernborough Avenue	Against Gazettal	86.1	87.0	5,097	1.3%	13%
		Gazettal	86.1	87.0	4,795	-0.8%	14%
	Bernborough Avenue - City Gates	Against Gazettal	87.0	87.8	5,476	1.7%	17%
		Gazettal	87.0	87.8	5,363	-0.3%	17%

[1] *Chainage based on TMR Road Asset Data 'TDistStart' and 'TDistEnd'*
[2] *Average linear growth over the 5-year period between 2014 and 2018*
[3] *HV% – Percentage of Heavy Vehicles*
[4] *Updated 2019 data utilised*

3.3.2. Council Controlled Roads

Background traffic volumes for the Isaac Regional Council controlled roads of Saraji Road and Peak Downs Mine Road have been sourced from traffic surveys undertaken by the Proponent for the Bulk Sample Project. This data was provided within the BSP TIA, dated 2 July 2019, which previously completed vehicle movement counts at the Peak Downs Mine Road intersections with the Peak Downs Highway and Saraji Road. An extract from the report which contains the traffic count data for Saraji Road and Peak Downs Mine Road is provided at Appendix B, with a summary of data provided in Table 3.4. Daily traffic volumes are based on peak hourly movement volumes and a peak-to-daily ratio of 15%. The application of this ratio is in accordance with guidance for rural roads provided in the *RPDM 1st Edition – Chapter 5*.

Consistent with the approach outlined in the GTIA, a background traffic growth rate of 3% per annum (linear) has been adopted to inform the basis of future traffic forecasts. The application of this growth rate is generally considered appropriate for locations where site-specific data is unavailable.

Table 3.4: Baseline Traffic Volumes – Local Road Network (2019)

Road Name	Segment Description	Direction	Section Length	Daily traffic volume	5 Year Growth [2]	HV% [3]
Saraji Road	Between Peak Downs Mine Road Site Access Location	Combined	43.1 km [1]	2270	-	7%
Peak Downs Mine Road	Between Peak Downs Highway and Saraji Road	Combined	25.9 km	3,185	-	9%

[1] *Site Access is located approximately 4 km south of the Saraji Road & Peak Downs Mine Road intersection*

3.4. Rail Network

The Project is located proximate to the Peak Downs railway line which transports coal from the Peak Downs Mine to the Hay Point and Dalrymple Bay Coal Terminal south-east of Mackay. The Project will utilise the proposed rail loop for transporting coal to export terminals.

There is a single rail level-crossing present within the haulage route of the Project and its frontage. It is expected that liaison with Aurizon will be undertaken at a later stage of this approval (if required) to undertake an Australian Level Crossing Assessment Model (ALCAM) assessment to determine whether any changes to the rail level crossing treatment is required as a result of the Project.

3.5. Intersection & Network Performance

On-site observations (undertaken on 4 February 2020 and 5 February 2020) suggest that current traffic volumes during the peak hour of key segments of the haulage route and proximate to the Project site are low. As such, the current network and intersection performance of Peak Downs Highway & Peak Downs Mine Road intersection, Peak Downs Mine Road & Saraji Road intersection, and Saraji Road & Site Access proximate to the Project is expected to be within capacity.

This is assessed and discussed further in Section 5 and Section 6.

3.6. Public Transport & Active Travel

There are no public or active transport provisions on the road network proximate to the Project, with the exception of infrequent school bus services. This is a result of the adjacent land uses being mining / resource sector developments and pastoral properties which do not require access via public or active transport. As such, no impacts are expected to occur to existing public and active transport provisions proximate to the Project as a result of the Project.

4. PROJECT TRAFFIC

04

4.1. Design Horizons for Assessment

The GTIA describes key impact years which would ordinarily form part of a TIA. GTIA defined design horizons for each assessment type are summarised in Table 4.1.

Table 4.1: GTIA Specified Design Horizons for Assessment

Assessment / Impact Type	Assessment / Impact Year
Road Safety	Year of opening of each stage including the final stage.
Access and Frontage	Year of opening of each stage including the final stage and 10 years after the year of opening of the final stage for access intersections.
Intersection Delay	Year of opening of each stage including the final stage.
Road Link Capacity	Year of opening of each stage including the final stage.
Pavement	Year of opening of each stage including the final stage. Note that mitigation of pavement impacts occurs for a period of 20 years after the opening of the final stage.

Source: TMR's GTIA Table 6.5 (2018)

Taking into consideration the Project schedule, the following years are of relevance to this TIA:

- Project Year 1 (expected 2022): Project construction
- Project Year 2 (expected 2023): Year of opening for the Project
- Project Year 9 (expected 2030): Final year of Project (to be used in lieu of the 10-year design horizon from opening of the final stage of the Project for the Access and Frontage Assessments, as the project does not span the assessable 10 years – refer to Table 4.1)

The design horizons as shown in Table 4.2 have been selected for this assessment.

4.2. Workforce Traffic Generation

Traffic generated by the Project workforce has been estimated based on the workforce projections outlined in Section 2. Assumptions have been made regarding the location of the workforce, likely roster arrangements and vehicle occupancies, as detailed in the following sections. These assumptions have been developed in consultation with the Proponent and have been derived based on the best available knowledge of the Project at the time of preparing this report. A summary of the anticipated workforce projections for the Project correlated to each of the adopted design horizons is provided in Table 4.3.

4.2.1. Location of Workforce

It is anticipated that the construction and operations workforce will be accommodated through a mix of local workers, DIDO and FIFO workers staying at the Moranbah and Dysart accommodation villages.

A summary of the expected workforce locations and associated directional distribution is provided in Table 4.4 with proportions relating to each mode of travel detailed in Table 4.4 and Table 4.5.

Table 4.2: Adopted Design Horizons

Assessment / Impact Type	Assessment / Impact Year
Road Safety	Construction – Project Year 1 Operations – Project Year 2
Access and Frontage	Construction – Project Year 1 Operations – Project Year 2 10-year design horizon from year of opening – Project Year 9
Intersection Delay	Construction – Project Year 1 Operations – Project Year 2
Road Link Capacity	Construction – Project Year 1 Operations – Project Year 2
Pavement	Construction – Project Year 1 Operations – Project Year 2 Final Year of Project – Project Year 9

Table 4.3: Total Workforce – Vulcan South Project

Project Activity	Workforce Estimate (Daily Persons)
Construction (Year 1)	175
Operations (Years 2 – 9)	110

Table 4.4: Workforce Location - Directional Distribution

Project Activity	Moranbah	Dysart
Construction (Year 1)	50%	50%
Operations (Years 2 – 9)	50%	50%

Table 4.5: Proportion of Workforce by Mode of Travel – Construction and Operations Phase

Origin / Destination of Workforce	Mode of Travel	Proportion of Workforce
Moranbah	Car[1]	10%
	Bus[2]	40%
Dysart	Car[1]	10%
	Bus[2]	40%
Total		100%

[1] *Cars are assumed to have a vehicle occupancy of 1.2 persons per vehicle*
[2] *Buses are assumed to have a seating capacity of 22 persons per bus*

4.2.2. Workforce Rosters

The Project is expected to operate on different workforce rosters for the Project phases, as follows:

- Construction: **Workforce & Staff** – 1 x 12-hour shift (day shift only), 7 days per week
- Operations: **Workforce** – 2 x 12-hour shift (day shift and night shift), 7 days per week
  Staff – 1 x 12-hour shift (day), 5 days per week

It is assumed that traffic generation associated with shift start and end times will occur within a single hour, coinciding with the network peaks. Information provided by the Proponent has indicated that the likely shift starts will occur at 6 AM and 6 PM.

All construction phase traffic is assumed to arrive in the AM peak and depart in the PM peak. All operations traffic is assumed to have "day" shift traffic arrive in the AM peak and depart in the PM peak with "night" shift traffic arriving in the PM peak and departing in the AM peak.

4.2.3. Summary of Workforce Traffic Generation

Based on the assumptions documented in the preceding sections, the estimated workforce generated traffic (inclusive of bus movements) is summarised in Table 4.6. Vehicles are assumed to be running at full occupancy in both directions for operations "day" and "night-time" shift changes.

Table 4.6: Workforce Traffic Generation Summary

Project Activity	Direction	AM Peak (veh / hr)		PM Peak (veh / hr)	
		In	Out	In	Out
Construction	Moranbah (North)	19	0	0	19
	Dysart (South)	19	0	0	19
Operations	Moranbah (North)	6	6	6	6
	Dysart (South)	6	6	6	6

veh / hr – vehicle movements per hour

4.3. Heavy Vehicle Traffic Generation

The Proponent has provided estimates of heavy vehicle movements for the Project construction and operations phases. The anticipated origins / destinations of heavy vehicles is Mackay as detailed in Section 2.5. A summary of anticipated daily two-way vehicle movements is provided in Table 4.7.

Table 4.7: Daily (Peak) Project Heavy Vehicle Movements (Two – Way Movements)

Project Activity	Austroads Vehicle Class	Peak Daily Movements (veh / day)
		Mackay
Construction	Class 3	1
	Class 9	15
	Class 10	1
	Total	**17**
Operations	Class 3	1
	Class 9	0
	Class 10	3
	Total	**4**

The assumed haul routes for all heavy vehicle movements are Saraji Road, Peak Downs Mine Road and the Peak Downs Highway.

It is assumed that traffic generation associated with operations haulage will occur steadily over a 24-hour workday. For all other heavy vehicle movements, it has been conservatively assumed that all movements will arrive and depart in the peak period and have been applied to both peak periods for assessment purposes.

Based on the assumptions documented in the preceding sections, peak hour estimates of heavy vehicle traffic are summarised in Table 4.8.

Table 4.8: Peak Hour Project Heavy Vehicle Traffic Generation Summary – Site Access

Project Activity	Peak Hour Movements (veh / hr)	
	In	Out
Construction (Years 1)	10	10
Operations (Years 2 – 9)	3	3

veh / hr – vehicle movements per hour

4.4. Cumulative Traffic

The traffic associated with the operations of the VCM have not been captured in the baseline traffic count datasets and are required to be considered so that the cumulative impact of the Project is assessed for the external road network. The Proponent has indicated that operations associated with the BSP are not expected to overlap with the Project. However, vehicle movements associated with the VCM may overlap during the years of 2022, 2023 and 2024, coinciding with the Project Construction phase and the first two years of the Project Operations Phase. A conservative assessment has been undertaken which assumes that the peak daily movements of up to 101 vehicles (with up to 32 vehicles per hour) will overlap with the Construction Phase of the Project. The contribution of the peak of 32 vehicles per hour has been conservatively excluded for impact assessments (i.e. the percentage increase of Project traffic compared with baseline traffic conditions), but conservatively included for all design considerations such as turn warrant assessments.

5. ROAD LINK ASSESSMENT

05

5.1. Context of Road Link Assessment

The following section has been prepared to assess anticipated Project impacts on the road network with due consideration of forecast traffic volumes "with" and "without" the Project. This assessment has been undertaken in accordance with the principles outlined in the GTIA which defines the impact assessment area to be:

"All road links where the development traffic exceeds 5% of the base traffic in either direction on the link's annual average daily traffic (AADT) in the year of opening of each stage"

5.2. Impacted Road Links on State Controlled Roads

Table 5.1 summarises the comparison of baseline AADT traffic to peak daily Project traffic on SCRs, to determine whether the 5% traffic impact threshold of the GTIA is exceeded. This assessment excludes consideration of BSP traffic (as discussed in Section 4.4) to provide a conservative assessment.

Table 5.1: Road Link Assessment – Impact Identification Table

Road Name	Road Section	Direction	Chainage Start	Chainage End	Percentage Increase	
					Year 1	Year 2
33A - Peak Downs Highway (Clermont - Nebo)	Peak Downs Hwy West of Wuthung Turnoff 65.28	Gazettal	0.0	89.1	0.0%	0.0%
		Against Gazettal	0.0	89.1	0.0%	0.0%
	33A Between Moranbah Turnoff & Dysart Turnoff	Gazettal	89.1	90.4	1.7%	0.7%
		Against Gazettal	89.1	90.4	1.7%	0.7%
	Peak Downs Hwy 150 m West of Isaac River	Gazettal	90.4	101.8	0.9%	0.2%
		Against Gazettal	90.4	101.8	0.9%	0.2%
	West of Coppabella (Prior to CHPP turnoff)	Gazettal	101.8	128.0	0.7%	0.2%
		Against Gazettal	101.8	128.0	0.8%	0.2%
	East of Coppabella	Gazettal	128.0	149.4	0.8%	0.2%
		Against Gazettal	128.0	149.4	0.8%	0.2%
	East of Bee Creek	Gazettal	149.4	163.6	0.7%	0.2%
		Against Gazettal	149.4	163.6	0.7%	0.2%
	North of Braeside Road	Gazettal	163.6	178.2	0.8%	0.2%
		Against Gazettal	163.6	178.2	0.8%	0.2%
	Retreat Hotel Permanent Counter	Gazettal	0.0	44.8	0.8%	0.2%
		Against Gazettal	0.0	44.8	0.8%	0.2%
	Weigh in Motion Site Eton	Gazettal	44.8	62.0	0.9%	0.2%

Road Name	Road Section	Direction	Chainage Start	Chainage End	Percentage Increase	
					Year 1	Year 2
33B - Peak Downs Highway (Nebo - Mackay)		Against Gazettal	44.8	62.0	0.9%	0.2%
	West of Walkerston Township	Gazettal	62.0	76.0	0.5%	0.1%
		Against Gazettal	62.0	76.0	0.6%	0.1%
	East of Walkerston Cemetery	Gazettal	76.0	81.4	0.3%	0.1%
		Against Gazettal	76.0	81.4	0.4%	0.1%
	East of BSES	Gazettal	81.4	86.1	0.2%	0.0%
		Against Gazettal	81.4	86.1	0.2%	0.0%
	West of Bernborough Avenue	Gazettal	86.1	87.0	0.3%	0.1%
		Against Gazettal	86.1	87.0	0.3%	0.1%
	Bernborough Avenue - City Gates	Gazettal	87.0	87.8	0.3%	0.1%
		Against Gazettal	87.0	87.8	0.3%	0.1%

On the basis of the summary provided in Table 5.1, the impact of forecast Project traffic does not exceed 5% of the forecast AADT for any road segment during any of the identified design horizons. As a result, the Project impact on SCR links is considered to be negligible and does not warrant any further analysis.

5.3. Impacted Road Links on Council Controlled Roads

Table 5.2 summarises the comparison of baseline AADT traffic to peak daily Project traffic on Council controlled roads, to determine whether the 5% traffic impact threshold is exceeded. This assessment includes consideration of BSP traffic (as discussed in Section 4.4) to provide for a conservative assessment.

Table 5.2: Road Link Assessment – Impact Identification Table

Road Name	Road Section	Direction	Percentage Increase	
			Year 1	Year 2
Saraji Road	Between Peak Downs Mine Road Site Access Location	Combined	2.8%	1.2%
Peak Downs Mine Road	Between Peak Downs Highway and Saraji Road	Combined	2.0%	0.9%

On the basis of the summary provided in Table 5.2, the impact of forecast Project traffic does not exceed 5% of the forecast AADT for either Saraji Road and Peak Downs Mine Road during the opening year of construction (Year 1) or opening year of operations (Year 2). As a result, the Project impact on council-controlled roads does not warrant further analysis.

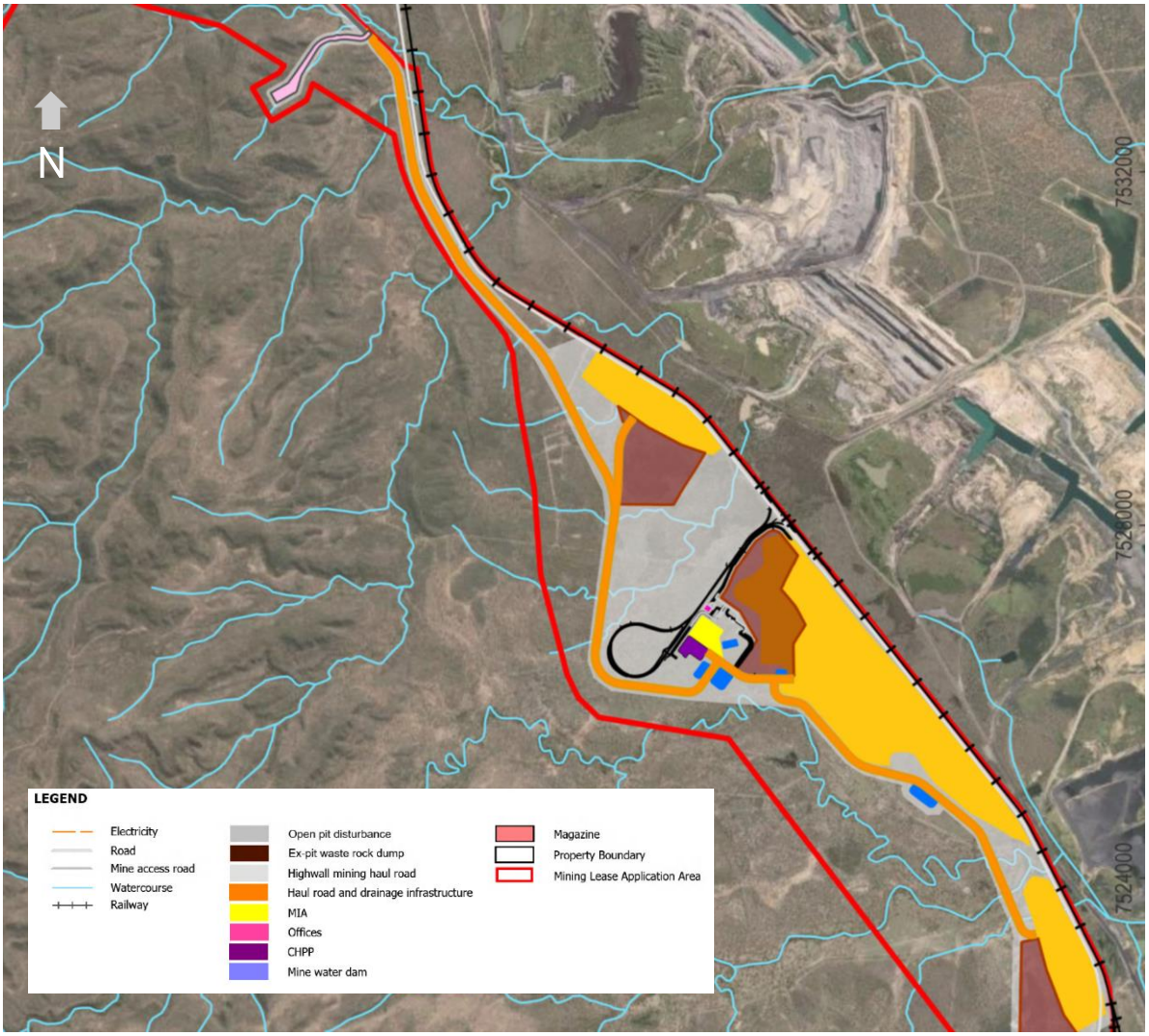
6. INTERSECTION IMPACT ASSESSMENT

06

6.1. Project Access Locations

The Project proposes to gain vehicular access to the site from Saraji Road as discussed in Section 2. This access is to be constructed south of the Saraji Road realignment along an existing portion of Saraji Road. The proposed access location is shown in Figure 6.1.

Figure 6.1: Proposed Site Access Locations



Source: Vulcan South Project – Proposed Project Layout (Provided February 2022)

6.2. Project Access – Saraji Road Realignment

6.2.1. Sight Distance Assessment

A review of the Safe Intersection Sight Distance (SISD) requirements has been undertaken for a proposed access location to be located along Saraji Road. As dictated within Austroads Guidelines Part 4A (2017) Table 3.2, based on a 100 km/h speed limit (85th percentile operating speed of 110 km/h) and a Type 2 Road Train (Austroads Vehicle Class 12) the SISD is 336m (plus longitudinal grade adjustments) in each direction.

It is noted that whilst the design vehicle for Vulcan South is smaller than a Type 2 Road Train, this access is required to accommodate the vehicles utilised by the VCM which has a design vehicle of a Type 2 Road Train, and has been designed as such.

A desktop review of the indicative site access location has been undertaken and it appears that a SISD of at least 336m (plus longitudinal grade adjustments) can be achieved in each direction along Saraji Road. It is recommended that a detailed review of the SISD for the proposed site access be undertaken as part of subsequent stages of design development.

It is noted that it is recommended that minimum sight distances are exceeded in an attempt to reduce risk associated with sight distances for any proposed accesses. Additionally, maintenance of the roadside foliage along Saraji Road is recommended to maximise the available sight distances. Should foliage be located within the Council owned road easement, the proponent will discuss maintenance options and solutions with Council.

6.2.2. Turn Warrant Assessment

A turn warrant assessment of the proposed Project access / Saraji Road intersection has been undertaken in accordance with the methodology provided in the *RPDM Volume 3: Part 4A*. Results of the assessment (included at Appendix C) conclude that turn treatments on the realigned Saraji Road of the proposed site access intersection are required to take the form of:

- Left-Turn: Basic Left Turn (BAL)
- Right-Turn: Basic Right Turn (BAR).

The turn warrant assessment indicates that BAL and BAR turn treatments are required at the Project access / Saraji Road intersection to cater for Project generated traffic. It should be noted that these turn treatments are required during the opening year of construction (2022).

It is noted that a turn warrant assessment has previously been completed as part of the VCM Road Impact Assessment. The results of this concluded that prior to the Vulcan South Project, the VCM construction period requires turn treatments on the Saraji Road site access intersection to take the form of:

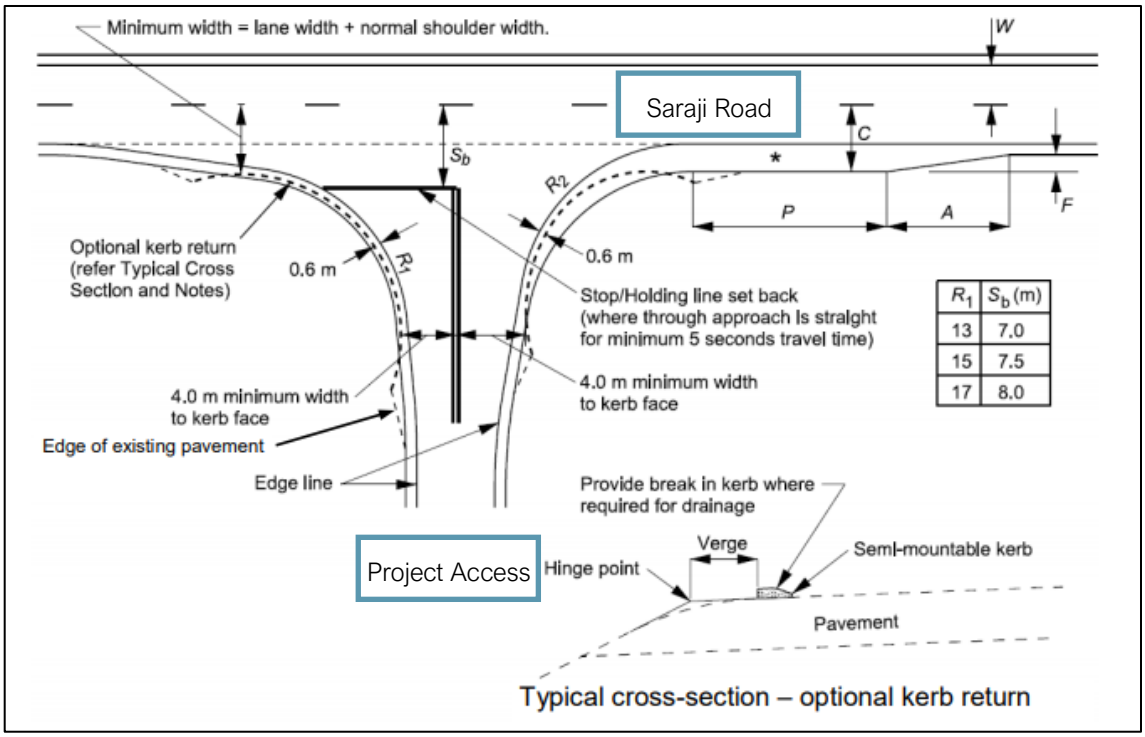
- Left-Turn: Basic Left Turn (BAL)
- Right-Turn: Short Channelised Right Turn (CHR[s]).

The intersection form for the left and right turn treatments for the site access for the Project are lower than those required by the VCM and the greater requirements have therefore been retained.

6.2.3. Intersection Form

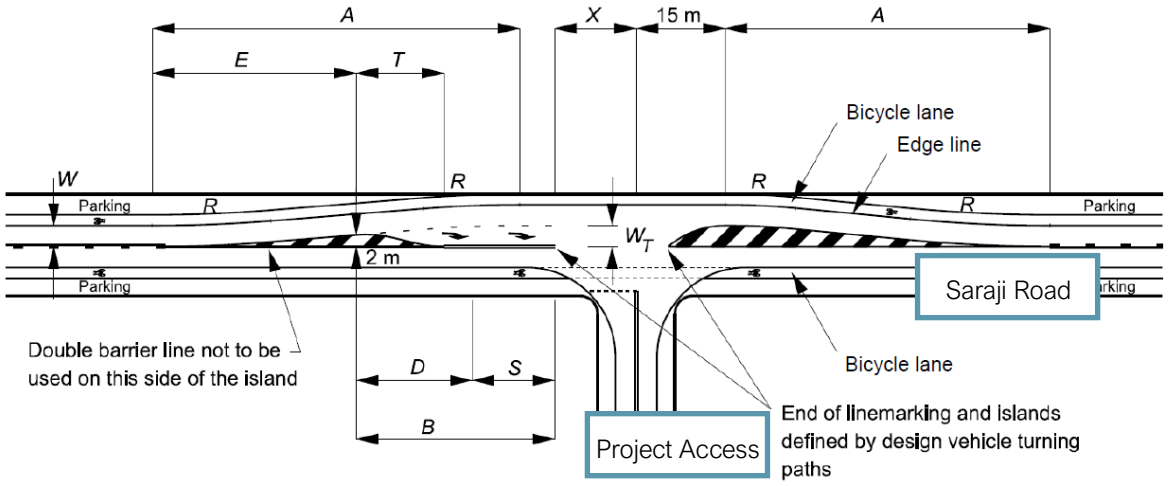
The required form for the left and right turn treatment at the proposed Project access / Saraji Road intersection is provided in Figure 6.2 and Figure 6.3 This treatment is based on the requirements set out in *Austroads GRD: Part 4A*.

Figure 6.2: Basic Left Turn Treatment - General Form



Source: Austroads Guide to Road Design Part 4A (2017), figure 8.2

Figure 6.3: Channelised Right Turn Treatment – General Form



Source: Austroads Guide to Road Design Part 4A (2017), figure 7.7

6.3. Project Impact on Intersections

6.3.1. Intersection Impact Assessment

An assessment of intersections proximate to the site was undertaken for the selected design horizons, to identify impacted intersections (i.e. intersections where the development traffic exceeds 5% of the base traffic for any movements in the design peak periods). Table 6.1 details intersections where the 5% threshold was exceeded for one or more movements for both the AM and PM peak periods.

Table 6.1: Intersection Impact Identification

Intersection	Design Year	Impact
Saraji Road & Peak Downs Mine Road	Year 1 (2022)	Exceeds 5% threshold for 2 movements.
	Year 2 (2023)	Exceeds 5% threshold for 2 movements.
Peak Downs Mine Road & Peak Downs Highway	Year 1 (2022)	Exceeds 5% threshold for 2 movement.
	Year 2 (2023)	Exceeds 5% threshold for 2 movements.

6.3.2. Turn Warrant Assessment (Baseline Conditions)

Turn warrant assessments of the Saraji Road & Peak Downs Mine Road intersection and Peak Downs Mine Road & Peak Downs Highway intersection have been undertaken for baseline conditions (i.e. without Project related traffic) in accordance with the methodology provided in the *RPDM Volume 3: Part 4A*. Results of the assessment (included at Appendix C) conclude that turn treatments on the major road of the intersections are required to take the form of:

Saraji Road & Peak Downs Mine Road (Peak Downs Mine Road approaches)

- Left-Turn: Short Auxiliary Left Turn (AUL[s])
- Right-Turn: Channelised Right Turn (CHR)

Peak Downs Mine Road & Peak Downs Highway (Peak Downs Highway approaches)

- Left-Turn: Short Auxiliary Left Turn (AUL[s])
- Right-Turn: Short Channelised Right Turn (CHR[s]).

6.3.3. Turn Warrant Assessment (Project Conditions)

Turn warrant assessments of the Saraji Road & Peak Downs Mine Road intersection and Peak Downs Mine Road & Peak Downs Highway intersection have been undertaken for Project conditions (i.e. with additional Project related traffic) in accordance with the methodology provided in the *RPDM Volume 3: Part 4A*. Results of the assessment (included at Appendix C) conclude that turn treatments on the major road of the intersections are required to take the form of:

Saraji Road & Peak Downs Mine Road (Peak Downs Mine Road approaches)

- Left-Turn: Short Auxiliary Left Turn (AUL[s])
- Right-Turn: Channelised Right Turn (CHR)

Peak Downs Mine Road & Peak Downs Highway (Peak Downs Highway approaches)

- Left-Turn: Short Auxiliary Left Turn (AUL[s])
- Right-Turn: Short Channelised Right Turn (CHR[s]).

6.3.4. Intersection Form

Saraji Road & Peak Downs Mine Road

A comparison of Baseline and Project Conditions turn warrant assessments show that the required turn treatments for Saraji Road and Peak Downs Mine Road intersection do not alter as a result of the Project related traffic movements. As a result, it is not the responsibility of the proponent to provide additional turn treatments based on project related traffic volumes.

Peak Downs Mine Road & Peak Downs Highway

The Peak Downs Mine Road and Peak Downs Highway intersection currently accommodates both Channelised Left Turn and Channelised Right Turn treatments, exceeding the requirements detailed in the turn warrant assessment. Therefore, no intersection upgrades are recommended at this intersection based on Project related traffic volumes.

7. PAVEMENT IMPACT ASSESSMENT

07

7.1. Introduction

Identification of pavement impacts to SCRs was undertaken in accordance with TMR's GTIA Practice Note for Pavement Impact Assessments (PIA) (December 2018). This process was supplemented with Marginal Cost spreadsheets, provided by TMR for the Peak Downs Highway in January 2020.

The PIA methodology compares the baseline heavy vehicle Standard Axle Repetitions (SARs) with Project generated heavy vehicle SARs for each year of the Project. Any identified Project increases of greater than 5% per year generally requires some level of contribution to offset Project impacts. Mitigation of pavement impacts occurs for a period of 20 years after the opening of the final stage, or for this Project, until the final year of the project (Project Year 9). It is assumed that heavy vehicle movements associated with the Project will cease at this time.

For assessment of SCRs, this assessment has covered the entire length of the Peak Downs Highway. This SCR carries all of the heavy vehicle movements and is therefore considered a suitable scope for the assessment.

For consideration of pavement contributions for Council controlled roads, it is expected that a separate agreement will be formalised between the Proponent and Isaac Regional Council, similar to the prior methodology adopted for the BSP and VCM.

7.2. SAR Conversion Factors

SAR conversion factors have been provided in TMR's GTIA and the PIA Practice Note. The adopted SAR4 conversion factors for relevant vehicle types used in the impact identification are detailed in Table 7.1.

Table 7.1: SAR4 Conversion Factors

Vehicle Type	Vehicle Class	Loaded SAR4 Conversion Factor	Unloaded SAR4 Conversion Factor
Two Axle Truck	3	3.6	0.54
Semi-Trailer	9	4.9	0.51
B-Double	10	6.3	0.53

7.3. Baseline SAR4

The Marginal Cost spreadsheet provided by TMR indicates that the Peak Downs Highway comprises of 'Granular Pavement', and as per TMR's GTIA this correlates to a 'load damage exponent' of 4 (SAR4). Baseline heavy vehicle movements and associated daily SAR4s on sealed SCR proximate to the Project are provided in Table 7.2.

Table 7.2: Baseline Traffic Volumes – Peak Downs Highway (2018/2019)

Road Name	Segment Description	Direction	Chainage Start [1]	Chainage End [1]	Background SAR4 Daily
Saraji Road	Between Peak Downs Mine Road Site Access Location	Combined	-	-	508
Peak Downs Mine Road	Between Peak Downs Mine Road Site Access Location	Combined	-	-	928

Road Name	Segment Description	Direction	Chainage Start [1]	Chainage End [1]	Background SAR4 Daily
33A - Peak Downs Highway (Clermont - Nebo)	Peak Downs Hwy West of Wuthung Turnoff [2]	Gazettal	0.0	89.1	262
		Against Gazettal	0.0	89.1	345
	33A Between Moranbah Turnoff & Dysart Turnoff [2]	Gazettal	89.1	90.4	1,117
		Against Gazettal	89.1	90.4	1,178
	Peak Downs Hwy 150 m West of Isaac River [2]	Gazettal	90.4	101.8	893
		Against Gazettal	90.4	101.8	1,136
	West of Coppabella [2]	Gazettal	101.8	128.0	3,584
		Against Gazettal	101.8	128.0	938
	East of Coppabella [2]	Gazettal	128.0	149.4	1,290
		Against Gazettal	128.0	149.4	2,566
	East of Bee Creek	Gazettal	149.4	163.6	3,779
		Against Gazettal	149.4	163.6	1,008
	North of Braeside Road	Gazettal	163.6	178.2	1,664
		Against Gazettal	163.6	178.2	2,026
33B - Peak Downs Highway (Nebo - Mackay)	Retreat Hotel Permanent Counter	Gazettal	0.0	44.8	1,174
		Against Gazettal	0.0	44.8	1,923
	Weigh in Motion Site Eton	Gazettal	44.8	62.0	1,034
		Against Gazettal	44.8	62.0	1,600
	West of Walkerston Township	Gazettal	62.0	76.0	1,680
		Against Gazettal	62.0	76.0	1,821
	East of Walkerston Cemetery	Gazettal	76.0	81.4	1,686
		Against Gazettal	76.0	81.4	1,888
	East of BSES	Gazettal	81.4	86.1	2,307
		Against Gazettal	81.4	86.1	7,050
	West of Bernborough Avenue	Gazettal	86.1	87.0	2,093
		Against Gazettal	86.1	87.0	2,080

Road Name	Segment Description	Direction	Chainage Start [1]	Chainage End [1]	Background SAR4 Daily
	Bernborough Avenue - City Gates	Gazettal	87.0	87.8	2,970
		Against Gazettal	87.0	87.8	3,027

[1] *Chainage based on TMR Road Asset Data 'TDistStart' and 'TDistEnd'*
[2] *Updated 2019 data utilised*

7.4. Development SAR4

The annual heavy vehicle movements for the construction, operations and decommissioning periods have been calculated based on information provided by the Proponent.

The annual heavy vehicle movements for the construction phase (Year 1) and operations phase (Year 2 - Year 9) are detailed in Table 7.3 and Table 7.4. The application of the anticipated annual Project heavy vehicle generation combined with the relevant SAR4 conversion factor (as shown in Table 7.1) is detailed in Table 7.5 and Table 7.6, and summarised for each road section in Table 7.7.

Table 7.3: Annual Project Heavy Vehicle Movements – Inbound to Site

Project Activity	Austroads Vehicle Class	Loaded Movements (veh / year)	Unloaded Movements (veh / year)
Construction (Year 1)	Class 3	240	0
	Class 9	5,475	0
	Class 10	365	0
Operations (Year 2 – 9)	Class 3	240	0
	Class 9	0	0
	Class 10	1,095	0

Table 7.4: Annual Project Heavy Vehicle Movements – Outbound from Site

Project Activity	Austroads Vehicle Class	Loaded Movements (veh / year)	Unloaded Movements (veh / year)
Construction (Year 1)	Class 3	0	240
	Class 9	0	5,475
	Class 10	0	365
Operations (Year 2 – 9)	Class 3	0	240
	Class 9	0	0
	Class 10	0	1,095

Table 7.5: Annual Project Heavy Vehicle SAR4 – Inbound to Site

Project Activity	Austroads Vehicle Class	Loaded Movements (veh / year)	Unloaded Movements (veh / year)
Construction (Year 1)	Class 3	715	0
	Class 9	26,992	0

Project Activity	Austroads Vehicle Class	Loaded Movements (veh / year)	Unloaded Movements (veh / year)
	Class 10	2,300	0
Operations (Year 2 – 9)	Class 3	715	0
	Class 9	0	0
	Class 10	6,899	0

Table 7.6: Annual Project Heavy Vehicle SAR4 – Outbound from site

Project Activity	Austroads Vehicle Class	Loaded Movements (veh / year)	Unloaded Movements (veh / year)
Construction (Year 1)	Class 3	0	130
	Class 9	0	2,792
	Class 10	0	193
Operations (Year 2 – 9)	Class 3	0	130
	Class 9	0	0
	Class 10	0	580

Table 7.7: Project Heavy Vehicle Annual SAR4 Loading

Road Name	Section Description	Chainage Start [1]	Chainage End [1]	Direction	Construction	Operations
Saraji Road	Between Peak Downs Mine Road Site Access Location	-	-	Gazettal	3,115	710
		-	-	Against Gazettal	30,007	7,614
Peak Downs Mine Road	Between Peak Downs Mine Road Site Access Location	-	-	Gazettal	3,115	710
		-	-	Against Gazettal	30,007	7,614
33A - Peak Downs Highway (Clermont - Nebo)	Between Moranbah Turnoff & Dysart Turnoff	89.1	90.4	Gazettal	3,115	710
		89.1	90.4	Against Gazettal	30,007	7,614
	Peak Downs Hwy 150 m West of Isaac River	90.4	101.8	Gazettal	3,115	710
		90.4	101.8	Against Gazettal	30,007	7,614
	West of Coppabella (Prior to CHPP turnoff)	101.8	112.0	Gazettal	3,115	710
		101.8	112.0	Against Gazettal	30,007	7,614
	West of Coppabella (following CHPP turnoff)	112.0	128.0	Gazettal	3,115	710
		112.0	128.0	Against Gazettal	30,007	7,614
	East of Coppabella	128.0	149.4	Gazettal	3,115	710

Road Name	Section Description	Chainage Start [1]	Chainage End [1]	Direction	Construction	Operations
		128.0	149.4	Against Gazettal	30,007	7,614
	East of Bee Creek	149.4	163.6	Gazettal	3,115	710
		149.4	163.6	Against Gazettal	30,007	7,614
	North of Braeside Road	163.6	178.2	Gazettal	3,115	710
		163.6	178.2	Against Gazettal	30,007	7,614
33B - Peak Downs Highway (Nebo - Mackay)	Retreat Hotel Permanent Counter	0.0	44.8	Gazettal	3,115	710
		0.0	44.8	Against Gazettal	30,007	7,614
	Weigh in Motion Site Eton	44.8	62.0	Gazettal	3,115	710
		44.8	62.0	Against Gazettal	30,007	7,614
	West of Walkerston Township	62.0	76.0	Gazettal	3,115	710
		62.0	76.0	Against Gazettal	30,007	7,614
	East of Walkerston Cemetery	76.0	81.4	Gazettal	3,115	710
		76.0	81.4	Against Gazettal	30,007	7,614
	East of BSES	81.4	86.1	Gazettal	3,115	710
		81.4	86.1	Against Gazettal	30,007	7,614
	West of Bernborough Avenue	86.1	87.0	Gazettal	3,115	710
		86.1	87.0	Against Gazettal	30,007	7,614
	Bernborough Avenue - City Gates	87.0	87.8	Gazettal	3,115	710
		87.0	87.8	Against Gazettal	30,007	7,614

7.5. Impact Identification

As per the PIA methodology, the baseline heavy vehicle SARs were compared with Project generated heavy vehicle SARs for each year of the Project. Results of this comparison are detailed in Table 7.8.

The results of the PIA indicate that the additional SAR4 loading resulting from Project related heavy vehicle movements is anticipated to exceed 5% of the baseline SAR4 for the following road segments during project year 1:

- Saraji Road between the site access and Peak Downs Mine Road intersection;
- Peak Downs Mine Road between Saraji Road and Peak Downs Highway;
- Peak Downs Highway Section 33A between chainages 101.77 to 128.004 in the Gazettal direction; and

- Peak Downs Highway Section 33A between chainages 149.366 to 163.631 in the Gazettal direction.

Monetary contributions may be required to offset identified impacts. Further detail is provided in Section 7.6 and 7.7.

Table 7.8: Pavement Impact Assessment Results Summary – Construction Years

Road Name	Section Description	Chainage Start [1]	Chainage End [1]	Direction	Year 1
Saraji Road	Between Peak Downs Mine Road & Site Access Location	-	-	Both	8.4%
Peak Downs Mine Road	Between Peak Downs Highway & Saraji Road	-	-	Both	12.8%
33A - Peak Downs Highway (Clermont - Nebo)	Between Moranbah Turnoff & Dysart Turnoff	89.1	90.4	Gazettal	0.7%
		89.1	90.4	Against Gazettal	6.1%
	Peak Downs Hwy 150 m West of Isaac River	90.4	101.8	Gazettal	0.8%
		90.4	101.8	Against Gazettal	6.3%
	West of Coppabella	101.8	128.0	Gazettal	0.2%
		101.8	128.0	Against Gazettal	7.9%
	East of Coppabella	128.0	149.4	Gazettal	0.6%
		128.0	149.4	Against Gazettal	2.8%
	East of Bee Creek	149.4	163.6	Gazettal	0.2%
		149.4	163.6	Against Gazettal	7.5%
	North of Braeside Road	163.6	178.2	Gazettal	0.5%
		163.6	178.2	Against Gazettal	3.6%
33B - Peak Downs Highway (Nebo - Mackay)	Retreat Hotel Permanent Counter	0.0	44.8	Gazettal	0.7%
		0.0	44.8	Against Gazettal	4.1%
	Weigh in Motion Site Eton	44.8	62.0	Gazettal	0.8%
		44.8	62.0	Against Gazettal	4.9%
	West of Walkerston Township	62.0	76.0	Gazettal	0.5%
		62.0	76.0	Against Gazettal	4.3%
	East of Walkerston Cemetery	76.0	81.4	Gazettal	0.5%
		76.0	81.4	Against Gazettal	4.2%
	East of BSES	81.4	86.1	Gazettal	0.3%
		81.4	86.1	Against Gazettal	1.1%
	West of Bernborough Avenue	86.1	87.0	Gazettal	0.4%
		86.1	87.0	Against Gazettal	3.8%
		87.0	87.8	Gazettal	0.3%

Road Name	Section Description	Chainage Start [1]	Chainage End [1]	Direction	Year 1
	Bernborough Avenue - City Gates	87.0	87.8	Against Gazettal	2.5%

7.6. Pavement Impact Contribution – State Controlled Roads

As per the PIA methodology, contributions have been assessed based on the costing pavement type and marginal cost provided by TMR. The monetary contributions have been calculated based on the corresponding SAR4, SAR5, and SAR12 impacts consistent with the PIA methodology for the life of the project (in lieu of 20 years following the opening of the final stage).

The monetary contributions have been calculated based on the impacted road section segments of the Peak Downs Highway (section 33A) for the years where an annual impact of greater than 5% was identified. A summary of the monetary contributions required for the given heavy vehicle generation and options proposed is provided in Table 7.9.

Table 7.9: Pavement Impact Assessment Monetary Contributions

Year	Monetary Contribution Required
Construction	$45,090
Operations	$0
Combined Total	**$45,090**

The pavement impact identified for Peak Downs Highway Section 33A, for the against gazettal direction between chainage 89.1 to 90.4, 90.4 to 101.8, 101.8 to 128.0 and chainages 149.4 to 163.6 has a calculated value for the monetary contributions based on assumptions presented herein of **$45,090** for the life of the project. A summary of pavement contribution by road section is provided in Appendix D.

7.7. Pavement Impact Contribution – Council Controlled Roads

Contributions towards pavement impacts and rehabilitation of pavement on Council-controlled roads are subject to separate negotiations between the Proponent and Council. It is expected that a similar methodology to that adopted for the BSP and VCM will be adopted.

8. ROAD SAFETY RISK ASSESSMENT

08

8.1. Risk Identification

Safety on the road network is an important consideration for new developments. The following road safety risks are of relevance to this TIA:

- Increased through traffic on both local council and state-controlled road networks resulting in additional delays and potential for vehicle collision;
- Increased risk of vehicle collision due to driver fatigue;
- Debris / haulage material on roads during the construction and operations phases
- Transportation of Hazardous and Dangerous materials during construction and operations phases.

8.2. Risk Assessment & Mitigation

In accordance with the GTIA, *"development should ensure that a road's safety is not significantly worsened as a result of the development and that any pre-existing or development-introduced unacceptable safety risk is addressed"*. GTIA defines 'significantly worsened' as change in safety risk (i.e. medium to high). Traffic safety risks are scored based on the matrix shown in Figure 8.1.

Figure 8.1: Traffic Safety Risk Scoring Matrix

		Potential consequence				
		Property only (1)	Minor injury (2)	Medical treatment (3)	Hospitalisation (4)	Fatality (5)
Potential likelihood	Almost certain (5)	M	M	H	H	H
	Likely (4)	M	M	M	H	H
	Moderate (3)	L	M	M	M	H
	Unlikely (2)	L	L	M	M	M
	Rare (1)	L	L	L	M	M

L: Low risk
M: Medium risk
H: High risk

Potential road safety risks as a result of the Project have been scored as presented in Table 8.1. Where a change in safety risk was identified, appropriate measures for mitigation have been suggested.

Table 8.1: Project Related Road Safety Risk Assessment

Risk Item	Without Development			With Development			Mitigation measures	With Development & Mitigation		
	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating
Increased through traffic on the road network resulting in additional delays and potential for vehicle collision	1	2	L	2	2	L	No Action			
Increased traffic at intersections may cause congestion for motorists	1	1	L	2	1	L	No Action			
Increase risk of vehicle collision due to driver fatigue	3	5	H	4	5	H	Monitoring of workforce hours and driver behaviours to be incorporated into a RMP to address this risk	2	5	M
Debris / haulage material on roads during the construction and operations phases	2	2	L	4	2	M	Ensure a haulage management plan is in place to address impacts on the road network as a result of project generated debris and haulage material	2	2	L
Transportation of Hazardous and Dangerous materials during construction and operations phases	2	5	M	2	5	M	Transportation of hazardous and dangerous goods is to comply with requirements of Australian Dangerous Goods Code	2	2	L

In addition to the Road Safety Risk Assessment, analysis of road crash data for the Peak Downs Highway was undertaken to assess current levels of road safety. Road crash data for the Peak Downs Highway was sourced from TMR (obtained January 2020) for a five-year period between 1 January 2013 – 31 December 2018. This crash data provides information on the number of crashes along the Peak Downs Highway between Peak Downs Mine Road and Mackay, categorised into the following:

- Crash resulting in fatality
- Crash resulting in hospitalisation
- Crash resulting in medical treatment
- Crash resulting in minor injury
- Crash resulting in property damage only (not shown in Figure 8.3)

A review of the recorded crashes found that 84 crashes occurred on the Peak Downs Highway between Peak Downs Mine Road and Mackay, with 5 of those being fatalities. A breakdown of the crash incidence by severity is shown in Table 8.2, breakdown of these crashes by Definition for Coding Accidents (DCA) codes are shown in Figure 8.2, and locations shown in Figure 8.3.

Table 8.2: Road Crash Statistics by Severity (2013 – 2018) – Peak Downs Highway (Moranbah to Mackay)

Location	Crash Severity	Number of Crashes (Years)
Peak Downs Highway (Peak Downs Mine Road – Mackay)	Fatal	5 (2013 x1, 2014 x1, 2015 x1, 2016 x1, 2017 x1)
	Hospitalisation	43 (2013 x9, 2014 x8, 2015 x8, 2016 x9, 2017 x9)
	Medical Treatment	24 (2013 x5, 2014 x6, 2015 x7, 2016 x5, 2017 x1)
	Minor Injury	9 (2013 x2, 2014 x2, 2015 x1, 2016 x2, 2017 x2)
	Total	81

Figure 8.2: Road Crash Statistics by DCA Code (2013 – 2018) - Peak Downs Highway (Peak Downs Mine Road – Mackay)

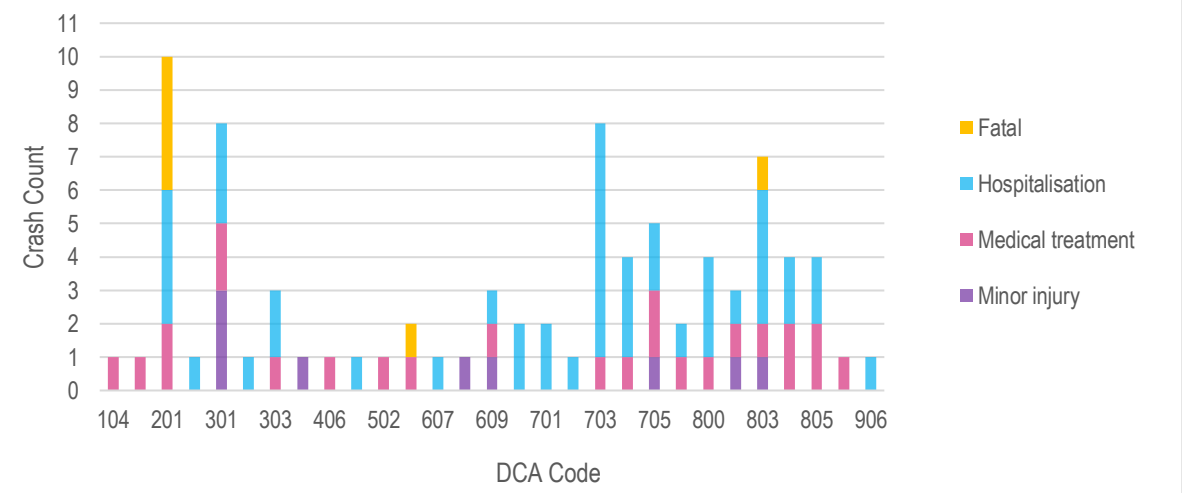
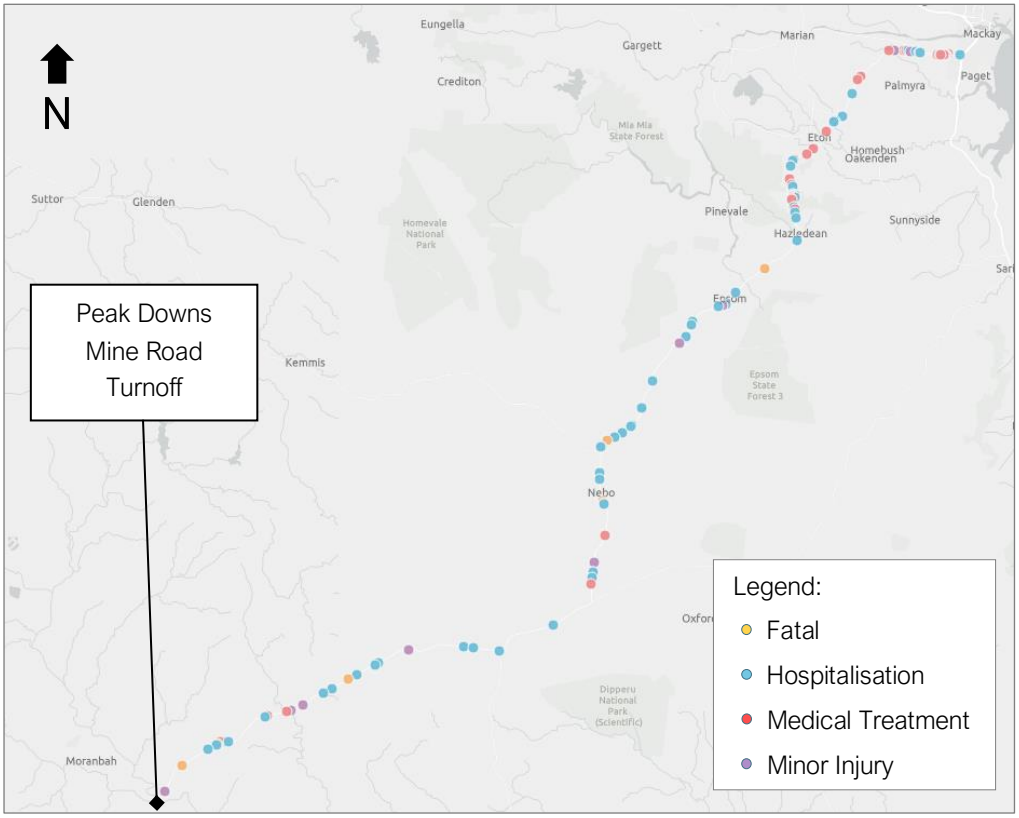


Figure 8.3: Road Crash Location (2013 – 2018) – Peak Downs Highway (Saraji Road to Mackay)



Based on the information presented in this section of the report, it is observed that there is no incident clustering around the proposed site access or any of the assessed intersections. It is also observed that crashes for the preceding five year period were evenly distributed along the Peak Downs Highway with the greatest number of crashes relating to DCA codes 201, 301, 703 and 803 (DCA Code Summary provided in Appendix E). These codes relate to crashes involving head on collisions, rear end crashes, and run off road crashes into an object which could be attributable to driver fatigue. It is therefore considered that this crash history is typical for the use, type and function of the Peak Downs Highway within the area, and therefore the crash data suggests that the Peak Downs Highway proximate to the Project does not pose any atypical safety risks or hazards that need to be factored into the access design or vehicle movement considerations.

9. CONSIDERATION OF OTHER IMPACTS

9

9.1. Oversized Vehicles

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

9.2. Road Use Management Plan

The preparation of an RMP may be required as the Project progresses. 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
- Defining responsibilities and procedures for implementation, monitoring and RMP strategy amendment.

The outcomes of this TIA 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 operations activities of the Project. Based on the findings of this TIA, potential strategies to be considered as part of the RMP to offset road impacts include:

- Installation of appropriate signage to inform motorists of changed conditions during Project construction
- Introduction and enforcement of policies focusing on driver behaviour and fatigue management
- Consideration of seasonal weather influences on transport operations
- Monitoring and enforcement of speed limits for workforce (where company issued vehicles are provided)
- Limiting overtime and developing safe driving plans.

10. CONCLUSION

10

10.1. Conclusions

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

1. Peak traffic demands for the Project are expected to occur in:
   - 2022 (project year 1): Construction opening year
   - 2023 (project year 2): Operations opening year
2. All road segments on the Peak Downs Highway are expected to result in Project impacts of less than 5% of the baseline traffic volumes. On this basis, mitigating works are not required.
3. Saraji Road and Peak Downs Mine Road are expected to have Project traffic volumes which exceed 5% of the baseline traffic volumes. However, a capacity assessment has indicated that these roads are expected to operate well below their theoretical capacity and mitigating works are therefore not required.
4. A turn warrant assessment indicates that BAL / BAR turn treatments are required at the Project access location on Saraji Road to cater for Project generated traffic. It is noted this is lower than the turn warrant requirements of the VCM, which indicates that a BAL/ CHR[s] is required to accommodate forecast VCM traffic volumes.
5. Based on the calculated development SAR's, pavement impacts of greater than 5% have been identified for a number of road links on the Peak Downs Highway. A monetary contribution will likely be required to ameliorate the impact. The results of this assessment indicate that the impact correlates to a monetary contribution for state controlled roads of $45,090 as per GTIA methodology.
6. Contributions towards pavement impacts and rehabilitation of pavement on Council-controlled roads are subject to separate negotiations between the Proponent and Council. It is expected that a similar methodology to that adopted for the Bulk Sample Project and VCM may be adopted.
7. Based on the Road Safety Risk Assessment all identified risks associated with the Project are expected to be within a medium level.

Based on the assessment and findings of this Transport Impact Assessment it is concluded that there are no reasonable or relevant transport planning and engineering grounds that may arise which would give reason not to approve this Project's environmental authority and mining lease applications.

A.TMR ROAD ASSET DATA

A

Annual Average Daily Traffic data for sealed segments of the selected road sections

ROADNAME	ROAD_SECTION_ID	SUPERSET_CWAY	DIRECTION	TdistStart	TdistEnd	SURFACE_TYPE_LABEL	AADT	AADT_YEAR	GROWTH_PC_5YR	AADT_NONHV	PERCENT_NONHV	AADT_HV	PERCENT_HV	ExistingSAR
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	0	0.8	SEALED	4056	2018	1.04	3530	87.04	526	12.96	1683.2
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	0	0.8	SEALED	5112	2018	0.67	4095	80.1	1017	19.9	3254.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	0.8	1.37	SEALED	4827	2018	1.18	4073	84.37	754	15.63	2412.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	0.8	1.37	SEALED	5665	2018	-0.41	4775	84.29	890	15.71	2848
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	1.37	1.78	SEALED	3092	2018	8.26	2528	81.77	564	18.23	1804.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	1.37	1.78	SEALED	3017	2018	6.84	2355	78.05	662	21.95	2118.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	1.78	4.232	SEALED	3092	2018	8.26	2528	81.77	564	18.23	1804.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	1.78	4.232	SEALED	3017	2018	6.84	2355	78.05	662	21.95	2118.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	4.232	16.15	SEALED	1339	2018	0.33	900	67.23	439	32.77	1404.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	4.232	16.15	SEALED	1314	2018	-0.68	1090	82.97	224	17.03	716.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	16.15	51.97	SEALED	918	2018	-1.76	718	78.16	200	21.84	640
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	16.15	51.97	SEALED	911	2018	-2.2	729	79.99	182	20.01	582.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	51.97	52.98	SEALED	1175	2018	-2.18	871	74.15	304	25.85	972.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	51.97	52.98	SEALED	1112	2018	-1.61	856	76.96	256	23.04	819.2
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	52.98	53.69	SEALED	817	2018	0.61	560	68.55	257	31.45	822.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	52.98	53.69	SEALED	815	2018	0.88	578	70.93	237	29.07	758.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	53.69	69.33	SEALED	616	2018	-1.38	456	73.95	160	26.05	512
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	53.69	69.33	SEALED	619	2018	-0.89	470	75.88	149	24.12	476.8
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	A	69.33	105.88	SEALED	526	2018	-1.03	309	58.74	217	41.26	694.4
GREGORY HIGHWAY (EMERALD - CLERMONT)	27B	1	G	69.33	105.88	SEALED	529	2018	-1.01	348	65.72	181	34.28	579.2
GREGORY HIGHWAY (CLERMONT - BELYANDO	27C	1	G	0	9.832	SEALED	858	2018	0.52	709	82.65	149	17.35	476.8
GREGORY HIGHWAY (CLERMONT - BELYANDO	27C	1	A	0	9.832	SEALED	857	2018	0.28	616	71.92	241	28.08	771.2
GREGORY HIGHWAY (CLERMONT - BELYANDO	27C	1	G	9.832	14.001	SEALED	810	2018	7.54	704	86.89	106	13.11	339.2
GREGORY HIGHWAY (CLERMONT - BELYANDO	27C	1	A	9.832	14.001	SEALED	715	2018	3.1	598	83.64	117	16.36	374.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	0	89.05	SEALED	324	2018	2.68	195	60.08	129	39.92	412.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	0	89.05	SEALED	325	2018	3.16	191	58.62	134	41.38	428.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	89.05	90.37	SEALED	1949	2018	5.13	1158	59.41	791	40.59	2531.2
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	89.05	90.37	SEALED	1912	2018	4.16	1508	78.89	404	21.11	1292.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	90.37	101.77	SEALED	1817	2018	9.03	1499	82.48	318	17.52	1017.6
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	90.37	101.77	SEALED	1749	2018	8.03	1079	61.69	670	38.31	2144
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	101.77	128.004	SEALED	1961	2018	2.97	1474	75.17	487	24.83	1558.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	101.77	128.004	SEALED	1958	2018	2.13	1366	69.78	592	30.22	1894.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	128.004	149.366	SEALED	1693	2018	2.71	1130	66.74	563	33.26	1801.6
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	128.004	149.366	SEALED	1689	2018	3.01	927	54.91	762	45.09	2438.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	149.366	163.631	SEALED	2101	2018	2.27	1786	85.03	315	14.97	1008
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	149.366	163.631	SEALED	2097	2018	2.81	916	43.66	1181	56.34	3779.2
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	163.631	178.197	SEALED	1977	2018	2.79	1457	73.71	520	26.29	1664
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	163.631	178.197	SEALED	2006	2018	3.05	1373	68.43	633	31.57	2025.6
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	0	44.798	SEALED	2011	2018	1.02	1644	81.74	367	18.26	1174.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	0	44.798	SEALED	1989	2018	0.65	1388	69.8	601	30.2	1923.2
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	44.798	62.035	SEALED	1803	2018	-4.56	1303	72.27	500	27.73	1600
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	44.798	62.035	SEALED	1796	2018	-3.26	1473	82.03	323	17.97	1033.6
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	62.035	76.003	SEALED	2954	2018	1.29	2385	80.73	569	19.27	1820.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	62.035	76.003	SEALED	2872	2018	0.28	2347	81.71	525	18.29	1680
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	76.003	81.376	SEALED	4905	2018	-0.96	4315	87.97	590	12.03	1888
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	76.003	81.376	SEALED	4572	2018	-1.21	4045	88.48	527	11.52	1686.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	81.376	86.052	SEALED	8587	2018	1.69	7866	91.6	721	8.4	2307.2
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	81.376	86.052	SEALED	8541	2018	2.51	6338	74.21	2203	25.79	7049.6
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	86.052	87.036	SEALED	5097	2018	1.27	4447	87.24	650	12.76	2080
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	86.052	87.036	SEALED	4795	2018	-0.8	4141	86.37	654	13.63	2092.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	87.036	87.842	SEALED	5363	2018	-0.27	4435	82.7	928	17.3	2969.6
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	87.036	87.842	SEALED	5476	2018	1.73	4530	82.72	946	17.28	3027.2

B. ‘VULCAN PROJECT BULK SAMPLE’ TRAFFIC IMPACT ASSESSMENT EXTRACT

B

3 Existing Road Network

3.1 Road Conditions

Table 3-1 summarises the existing road conditions for State Controlled Roads (SCR) and Council owned roads within the proposed haulage route.

Table 3-1 State Controlled Roads

Road	Form	Speed Limit	AADT	HV%
State Controlled Roads				
Peak Downs Highway	Sealed - 2 lane undivided	100km/h	2942	24.24%
Isaac Regional Council Roads				
Peak Downs Mine Road	Sealed - 2 lane undivided	60km/h - 100km/h	3185*	9.1%
Saraji Road	Sealed - 2 lane undivided	100km/h	2270*	7.0%

** Converted peak hour traffic from Austraffic surveys to AADT*

3.2 Background Traffic Volumes

To understand the existing traffic conditions, a 14-hour traffic survey was undertaken by Austraffic between 05:00 – 19:00 hours on Tuesday 18th June 2019, for the Peak Downs Highway / Peak Downs Mine Road intersection and Peak Downs Mine Road / Saraji Road intersection.

A review of the survey indicated that the AM and PM peak period as a network was as follows:

- 5:00 AM – 6:00 AM
- 5:15 PM – 6:15 PM

Detailed traffic count information is included in Appendix A.

3.3 Traffic Growth

The proposed haulage operation is for 9 months. Background growth is not considered appropriate.

3.4 Active Transport

A site visit was undertaken for all study intersections within the project scope on the 30th and 31st of May 2019. The site visit did not identify any pedestrian or cycling facilities within the project area. Due to the rural nature of the project area and associated road networks, there is a very low level of pedestrians and cyclist usage and facilities are not considered to be required.

3.5 Public Transport

One bus service was identified to travel from Emerald to Mackay in the morning and Mackay to Emerald in the afternoon. This service uses the Peaks Down Highway and passes through two of the study intersections (Peak Downs Highway / Peak Downs Mine Road Intersection and Peak Downs Highway / Isaac Plains Mine Access Road Intersection).

3.6 Future Network Planning

Future network planning for state controlled roads is derived from DTMR who produce the Queensland Transport and Roads Investment Program (QTRIP) every two years. This document reports the planned spending committed to by the state government for all state funded transport initiatives in Queensland. At the time of preparing this document, no future planning has been planned in the study area.

No future planning or development of local government roads has been identified in this assessment.

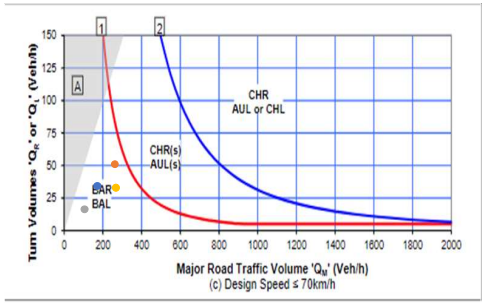
C. TURN WARRANT ASSESSMENT

C

Construction Phase - Turn Warrant Assessment

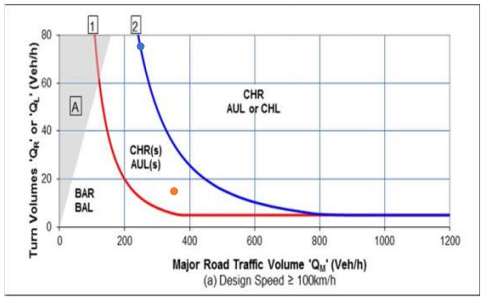
Site Access / Saraji Road

	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	27	45	8	26
Qm	174	264	108	269
	BAL	BAR	BAL	BAR



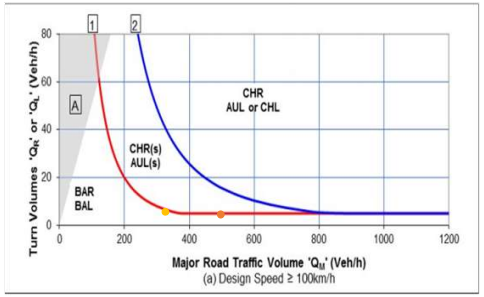
Saraji Road / Peak Downs Highway

	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	75	15	80	99
Qm	241	345	110	349
	AUL(s)	CHR(s)	AUL(s)	CHR



Peak Downs Highway / Peak Downs Road

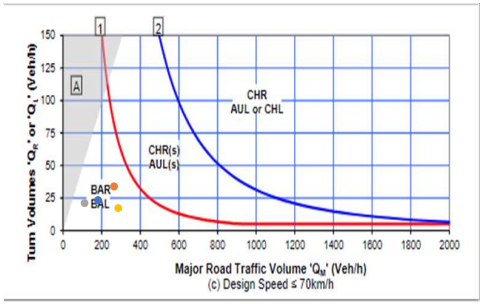
	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	360	4	136	6
Qm	88	497	64	327
	AUL(s)	CHR(s)	BAL	BAR



Operations Phase - Turn Warrant Assessment

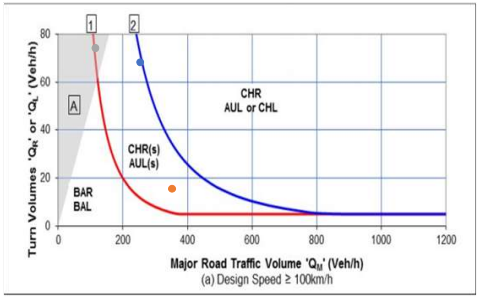
Site Access / Saraji Road

	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	15	27	13	9
Qm	183	266	113	288
	BAL	BAR	BAL	BAR



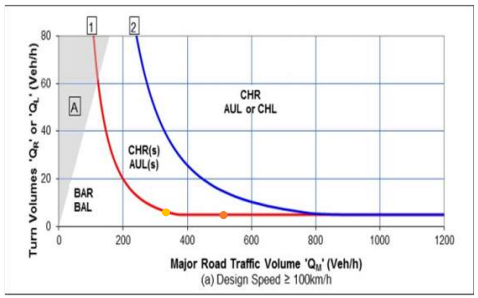
Saraji Road / Peak Downs Highway

	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	68	15	74	104
Qm	254	352	116	357
	AUL(s)	CHR(s)	AUL(s)	CHR



Peak Downs Highway / Peak Downs Road

	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	369	5	133	6
Qm	93	513	67	333
	AUL(s)	CHR(s)	BAL	CHR(s)



D. PAVEMENT IMPACT ASSESSMENT SUMMARY

D

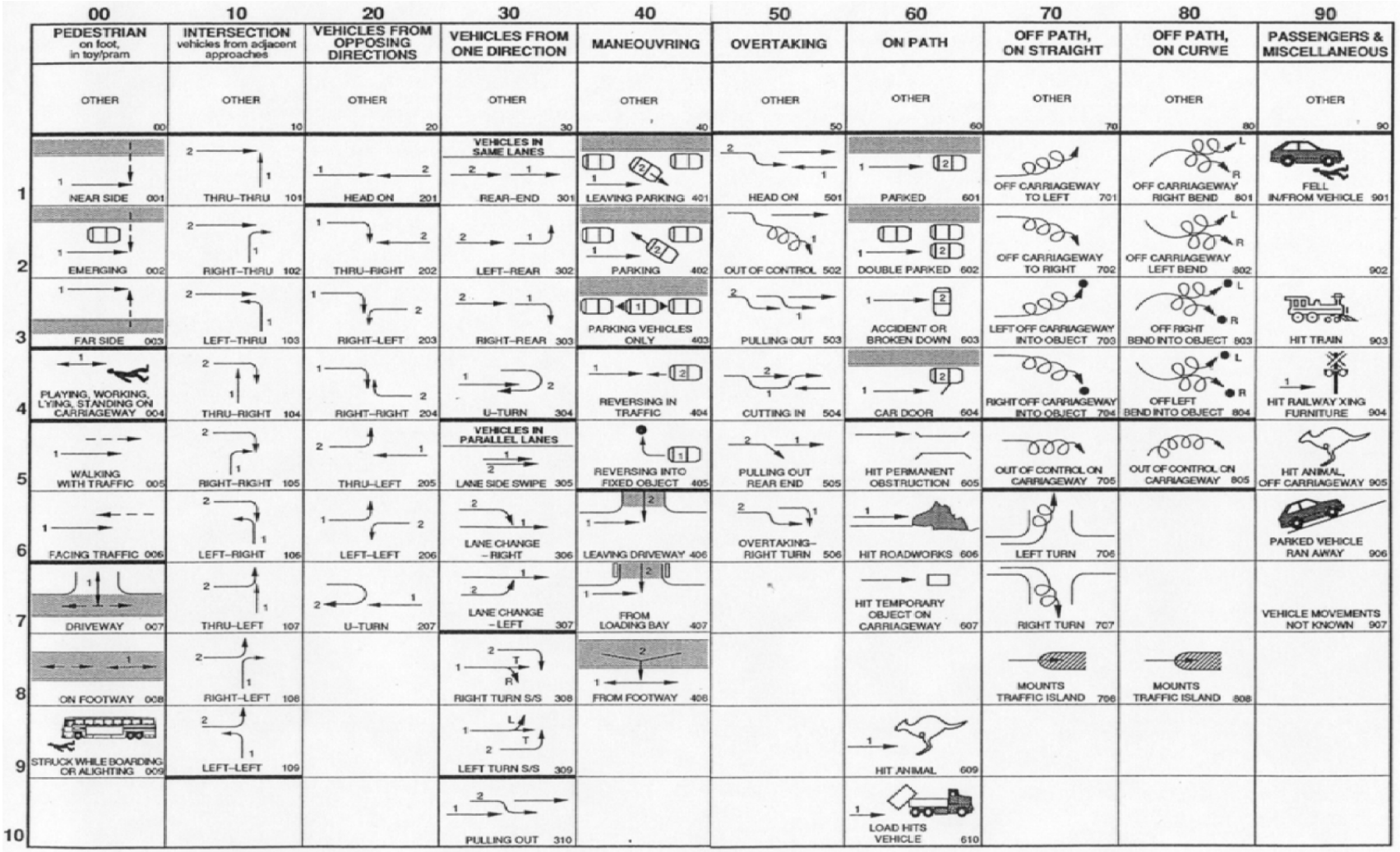
Vulcan Mine Extension Project - Pavement Impact Assessment Contributions

TOTAL COST FOR YEAR											
	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10	Total
33A-A	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33A-B	$ 1,251	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,251
33A-C	$ 8,867	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,867
33A-D	$ 23,925	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,925
33A-E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33A-F	$ 11,046	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,046
33A-G	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-A	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-B	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-C	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-D	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
33B-H	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
											$ -
Total	$ 45,090	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 45,090

E. DCA CODE EXTRACT

E

Figure 2.1: Standard accident-type codes for definitions for coding accidents (DCAs) in Australia



Source: Andreassen DC (1991). Australian Road Research Board, Technical Manual ATM 29 – Model Guidelines for Road Accident Data and Accident Types, Version 1.1.

GTAconsultants

www.gta.com.au