Lake Vermont Meadowbrook Project

Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for Bowen Basin Coal Pty Ltd

on 18/03/2022

Reference: Q202180

Issue #: A

GTAconsultants now Stantec

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Quality Record

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EXECUTIVE SUMMARY

INTRODUCTION

Bowen Basin Coal Pty Ltd (the Proponent), on behalf of the Lake Vermont Joint Venture, proposes an extension to the Lake Vermont Mine onto the 'Meadowbrook' property described as the Lake Vermont Meadowbrook Project (the Project). The Project involves the construction and operation of an underground multi-seam longwall coal mine and a satellite open cut pit to facilitate the extraction of up to 6.5 Million tonnes per annum (Mtpa) of Run-Of-Mine (ROM) coal. The extension of operations will extend the life at which production can be maintained at the currently approved levels of 12 Mtpa ROM by approximately 20 years.

PROJECT DESCRIPTION

The Proponent currently operates the Lake Vermont Mine as an open-cut coal mine and is seeking an extension to operations onto the 'Meadowbrook' property (owned by the Proponent). The Project is located within the Bowen Basin coal field, Central Queensland, approximately 25km north east of Dysart and approximately 160km southwest of Mackay, within the Isaac Regional Council Local Government Area (LGA). The Proponent intends to apply for mining leases (MLs) and an environmental authority (EA) to enable extension of the Lake Vermont Mine mining operations (i.e. the Lake Vermont Meadowbrook Project).

The Project proposes to use the existing Lake Vermont Mine's Coal Handling and Preparation Plant (CHPP), tailings storage facilities and water, power and rail infrastructure. Product coal will be hauled on the existing rail loop along the Lake Vermont spur line that connects to the Aurizon Goonyella rail system for shipments to Abbott Pont Coal Terminal (APCT) north of Bowen, the RG Tanna Coal Terminal (RGTCT) in Gladstone, or potentially the Dalrymple Bay Coal Terminal (DBCT) in Mackay.

Construction of the Project is planned to be completed over 2 years (indicatively 2024 and 2025). Mining establishment/development works are expected to be undertaken over the following 2 years (indicatively 2026 and 2027), following which regular mining operations will occur for approximately 21 years. A summary of the proposed Project schedule is provided in Table E1.1.

Table E1.1: Project Schedule

Project Year	Project Activity	Year	Duration
Project Years -1 to 0	Construction Phase	Expected 2024 – 2025	2 Years
Project Years 1 to 2	Underground Development Operations Phase	Expected 2026 – 2027	2 Years
Project Years 3 to 23	Underground Mining Operations Phase	Expected 2028 – 2048	21 years

The Project would employ up to 250 employees to undertake construction of the Project, and approximately 410 employees during the operational phase of the Project. The maximum workforce projection for each of the Project activities is shown in Table E1.2.

Table E1.2: Project Workforce Projections

Year	Project Activities	Maximum Workforce (Daily Persons)
Project Year -1 to 0	Construction	250
Project Year 1 to 2	Underground Development Operations	325

Year	Project Activities	Maximum Workforce (Daily Persons)
Project Year 3 to 23	Underground Operations	410

The workforce will be primarily sourced from the surrounding regional area (i.e. Isaac and Mackay regions) and make use of the existing Lake Vermont Accommodation Village facilities at Dysart. Project related transport would include Drive-in / Drive-out (DIDO) from Mackay to Dysart, with daily transport from the Lake Vermont Accommodation Village to the Project provided by way of shuttle bus (approximately 22 seat capacity).

The Proponent has advised that 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, with B-Doubles used for the delivery of fuel. Some oversize loads may be required throughout the life of the Project on an 'as-required' basis, however, these will be managed through obtaining the relevant traffic management permits as required by legislation. Project infrastructure and other freight are expected to be transported to site primarily from Mackay, Rockhampton (via Mackay) and Moranbah. Where materials, plant and equipment are to be sourced from overseas, these will arrive from Mackay or Rockhampton utilising existing port facilities.

The Project proposes to gain access to the external road network via the existing Lake Vermont Mine access road intersecting Golden Mile Road. The existing Lake Vermont Mine access road is a private access road owned and maintained by the Proponent. Golden Mile Road forms part of the Council controlled road network, connecting to the existing Lake Vermont Accommodation Village located in Dysart, west of the Project location.

In addition to the abovementioned road-based transport movements, rail transport will be used during the operations phase to transport coal to market. Existing rail and port infrastructure will be used, consistent with the operations of the existing Lake Vermont Mine.

PROJECT TRAFFIC

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

- Project Year -1 (expected 2024): Peak construction phase of the Project
- Project Year 1 (expected 2026): Year of opening for the Project (for regular operations)
- Project Year 11 (expected 2036): 10-year design horizon from operations commencement
- Project Year 21 (expected 2046): 20-year design horizon from operations commencement, the final year considered for the mitigation of pavement impacts resulting from the Project.

A summary of the Proponent provided workforce Projections for the Project correlated to each of the adopted design horizons is provided in Table E1.3. Based on the assumptions documented herein, the estimated workforce generated traffic (inclusive of bus movements) is summarised in Table E1.4. Vehicles travelling from Dysart will be small capacity buses, assumed to be running at full occupancy in both directions for operations 'day' and 'night-time' shift changes.

Table E1.3: Total Project Workforce

Workforce Type	Assessment / Impact Year		
	Year -1 (2024)	Year 1 (2026)	Year 11 (2036)
Construction	200	0	0
Operations	0	410	410
Total	**200**	**410**	**410**

Table E1.4: Workforce Traffic Generation Summary

Design Year	Direction	AM Peak (veh/ hr)		PM Peak (veh/ hr)	
		In	Out	In	Out
Year -1 (2024)	Dysart (West of site)	89	23	23	89
Year 1 (2026)	Dysart (West of site)	20	17	17	20
Year 11 (2036)	Dysart (West of site)	20	17	17	20

Veh/ hr- vehicle movements per hour

The Proponent has provided estimates of heavy vehicle movements for the Project construction and operations phases. The anticipated origins / destinations of heavy vehicles are Mackay and the Tay Glen Borrow Pit / Quarry, with occasional movements to / from Moranbah as detailed in Section 2.5. A summary of anticipated daily two-way vehicle movements for the construction phase and operational phase peaks of the Project are provided in Table E1.5.

Table E1.5: Daily (Peak) Project Heavy Vehicle Movements (Two – Way Movements)

Project Phase	Austroads Vehicle Class	Origin/ Destination (veh/ day)	
		Mackay	Tay Glen Quarry
Construction (Years -1 to 0)	4	0	0
	5	4	0
	9	1	0
	10	0	15
	Total	**5**	**15**
Underground Development Operations (Years 1 to 2)	4	1	0
	5	2	0
	9	1	0
	10	1	1
	Total	**5**	**1**
Underground Operations (Years 3 onwards)	4	1	0
	5	1	0
	9	1	0
	10	1	1
	Total	**4**	**1**

The Proponent has indicated that access arrangements to the quarry (to support construction and ongoing maintenance) would not require heavy vehicle access to the council-controlled road network. Under this arrangement, heavy vehicle movements associated with the haulage of quarry material would be through a private haul road between the Lake Vermont Meadowbrook Project and the Tay Glen quarry. As such, these heavy vehicle movements have been excluded from assessment.

Should this arrangement not be adopted, the heavy vehicle traffic generation of the Project accessing the external road network (i.e. council-controlled and state-controlled roads) may be increased.

ROAD LINK ASSESSMENT

For State Controlled Roads, the road link assessment has been undertaken in accordance with the principles outlined in the GTIA. Table E1.6 summarises the comparison of baseline traffic to Project traffic on the State Controlled Road network, to determine whether the 5% traffic impact threshold is exceeded.

Table E1.6: Road Link Assessment (State Controlled Network) – Impact Identification Table

Road Name	Road Section		Direction	Percentage Increase	
	Start Chainage (m)	End Chainage (m)		Year -1 (2024)	Year 1 (2026)
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	Anti-gazettal	0.1%	0.1%
	89.05	90.37	Gazettal	0.1%	0.1%
	90.37	101.77	Anti-gazettal	0.1%	0.1%
	90.37	101.77	Gazettal	0.1%	0.1%
	101.77	128.004	Gazettal	0.1%	0.1%
	101.77	128.004	Anti-gazettal	0.1%	0.1%
	128.004	149.366	Anti-gazettal	0.1%	0.1%
	128.004	149.366	Gazettal	0.1%	0.1%
	149.366	163.631	Anti-gazettal	0.1%	0.1%
	149.366	163.631	Gazettal	0.1%	0.1%
	163.631	178.197	Gazettal	0.1%	0.1%
	163.631	178.197	Anti-gazettal	0.1%	0.1%
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	Gazettal	0.1%	0.1%
	0	44.798	Anti-gazettal	0.1%	0.1%
	44.798	62.035	Anti-gazettal	0.1%	0.1%
	44.798	62.035	Gazettal	0.1%	0.1%
	62.035	76.003	Anti-gazettal	0.1%	0.0%
	62.035	76.003	Gazettal	0.1%	0.1%
	76.003	81.376	Anti-gazettal	0.0%	0.0%
	76.003	81.376	Gazettal	0.0%	0.0%
	81.376	86.052	Gazettal	0.0%	0.0%
	81.376	86.052	Anti-gazettal	0.0%	0.0%

Road Name	Road Section		Direction	Percentage Increase	
	Start Chainage (m)	End Chainage (m)		Year -1 (2024)	Year 1 (2026)
	86.052	87.036	Anti-gazettal	0.0%	0.0%
	86.052	87.036	Gazettal	0.0%	0.0%
	87.036	87.842	Gazettal	0.0%	0.0%
	87.036	87.842	Anti-gazettal	0.0%	0.0%

On the basis of the summary provided in Table E1.6, the impact of forecast Project traffic does not exceed the 5% of the forecast AADT for any state-controlled road segment during the initial year of construction (Year -1) and initial year of operations (Year 1). As a result, the Project impact on SCR links is considered insignificant and does not warrant any further analysis.

Table E1.7 summarises the comparison of baseline traffic to Project traffic on the Council Controlled Road network based on information provided by the Proponent.

Table E1.7: Road Link Assessment (Council Controlled Network) – Impact Identification Table

Road Section	Direction	Traffic Volumes (Daily)	
		Year -1 (2024)	Year 1 (2026)
Golden Mile Road (West of Site Access)	Eastbound	12%	5%
	Westbound	13%	5%
Golden Mile Road (East of Site Access)	Eastbound	0.4%	0.3%
	Westbound	0.3%	0.2%
Saraji Road & Peak Downs Mine Road	Northbound	0.2%	0.1%
	Southbound	0.2%	0.1%

Having regard for the information provided in Table 5.2 (and detailed within Section 4), the number of additional vehicle trips expected to be generated by the Project is expected to result in an increase to daily vehicle demands on Golden Mile Road west of the site access in the order of 13% and 5%, Golden Mile Road east of the site access in the order of 1% and 1%, and on Saraji Road of less than 1% and less than 1% during Project year -1 and year 1 assessment years, respectively. This is reflective of the additional 100 vehicles (200 movements) (approx.) during the construction phase and 50 vehicles (100 movements) (approx.) during the operation travelling in each direction during the initial years of the project.

As discussed in Section 4.2.4, from Project year 4 until Project year 11 the combined Lake Vermont Mine and Project workforce traffic generation is expected to equivalent to that of the existing workforce. As such, no road link impact resulting from the Project (with consideration to the reduction in workforce demand) is expected between Project years 4 to 11.

Whilst it is expected that impacts on Golden Mile Road east of the site access will be in the order of 1% (reflective of approximately 1 heavy vehicle per day), the existing operations of Lake Vermont Mine are expected to lessen during operation of the Project. As a result, it is not expected that the Project will result in an increase to existing heavy vehicle demands on Golden Mile Road for the road section east of the Lake Vermont Mine Access Road.

It is noted that the quarry based heavy vehicle demands are not included in the above commentary as these demands will not require use of Council controlled roads and therefore ill not contribute to road link impacts.

Based on on-site observations, the expected demand resulting from the extension can be catered for within existing available capacity.

INTERSECTION ASSESSMENT

The Project proposes to gain vehicular access to the site from the existing Lake Vermont Mine / Golden Mile Road intersection. As a result of the increased vehicle demand during construction and mine development, a turn warrant assessment of the existing Lake Vermont Mine / Golden Mile Road intersection has been undertaken in accordance with the methodology provided in the *RPDM Volume 3: Part 4A*. Results of the assessment conclude that turn treatments for all design years (year -1, year 1 and year 11) for the Lake Vermont Mine / Golden Mile Road intersection are required to take the form of:

- Left-Turn: Channelised Left Turn (CHL)
- Right-Turn: Channelised Right Turn (CHR)

Based on the turn warrant assessment, the existing intersection design exceeds the required turn treatments for the design years assessed.

A turn warrant assessment of the existing Lake Vermont Accommodation Village / Golden Mile Road intersection was also undertaken. Results of the assessment conclude that turn treatments for all design years (year -1, year 1 and year 11) for the Lake Vermont Accommodation Village / Golden Mile Road intersection are required to take the form of:

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

Based on this turn warrant assessment, no modification to the turn treatments accessing the village is required to accommodate the additional workforce demand resulting from the Project for the design years assessed.

Based on the information provided within this report, up to 1 vehicle per hour in each direction is expected to travel on intersections which intersect a State Controlled Road during each peak hour.

Observations of the Peak Downs Mine Road / Peak Downs Highway intersection indicates that the existing intersection operates within reasonable capacity and could be expected to cater for the additional peak hour vehicle demand resulting from the Project. Given the very low volume of Project traffic expected to be generated on the SCR, no further assessment has been undertaken.

PAVEMENT IMPACT ASSESSMENT

Identification of pavement impacts has been determined in accordance with TMR's GTIA Practice Note for Pavement Impact Assessments (December 2018). This process was supplemented with Marginal Cost spreadsheets, provided by TMR for the Peak Downs Highway in June 2020, and road traffic data for Council controlled roads, provided by Council for June 2020. Results of the assessment are detailed in Table E1.8.

Table E1.8: Pavement Impact Assessment – State Controlled Roads

Road Name	Road Section		Direction	Project Year				
	Start Chainage	End Chainage		-1 (2024)	0 (2025)	1 (2026)	2 (2027)	3 (2028)
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	A	0.6%	0.6%	0.4%	0.3%	0.2%
	89.05	90.37	G	0.1%	0.1%	0.0%	0.0%	0.0%
	90.37	101.77	A	0.8%	0.8%	0.6%	0.4%	0.3%
	90.37	101.77	G	0.1%	0.1%	0.0%	0.0%	0.0%
	101.77	128.004	G	0.0%	0.0%	0.0%	0.0%	0.0%
	101.77	128.004	A	0.9%	0.8%	0.6%	0.4%	0.3%
	128.004	149.366	A	0.3%	0.3%	0.2%	0.2%	0.1%
	128.004	149.366	G	0.1%	0.1%	0.0%	0.0%	0.0%
	149.366	163.631	A	1.1%	1.1%	0.8%	0.6%	0.4%
	149.366	163.631	G	0.0%	0.0%	0.0%	0.0%	0.0%
	163.631	178.197	G	0.1%	0.1%	0.1%	0.0%	0.0%
	163.631	178.197	A	0.5%	0.5%	0.4%	0.3%	0.2%
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	G	0.1%	0.1%	0.1%	0.1%	0.0%
	0	44.798	A	0.8%	0.8%	0.6%	0.4%	0.3%
	44.798	62.035	A	0.8%	0.8%	0.6%	0.4%	0.3%
	44.798	62.035	G	0.1%	0.1%	0.1%	0.0%	0.0%
	62.035	76.003	A	1.0%	1.0%	0.7%	0.5%	0.4%
	62.035	76.003	G	0.1%	0.1%	0.0%	0.0%	0.0%
	76.003	81.376	A	0.6%	0.5%	0.4%	0.3%	0.2%
	76.003	81.376	G	0.1%	0.1%	0.1%	0.1%	0.0%
	81.376	86.052	G	0.0%	0.0%	0.0%	0.0%	0.0%
	81.376	86.052	A	0.2%	0.2%	0.2%	0.1%	0.1%
	86.052	87.036	A	0.4%	0.4%	0.3%	0.2%	0.1%
	86.052	87.036	G	0.1%	0.1%	0.0%	0.0%	0.0%
	87.036	87.842	G	0.0%	0.0%	0.0%	0.0%	0.0%
	87.036	87.842	A	0.3%	0.3%	0.2%	0.2%	0.1%

** G = Gazettal, A = Anti-Gazettal*

Following Project year 3, the Project related annual traffic loading is not expected to change. As such, the expected pavement impacts on the SCR network are expected to reduce following year 3. Due to this, the assessment from year 4 onwards has not been presented as the Project impacts observed are below 1%, and below the 5% impact threshold.

The results of the PIA indicate that the additional SAR4 loading resulting from the Project related heavy vehicle movements is not anticipated to exceed 5% in any year of the Project (i.e., no impact was identified on any relevant road section for any of the Project phases). Therefore no monetary contributions to offset pavement loading are required for the SCR network.

Identification of pavement impacts for the Council controlled road network is provided in Table E1.9.

Table E1.9: Pavement Impact Assessment – Council Controlled Roads

Road Name	Direction	Project Year				
		-1 (2024)	0 (2025)	1 (2026)	2 (2027)	3 (2028)
Golden Mile Road (West of Site Access)	Eastbound	3.8%	3.7%	2.7%	1.9%	1.3%
	Westbound	0.4%	0.4%	0.3%	0.2%	0.1%
Golden Mile Road (East of Site Access)	Eastbound	0.1%	0.1%	0.1%	0.1%	0.0%
	Westbound	3.7%	3.6%	2.6%	1.9%	1.2%

Based on the information provided within Table E1.9, the Project is expected to generate a pavement impact in the order of 4% (eastbound) and less than 1% (westbound) during Project year -1 and Project year 0 for Golden Mile Road west of the site access, and in the order of less than 1% (eastbound) and 4% (westbound) during Project year -1 and Project year 0 for Golden Mile Road west of the site access. The magnitude of the pavement impacts largely corresponds to the low background volumes rather than the volume of Project related heavy vehicle movements. As such, the heavy vehicle loading (not percentage impact) is expected to be consistent for each of the road sections, corresponding to the heavy vehicle movements to the west (Saraji Road, Dysart Bypass Road and Golden Mile Road between the quarry and the Project) and east of the site access (Golden Mile Road between site and Fitzroy Developmental Road).

Following construction (i.e. Project year 1 onwards), the pavement loading resulting from the Project is expected to reduce to in the order of 2% (eastbound) and less than 1% (westbound) for Golden Mile Road west of the site access, and in the order of less than 1% (eastbound) and 2% (westbound) for Golden Mile Road west of the site access. This is expected to be further reduced from Project year 3 onwards where production output of the existing Lake Vermont Mine is expected to decline.

Based on the information provided within this section of the report, pavement impacts to the Council controlled road network are likely to vary based on the background (baseline) traffic volumes and the actual Project heavy vehicle demand accessing Council controlled roads.

It is recommended that a review of the existing infrastructure agreement should be undertaken to inform any required pavement contributions in the future which are likely to result from the Project. It is expected that this information provided in this TIA will inform future negotiations to be held between the Proponent and Council.

ROAD SAFETY RISK ASSESSMENT

The road safety risk assessment has found that there is no incident clustering around the proposed intersection of Peak Downs Mine Road/ Saraji Road to the Peak Downs Highway. It is also observed that crashes for the preceding five-year period were evenly spatially distributed along the Peak Downs Highway. Crash types were generally attributed to head-on collisions, rear end crashes, and run-off road crashes into an object (which could be attributed to driver fatigue). It is 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 section proximate to the Project does not pose any atypical safety risks or hazards that need to be factored into vehicle movement considerations.

MULTI-MODAL TRANSPORT ASSESSMENT

Based on information provided by the Proponent, the Project is not expected to increase the production of coal beyond that currently output by the existing Lake Vermont Mine. As such, impacts to rail and port infrastructure is not expected to occur as a result of the Project.

Additionally, it is understood that the only air transportation associated with the Project is the movement of Fly-in / Fly-out (FIFO) workforce. The increase to FIFO workforce demands is expected to be accommodated within the existing flight schedules and services of nearby Moranbah, Emerald, Mackay and Rockhampton airports. As such, impacts to airports are therefore not expected.

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1. INTRODUCTION

01

1.1. Background

Bowen Basin Coal Pty Ltd (the Proponent), on behalf of the Lake Vermont Joint Venture, proposes an extension to the Lake Vermont Mine onto the 'Meadowbrook East' property described as the Lake Vermont Meadowbrook Project (the Project). The Project involves the construction and operation of an underground longwall coal mine and a satellite open cut pit to facilitate the extraction of up to 6.5 Million tonnes per annum (Mtpa) of Run-Of-Mine (ROM) coal. This will replace the forecast decline in output from the existing Lake Vermont Mine The extension of operations will extend the life at which production can be maintained at the currently approved levels of 12 Mtpa ROM by approximately 20 years. The Project is located within the Bowen Basin coal field, Central Queensland, approximately 25km north east of Dysart and approximately 160km southwest of Mackay, within the Isaac Regional Council Local Government Area (LGA). The Proponent intends to apply for mining leases (MLs) and an environmental authority (EA) to enable extension of the Lake Vermont Mine mining operations (i.e. the Lake Vermont Meadowbrook Project).

The Proponent currently operates the Lake Vermont Mine as an open-cut coal mine on granted ML 70331, ML 70477 and ML 70528. The Proponent seeks an extension to the north of existing operations within Lot 102 SP310393 (formerly Lot 10) on Plan CNS93 and owned by the proponent. The proposed Project site is defined by the area of land within the northern portion of Mineral Development Lease (MDL) 303 and the southern portion of MDL 429. The Proponent proposes development of the following as part of the proposed Project:

- An underground longwall (plus bord and pillar) coal mine
- One small-scale 'satellite' open-cut pit
- Development of a new infrastructure corridor linking the new mining area to the existing infrastructure of the Lake Vermont Mine
- Development of supporting Mine Infrastructure Area (MIA)
- Construction of drifts and shafts.

The Project proposes to use the existing Lake Vermont Mine's Coal Handling and Preparation Plant (CHPP), tailings storage facilities and water, power and rail infrastructure. Product coal will be hauled on the existing rail loop along the Lake Vermont spur line that connects to the Aurizon Goonyella rail system for shipments to Abbott Pont Coal Terminal (APCT) north of Bowen, the RG Tanna Coal Terminal (RGTCT) in Gladstone, or potentially the Dalrymple Bay Coal Terminal (DBCT) in Mackay.

The Project would employ up to 250 employees to undertake construction, and approximately 410 employees during the underground mine operational phase. This increase in workforce will be offset by an expected reduction in the existing open-cut workforce numbers reflecting the scheduled future reduction in open-cut output. In total, an overall increase in the total workforce of up to 250 employees is forecast during the underground construction phase, and an increase in total manning of approximately 325 employees is forecast during the first 2 years of in-seam development. Once the underground commences longwall extraction, the combined Lake Vermont Meadowbrook workforce will reduce to levels equivalent to the current manning levels. During the latter stages of the operation, manning is expected to gradually increase to approximately 100 to 150 employees beyond the current workforce levels.

1.2. Purpose of this Report

This report sets out the assessment of the anticipated transport implications resulting from the construction and operational 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 anticipated to service the Project (base case).
2. The traffic generating characteristics of the Project.
3. The anticipated 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.
5. Expected traffic volumes of heavy vehicle hail movements associated with transport of materials, wastes, and other goods for construction and operational 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 transport impacts.

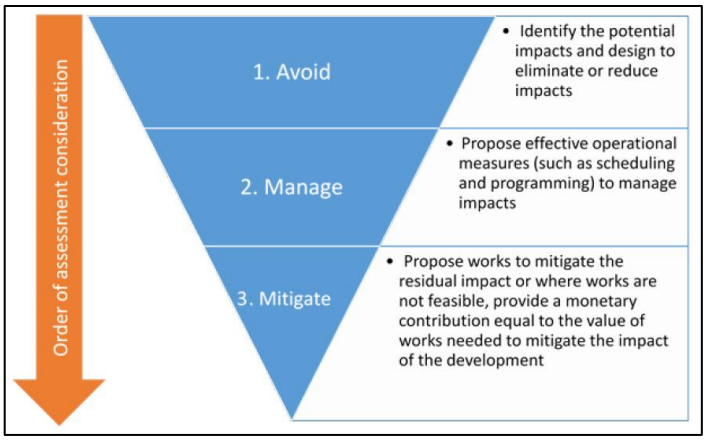
1.3. Study Methodology

This Transport Impact Assessment (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 of existing road conditions and operations and establishment of a baseline conditions (i.e. the existing transport operation of the Lake Vermont Mine)
- Preparation of estimates for Project generated traffic, based on the intended haul routes of heavy vehicles and workforce requirements supplied by the Proponent.
- Preparation of scenarios for the transport assessment which consider baseline and Project traffic generation estimates at critical Project milestones (referred herein as design horizons).
- Determination of anticipated 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 has been considered:
    - Impact of Project related traffic on existing road link capacity for key haul routes.
    - Impact of Project related traffic on key intersections which are expected to carry the majority of Project generated traffic.
    - 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 the GTIA and shown in Figure 1.1.
- Review and assessment of road safety risks that might arise as a result of the Project and identification of mitigation measures to ensure no worsening of these risks.

It is noted that a conservative impact assessment has been undertaken, assuming that the existing baseline traffic volumes would be maintained for all future design horizons. Project traffic volumes have been overlaid on top of existing baseline traffic. This is considered conservative given that the existing Lake Vermont workforce and production (which drive the baseline traffic volumes) are forecast to reduce in the future as the Project traffic volumes increase. This reflects the expected shift in production and manning from the existing Lake Vermont Mine to the Project.

Figure 1.1: Impact Mitigation Hierarchy



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

1.4. References and Supporting Data

In preparing this report, reference has been made to the following:

- 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 (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) Segment reports and Marginal Cost Spreadsheet for Peak Downs Highway (road sections 33A and 33B), provided by TMR in July 2020
- Site inspection undertaken by GTA Consultants on Wednesday 3 March 2021 and Thursday 4 March 2021
- Other background data and Project input assumptions as agreed in consultation with the Proponent.

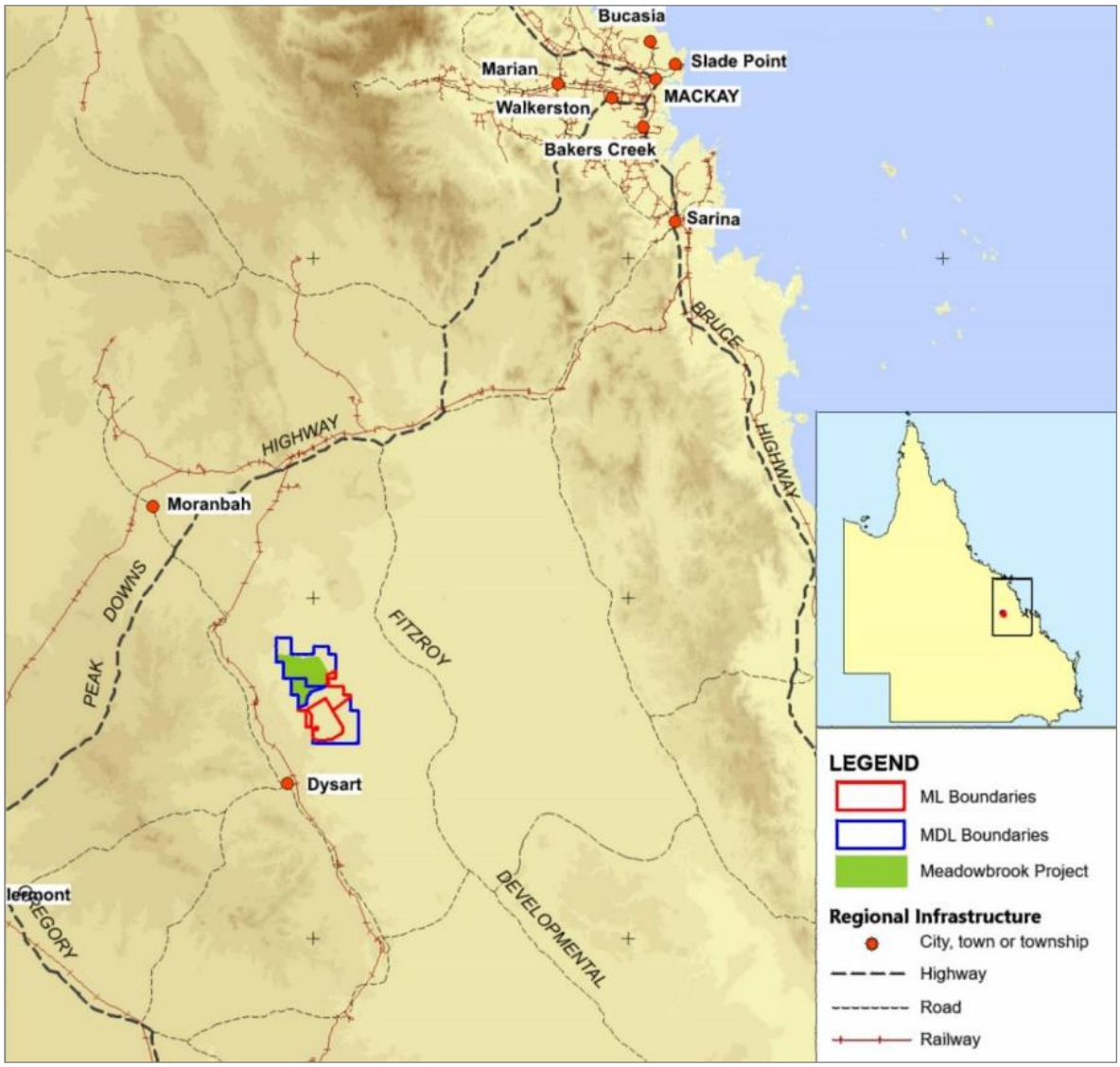
2. PROJECT DESCRIPTION

02

2.1. Project Location

The Proponent currently operates the Lake Vermont Mine as an open-cut coal mine on granted ML 70331, ML 70477 and ML 70528. The Proponent seeks an extension to operations to the north of the existing Lake Vermont Mine, on Lot 102 SP310393 (formerly Lot 10 on Plan CNS93) and owned by the proponent. The proposed Project site is defined by the area of land within the northern portion of Mineral Development Lease (MDL) 303 and the southern portion of MDL 429. The Project is located in the Bowen Basin coal field of Central Queensland, approximately 250 km south-west of Mackay and 25 km north-east of the town of Dysart, within the Isaac Regional Council area. The Project location in the regional context is provided in Figure 2.1 below.

Figure 2.1: Subject Site and Its Environs



Source: Final Terms of Reference for the proposed Lake Vermont Meadowbrook Project (figure 1), dated April 2020

2.2. Project Schedule

Construction of the Project is planned to be completed over 2 years between 2024 and 2025. Mining establishment works are expected to be undertaken over the following 2 years between 2026 and 2027, following which regular longwall mining operations will occur for approximately 21 years. A summary of the proposed Project schedule is provided in Table 2.1.

Table 2.1: Project Schedule

Project Year	Project Activity	Year	Duration
Project Years -1 to 0	Construction Phase	Expected 2024 – 2025	2 Years
Project Years 1 to 2	Underground Development Operations Phase	Expected 2026 – 2027	2 Years
Project Years 3 to 23	Underground Mining Operations Phase	Expected 2028 – 2048	21 years

2.3. Workforce Projections

2.3.1. Lake Vermont Meadowbrook Project

The Project would employ up to 250 employees to undertake construction of the Project, and approximately 410 employees during the operational phase of the Project. The maximum workforce projection for each of the Project activities is shown in Table 2.2.

Table 2.2: Project Workforce Projections

Year	Project Activities	Maximum Workforce (Daily Persons)
Project Year -1 to 0	Construction	250
Project Year 1 to 2	Underground Development Operations	325
Project Year 3 to 23	Underground Operations	410

The operations workforce will be primarily sourced from the surrounding regional area (i.e. Isaac and Mackay regions) and for those that choose not to permanently reside in Dysart, accommodation will be provided at the existing Lake Vermont Accommodation Village, in Dysart. Project related transport would include Drive-in / Drive-out (DIDO) from Mackay to Dysart, with daily transport from the Lake Vermont Accommodation Village to the Project provided by way of shuttle bus (approximately 22 seat capacity).

Vehicle demand associated with workforce projections is discussed further in Section 4.2.

2.3.2. Existing Lake Vermont Mine Baseline

The Proponent has indicated that the Project will enable transition of a portion of the required workforce from the existing Lake Vermont Mine Operations to the Project, with a short transitional period of peak manning occurring during the construction and development of the Project. Indicative workforce projections, combining assumptions for both the existing Lake Vermont Mine and the Lake Vermont Meadowbrook Project is shown in Figure 2.2. The workforce identified in Figure 2.2 corresponds to the following activities:

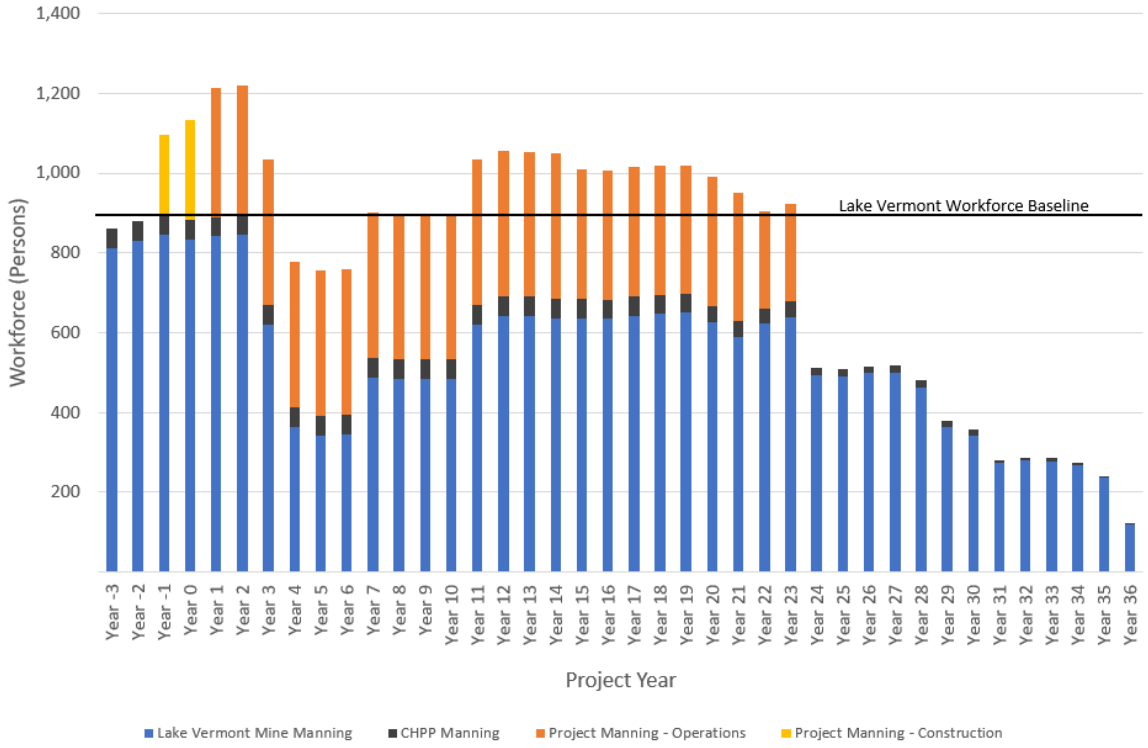
- "Lake Vermont Mine Manning" is continued operations of mine and infrastructure at the existing Lake Vermont Mine

- "CHPP Manning" is continued operations of the Lake Vermont Coal Handing and Preparation Plant (CHPP)
- "Project Manning – Construction" is construction of the Lake Vermont Meadowbrook Project
- "Project Manning – Operations" is operations of the Lake Vermont Meadowbrook Project.

It is noted that the existing Lake Vermont Mine vehicle traffic (i.e. traffic associated with "Lake Vermont Mine Manning" and "CHPP Manning") is already present on the road network, and any existing road traffic counts would capture this vehicle traffic within the baseline traffic volumes. There is a steady workforce associated with operation of the CHPP, rail loop, infrastructure and administrative facilities at Lake Vermont. This workforce is required irrespective of whether the coal is sourced from the existing Lake Vermont Mine or the Project operations. As implied by Figure 2.2, existing Lake Vermont Mine vehicle traffic is expected to reduce following Project construction.

To complete a conservative impact assessment, this TIA has assumed that the existing baseline traffic volumes would be maintained for all future design horizons. Project traffic volumes (i.e. traffic associated "Project Manning – Construction" and "Project Manning – Operations") have been overlaid on top of existing baseline traffic. This is considered conservative given that the workforce profile provided by the Proponent implies that baseline traffic volumes are forecast to reduce in the future as the Project traffic volumes increase. This reflects the expected shift in production and manning from the existing Lake Vermont Mine to the Project.

Figure 2.2: Indicative Workforce Projections – Lake Vermont Mine and Lake Vermont Meadowbrook Project



Source: Jellinbah Group Lake Vermont Resources – Meadowbrook Extension Project (provided via email, dated 23/09/2021).
Note: Year -1 is currently anticipated as 2024.

2.4. Proposed Access Arrangements

The Project proposes to gain access to the external road network via the existing Lake Vermont Mine access road intersecting Golden Mile Road. The existing Lake Vermont Mine access road is a private access road owned and maintained by the Proponent. Golden Mile Road forms part of the Council controlled road network, connecting to the existing Lake Vermont Accommodation Village located in Dysart, west of the Project location.

2.5. Anticipated Haul Movements and Haul Routes

The Proponent has advised that 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, with B-Doubles used for the delivery of fuel. Some oversize loads may be required throughout the life of the Project on an 'as-required' basis, however, these will be managed through obtaining the relevant traffic management permits as required by legislation. Project infrastructure and other freight are expected to be transported to site primarily from Mackay, Rockhampton (via Mackay) and Moranbah. Where materials, plant and equipment are to be sourced from overseas, these will arrive from Mackay or Rockhampton utilising existing port facilities.

Heavy vehicle movements associated with the construction and operational phases have been based upon Projections provided by the Proponent and relate to the best available knowledge of the Project at the time of preparing this report. Heavy vehicle traffic flows and associated vehicle types are expected to vary over the life of the Project, reflecting the types of materials and equipment required at specific points in time. The types of heavy vehicle transport which have been considered in this assessment include:

Construction phase

- Movement of quarry material (likely to be sourced from the local Tay Glen quarry located on Saraji Road)
- Movement of concrete (likely to be sourced from Mackay)
- Movement of materials for construction of the Underground mine - Surface Mine Infrastructure Area, drifts and shafts (likely to be sourced from Mackay)
- Movement of buildings and other equipment for maintenance and construction facilities (likely to be sourced from Mackay)

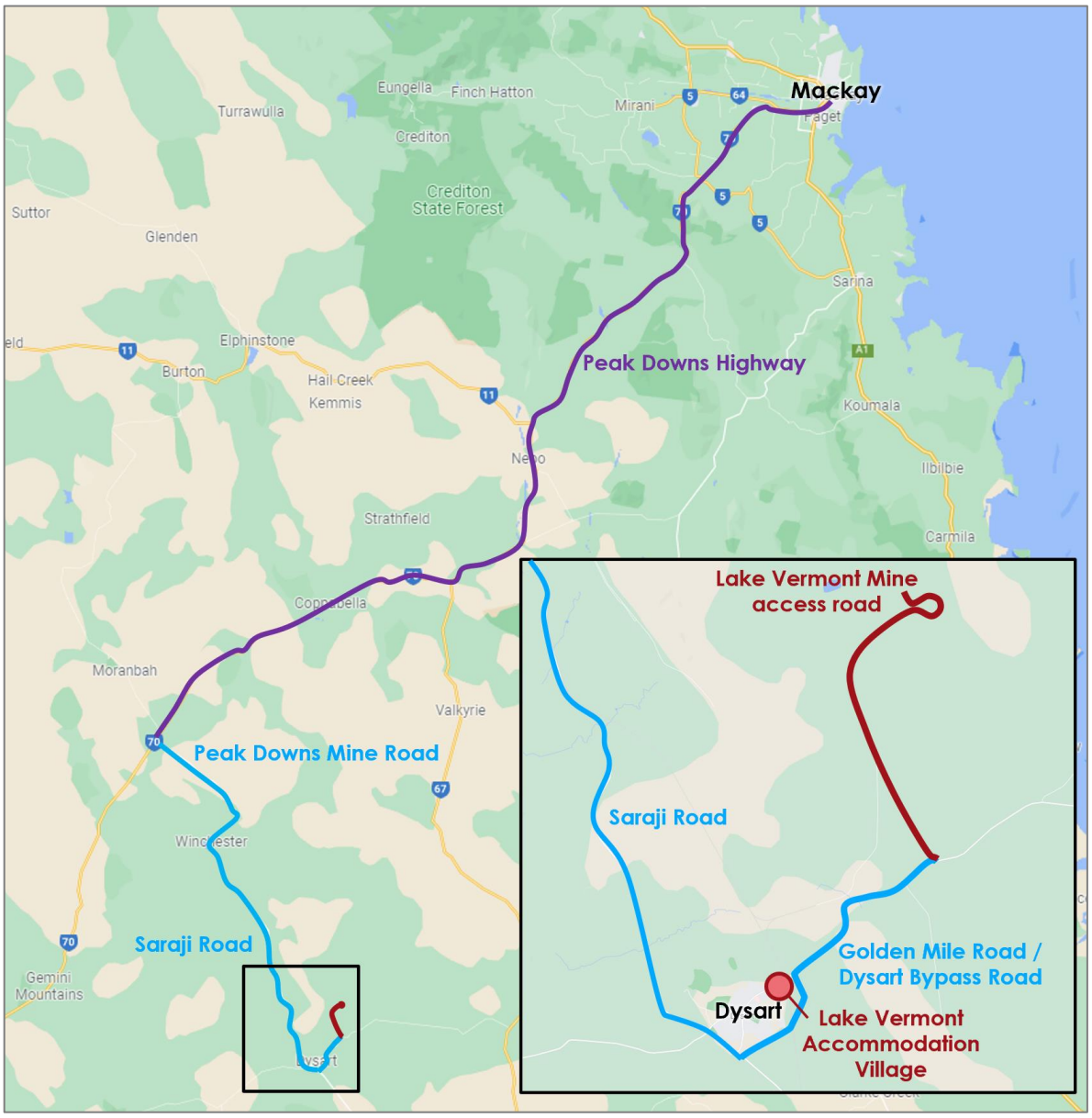
Operations phase

- Transport of general freight including items such as waste, tyres and general supplies (likely to be sourced to/from Mackay)
- Movement of fuel (likely to be sourced from Mackay)
- Movement of explosives (likely to be sourced from Moranbah or Mackay)
- Movement of quarry material for on-going maintenance (likely to be sourced from the local Tay Glen quarry located on Saraji Road).

In addition to the abovementioned road-based transport movements, rail transport will be used during the operations phase to transport coal to market. Existing rail and port infrastructure will be used, consistent with the operations of the existing Lake Vermont mine.

A summary of the key haulage routes associated with the Project between Mackay and Lake Vermont Mine access road is provided in Figure 2.3.

Figure 2.3: Indicative Haulage Route between Mackay and Lake Vermont Mine Access Road



The Proponent is committed to ensuring safe and efficient haulage operations by heavy vehicles. It is understood that this will be achieved through continuation of existing procedures such as Job Safety Analyses, Safe Operation of Mobile Plant Standard Operating Procedures, Journey Management Systems, Fatigue management policies, and educating the workforce through inductions on road safety.

3. EXISTING ENVIRONMENT

03

3.1. Road Network

The transport routes in the vicinity of the Project include the Council controlled roads of Golden Mile Road (between site access and Dysart) and Saraji Road (Dysart to the Peak Downs Highway) and the State Controlled Road (SCR) of Peak Downs Highway. The characteristics of each of these roads proximate to the Project are described in Table 3.1, and Council controlled road network shown in Figure 3.1.

Figure 3.1: Lake Vermont Mine- Dysart Road Network

Source: Google Maps (2020)

Table 3.1: Existing Road Network

Road Name	Lake Vermont Mine (Project) Access Road (Figure 3.2)	Golden Mile Road (Figure 3.3)	Saraji Road (Figure 3.4)	Peak Downs Highway (Figure 3.5)
Trending Direction	North – South	East – West	North – South	East – West
Jurisdiction	Private Access	Council Controlled	Council Controlled	State Controlled
Class Type	Private Access	Rural Arterial Road	Rural Arterial Road	Highway
Road Type	Sealed	Sealed	Sealed	Sealed
Posted Speed	60 km/h	60 km/h – 100 km/h	100 km/h	100 km/h
Lane Formation	Two-lane / undivided / two-way	Two-lane / undivided / two-way	Two-lane / undivided / two-way	Two-lane / undivided / two-way

Road Name	Lake Vermont Mine (Project) Access Road (Figure 3.2)	Golden Mile Road (Figure 3.3)	Saraji Road (Figure 3.4)	Peak Downs Highway (Figure 3.5)
Carriageway Width	8m	10m	9m	9m
Reserve Width	-	400m	60m	100m
Kerbside Parking	Nil	Nil	Nil	Nil
Daily Volume	< 500 vehicles per day[1]	< 1,000 vehicles per day[1]	Approx. 2,500 vehicles per day[2]	< 4,000 vehicles per day[3]

[1] Based on traffic counts obtained / undertaken by Council
[2] Based on traffic counts within public domain, obtained as part of the Winchester South Project Environmental Impact Statement
[3] Based on traffic counts obtained / undertaken as part of TMR Road Asset Data

Lake Vermont Mine Access, Golden Mile Road, Saraji Road and Peak Downs Highway are shown in Figure 3.2, Figure 3.3, Figure 3.4 and Figure 3.5 respectively.

Figure 3.2: Lake Vermont Mine (Project) Access Road at Golden Mile Road (Facing South)

Figure 3.3: Saraji Road / Dysart Middlemount Road at Queen Elizabeth Drive (Facing North)

Figure 3.4: Saraji Road / Dysart Middlemount Road at Queen Elizabeth Drive (Facing North)

Figure 3.5: Peak Downs Road at Peak Downs Mine Road (Facing East)

3.1.1. Lake Vermont Mine – Infrastructure Agreement

As part of the existing Lake Vermont Mine operations, a 'compensation agreement' (dated 19 September 2007) has been established between the Proponent (Bowen Basin Coal Pty Ltd) and the former Broadsound

Shire Council. The 'compensation agreement' details the road sections and maintenance cost obligation of the Proponent for use of relevant Council controlled roads, namely Golden Mile Road between Dysart and the Lake Vermont Mine Access Road. The maintenance contribution is calculated from the proportion of Lake Vermont Mine heavy vehicle demand to the total heavy vehicle demand on Golden Mile Road.

3.2. Future Upgrades

A review of TMR's Queensland Transport and Roads Investment Program (QTRIP) for 2021-22 to 2024-25 for the Mackay-Whitsunday District has been undertaken with regards to future planning for the Peak Downs Highway between Clermont and Mackay and the local network. The works identified in QTRIP for the Peak Downs Highway between Claremont and Mackay and local network are presented in Table 3.2.

Table 3.2: QTRIP Works Schedule

Project Location	Location Description	Works Description
Peak Downs Highway (Clermont – Nebo)	Various locations	Rehabilitate and widen
Peak Downs Highway (Clermont – Nebo)	Wuthung Road to Caval Ridge Mine	Widen and strengthen
Peak Downs Highway (Nebo – Mackay)	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 Road intersection	Improve safety
Saraji Road	Moranbah	Improve safety
Golden Mile Road	Moranbah	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 and the local network. These works are scheduled to be undertaken between 2021 and 2025, with minor works occurring after this period. Upgrades identified in Table 3.2 largely consist of safety improvements to the road network through intersection upgrades and pavement widening proximate to the site and are therefore 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 have not been considered in this TIA to allow for a worst-case (conservative) assessment.

3.3. Baseline Traffic Volumes and 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 segment between Clermont to Nebo (33A) and Nebo to Mackay (33B). 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 data detailed within the AADT reports indicates that the Peak Downs 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. 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 (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	1,809	6.4%	19%
		Gazettal	89.1	90.4	1,834	6.6%	20%
	Peak Downs Hwy 150 m West of Isaac River[4]	Against Gazettal	90.4	101.8	1,675	8.8%	16%
		Gazettal	90.4	101.8	1,712	8.8%	21%
	West of Coppabella[4]	Against Gazettal	101.8	128.0	2,028	5.4%	55%
		Gazettal	101.8	128.0	1,925	3.5%	15%
	East of Coppabella[4]	Against Gazettal	128.0	149.4	1,820	5.8%	44%
		Gazettal	128.0	149.4	1,799	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 Golden Mile Road have been sourced from traffic surveys undertaken by Council in 2020. A copy of the AADT data for Golden Mile Road is provided at Appendix B, with a summary of data provided in Table 3.4.

The data provided in Table 3.4 is included as part of baseline vehicles which are used to compare the expected Project vehicle demands. 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 – Golden Mile Road (2020) [1]

Road Name	Segment Description	Direction	Daily traffic volume	Heavy Vehicle Percentage
Golden Mile Road	West of Site Access	Westbound	417	29%
		Eastbound	441	22%
Golden Mile Road	East of Site Access	Westbound	238	66%
		Eastbound	224	13%

[1] Traffic data provided by the Proponent as part of the Infrastructure Agreement referenced in Section 3.1.1

3.4. Intersection and Network Performance

Based on on-site observations (undertaken Wednesday 3 March 2021 and Thursday 4 March 2021), current traffic volumes on the Peak Downs Highway, Golden Mile Road and Saraji Road (the road network proximate to the Project site) are quite low. As such, the current network and intersection performance on Peak Downs Highway and the local road network proximate to the Project is expected to be within capacity.

This is assessed and discussed further in Section 6 and 7.

3.5. Public Transport and Active Travel

There are no public or active transport provisions on Golden Mile Road proximate to the Project, with the exception of infrequent school bus services and long-distance coach services. The limited public transport and active travel provisions are likely a result of the adjacent land uses including mining, cropping, and other minimal use, with the exception of the residential and services land uses within the township of Dysart.

As there are no material public transport and active travel provisions proximate to the site, no impacts to these provisions are expected to occur. As such, no further assessment of public and active transport provisions as a result of the Project are required.

3.6. Rail Network

Product coal will be hauled on the existing rail loop along the Lake Vermont spur line that connects to the Aurizon Goonyella rail system for shipments to Abbott Point Coal Terminal (APCT) north of Bowen, the RG Tanna Coal Terminal (RGTCT) in Gladstone, or potentially the Dalrymple Bay Coal Terminal (DBCT) in Mackay.

There are no rail level crossings present within the vicinity of the Project and its frontage, however, should rail crossings be identified or proposed, it is expected that liaison with Queensland Rail will be undertaken post submission of the EIS to undertake an Australian Level Crossing Assessment Model (ALCAM) assessment.

3.7. Port Infrastructure

The Aurizon Goonyella rail system provides a connection between the Project and the Abbot Point Coal Terminal (APCT), RG Tanna Coal Terminal (RCTCT), and Dalrymple Bay Coal Terminal (DBCT) for coal shipments.

APCT is located 25 kilometres north of Bowen, between Townsville to the north and Mackay to the south. Under operational management by Abbot Point Operations (APO), the terminal has the capacity to handle 50 million tonnes of coal annually, with existing coal stockpiles at the yard holding more than two million tonnes of coal. Train in-loading facilities are provided to deliver coal to the terminal stockpiles, with Abbot Point receiving 400 coal trains a month on average. Coal out-loading is achieved via a conveyor belt along the Abbot Point trestle jetty to the wharf and one of two berths.

The RGTCT is located within the Port of Gladstone. Owned and operated by Gladstone Ports Corporation (GPC), the terminal is one of eight main wharf centres within the Port of Gladstone comprising of four wharves and has a current throughput capacity in excess of 60 million tonnes annually. The four wharves utilise Mobile Gantry Shiploaders, with a maximum capacity of 6,000 tonnes per hour each. The RGTCT can handle up to 42 coal types across 85 stockpile zones. All coal exported through the RG Tanna Coal Terminal is transported by rail via either the Moura or Blackwater Line.

The DBCT is located at the Port of Hay Point and is 38 kilometres south of Mackay and is under operational management by Dalrymple Bay Infrastructure (DBI). It is Queensland's largest coal export terminal, with an annual export capacity of 85 million tonnes. The DBCT facility includes three in-loading systems and three out-loading systems which feed three shiploaders and four berths. The shiploaders are used to transfer coal from wharf conveyors to the holds of ships at a loading rate ranging from 7,200 to 8,650 tonnes per hour.

It is not expected that the Project will have any significant adverse impact on existing port operations given that coal production for the Project is forecast to remain consistent with existing Lake Vermont Mine output, and would therefore be consistent with the current Jellinbah group agreements with relevant port operators.

3.8. Airports

Airports may be utilised by the Project for transport of the FIFO workforce. Airports within the vicinity of the Project include Moranbah, Emerald, Mackay and Rockhampton.

Moranbah Airport (MOV) is located approximately 6 kilometres south of Moranbah and 60 kilometres north of the Project. Moranbah airport operates both BMA and public flights, with a total of 53,300 passenger movements for 2021, down from 109,400 in 2019 and 86,000 in 2020.

Emerald Airport (EMD) is located 6 kilometres south of Emerald's town centre and 110 kilometres south of the Project. The airport is serviced by Qantas and Virgin Australia, with a total of 121,800 passenger movements in 2021.

Mackay Airport (MKY) is a major Australian regional airport and is located in South Mackay, approximately 170 kilometres north east of the Project. The airport recorded 571,280 total passenger movements for 2021, down from 658,660 in 2020 and 821,760 in 2019.

Rockhampton Airport (ROK) is also another major regional airport and is located in West Rockhampton, approximately 240 kilometres south east of the Project. The Rockhampton Airport recorded a total of 355,340 passenger movements in 2021, down from 434,100 in 2020 and 552,600 in 2019.

The data indicates that all airports are currently operating at reduced throughput from volumes recorded in 2020 and 2019, and significantly under the maximum capacities which have been recorded in years prior. Additionally, minimal impacts to flight volumes can be expected from the Project through the use of a predominantly local workforce. It is therefore not expected that the Project will have any significant adverse impact on existing airport operations.

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 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 resulting from the Project occurs for a period of up to 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 assessment:

- Project Year -1 (expected 2024): Peak construction phase of the Project
- Project Year 1 (expected 2026): Year of opening for the Project (for regular operations)
- Project Year 11 (expected 2036): 10-year design horizon from operations commencement
- Project Year 21 (expected 2046): 20-year design horizon from operations commencement, the final year considered for the mitigation of pavement impacts resulting from the Project.

The correlation of these design horizons to the impact assessment requirements are summarised in Table 4.2.

Table 4.2: Adopted Design Horizons for Assessment

Assessment / Impact Type	Assessment / Impact Year
Road Safety	Construction – Project Year -1 Operations – Project Year 1
Access and Frontage	Construction – Project Year -1 Operations – Project Year 1 10-year design horizon from year of opening – Project Year 11
Intersection Delay	Construction– Project Year -1 Operations – Project Year 1
Road Link Capacity	Construction– Project Year -1 Operations – Project Year 1
Pavement	Construction– Project Year -1 Operations – Project Year 1 20-year design horizon from year of opening – Project Year 21

Source: TMR's GTIA Table 6.5 (2018)

4.2. Workforce Traffic Generation

Traffic generated by the Project workforce has been estimated based on the workforce projections outlined in Section 2.3. Details including the location of the workforce and roster arrangements including the workforce split between night and day shift have been provided by the Proponent, with assumptions made regarding the private vehicle and shuttle bus occupancies. 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.

Table 4.3: Total Project Workforce

Workforce Type	Assessment / Impact Year		
	Year -1 (2024)	Year 1 (2026)	Year 11 (2036)
Construction	200	0	0
Operations	0	410	410
Total	**200**	**410**	**410**

4.2.1. Location of Workforce

The DIDO construction workforce will be accommodated at commercial WAV facilities located in Dysart. These include the Civeo village and the Stayover village. The Operations workforce will consist of a mix of local workers (Dysart) plus DIDO workers staying at the Lake Vermont Accommodation Village located on Golden Mile Road / Queen Elizabeth Drive in Dysart.

A summary of the expected workforce proportions by mode of travel for each Project phase is detailed in Table 4.4 and Table 4.5.

Table 4.4: Proportion of Workforce by Mode of Travel – Construction Phase

Mode of Travel	Proportion of Workforce
Car [1]	50%
Bus [2]	50%
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 vehicle*

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

Mode of Travel	Proportion of Workforce
Car [1]	5%
Bus [2]	95%
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 vehicle*

4.2.2. Workforce Rosters

The Project is expected to operate on different workforce proportions between day and night shifts for the construction and operations phases, as follows:

- Construction Phase: 200-person workforce, 80% day shift / 20% night shift
- Operations Phase: 410-person workforce, 55% day shift / 45% night shift.

It is noted that of the total 410 workforce during the Operations Phase, 50% (205 persons) of the workforce will be "on roster" and 50% (205 persons) will be "off roster".

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

All Project 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 Project 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 travelling from Dysart will be small capacity buses, 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

Design Year	Direction	AM Peak (veh/ hr)		PM Peak (veh/ hr)	
		In	Out	In	Out
Year -1 (2024)	Dysart (West of site)	89	23	23	89
Year 1 (2026)	Dysart (West of site)	20	17	17	20
Year 11 (2036)	Dysart (West of site)	20	17	17	20

Veh/ hr- vehicle movements per hour

It is noted that during construction, a greater proportion of the workforce are expected to travel to the Project by car. Therefore, despite the greater workforce requirement during the operations phase, there is expected to be lower volumes of Project generated traffic on the external road network post construction.

4.2.4. Existing Workforce Vehicle Demand

With consideration of the existing workforce (as shown in Figure 2.2), the existing workforce demand could be expected to generate traffic demand as provided in Table 4.6 (based on the assumptions provided in this section of the report).

Table 4.7: Lake Vermont Workforce Traffic Generation Summary

Design Year	Direction	AM Peak (veh/ hr)		PM Peak (veh/ hr)	
		In	Out	In	Out
Year -2 (2023)	Dysart (West of site)	40	35	35	40
Year -1 (2024)	Dysart (West of site)	40	35	35	40
Year 1 (2026)	Dysart (West of site)	40	35	35	40
Year 4 (2029)	Dysart (West of site)	20	18	18	20
Year 11 (2036)	Dysart (West of site)	32	28	28	32

As shown in Figure 2.2, Project year 4 (2029) is the first year in which the combined workforce of both the Lake Vermont Mine and the Project reduces below the existing Lake Vermont Mine workforce. At this time, the combined workforce traffic generation could be expected to be lower than the existing Lake Vermont Mine workforce traffic generation.

The combined Lake Vermont Mine and Project workforce remains below the existing Lake Vermont Mine workforce until Project year 11 (3036), in which the combined Lake Vermont Mine and Project workforce generates in the order of 10 additional inbound and 10 additional outbound vehicle movements in each peak period.

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 are Mackay and the Tay Glen Borrow Pit / Quarry, with occasional movements to / from Moranbah, as detailed in Section 2.5. A summary of anticipated daily two-way vehicle movements for the construction phase and operational phase peaks of the Project are provided in Table 4.8.

For the purpose of this assessment, other than quarry material, all heavy vehicle demands have been assumed to originate from Mackay to maximise the potential impacts observed (i.e. a conservative assessment). Additionally, heavy vehicle demands have been distributed to the external road network using the existing directional distribution as currently observed for the Lake Vermont Mine.

The assumed haul routes for heavy vehicle movements are as follows:

- To / from Mackay (west of site access) – Golden Mile Road / Dysart Bypass Road (west of Lake Vermont Mine access road), Saraji Road, Peak Downs Mine Road, Peak Downs Highway (east from Peak Downs Mine Road)
- To / from Mackay (east of site access) – Golden Mile Road (east of Lake Vermont Mine access road), Fitzroy Developmental Road, Peak Downs Highway (east from Fitzroy Developmental Road)
- To / from Tay Glen Quarry – via private haulage road, through consultation with BHP Mitsubishi Alliance (BMA), the holder of the relevant land tenure.

With the exception of movements associated with concrete deliveries, it is assumed that traffic generation associated with heavy vehicles will occur steadily over a 10-hour workday. For concrete, all heavy vehicle movements are assumed to arrive and depart in the AM peak.

Table 4.8: Daily (Peak) Project Heavy Vehicle Movements (Two – Way Movements)

Project Phase	Austroads Vehicle Class	Origin / Destination (veh / day)	
		Mackay [1]	Tay Glen Quarry [2]
Construction (Years -1 to 0)	4	0	0
	5	4	0
	9	1	0
	10	0	15
	Total	**5**	**15**
Underground Development Operations (Years 1 to 2)	4	1	0
	5	2	0
	9	1	0
	10	1	1
	Total	**5**	**1**
Underground Operations (Years 3 onwards)	4	1	0
	5	1	0
	9	1	0
	10	1	1
	Total	**4**	**1**

[1] Combined total heavy vehicle movements for vehicles travelling east and west from the site access.

[2] Heavy vehicle movements associated with the Tay Glen quarry will travel via a private haulage road, not accessing Council controlled roads.

The Proponent has indicated that access arrangements to the quarry would not require heavy vehicle access to the council-controlled road network. Under this arrangement, heavy vehicle movements associated with the haulage of quarry material would be through a private haul road between the Lake Vermont Meadowbrook Project and the Tay Glen quarry. As such, the quarry based heavy vehicle movements have been excluded from assessment. Should this arrangement not be adopted, the heavy vehicle traffic generation of the Project accessing the external road network (i.e. council-controlled roads) may increase.

Based on the assumptions documented in the preceding sections, peak hour estimates of heavy vehicle traffic on the external road network (i.e. excluding heavy vehicle movements associated with the transport of quarry material) are summarised in Table 4.9.

Table 4.9: Peak Hour Project Heavy Vehicle Traffic Generation Summary (Excluding Quarry Movements)

Project Years	AM Peak (veh/ hr)		PM Peak (veh/ hr)	
	In	Out	In	Out
Year -1 to 0	< 1	< 1	< 1	< 1
Year 1 to 2	< 1	< 1	< 1	< 1

Project Years	AM Peak (veh/ hr)		PM Peak (veh/ hr)	
	In	Out	In	Out
Year 3+ (Ongoing)	< 1	< 1	< 1	< 1

Veh/ hr- vehicle movements per hour

Based on the distributions of the existing Lake Vermont Mine heavy vehicle demands accessing Golden Mile Road, approximately 30% travel east and 70% travel west on Golden Mile Road toward Mackay / Moranbah / Rockhampton. As a result, it is expected that approximately 1 heavy vehicle per day is expected to travel east on Golden Mile Road (toward Fitzroy Developmental Road).

4.4. Project Generated Multi-Modal Transport Demand

Based on information provided by the Proponent, the Project is not planned to increase the production of coal beyond that currently output by the existing Lake Vermont Mine. As such, impacts to rail and port infrastructure is not expected to occur as a result of the Project.

Additionally, it is understood that the only air transportation associated with the Project is the movement of Fly-in / Fly-out (FIFO) workforce. The increase to FIFO workforce demands are expected to be accommodated within the existing flight schedules and services of nearby Moranbah, Mackay, Emerald and Rockhampton airports. As such, impacts to airports are therefore not expected.

5. ROAD LINK ASSESSMENT

05

5.1. Context of Road Assessment

The following section has been prepared to assess expected Project impacts on the external road network with due consideration of forecast traffic volumes 'with' and 'without' the Project.

For State Controlled Roads, 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"

For Council Controlled Roads, the expected increase in traffic on the external road network as a direct result of the Project has been assessed to assist in the determination and negotiation of any infrastructure maintenance agreements which may be required between the Proponent and Council.

5.2. State Controlled Road Network

Table 5.1 summarises the comparison of baseline traffic to Project traffic, to determine whether the 5% traffic impact threshold is exceeded.

Table 5.1: Road Link Assessment (State Controlled Network) – Impact Identification Table

Road Name	Road Section		Direction	Percentage Increase	
	Start Chainage (m)	End Chainage (m)		Year -1 (2024)	Year 1 (2026)
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	Anti-gazettal	0.1%	0.1%
	89.05	90.37	Gazettal	0.1%	0.1%
	90.37	101.77	Anti-gazettal	0.1%	0.1%
	90.37	101.77	Gazettal	0.1%	0.1%
	101.77	128.004	Gazettal	0.1%	0.1%
	101.77	128.004	Anti-gazettal	0.1%	0.1%
	128.004	149.366	Anti-gazettal	0.1%	0.1%
	128.004	149.366	Gazettal	0.1%	0.1%
	149.366	163.631	Anti-gazettal	0.1%	0.1%
	149.366	163.631	Gazettal	0.1%	0.1%
	163.631	178.197	Gazettal	0.1%	0.1%
	163.631	178.197	Anti-gazettal	0.1%	0.1%
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	Gazettal	0.1%	0.1%
	0	44.798	Anti-gazettal	0.1%	0.1%
	44.798	62.035	Anti-gazettal	0.1%	0.1%
	44.798	62.035	Gazettal	0.1%	0.1%
	62.035	76.003	Anti-gazettal	0.1%	0.0%
	62.035	76.003	Gazettal	0.1%	0.1%
	76.003	81.376	Anti-gazettal	0.0%	0.0%

Road Name	Road Section		Direction	Percentage Increase	
	Start Chainage (m)	End Chainage (m)		Year -1 (2024)	Year 1 (2026)
	76.003	81.376	Gazettal	0.0%	0.0%
	81.376	86.052	Gazettal	0.0%	0.0%
	81.376	86.052	Anti-gazettal	0.0%	0.0%
	86.052	87.036	Anti-gazettal	0.0%	0.0%
	86.052	87.036	Gazettal	0.0%	0.0%
	87.036	87.842	Gazettal	0.0%	0.0%
	87.036	87.842	Anti-gazettal	0.0%	0.0%

On the basis of the summary provided in Table 5.1, the impact of forecast Project traffic does not exceed the 5% of the forecast AADT for any state-controlled road segment during the initial year of construction (Year -1) and initial year of operations (Year 1). As a result, the Project impact on SCR links is considered insignificant and does not warrant any further analysis.

5.3. Local Road Network

Table 5.2 summarises the comparison of baseline traffic to Project traffic on the Council Controlled Road network, based on information provided by the Proponent.

Table 5.2: Road Link Assessment (Council Controlled Network) – Impact Identification Table

Road Section	Direction	Traffic Volumes (Daily)	
		Year -1 (2024)	Year 1 (2026)
Golden Mile Road (West of Site Access)	Eastbound	12%	5%
	Westbound	13%	5%
Golden Mile Road (East of Site Access)	Eastbound	0.4%	0.3%
	Westbound	0.3%	0.2%
Saraji Road & Peak Downs Mine Road	Northbound	0.2%	0.1%
	Southbound	0.2%	0.1%

Having regard for the information provided in Table 5.2 (and detailed within Section 4), the number of additional vehicle trips expected to be generated by the Project is expected to result in an increase to daily vehicle demands on Golden Mile Road west of the site access in the order of 13% and 5%, Golden Mile Road east of the site access in the order of 1% and 1%, and on Saraji Road of less than 1% and less than 1% during Project year -1 and year 1 assessment years, respectively. This is reflective of the additional 100 vehicles (200 movements) (approx.) during the construction phase and 50 vehicles (100 movements) (approx.) during the operation travelling in each direction during the initial years of the project.

As discussed in Section 4.2.4, from Project year 4 until Project year 11 the combined Lake Vermont Mine and Project workforce traffic generation is forecast to be equivalent to that of the existing workforce. As such, no road link impact resulting from the Project (with consideration to the reduction in workforce demand) is expected between Project years 4 to 11.

Whilst it is expected that impacts on Golden Mile Road east of the site access will be in the order of 1% (reflective of approximately 1 heavy vehicle per day), the existing operations of Lake Vermont Mine are expected to lessen during operation of the Project. As a result, it is not expected that the Project will result in an increase to existing heavy vehicle demands on Golden Mile Road for the road section east of the Lake Vermont Mine Access Road.

It is noted that the quarry based heavy vehicle demands are not included in the above commentary as these demands will not require use of Council controlled roads and therefore will not contribute to road link impacts.

Based on on-site observations, the expected demand resulting from the extension can be catered for within existing available capacity.

6. INTERSECTION IMPACT ASSESSMENT

06

6.1. Assessment Methodology

Turn warrant assessments of the key intersections expected to be used by the Project has been undertaken in accordance with the methodology provided in the Austroads' *Guide to Road Design, Part 4A* and TMR's *Road Planning and Design Manual (RPDM) Supplement to Austroads Guide to Road Design Part 4A (September 2020)*. The turn warrant assessment provides information on the minimum turn treatments required on the major road to satisfy traffic operation, road safety, and physical conditions at the site. The notations for each of the turn treatments are as follows:

- BAL / BAR: Basic left turn / Basic right turn
- AUL(s): auxiliary left-turn (short lane)
- AUL: auxiliary left-turn
- CHR(s): channelised right turn (short lane)
- CHR: channelised right turn.

6.2. Project Access / Golden Mile Road Intersection

6.2.1. Existing Intersection Form

The Project proposes to gain vehicular access to the site from the existing Lake Vermont Mine / Golden Mile Road intersection. The location of this intersection is shown in Figure 3.1.

The turn treatments for the existing Lake Vermont Mine / Golden Mile Road intersection are provided in the form of:

- Left-Turn: Channelised Left Turn (CHL)
- Right-Turn: Channelised Right Turn (CHR)

6.2.2. Turn Warrant Assessment

As a result of the increased vehicle demand, a turn warrant assessment of the existing Lake Vermont Mine / Golden Mile 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 for all design years (year -1, year 1 and year 11) for the Lake Vermont Mine / Golden Mile Road intersection are required to take the form of:

- Left-Turn: Channelised Left Turn (CHL)
- Right-Turn: Channelised Right Turn (CHR)

Based on the turn warrant assessment, the existing intersection design exceeds the required turn treatments for the design years assessed.

6.3. State Controlled Intersections

Based on the information provided within Section 4, up to 1 vehicle per hour in each direction is expected to travel on intersections which intersect a State Controlled Road during each peak hour.

Observations of the Peak Downs Mine Road / Peak Downs Highway intersection indicates that the existing intersection operates within reasonable capacity and could be expected to cater for the additional peak hour vehicle demand resulting from the Project. Given the very low volume of Project traffic expected to be generated on the SCR, no further assessment has been undertaken.

6.4. Local Council Controlled Intersections

6.4.1. Accommodation Village Access

As a result of the increased vehicle demand, a turn warrant assessment of the existing Lake Vermont Accommodation Village / Golden Mile 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 for all design years (year -1, year 1 and year 11) for the Lake Vermont Accommodation Village / Golden Mile Road intersection are required to take the form of:

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

Based on this turn warrant assessment, no modification to the turn treatments accessing the village are required to accommodate the additional workforce demand resulting from the Project for the design years assessed.

6.4.2. Other Council Controlled Intersections

Based on the information provided within Section 4, for haul route road sections between the Dysart Bypass Road and the Peak Downs Highway, up to 1 vehicle per hour in each direction is expected to travel on intersections of Council controlled roads during each peak hour.

Existing observations of Golden Mile Road / Dysart Bypass Road intersection, Dysart Middlemount Road / Dysart Bypass Road intersection, Saraji Road / Garnham Drive intersection and Saraji Road / Peak Downs Mine Road intersection indicates that the operations of these intersections are within reasonable capacity and could be expected to cater for the additional peak hour vehicle demand resulting from the Project. Given the very low volume of Project traffic expected to be generated on these local roads, no further assessment has been undertaken.

7. PAVEMENT IMPACT ASSESSMENT

07

7.1. Introduction

Identification of pavement impacts has been determined in accordance with TMR's GTIA Practice Note for Pavement Impact Assessments (December 2018). This process was supplemented with Marginal Cost spreadsheets, provided by TMR for the Peak Downs Highway in June 2020, and road traffic data for Council controlled roads, provided by Council for June 2020.

The Pavement Impact Assessment (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 resulting from the Project occurs for a period of up to 20 years after the opening of the final stage (being Year 21 – expected 2046).

The SCR assessment area has covered the Peak Downs Highway between Peak Downs Mine Road (Section 33A, Chainage 89.05) and the Bruce Highway intersection in Mackay (Section 33B, Chainage 87.842). This transport route carries the majority of the heavy vehicle movements and is therefore considered a suitable scope for the assessment.

For Council controlled roads, identification of pavement impacts resulting from Project generated heavy vehicles for each year of the Project has also been determined in accordance with the principles set out in TMR's GTIA Practice Note for Pavement Impact Assessments (December 2018). It is expected that the impact assessment will assist in the determination and negotiation of any infrastructure maintenance agreements which may be required between the Proponent and Council.

The Council controlled roads review area has covered the sections of road likely to experience the majority of the heavy vehicle traffic including Golden Mile Road (west of the Project Access intersection), Dysart Bypass Road, Saraji Road, and Peak Downs Mine Road.

7.2. Pavement Loading

7.2.1. Baseline SAR4 – State Controlled Roads

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 7.1.

Table 7.1: Road Link Traffic and Background SAR's (2019)

Road Name	Road Section		Direction*	AADT	Heavy Vehicle Percentage	Background SAR4 (Daily)	Background SAR4 (Annual)
	Start Chainage (m)	End Chainage (m)					
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	A	1,949	41	1,117	407,632
	89.05	90.37	G	1,912	21	1,178	429,824
	90.37	101.77	A	1,817	18	893	325,872
	90.37	101.77	G	1,749	38	1,136	414,640
	101.77	128.004	G	1,961	25	3,584	1,308,160

Road Name	Road Section		Direction*	AADT	Heavy Vehicle Percentage	Background SAR4 (Daily)	Background SAR4 (Annual)
	Start Chainage (m)	End Chainage (m)					
	101.77	128.004	A	1,958	30	938	342,224
	128.004	149.366	A	1,693	33	2,566	936,736
	128.004	149.366	G	1,689	45	1,290	470,704
	149.366	163.631	A	2,101	15	1,008	367,920
	149.366	163.631	G	2,097	56	3,779	1,379,408
	163.631	178.197	G	1,977	26	1,664	607,360
	163.631	178.197	A	2,006	32	2,026	739,344
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	G	2,011	18	1,146	418,144
	0	44.798	A	1,989	30	1,558	568,816
	44.798	62.035	A	1,803	28	1,565	571,152
	44.798	62.035	G	1,796	18	2,013	734,672
	62.035	76.003	A	2,954	19	1,203	439,168
	62.035	76.003	G	2,872	18	2,134	779,056
	76.003	81.376	A	4,905	12	2,202	803,584
	76.003	81.376	G	4,572	12	1,229	448,512
	81.376	86.052	G	8,587	8	2,848	1,039,520
	81.376	86.052	A	8,541	26	5,395	1,969,248
	86.052	87.036	A	5,097	13	3,264	1,191,360
	86.052	87.036	G	4,795	14	2,480	905,200
	87.036	87.842	G	5,363	17	4,352	1,588,480
	87.036	87.842	A	5,476	17	3,978	1,451,824

** G = Gazettal, A = Anti-Gazettal*

7.2.2. Baseline SAR4 – Council Controlled Roads

Information provided by Council included traffic data counts for a 1-month period between 29 May 2020 and 2 July 2020 at the following locations:

- Golden Mile Road – West of Project Access
- Golden Mile Road – East of Project Access
- Lake Vermont Mine (Project) Access
- Carfax Road (accessible from Golden Mile Road – East of Project Access).

This traffic data included the average directional daily traffic for the locations collected and a detailed breakdown of vehicles based on Austroads vehicle classifications. Based on the breakdown of vehicles

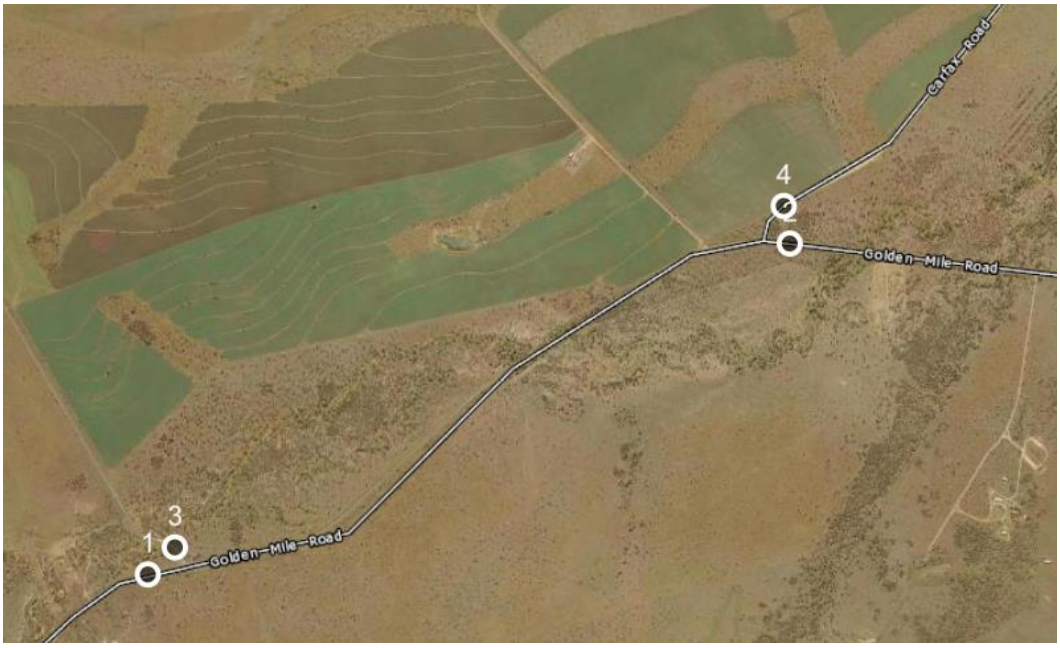
provided, existing background SAR4 loading was calculated. A summary of the provided traffic data and calculated SAR4 loading is provided in Table 7.2, with locations shown in Figure 7.1

Table 7.2: Council Controlled Road Background Traffic Data (2020) and Pavement Loading

Road Reference	Road Name (Description)	Direction	AADT	Heavy Vehicle Percentage	Background SAR4 (daily)	Background SAR4 (annual) [1]
1	Golden Mile Road (West of Project access)	Eastbound	441	22%	209	54,358
		Westbound	417	29%	243	63,214
2	Golden Mile Road (East of Project access)	Eastbound	224	13%	93	24,115
		Westbound	238	66%	230	83,267
3	Lake Vermont Mine (Project) Access	Northbound	220	37%	164	42,546
		Southbound	221	71%	298	77,502
4	Carfax Road	Eastbound	19	23%	9	2,288
		Westbound	19	11%	4	1,058

[1] Based on heavy vehicle movements 5 days per week, 52 weeks per year (260 days per year).

Figure 7.1: Council Traffic Data Collection Locations



7.2.3. Development Generated SAR4

The annual heavy vehicle movements for the construction and operations periods have been calculated based on information provided by the Proponent. The relevant SAR4 conversion factors as sourced from TMR's GTIA Practice Note are detailed in Table 7.3. The annual heavy vehicle movements for the construction years (Years -1 and 0), underground operations development (Years 1 and 2), and underground ongoing operations (Year 3 onwards) are detailed in Table 7.4. The application of the anticipated annual Project heavy vehicle generation with the relevant SAR4 conversion factor is shown in Table 7.5.

Table 7.3: SAR Conversion Factors (TMR's 'GTIA Practice Note: Pavement Impact Assessment' extract)

Austroads Vehicle Classification	SAR4 Conversion Factors	
	Unloaded	Loaded
4	0.5	3.57
5	0.46	4.09
9	0.51	4.93
10	0.53	6.3

Table 7.4: Annual Project Heavy Vehicles – Construction and Operation (Years -1 to 3+)

Project Year	Origin	Mackay			
	Load Status	Loaded		Unloaded	
	Vehicle Class	Inbound	Outbound	Inbound	Outbound
Year -1 [1] (Construction)	5	868	0	0	868
	9	229	0	0	229
Year 0 (Construction)	5	1011	0	0	1011
	9	104	0	0	104
Year 1 (Underground Operations Development)	4	104	0	0	104
	5	510	0	0	510
	9	184	0	0	184
	10	26	0	0	26
Year 2 (Underground Operations Development)	4	104	0	0	104
	5	52	0	0	52
	9	369	0	0	369
	10	26	0	0	26
Year 3 onwards [2] (Underground Operations)	4	150	0	0	150
	5	52	0	0	52
	9	164	0	0	164
	10	26	0	0	26

[1] No Class 4 and Class 10 Heavy Vehicles are expected to be utilised in the Construction Phase (Years -1 and 0) as per information provided by the Proponent.

[2] 'Year 3+ (Underground Operations)' annual heavy vehicle demand is a reflection of the peak annual heavy vehicle generation for project year 3 onwards. It is understood annual heavy vehicle generation during Underground operations will not exceed this peak demand.

Table 7.5: Project Related SAR4 (Annual) – SCR Road Network

Road Name	Road Section		Direction	Project Year				
	Start Chainage (m)	End Chainage (m)		-1	0	1	2	3+
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	A	3,275	3,253	2,470	1,797	1,204
	89.05	90.37	G	361	363	276	195	137
	90.37	101.77	A	3,275	3,253	2,470	1,797	1,204
	90.37	101.77	G	361	363	276	195	137
	101.77	128.004	G	361	363	276	195	137
	101.77	128.004	A	3,275	3,253	2,470	1,797	1,204
	128.004	149.366	A	3,275	3,253	2,470	1,797	1,204
	128.004	149.366	G	361	363	276	195	137
	149.366	163.631	A	4,679	4,648	3,528	2,567	1,721
	149.366	163.631	G	516	518	394	278	196
	163.631	178.197	G	516	518	394	278	196
	163.631	178.197	A	4,679	4,648	3,528	2,567	1,721
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	G	516	518	394	278	196
	0	44.798	A	4,679	4,648	3,528	2,567	1,721
	44.798	62.035	A	4,679	4,648	3,528	2,567	1,721
	44.798	62.035	G	516	518	394	278	196
	62.035	76.003	A	4,679	4,648	3,528	2,567	1,721
	62.035	76.003	G	516	518	394	278	196
	76.003	81.376	A	4,679	4,648	3,528	2,567	1,721
	76.003	81.376	G	516	518	394	278	196
	81.376	86.052	G	516	518	394	278	196
	81.376	86.052	A	4,679	4,648	3,528	2,567	1,721
	86.052	87.036	A	4,679	4,648	3,528	2,567	1,721
	86.052	87.036	G	516	518	394	278	196
	87.036	87.842	G	516	518	394	278	196
	87.036	87.842	A	4,679	4,648	3,528	2,567	1,721

** G = Gazettal, A = Anti-Gazettal*

Table 7.6: Project Related SAR4 (Annual) – Council Controlled Roads

Road Section	Direction	Annual SAR4 Loading				
		Year -1	Year 0	Year 1	Year 2	Year 3+
Golden Mile Road (West of Site Access)	Eastbound	3,275	3,253	2,470	1,797	1,204
	Westbound	361	363	276	195	137
Golden Mile Road (East of Site Access)	Eastbound	1,404	1,394	1,058	770	516
	Westbound	155	155	118	83	59
Dysart Bypass Road	Eastbound	3,275	3,253	2,470	1,797	1,204
	Westbound	361	363	276	195	137
Saraji Road / Peak Downs Mine Road	Northbound	361	363	276	195	137
	Southbound	3,275	3,253	2,470	1,797	1,204

7.3. State Controlled Road Network

7.3.1. Impact Identification

As per the Pavement Impact Assessment (PIA) methodology, the baseline heavy vehicle SAR's were compared with Project generated heavy vehicle SAR's for each year of the Project, following which heavy vehicle movements associated with the Project will cease. Results of this comparison are detailed in Table 7.7.

Table 7.7: Pavement Impact Assessment – State Controlled Roads

Road Name	Road Section		Direction	Project Year				
	Start Chainage	End Chainage		-1 (2024)	0 (2025)	1 (2026)	2 (2027)	3 (2028)
PEAK DOWNS HIGHWAY (CLERMONT - NEBO) 33A	89.05	90.37	A	0.6%	0.6%	0.4%	0.3%	0.2%
	89.05	90.37	G	0.1%	0.1%	0.0%	0.0%	0.0%
	90.37	101.77	A	0.8%	0.8%	0.6%	0.4%	0.3%
	90.37	101.77	G	0.1%	0.1%	0.0%	0.0%	0.0%
	101.77	128.004	G	0.0%	0.0%	0.0%	0.0%	0.0%
	101.77	128.004	A	0.9%	0.8%	0.6%	0.4%	0.3%
	128.004	149.366	A	0.3%	0.3%	0.2%	0.2%	0.1%
	128.004	149.366	G	0.1%	0.1%	0.0%	0.0%	0.0%
	149.366	163.631	A	1.1%	1.1%	0.8%	0.6%	0.4%
	149.366	163.631	G	0.0%	0.0%	0.0%	0.0%	0.0%
	163.631	178.197	G	0.1%	0.1%	0.1%	0.0%	0.0%
	163.631	178.197	A	0.5%	0.5%	0.4%	0.3%	0.2%

Road Name	Road Section		Direction	Project Year				
	Start Chainage	End Chainage		-1 (2024)	0 (2025)	1 (2026)	2 (2027)	3 (2028)
PEAK DOWNS HIGHWAY (NEBO - MACKAY) 33B	0	44.798	G	0.1%	0.1%	0.1%	0.1%	0.0%
	0	44.798	A	0.8%	0.8%	0.6%	0.4%	0.3%
	44.798	62.035	A	0.8%	0.8%	0.6%	0.4%	0.3%
	44.798	62.035	G	0.1%	0.1%	0.1%	0.0%	0.0%
	62.035	76.003	A	1.0%	1.0%	0.7%	0.5%	0.4%
	62.035	76.003	G	0.1%	0.1%	0.0%	0.0%	0.0%
	76.003	81.376	A	0.6%	0.5%	0.4%	0.3%	0.2%
	76.003	81.376	G	0.1%	0.1%	0.1%	0.1%	0.0%
	81.376	86.052	G	0.0%	0.0%	0.0%	0.0%	0.0%
	81.376	86.052	A	0.2%	0.2%	0.2%	0.1%	0.1%
	86.052	87.036	A	0.4%	0.4%	0.3%	0.2%	0.1%
	86.052	87.036	G	0.1%	0.1%	0.0%	0.0%	0.0%
	87.036	87.842	G	0.0%	0.0%	0.0%	0.0%	0.0%
	87.036	87.842	A	0.3%	0.3%	0.2%	0.2%	0.1%

** G = Gazettal, A = Anti-Gazettal*

Following Project year 3, the Project related annual traffic loading is not expected to change. As such, the expected pavement impacts on the SCR network are expected to reduce following year 3. Due to this, the assessment from year 4 onwards has not been presented as the Project impacts observed are below 1%, and below the 5% impact threshold.

The results of the PIA indicate that the additional SAR4 loading resulting from the Project related heavy vehicle movements is not anticipated to exceed 5% in any year of the Project (i.e., no impact was identified on any relevant road section for any of the Project phases).

7.3.2. Pavement Impact Contributions – State Controlled Roads

As the PIA does not result in any anticipated impacts exceeding 5%, no monetary contributions to offset pavement loading are required for the SCR network.

7.4. Local Council Controlled Road Network

7.4.1. Impact Identification

Based on the expected heavy vehicle demand provided in Section 4.3, a summary of expected Project related pavement loading (SAR4) against background SAR4 loading on Council controlled roads is provided in Table 7.6. The expected Project related pavement loading has been compared to the existing pavement loading within available data collection (provided in Table 7.6). A summary of the pavement impact assessment for Golden Mile Road is provided in Table 7.8. It is noted that a pavement impact assessment has not been

undertaken for Dysart Bypass Road and Saraji Road as there is no available pavement loading data suitable for assessment.

Table 7.8: Pavement Impact Assessment – Council Controlled Roads

Road Name	Direction	Project Year				
		-1 (2024)	0 (2025)	1 (2026)	2 (2027)	3 (2028)
Golden Mile Road (West of Site Access)	Eastbound	3.8%	3.7%	2.7%	1.9%	1.3%
	Westbound	0.4%	0.4%	0.3%	0.2%	0.1%
Golden Mile Road (East of Site Access)	Eastbound	0.1%	0.1%	0.1%	0.1%	0.0%
	Westbound	3.7%	3.6%	2.6%	1.9%	1.2%

Based on the information provided within Table 7.8, the Project is expected to generate a pavement impact in the order of up to 4% (eastbound) and less than 1% (westbound) during Project year -1 and Project year 0 for Golden Mile Road west of the site access, and in the order of less than 1% (eastbound) and 4% (westbound) during Project year -1 and Project year 0 for Golden Mile Road west of the site access. The magnitude of the pavement impacts largely corresponds to the low background volumes rather than the volume of Project related heavy vehicle movements. As such, the heavy vehicle loading (not percentage impact) is expected to be consistent for each of the road sections, corresponding to the heavy vehicle movements west (Saraji Road, Dysart Bypass Road and Golden Mile Road west of the Project) and east of the site access (Golden Mile Road between site and Fitzroy Developmental Road).

Following construction (i.e. Project year 1 onwards), the pavement loading resulting from the Project is expected to reduce to in the order of 2% (eastbound) and less than 1% (westbound) for Golden Mile Road west of the site access, and in the order of less than 1% (eastbound) and 2% (westbound) for Golden Mile Road west of the site access. This is expected to be further reduced from Project year 3 onwards where production output of the existing Lake Vermont Mine is expected to decline.

In this case the results of the PIA indicate that the additional SAR4 loading resulting from the Project related heavy vehicle movements is not anticipated to exceed 5% in any year of the Project.

7.4.2. Pavement Impact Contributions – Council Controlled Roads

Based on the information provided within this section of the report, pavement impacts to the Council controlled road network are likely to vary based on the background (baseline) traffic volumes and the actual Project heavy vehicle demand accessing Council controlled roads.

It is recommended that a review of the existing infrastructure agreement should be undertaken to inform any required pavement contributions in the future which are likely to result from the Project. It is expected that this information provided in this TIA will inform future negotiations to be held between the Proponent and Council.

8. ROAD SAFETY RISK ASSESSMENT

08

8.1. Risk Identification

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

- Increased risk of vehicle collision from changed traffic conditions
- Increased through traffic on the road network resulting in additional delays and potential for vehicle collision
- Increased risk of vehicle collision due to driver fatigue
- Debris / Project related materials on roads during the construction and ongoing operations of the Project
- Transportation of hazardous and dangerous materials during construction and operations.

A risk assessment and associated mitigation strategy is detailed in Section 8.2.

8.2. Risk Assessment and 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, identified in Section 8.1, 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			
Increase risk of vehicle collision due to driver fatigue	3	5	H	3	5	H	Monitoring of workforce hours and driver behaviours through the completion of Job Safety Analyses, Safe Operation of Mobile Plant Standard Operating Procedures, Journey Management Systems, Fatigue Management Policy, Education of workforce through inductions on road safety	2	5	M
Debris / construction material on roads during the construction and ongoing operations of the Project	2	2	L	4	2	M	Monitoring of workforce hours and driver behaviours through the Safe operation of Mobile Plant, Standard Operating Procedures, Education of workforce through inductions on road safety	2	2	L
Transportation of Hazardous and Dangerous materials during construction and operations	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 October 2021) for a five-year period between 2016 and 2020. This crash data provides information on the number of crashes along the Peak Downs Highway between Clermont and Mackay, categorised into the following:

- Crash resulting in fatality
- Crash resulting in hospitalisation
- Crash resulting in medical treatment
- Minor crash
- Crash resulting in property damage only (not shown in Figure 8.2).

A review of the recorded crashes found that 95 crashes occurred on the Peak Downs Highway between Peak Downs Mine Road and Mackay. The locations of these crashes are shown in Figure 8.2 and a breakdown of the crash incidence by severity is shown in Table 8.2.

Figure 8.2: Road Crash Location (2016 – 2020) – Peak Downs Highway (Peak Downs Mine Road to Mackay)

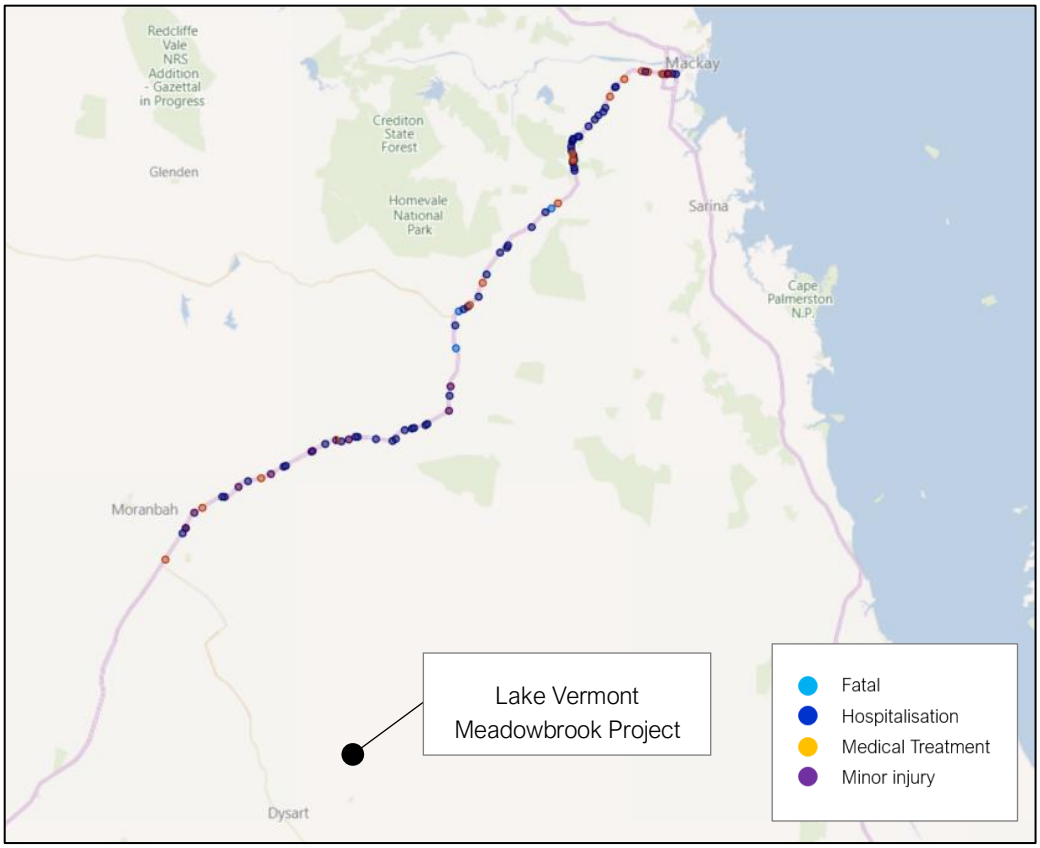
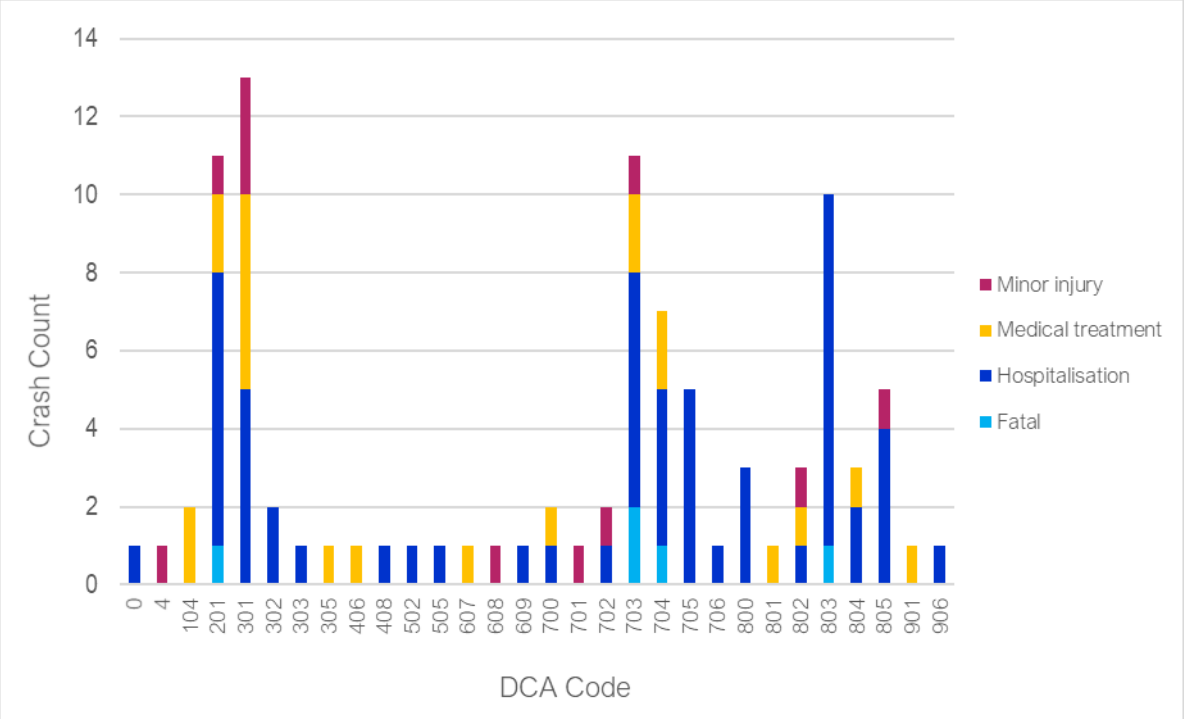


Table 8.2: Road Crash Statistics by Crash Severity (2016 – 2020) – Peak Downs Highway (Peak Downs Mine Road to Mackay)

Location	Crash Severity	Number of Crashes
Peak Downs Highway	Fatal	5 (2016, 2017, 2018, 2019, 2020)
	Hospitalisation	58 (2016 x10, 2017 x14, 2018 x11, 2019 x13, 2020 x10)
	Medical Treatment	21 (2016 x8, 2017 x1, 2018 x3, 2019 x3, 2020 x6)
	Minor Injury	11 (2016 x2, 2017 x3, 2018 x2, 2019 x2, 2020 x2)
	Total	95

Figure 8.3: Road Crash Statistics by DCA Code (2016 – 2020) – Peak Downs Highway (Peak Downs Mine Road to Mackay)



Based on the information presented above, it is observed that there is no incident clustering around the proposed access of Peak Downs Mine Road/ Saraji Road to the Peak Downs Highway. It is also observed that crashes for the preceding five-year period were evenly spatially distributed along the Peak Downs Highway. The most frequent crash types relating were relating to Definitions for Coding Accidents (DCA) 201, 301, 703 and 803 (DCA Code Summary Provided in Appendix E). These codes correspond to crashes involving head-on collisions, rear end crashes, and run-off road crashes into an object (which could be attributed 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 section proximate to the Project does not pose any atypical safety risks or hazards that need to be factored into vehicle movement considerations.

9. CONCLUSION

09

Bowen Basin Coal Pty Ltd (the Proponent) proposes an extension to the Lake Vermont Meadowbrook Project (the Project), involving the construction and operation of an underground multi-seam longwall coal mine. The Proponent intends to apply for mining leases and an environmental authority to enable the extension of the Project.

This Transport Impact Assessment (TIA) has examined the likely road transport implications of the Project. Based on the analysis and discussions presented within this report, the following conclusions are made:

1. Peak workforce traffic demands for the Project are expected to occur in Project year 1 (2026), however peak vehicle demands for the Project are expected to occur during Project year -1 and year 0 corresponding to the mode of travel expected by the construction workforce.
2. Peak heavy vehicle demands for the Project are expected to occur during Project year -1 and year 0 corresponding to the delivery of materials for construction, concrete and quarry material to support the construction phase.
3. All road segments on the State Controlled Road of 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 on State Controlled Roads.
4. The road segments between Golden Mile Road / Lake Vermont Mine intersection and Golden Mile Road / Lake Vermont Accommodation Village are expected to carry the majority of the vehicle demand on the Council Controlled Road network.
5. Based on on-site observations, the expected demand resulting from the extension can be catered for within existing available capacity.
6. A turn warrant assessment has been undertaken for the Golden Mile Road / Lake Vermont Mine intersection and indicates that the existing CHR / CHL turn treatments are suitable to accommodate the expected vehicle demand.
7. A turn warrant assessment has been undertaken for the Golden Mile Road / Lake Vermont Accommodation Village intersection and indicates that the existing BAL / BAR turn treatments are suitable to accommodate the expected vehicle demand.
8. Project generated traffic is only expected to result in an additional 1 vehicle movement per hour in each direction during each peak hour at intersections during peak operations. As such, no assessment of other intersections has been undertaken.
9. Based on the calculated development SAR's, pavement impacts of greater than 5% have not been identified for any SCR road sections of Peak Downs Highway. On this basis, mitigating measures are not required on State Controlled Roads.
10. A review of expected pavement loading on the Council controlled Golden Mile Road west of the site access has been undertaken and compared against available traffic data. The expected pavement loading results in an impact of less than 4% for the westbound movements during construction, reducing to less than 3% during operations, and less than 1% for eastbound movements during both construction and operations.
11. The expected pavement loading on the Council controlled Golden Mile Road east of the site access has been undertaken and compared against available traffic data. The expected pavement loading results in an impact of less than 4% for the eastbound movements during construction, reducing to less than 3% during operations, and less than 1% for westbound movements during both construction and operations.

12. It is recommended that pavement impacts be calculated following the finalisation of expected heavy vehicle demands and confirmed via data collection. Following confirmation of impacts, appropriate levels of compensation can be calculated.
13. 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

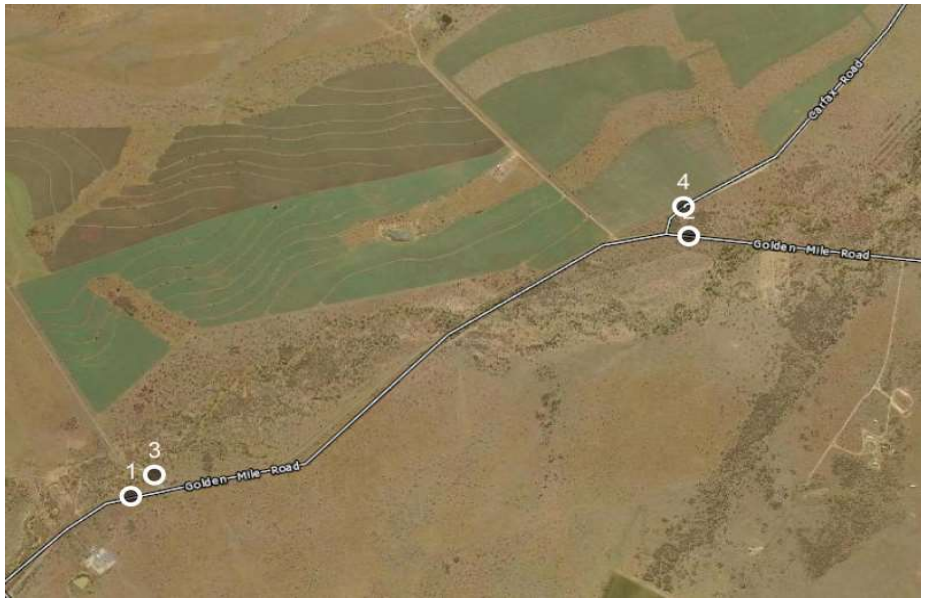
Annual Average Daily Traffic data for sealed segments of the selected road sections

RoadName	ROAD_SECTION	SUPER	DIREC	TdistStar	TdistEnd	SURFACE_TYPE	AADT	AADT_YEAR	GROWTH_P	AADT_NONHV	PERCENT_NONHV	AADT_HV	PERCENT_HV	ExistingSAR
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	0	89.05	SEALED	281	2020	0.19	177	63.01	104	36.99	332.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	0	89.05	SEALED	286	2020	0.29	202	70.8	84	29.2	268.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	89.05	90.37	SEALED	1647	2020	3.81	1079	65.51	568	34.49	1817.6
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	89.05	90.37	SEALED	1669	2020	4.55	1032	61.86	637	38.14	2038.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	90.37	101.77	SEALED	1528	2020	3.92	1263	82.67	265	17.33	848
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	90.37	101.77	SEALED	1516	2020	3.36	1212	79.92	304	20.08	972.8
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	101.77	128.004	SEALED	1977	2020	4.18	1576	79.71	401	20.29	1283.2
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	101.77	128.004	SEALED	2019	2020	4.97	1118	55.36	901	44.64	2883.2
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	128.004	149.366	SEALED	1783	2020	4.64	1372	76.95	411	23.05	1315.2
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	128.004	149.366	SEALED	1782	2020	4.79	1177	66.07	605	33.93	1936
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	149.366	163.631	SEALED	2126	2020	4.07	1401	65.92	725	34.08	2320
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	149.366	163.631	SEALED	2089	2020	3.84	1686	80.7	403	19.3	1289.6
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	A	163.631	178.197	SEALED	2047	2020	4.72	1550	75.72	497	24.28	1590.4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	1	G	163.631	178.197	SEALED	2015	2020	4.47	1636	81.18	379	18.82	1212.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	0	44.798	SEALED	2052	2020	3.46	1567	76.36	485	23.64	1552
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	0	44.798	SEALED	2110	2020	4.17	1466	69.47	644	30.53	2060.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	44.798	62.035	SEALED	2233	2020	3.86	1701	76.16	532	23.84	1702.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	44.798	62.035	SEALED	2261	2020	5.32	1589	70.29	672	29.71	2150.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	62.035	76.003	SEALED	2747	2020	-0.01	2202	80.16	545	19.84	1744
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	62.035	76.003	SEALED	2725	2020	-0.53	2373	87.08	352	12.92	1126.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	76.003	81.376	SEALED	4558	2020	-0.33	3541	77.69	1017	22.31	3254.4
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	76.003	81.376	SEALED	4364	2020	-0.23	3714	85.1	650	14.9	2080
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	81.376	86.052	SEALED	7348	2020	-0.47	6302	85.77	1046	14.23	3347.2
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	81.376	86.052	SEALED	7596	2020	-0.73	6485	85.37	1111	14.63	3555.2
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	86.052	87.036	SEALED	4568	2020	-0.05	3704	81.08	864	18.92	2764.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	86.052	87.036	SEALED	4658	2020	0.27	4019	86.29	639	13.71	2044.8
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	A	87.036	87.842	SEALED	4865	2020	-0.04	4080	83.87	785	16.13	2512
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	1	G	87.036	87.842	SEALED	4913	2020	-1.07	3992	81.26	921	18.74	2947.2

B.COUNCIL SURVEYED TRAFFIC VOLUMES

B

No.	Road Name	Chainage	START_DATE	END_DATE	AADT	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Mean Velocity	Vpp 85	%HV	Entering Area
1	Golden Mile Road WB	6.96	29/05/2020	2/07/2020	417	294	4	72	20	14	1	1	1	4	2	4	0	87.2	104.8	28.5	0
1	Golden Mile Road EB	6.96	29/05/2020	2/07/2020	441	339	8	69	4	2	1	1	1	6	3	9	0	90.3	104.2	21.8	1
2	Golden Mile Road EB	11.3	29/05/2020	2/07/2020	224	187	8	4	4	1	0	0	0	5	9	7	0	88.7	96.5	13.4	0
2	Golden Mile Road WB	11.3	29/05/2020	2/07/2020	238	80	1	123	8	1	3	3	0	4	8	7	0	115	128	66.0	1
3	Lake Vermont Mine Access Road NB		29/05/2020	2/07/2020	220	138	0	65	2	2	0	0	0	2	9	1	0	51	58.3	36.8	0
3	Lake Vermont Mine Access Road SB		29/05/2020	2/07/2020	221	64	0	137	3	3	0	0	0	2	10	1	0	54.2	61.7	70.6	1
4	Carfax Road EB	31.39	29/05/2020	2/07/2020	19	13	0	5	0	0	0	0	0	0	0	0	0	79.4	95.6	26.3	0
4	Carfax Road WB	31.39	29/05/2020	2/07/2020	19	16	1	0	2	0	0	0	0	0	0	0	0	83.7	99.1	10.5	1

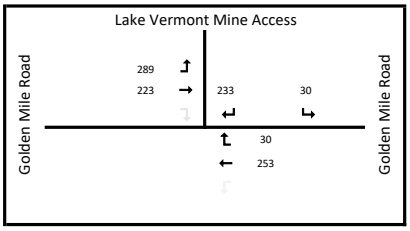


C. TURN WARRANT ASSESSMENT

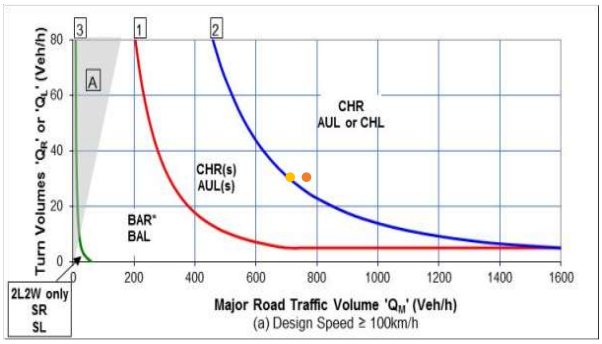
C

Turn Warrant Assessment - Site Access / Golden Mile Road

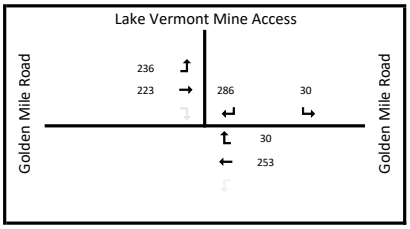
2024 DEVELOPMENT SCENARIO
AM PEAK



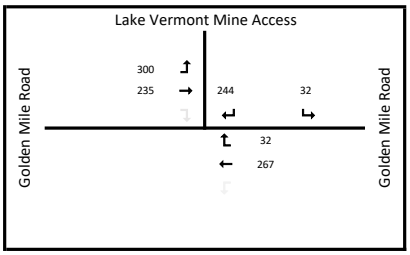
	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	289	30	236	30
Qm	223	765	223	712
	BAL	SR	BAL	SR



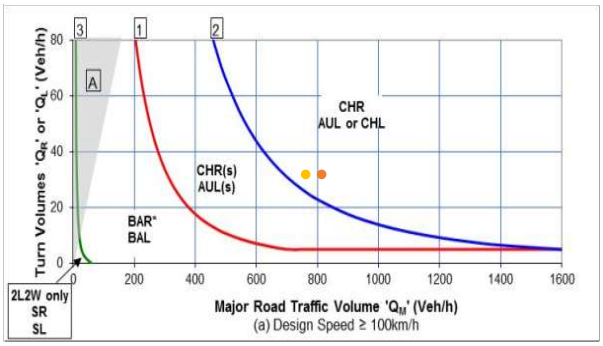
2024 DEVELOPMENT SCENARIO - PM PEAK



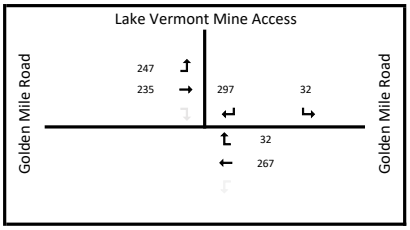
2026 DEVELOPMENT SCENARIO
AM PEAK



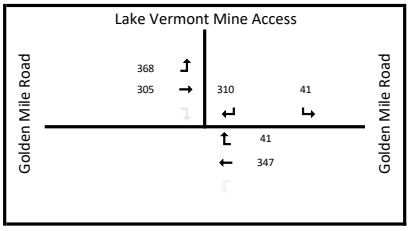
	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	300	32	247	32
Qm	235	802	235	749
	BAL	SR	BAL	SR



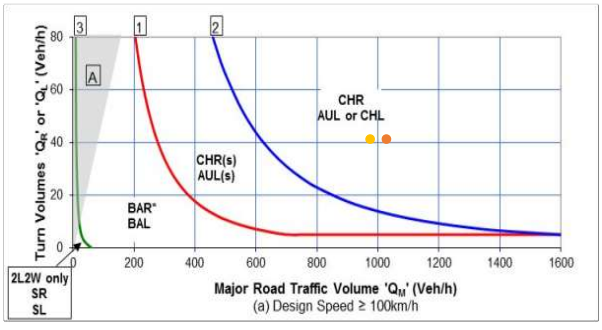
PM PEAK



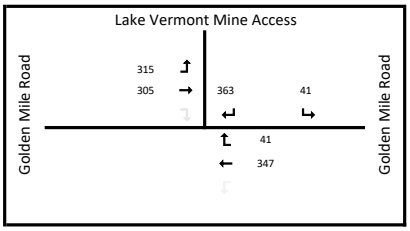
2036 DEVELOPMENT SCENARIO
AM PEAK



	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Ql/r	368	41	315	41
Qm	305	1020	305	967
	BAL	SR	BAL	SR



PM PEAK



D. PAVEMENT IMPACT ASSESSMENT SUMMARY

D

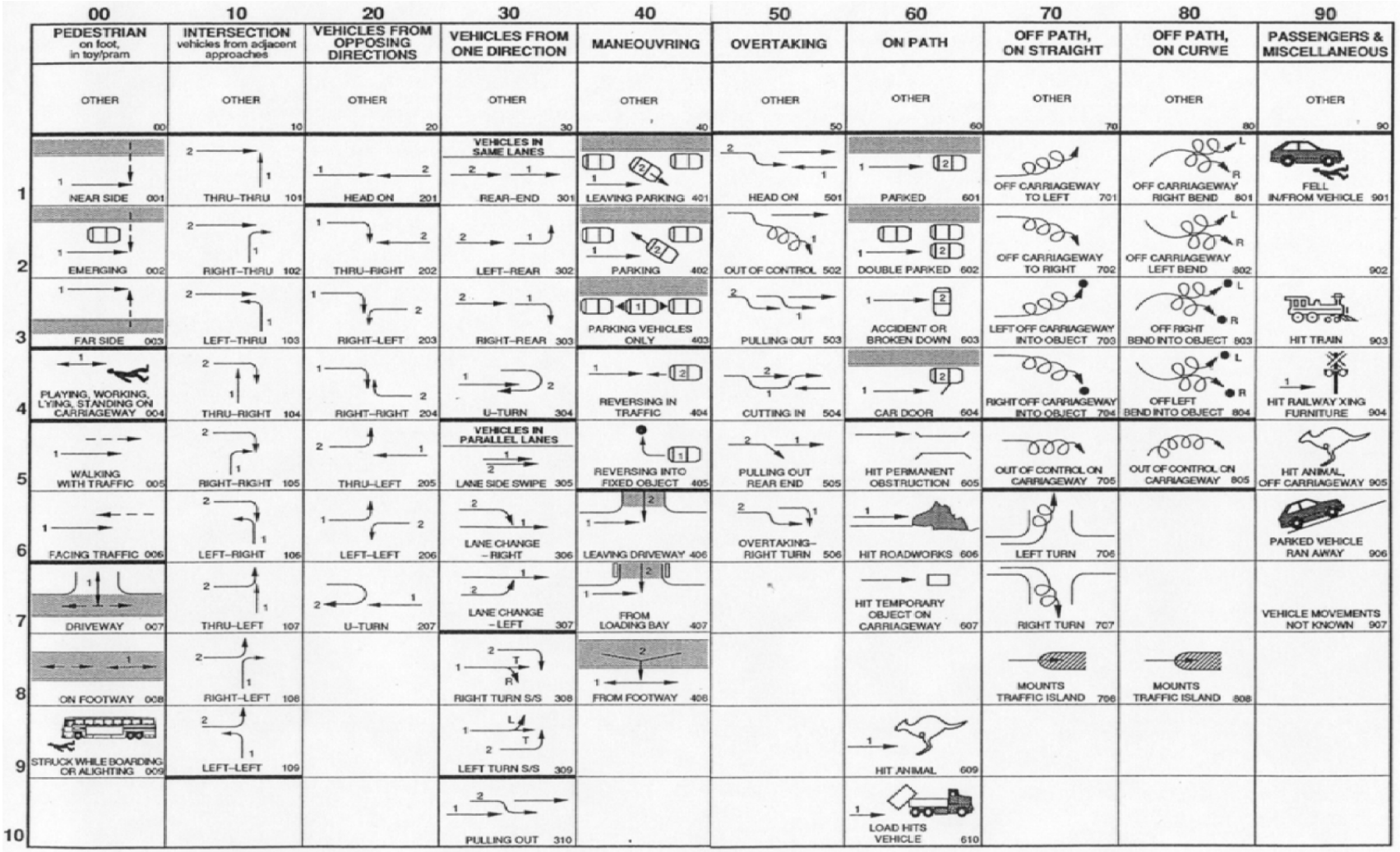
PAVEMENT IMPACT ASSESSMENT - IMPACTS BASED ON SAR4 Values

					2024	2025	2026	2027	2028
Road Name	**ID**	**DIRECTION**	**TdistStart**	**TdistEnd**	SAR4	SAR4	SAR4	SAR4	SAR4
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	89.05	90.37	0.6%	0.6%	0.4%	0.3%	0.2%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	89.05	90.37	0.1%	0.1%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	90.37	101.77	0.8%	0.8%	0.6%	0.4%	0.3%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	90.37	101.77	0.1%	0.1%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	101.77	128.004	0.0%	0.0%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	101.77	128.004	0.9%	0.8%	0.6%	0.4%	0.3%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	128.004	149.366	0.3%	0.3%	0.2%	0.2%	0.1%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	128.004	149.366	0.1%	0.1%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	149.366	163.631	1.1%	1.1%	0.8%	0.6%	0.4%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	149.366	163.631	0.0%	0.0%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	G	163.631	178.197	0.1%	0.1%	0.1%	0.0%	0.0%
PEAK DOWNS HIGHWAY (CLERMONT - NEBO)	33A	A	163.631	178.197	0.5%	0.5%	0.4%	0.3%	0.2%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	0	44.798	0.1%	0.1%	0.1%	0.1%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	0	44.798	0.8%	0.8%	0.6%	0.4%	0.3%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	44.798	62.035	0.8%	0.8%	0.6%	0.4%	0.3%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	44.798	62.035	0.1%	0.1%	0.1%	0.0%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	62.035	76.003	1.0%	1.0%	0.7%	0.5%	0.4%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	62.035	76.003	0.1%	0.1%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	76.003	81.376	0.6%	0.5%	0.4%	0.3%	0.2%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	76.003	81.376	0.1%	0.1%	0.1%	0.1%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	81.376	86.052	0.0%	0.0%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	81.376	86.052	0.2%	0.2%	0.2%	0.1%	0.1%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	86.052	87.036	0.4%	0.4%	0.3%	0.2%	0.1%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	86.052	87.036	0.1%	0.1%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	G	87.036	87.842	0.0%	0.0%	0.0%	0.0%	0.0%
PEAK DOWNS HIGHWAY (NEBO - MACKAY)	33B	A	87.036	87.842	0.3%	0.3%	0.2%	0.2%	0.1%
Golden Mile Road (West of Site Access)		EB			3.8%	3.7%	2.7%	1.9%	1.3%
Golden Mile Road (West of Site Access)		WB			0.4%	0.4%	0.3%	0.2%	0.1%
Golden Mile Road (East of Site Access)		EB			0.1%	0.1%	0.1%	0.1%	0.0%
Golden Mile Road (East of Site Access)		WB			3.7%	3.6%	2.6%	1.9%	1.2%

E. DCA CODE SUMMARY

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.