Appendix I
Road Transport Assessment

WINCHESTER SOUTH PROJECT
Environmental Impact Statement

WHITEHAVEN COAL

Resource Strategies

Winchester South Project
Road Transport Assessment

Prepared for:

Whitehaven WS Pty Ltd

16 April 2021

The Transport Planning Partnership

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Winchester South Project

Road Transport Assessment

Client: Whitehaven WS Pty Ltd

Version: Final

Date: 16 April 2021

TTPP Reference: 19227

Quality Record

Version	Date	Prepared by	Approved by	Signature
Final	16/04/2021	Penny Dalton	Penny Dalton	

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1 Introduction

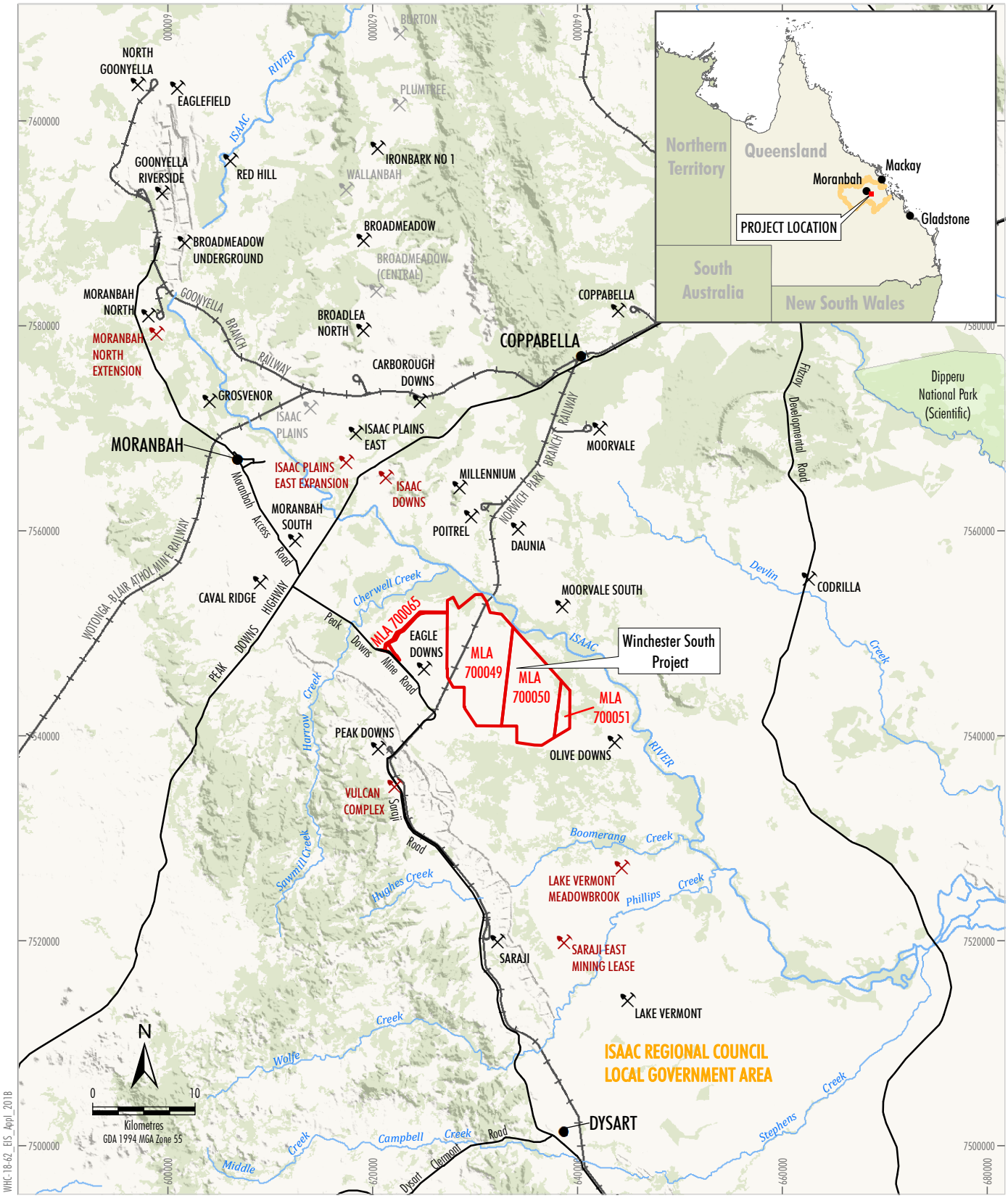
Whitehaven WS Pty Ltd (Whitehaven WS), a wholly owned subsidiary of Whitehaven Coal Limited (Whitehaven), proposes to develop the Winchester South Project (the Project), a metallurgical open cut coal mine and associated infrastructure within the Bowen Basin, located approximately 30 kilometres (km) south-east of Moranbah, within the Isaac Regional Council (IRC) Local Government Area (LGA) (Figure 1.1).

The Project involves the development of an open cut coal mine in an existing mining precinct for export of coal products. The Project would include construction and operation of a mine infrastructure area (MIA), including a Coal Handling and Preparation Plant (CHPP), train load-out facility and rail spur, which would be used for the handling, processing and transport of coal.

An infrastructure corridor would also form part of the Project, including a raw water supply pipeline connecting to the Eungella pipeline network, an electricity transmission line (ETL) and the Mine Access Road (Figure 1.2). It is estimated the Project would extract 15 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, with a forecast peak extraction of up to 17 Mtpa, for approximately 30 years. The coal resource would be mined by open cut mining methods, with product coal to be transported by rail to port for export.

This assessment has been prepared with reference to the Department of Transport and Main Roads (TMR) *Guide to Traffic Impact Assessment* (2018). The remainder of the report is set out as follows:

- Section 2 describes the Project, and its road transport characteristics, including workforce and travel characteristics, access routes and peak period and daily traffic generation forecasts.
- Section 3 describes the existing road transport environment, including road link and intersection conditions, traffic demands, active transport infrastructure and the road safety history.
- Section 4 assesses the future road transport demands which are expected to result from developments and growth unrelated to the Project, and the traffic expected to be generated by the Project.
- Section 5 identifies the impact assessment areas, presents the assessment of the Project's impacts, and identifies measures to mitigate the potential impacts of the Project on the road network.
- Section 6 presents the conclusions of the study, and summarises its findings.



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LEGEND
- Mining Lease Application Boundary
- Approved/Operating
- Proposed
- Care and Maintenance
- Local Government Area Boundary
- Railway
- Road

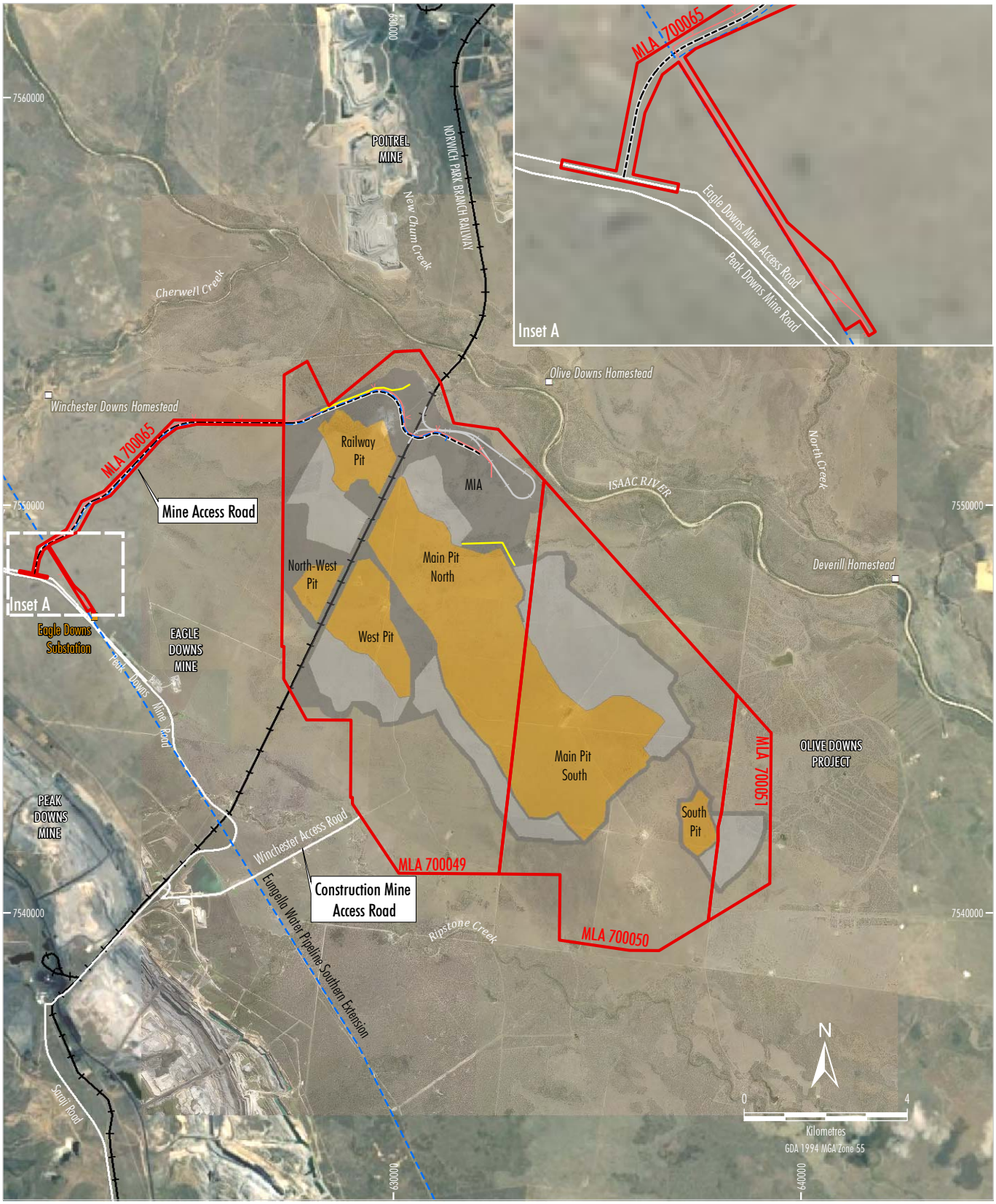
Source: The State of Queensland (2018 - 2020); Geoscience Australia (2018).

WHITEHAVEN COAL

WINCHESTER SOUTH PROJECT

Project Location

Figure 1.1



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LEGEND

- Mining Lease Application Boundary
- Eungella Water Pipeline Southern Extension
- Railway
- Substation

Project Component*

- Indicative Infrastructure Area
- Indicative Out-of-pit Waste Rock Emplacement
- Indicative Open Cut Pit Including In-pit Waste Rock Emplacement
- Indicative Mine Access Road
- Indicative Rail Spur and Loop
- Indicative Electricity Transmission Line
- Indicative Raw Water Supply Pipeline
- Indicative Flood Levee

*Note: * Excludes some project components such as water management infrastructure, access tracks, topsoil stockpiles, explosives magazines, power reticulation, temporary offices, other ancillary works and construction disturbance.*

Source: The State of Queensland (2018 - 2020); Whitehaven (2020). Orthophoto: Google Image (2019); Whitehaven (2017).

WHITEHAVEN COAL

WINCHESTER SOUTH PROJECT

Project General Arrangement

Figure 1.2

This Road Transport Assessment forms part of an Environmental Impact Statement (EIS) which has been prepared in accordance with Part 4 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This assessment has been prepared to satisfy the requirements of the *Terms of reference for an environmental impact statement – Winchester South Project* issued by the Coordinator-General on 4 September 2019 relevant to road transport (Table 1.1).

Table 1.1: Winchester South Project Road Transport Terms of Reference Reconciliation

Relevant Term of Reference	Section
Existing environment *Describe and map the existing transport infrastructure and corridors. The map should show the project in relation to other major infrastructure along the road network and be of a scale that will enable the potential traffic impacts of the site to be understood in context. Other near-by mines in the area should also be identified on the map.*	Sections 3.1 to 3.7
Provide an assessment of existing air, road, active transport and rail traffic in the project area.	Sections 3.1 to 3.7, 4.1 and 4.2
Describe how the project complies with the Queensland Level Crossing Safety Strategy 2012-2021 on new road/rail interfaces and the impacts on existing road/rail interfaces.	Sections 3.2 and 5.6
Impact assessment *The EIS should include a clear summary of the total transport task for the project, including workforce, inputs and outputs, during the construction, operational and closure phases. Proponents should make appropriate modal choices to ensure transport efficiency and minimise impacts on the community. Refer to the EIS Information Guideline - Transport (see Appendix 1).*	Sections 2.3 to 2.6
Conduct transport assessments and present the transport assessment in separate sections for each project-affected mode (road, rail, port and sea) as appropriate for each phase of the project. Provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level (e.g. local roads and state-controlled roads). The assessment should include identification of any existing and future road safety risks, impacts of project traffic on infrastructure condition or transport network performance that may be of significance to the project or from project traffic.	Sections 5.1 to 5.7
Include details of the adopted assessment methodology: *(a) for impacts on roads: the road impact assessment report in accordance with the Guide to Traffic Impact Assessment, (GTIA) (see Appendix 1)* *(b) for impacts on rail level crossings: the Australian Level Crossing Assessment Model.*	Sections 5.1 to 5.7
Mitigation measures *Detail and discuss how identified impacts will be mitigated in accordance with the GTIA. Mitigation strategies may include works, contributions or management plans and are to be prepared in close consultation with relevant transport authorities (including entering into infrastructure agreements with relevant transport authorities), should consider those authorities' works program and forward planning, and be in accordance with the relevant transport authorities' methodologies, guidelines and design manuals.*	Sections 5.1 to 5.7

2 Winchester South Project

2.1 Project Location

The Project is located approximately 200 km south-west of Mackay and 30 km south-east of Moranbah, within the IRC LGA of the Bowen Basin in central Queensland (Figure 1.1).

2.2 Project Description

The Project involves the development of an open cut coal mine in an existing mining precinct for export of coal products. The Project would include construction and operation of a MIA, including a CHPP, train load-out facility and rail spur, which would be used for the handling, processing and transport of coal. An infrastructure corridor would also form part of the Project, including a raw water supply pipeline connecting to the Eungella pipeline network, an ETL and the Mine Access Road (Figure 1.2).

It is estimated the Project would extract 15 Mtpa of ROM coal (up to 17 Mtpa), for approximately 30 years. The coal resource would be mined by open cut mining methods, with product coal to be transported by rail to port for export.

With respect to the potential impacts on the road transport environment, aspects of the Project have been refined in consideration of the mitigation hierarchy (TMR, 2018) to firstly avoid potential impacts through design, to secondly manage impacts through operational measures, and to thirdly mitigate the residual impacts, which are those addressed in this study. The key design and management aspects to mitigate potential impacts include:

- for the first six months of the Project, construction vehicular access to and from the Project would be via Winchester Access Road, minimising long-term potential impacts on Peak Downs Mine Road between Eagle Downs Mine Road and the former Dysart Road;
- once constructed and commissioned, all operational vehicular access to and from the Project would be via the new Mine Access Road from Eagle Downs Mine Access Road, minimising potential impacts to through traffic on Peak Downs Mine Road by consolidating interaction with the public road network to a single existing intersection rather than introducing a new intersection;
- management of workforce travel through the use of shuttle bus services to transport the majority of the workforce between the Project and accommodation facilities at Moranbah, thus significantly reducing the potential number of trips generated between the Project and the main accommodation location of the workforce; and
- product coal would be transported from the Project by rail, resulting in no increase in road traffic directly related to coal transport.

It should be noted that Whitehaven is investigating automation for the Project. This would reduce the traffic generation associated with the workforce, therefore this assessment provides for a conservative and robust assessment as it assumes no automation.

2.3 Road Transport Assessment Scenarios

To assess the potential road transport impacts of the Project and consistent with principles of the *Guide to Traffic Impact Assessment* (TMR, 2018), the future scenarios that have been adopted for this assessment are:

- during the initial construction activity in Year 1 of the Project (Year 2022);
- during the peak construction and initial coal production stage in Year 2 of the Project (Year 2023); and
- during the peak operational stage (i.e. peak operational workforce) in Year 8 of the Project (Year 2029).

These scenarios represent the busiest conditions (most conservative) expected throughout the development of the Project. The closure stage of the Project has not been assessed in detail as part of this Road Transport Assessment, noting that the operational life of the Project is anticipated to be approximately 30 years. The level of activity (i.e. traffic movements) associated with mine closure is expected to be lower than the ongoing operational activity and the longer term implications of the Project would be considered as part of the pavement impact assessment (Section 5.5). Therefore, the potential impacts on road transport would be less than the potential impacts of the operational and construction phases, assessed as part of this study.

While Sections 5.1 to 5.6 assess potential road transport impacts associated with the vehicular access for the Project via the Mine Access Road from Eagle Downs Mine Road, an additional access option has been assessed to examine the impacts of the Project should the Mine Access Road from Eagle Downs Mine Road not be constructed. Under this option, all construction and operational traffic access would be via Winchester Access Road throughout the life of the Project. The results of this assessment are presented in Appendix E and summarised in Sections 5.8 and 6.

It should also be noted that the Main Text of the EIS describes a peak operational workforce of 500 personnel with potential to increase depending on the level of automation. For the purpose of this impact assessment and the proposed scenarios, a higher workforce of 750 personnel has been applied. This provides for a conservative and robust assessment should the level of automation applied to the Project reduce and the workforce proportionally increase. For the purpose of this assessment, the workforce during the peak construction and initial production stage is assumed to be made up of 300 construction and 200 operational workers.

2.4 Project Transport Task

2.4.1 Workforce Travel

The majority component of Project-generated vehicular activity is expected to result from the movement of the workforce to and from the Project via light vehicles and shuttle buses, and so would be dependent upon the size of the workforce, the residential location of the workforce, the likely shift and roster arrangements, and their mode of travel. These characteristics are discussed below.

2.4.1.1 Size of the Workforce

The Project would employ approximately:

- 240 personnel (80 percent [%] present each day) during the first six months of the initial construction stage, of which 40 personnel would access the Project via the Mine Access Road off Eagle Downs Mine Access Road and 200 personnel would access the Project via Winchester Access Road;
- up to 500 personnel (80 % present each day) during the second six months of the initial construction stage and would access the Construction Area via the Mine Access Road off Eagle Downs Mine Access Road;
- total workforce of 500 personnel, made up of between 300 and 500 construction personnel and between 0 and 200 operational employees, during the initial production stage, of which 80 % of the construction personnel and 60 % of the operational personnel would be present at the Project each day and would access the Project via the Mine Access Road off Eagle Downs Mine Access Road; and
- up to 750 personnel (60 % present each day) during the peak operational stage (assuming no automation) and would access the Project via the Mine Access Road off Eagle Downs Mine Access Road.

Whitehaven has indicated that with automation, the peak operational workforce would be 500 personnel, however for the purpose of this assessment, a higher workforce has been applied, which will result in a robust assessment of potential road transport impacts. For the purpose of this assessment, the workforce during the peak construction and initial production stage is assumed to be made up of 300 construction and 200 operational workers.

2.4.1.2 *Working Hours*

Construction activity would occur between 6:00 am and 6:00 pm seven days per week, with personnel arriving between 5:30 am and 8:00 am, and departing between 5:00 pm and 7:00 pm. Once operational, the Project would operate 24 hours per day and seven days per week. The Project's operational workforce would be made up of 20 % administration personnel, 40 % mining operations (day) workers, and 40 % mining operations (night) workers. The operational workforce is expected to work varying shift and roster arrangements, typically:

- Administration 7:00 am to 5:00 pm weekdays;
- Mining Operations (Day) 5:30 am to 6:00 pm; and
- Mining Operations (Night) 5:30 pm to 6:00 am.

Based on the expected shift times, the distribution of arrivals and departures of the workforce throughout the day is summarised in Table 2.1.

Table 2.1: Project Workforce Arrivals and Departures (percent of workforce)

Hour	Construction Workforce		Operational Workforce	
	Arrivals	Departures	Arrivals	Departures
5:00 am to 6:00 am	30	-	40	-
6:00 am to 7:00 am	50	-	20	40
7:00 am to 8:00 am	20	-	-	-
4:00 pm to 5:00 pm	-	30	-	10
5:00 pm to 6:00 pm	-	50	40	10
6:00 pm to 7:00 pm	-	20	-	40
Daily Total	**100**	**100**	**100**	**100**

2.4.1.3 *Residential Location of the Workforce*

The Project workforce would be accommodated in existing towns and accommodation camp facilities in the local area. Table 2.2 presents the anticipated residential distribution of the Project's construction and operational workforce.

Table 2.2: Project Workforce Residential Locations (percent of workforce)

Place of Residence	Construction Workforce (2022-23)	Operational Workforce	
		Initial (2023)	Peak (2029)
Moranbah Accommodation Camps	90	90	80
Moranbah	5	5	15
Coppabella	3	3	3
Dysart	2	2	2
Total	**100**	**100**	**100**

2.4.1.4 *Workforce Mode of Travel to/from the Project*

Whitehaven would operate shuttle bus services for its workforce between the Project and Moranbah. Shuttle bus services have the potential to reduce the number of vehicle trips made by the workforce, with a number of factors influencing the number of workers who would travel by bus. The estimated mode split for the total workforce travelling between their local residential location and the Project for all stages of the Project is:

- Bus passenger 75 %;
- Car driver 18 %; and
- Car passenger 7 %.

It is noted that this is an estimate only and actual shuttle bus usage may vary. For the purpose of this assessment, it is assumed that buses would typically operate between the Moranbah accommodation camps and the Project. Details of routes and timetables would be developed, using suitably sized buses to suit the demand for each route.

For the purpose of this assessment, it is assumed that buses would have a capacity of 40 seats, and that during the construction stage, empty buses would depart the Project to Moranbah after unloading workers in the morning, and would return to the Project before picking up workers in the afternoon. During the operational stage, it is assumed that where practical, a bus which has arrived with passengers would depart with passengers.

2.4.2 Deliveries and Visitors

The Project would attract visitors and deliveries by both light and heavy vehicles throughout its construction and operational stages. Equipment and fuel deliveries would be made by a mix of rigid trucks, semitrailers and B-doubles. Light vehicles would be used by general visitors to the Project.

The anticipated number of light and heavy vehicles visiting the Project on a typical day during peak construction and peak operations is summarised in Table 2.3. During the initial construction and initial production stages, it is anticipated that the number of visitors and deliveries would be lower than during peak conditions. For the purpose of this assessment, the number of deliveries and visitors during these initial stages has been adjusted from the peaks pro rata with the number of workers at the Project, as summarised in Table 2.3.

Table 2.3: Daily Project Delivery and Visitor Vehicles

Origin	Construction Activity		Operational Activity		Total	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Initial Construction Stage Months 1 to 6						
Mackay	-	28	-	-	-	28
Moranbah	42	-	-	-	42	-
Total	**42**	**28**	**-**	**-**	**42**	**28**
Initial Construction Stage Months 7 to 12						
Mackay	-	100	-	-	-	100
Moranbah	150	-	-	-	150	-
Total	**150**	**100**	**-**	**-**	**150**	**100**
Initial Coal Production Stage						
Mackay	-	60	-	8	-	68
Moranbah	90	-	8	-	98	-
Total	**90**	**60**	**8**	**8**	**98**	**68**
Peak Operational Stage						
Mackay	-	-	24	24	24	24
Moranbah	-	-	6	6	6	6
Total	**-**	**-**	**30**	**30**	**30**	**30**

During construction activity, it is expected that deliveries and visitors would occur between 6:00 am and 6:00 pm. Once operational, deliveries and visitors would occur between 7:00 am and 6:00 pm.

2.4.3 Product Transport

Product coal from the Project would be transported by rail via the Norwich Park Branch Railway and the broader Queensland rail network. Depending on the availability of rail and port allocation, the product coal would be exported via the Abbot Point, Dalrymple Bay or Gladstone coal ports through the Newlands, Goonyella and Blackwater rail networks respectively.

An average of six train movements per day would be required (i.e. three arrivals and departures) with a maximum of 16 train movements per day (i.e. eight arrivals and departures). Train arrivals and departures would occur 24 hours per day. Transport of product coal would therefore not directly generate any road-based trips.

2.5 Project Access Routes

Based on the expected origins and destinations of trips (Section 2.4), the key routes that would be used by Project-generated traffic have been identified. Accommodation facilities in Moranbah are generally located in the northern part of the town, and for the purpose of this assessment, are assumed to be located on or near Acacia Street. The access routes are:

- to/from Moranbah Accommodation Camp via Peak Downs Mine Road, Peak Downs Highway, Moranbah Access Road, Goonyella Road, Curtin Street, Belyando Avenue and Acacia Street;
- to/from Moranbah town via Peak Downs Mine Road, Peak Downs Highway, Moranbah Access Road and Mills Avenue;
- to/from Coppabella via Peak Downs Mine Road, Peak Downs Highway and the access road for the Coppabella accommodation village (south of Maloney Street);
- to/from Dysart via Peak Downs Mine Road, Saraji Road and Garnham Drive; and
- to/from Mackay via Peak Downs Mine Road and Peak Downs Highway.

2.6 Project Traffic Generation

A vehicle trip is a one way movement, i.e. a vehicle arriving at the Project generates one vehicle trip, and a vehicle departing the Project generates one vehicle trip. A vehicle arriving and departing generates two vehicle trips. The AM and PM peak hours for Project traffic generation are identified as the hour before and after midday respectively during which the highest number of trips are generated.

2.6.1 Initial Construction Stage Vehicle Trips

The total vehicle trip generation throughout the day during the first six months of the initial construction stage would be less than that generated during the following six months of construction activity, as there would be significantly fewer people working at the Project. The primary difference is that the majority of workers would travel to and from the Project via Winchester Access Road during the initial six months only.

Based on the travel characteristics of the workforce, deliveries and visitors (Section 2.4), forecasts have been developed for the total vehicle trip generation throughout the day during the first six months of the initial construction stage. Project-generated traffic would peak between 6:00 am and 7:00 am, when it would generate 33 vehicle trips, and between 5:00 pm and 6:00 pm, when it would generate 25 vehicle trips.

Table 2.4 summarises the AM and PM peak hourly and total daily trip generation during the first six months of the initial construction stage of the Project.

Table 2.4: Initial Construction Trip Generation – Months 1 to 6

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Access via Eagle Downs Mine Access Road (40 workers)										
AM Peak[A]	4	0	1	0	1	0	1	1	7	1
PM Peak[A]	0	2	1	0	0	1	1	1	2	4
Daily[B]	7	7	2	2	8	8	12	12	29	29
Access via Winchester Access Road (200 workers)										
AM Peak[A]	15	0	2	1	2	1	3	1	22	3
PM Peak[A]	0	9	2	1	1	2	1	3	4	15
Daily[B]	29	29	6	6	20	20	30	30	85	85

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

Table 2.4 indicates that during the first six months of the initial construction stage of the Project, the Project would generate 228 vehicle trips per day, of which 170 vehicle trips would be to and from Winchester Access Road, and 58 vehicle trips would be to and from the Mine Access Road off Eagle Downs Mine Access Road.

Based on the travel characteristics of the workforce, deliveries and visitors (Section 2.4), forecasts have been developed for the total vehicle trip generation throughout the day during the second six months of the initial construction stage. Table 2.5 summarises the peak hourly and total daily trip generation during the second six months (i.e. Months 7 to 12) of the initial construction stage of the Project.

Table 2.5: Initial Construction Trip Generation – Months 7 to 12

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Access via Eagle Downs Mine Access Road										
AM Peak[A]	36	0	4	2	10	5	15	7	65	14
PM Peak[A]	0	22	4	2	5	10	7	15	16	49
Daily[B]	72	72	16	16	100	100	150	150	338	338

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

Table 2.5 demonstrates that during the second six months of the initial construction stage, the Project would generate 676 vehicle trips per day. Project-generated traffic would peak between 6:00 am and 7:00 am, when it would generate 79 vehicle trips, and between 5:00 pm and 6:00 pm, when it would generate 65 vehicle trips.

2.6.2 Initial Coal Production Stage Vehicle Trips

Based on the travel characteristics of the workforce, deliveries and visitors (Section 2.4), forecasts have been developed for the total vehicle trip generation throughout the day during the initial coal production stage, which would coincide with ongoing construction activity.

Table 2.6 summarises the peak hourly and total daily trip generation during the initial coal production stage of the Project.

Table 2.6: Initial Operational Stage Trip Generation

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Access via Eagle Downs Mine Access Road										
AM Peak[A]	25	9	3	3	7	3	10	4	45	19
PM Peak[A]	9	15	3	2	3	7	4	10	19	34
Daily[B]	65	65	13	13	68	68	98	98	244	244

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

Table 2.6 demonstrates that during the initial production stage, the Project would generate 488 vehicle trips per day. Project-generated traffic would peak between 6:00 am and 7:00 am, when it would generate 64 vehicle trips, and between 5:00 pm and 6:00 pm, when it would generate 53 vehicle trips.

2.6.3 Peak Operational Stage Vehicle Trips

Based on the travel characteristics of the workforce, deliveries and visitors (Section 2.4), forecasts have been developed for the total vehicle trip generation throughout the day during the peak coal production stage.

Table 2.7 summarises the peak hourly and total daily trip generation during the peak coal production stage of the Project.

Table 2.7: Peak Operational Stage Trip Generation

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Access via Eagle Downs Mine Access Road										
AM Peak[A]	16	32	2	4	0	0	0	0	18	36
PM Peak[A]	32	8	4	1	1	3	1	3	38	15
Daily[B]	81	81	9	9	30	30	30	30	150	150

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

Table 2.7 demonstrates that during the peak operational stage, the Project would generate 300 vehicle trips per day. Project-generated traffic would peak between 6:00 am and 7:00 am, when it would generate 54 vehicle trips, and between 5:00 pm and 6:00 pm, when it would generate 53 vehicle trips.

3 Existing Road Transport Environment

An appreciation of the existing road transport environment can be gained by considering the existing road network, the nature of its traffic demands, and its road safety history. These aspects have been reviewed within the overall study area which has been defined based on the Project transport task described in Section 2. The overall initial study area includes the likely Project routes broadly bounded by Moranbah, Dysart and Coppabella, however also includes the route to/from Mackay which may be used by lesser numbers of Project-generated vehicles. Within the study area, impact assessment areas have been defined in accordance with the *Guide to Traffic Impact Assessment*.

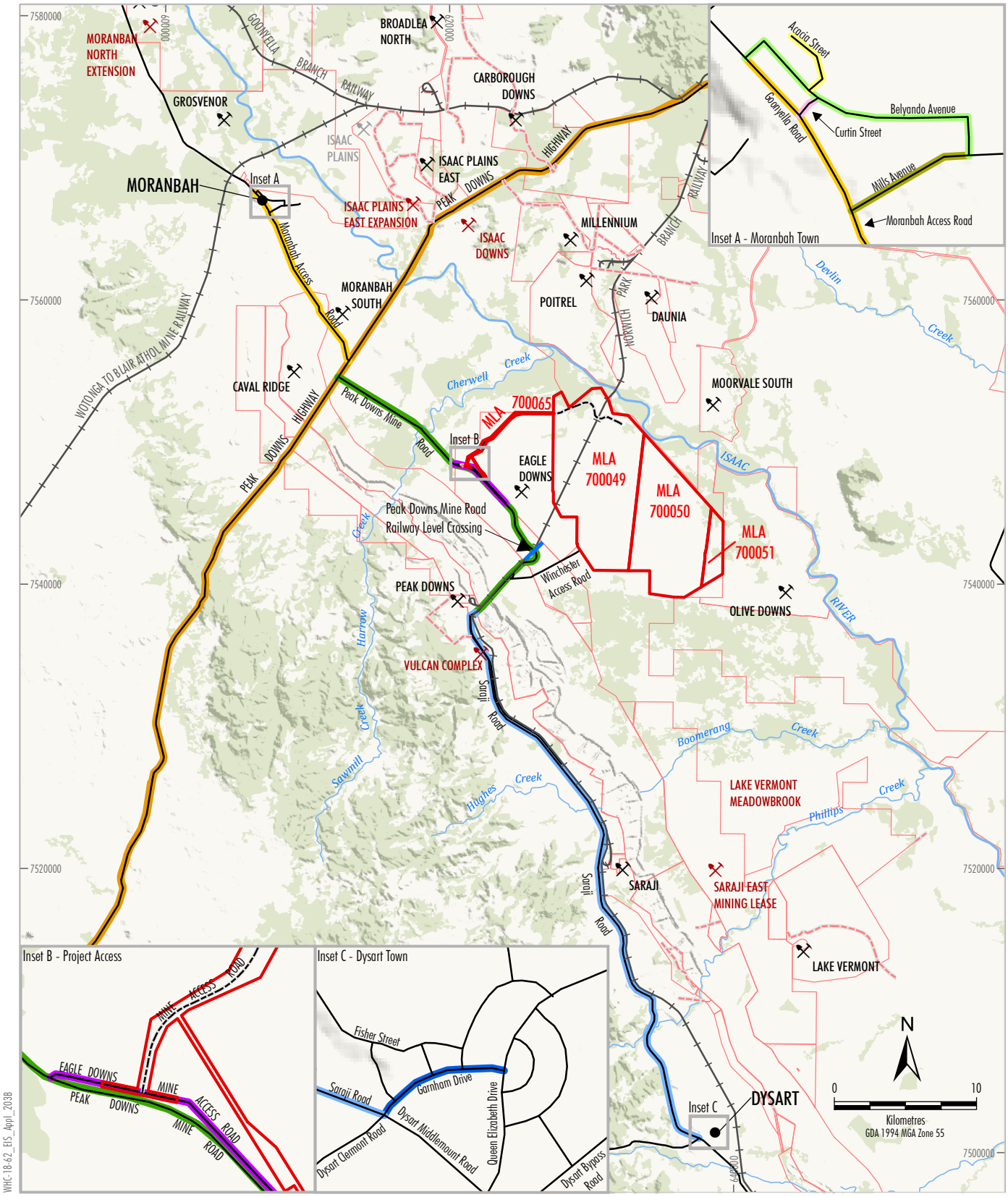
3.1 Road Network

The roads and intersections that would be used by Project-generated traffic were observed by The Transport Planning Partnership (TTPP) in November 2019, are described below and shown on Figure 3.1.

Peak Downs Highway is a State Controlled Road (SCR) which provides the primary link between the Whitsunday Coast and the Central West, linking the towns of Mackay and Clermont. Peak Downs Highway also provides access for major towns such as Walkerston, Nebo and Moranbah. It is a primary access route for access to existing coal mines in the Bowen Basin. In the vicinity of the Project, Peak Downs Highway follows a north-east to south-west alignment, and typically has a single travel lane in each direction, with auxiliary turn lanes at major intersections and a posted speed limit of 100 kilometres per hour (km/h). Peak Downs Highway typically has a single broken centre line, and single or double unbroken centre lines near crests and curves, and unbroken edgelines.

Peak Downs Mine Road intersects with Peak Downs Highway at a priority-controlled seagull intersection approximately 90 km from Clermont and 180 km from Mackay. Peak Downs Mine Road is a sealed road with a single travel lane in each direction, a single broken centre line and unbroken edge line marking and it typically has a posted speed limit of 100 km/h. The speed limit is 80 km/h on the approaches to the railway level crossing (refer to Section 3.2), and west of Winchester Access Road, further reducing to 60 km/h and 40 km/h at the underpass under the Peak Downs Mine internal haul road and the rail over road crossing near the intersection with Saraji Road.

The intersection of Peak Downs Mine Road with Peak Downs Highway has street lighting and dedicated left and right turn deceleration lanes in Peak Downs Highway for vehicles turning into Peak Downs Mine Road.



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LEGEND

- Mining Lease Application Boundary
- Mining Lease Boundary
- Mining Lease Access Road
- Railway
- Road
- Indicative Mine Access Road
- Peak Downs Mine Road Railway Level Crossing
- Approved/Operating
- Proposed
- Care and Maintenance

Regional

- Eagle Downs Mine Access Road
- Peak Downs Mine Road
- Saraji Road
- Peak Downs Highway
- Moranbah Access Road

Moranbah Local

- Curtin Street
- Belyando Avenue
- Acacia Street
- Mills Avenue

Dysart Local

- Garnham Drive

Source: The State of Queensland (2018 - 2020); TTPP (2019 - 2021). Geoscience Australia (2018).

WHITEHAVEN COAL

WINCHESTER SOUTH PROJECT

Existing Road Network

Figure 3.1

Saraji Road provides the vehicular link between Peak Downs Mine Road at Peak Downs Mine and the town of Dysart. Saraji Road is a sealed road with sealed shoulders, a single travel lane in each direction, a single broken centre line, and single or double unbroken centre lines near crests and curves, and unbroken edgelines. It typically has a posted speed limit of 100 km/h, reducing to 60 km/h on approach to the intersection with Peak Downs Mine Road, and to 80 km/h on approach to the intersection to **Garnham Drive**. At its intersection with Peak Downs Mine Road, Saraji Road forms the minor road (south) approach, and Peak Downs Mine Road (east) and the access road for Peak Downs Mine (west) form the major road. At its intersection with Garnham Drive, a left turn deceleration lane is provided in Saraji Road for vehicles entering Dysart. Garnham Drive provides the primary access to Dysart, and is constructed with a single travel lane in each direction, and has a posted speed limit of 60 km/h.

Moranbah Access Road is a Council-controlled road, and provides the sole vehicular access between Peak Downs Highway and the town of Moranbah. North-east of Moranbah, it continues as Goonyella Road, which provides vehicular access for other existing mining operations. Moranbah Access Road is an undivided sealed road with a single travel lane in each direction, sealed shoulders, and auxiliary lanes at its major intersections. It typically has a broken single centre line and unbroken edge lines. The posted speed limit is 100 km/h, reducing to 80 km/h and 60 km/h in proximity to Moranbah.

Moranbah Access Road intersects with Peak Downs Highway at a priority-controlled seagull intersection, with a left turn deceleration lane in Peak Downs Highway and a short right turn lane in Peak Downs Highway for vehicles entering Moranbah Access Road. The right turn lane length is constrained by the proximity of driveways for a service station on the western side of Peak Downs Highway near the intersection. Street lighting is provided at the intersection.

Moranbah Access Road provides vehicular access for Moranbah Airport, via a priority-controlled T-intersection approximately 5 km from Peak Downs Highway. At that intersection, left and right turn deceleration lanes are provided in Moranbah Access Road for vehicles entering the airport access road.

The primary access to the town of Moranbah from Moranbah Access Road is via **Mills Avenue**, which intersects with Moranbah Access Road at a priority-controlled T-intersection. At that intersection, left and right turn deceleration lanes are provided in Moranbah Access Road, and separate lanes are provided for left and right turns from Mills Avenue. Mills Avenue is constructed as a four lane divided road, with a wide median which in parts allows centre road parking. The signposted speed limit in Moranbah is 60 km/h. Access to Moranbah is also available via **Curtin Street**, approximately 1 km north of Mills Avenue, which is also constructed as a four lane divided road with a wide median. The intersection of Goonyella Road with Curtin Street is a priority-controlled T-intersection, with deceleration lanes provided in Goonyella Road for vehicles turning in to Curtin Street. Separate lanes are provided for left and right turn movements from Curtin Street.

Approximately 175 metres (m) from Goonyella Road, Curtin Street intersects with **Belyando Avenue**, which is constructed to a similar standard as Curtin Street, with centre road parking permitted to the west in proximity to the Moranbah Town Square and Moranbah State School. To the north-east of Curtin Street, Belyando Avenue provides access to accommodations camps on both Belyando Avenue and **Acacia Street**. Acacia Street is a dead end road, constructed with a single travel lane in each direction, with kerbside parallel parking permitted.

Eagle Downs Mine Access Road provides access to and from Eagle Downs Mine from Peak Downs Mine Road. It intersects with Peak Downs Mine Road at a priority controlled T-intersection. At that intersection, left and right turn deceleration lanes are provided in Peak Downs Mine Road, and separate lanes are provided for left and right turns from Eagle Downs Mine Access Road. Eagle Downs Mine Access Road is constructed with a single travel lane in each direction, and has a gated access located approximately 120 m from Peak Downs Mine Road. For approximately 800 m beyond the gated access, the posted speed limit on Eagle Downs Mine Access Road is 60 km/h, increasing to 80 km/h farther to the east. Eagle Downs Mine Access Road has a single unbroken centreline near Peak Downs Mine Road, and single broken centreline for most of the 60 km/h length, with the exception of a double unbroken centreline through a bend approximately 800 m from Peak Downs Mine Road. It has painted edgelines and guide posts.

Winchester Access Road is a private access road approximately 11 km from the Eagle Downs Mine Access Road intersection, which is accessed via the **former Dysart Road**. The former Dysart Road intersects with Peak Downs Mine Road at a priority-controlled T-intersection, and runs for approximately for 400 m to its intersection with the Winchester Access Road. The intersection of the former Dysart Road and Peak Downs Mine Road is located on the southern side of the Norwich Park Branch Railway. At the intersection, left and right turn deceleration lanes are provided in Peak Downs Mine Road, and a single flared lane is provided for left and right turns from the former Dysart Road. The former Dysart Road has a single travel lane in each direction, with a sealed surface for approximately 400 m from Peak Downs Mine Road, at which point it is currently an unsealed access road which provides access for the EME Build Pad.

The sealed portion of the former Dysart Road has painted edgelines and a mix of broken and unbroken centre lines. Prior to construction of the Peak Downs Mine Road, the former Dysart Road crossed the railway line immediately to the north of its current intersection with Peak Downs Mine Road, and some remnants of the associated road markings can be observed. The intersection of Winchester Access Road with the former Dysart Road has a sealed surface on the north-eastern (former Dysart Road) approach and a gravel surface on the eastern (Winchester Access Road) and south-western (former Dysart Road) approaches.

Although there is not signage or linemarking at the intersection of the former Dysart Road and Winchester Access Road, the layout of the intersection would be generally understood to reflect the typical T-intersection priority, with the eastern leg (Winchester Access Road) being the minor approach.

3.2 Rail Network and Railway Level Crossings

The Norwich Park Branch Railway is owned and operated by Aurizon. It extends through Mining Lease Application (MLA) 700049 for the Project, and forms part of the Goonyella Rail System which services the Bowen Basin, carrying product coal to the Dalrymple Bay Coal Terminal and Hay Point Coal Terminal at the Port of Hay Point and other destinations by way of connections to the North Coast Line at Yukan and the Central Line via Gregory to Burngrove (Aurizon, 2017). The junction for the Norwich Park Branch Railway is at Coppabella.

Peak Downs Mine Road crosses the single line Norwich Park Branch Railway at an actively controlled level crossing approximately 19 km from Peak Downs Highway (Figure 3.2 and Figure 3.3). The posted speed limit on Peak Downs Mine Road decreases from 100 km/h to 80 km/h on approach to the level crossing. Drivers approaching the level crossing on Peak Downs Mine Road have sufficient sight distance to be aware of the presence of the level crossing, its signage and road markings, and to observe any queue of vehicles formed when the road is closed.

The *Queensland Level Crossing Safety Strategy 2012- 2021* (TMR, 2012) sets out key actions and performance indicators with regard to its long term vision of zero harm at level crossings across Queensland. The strategy applies the "safe systems" approach, in which all aspects of the road-rail interface are geared to safety, and all parties, including both rail and road users are expected to contribute. With regard to level crossing infrastructure, the key actions include:

- continued assessment of risk related to level crossing environments through application of the Australian Level Crossing Assessment Model (ALCAM). ALCAM is the Australian standard assessment tool for assessing level crossings to prioritise safety improvement works and to assist in determining the most effective treatment;
- maintenance of level crossing infrastructure and environments in accordance with Australian Standards;
- where appropriate, reduce road speeds in the approach to level crossings;
- ensure local planning approvals do not increase risk at level crossings; and
- ensure approvals for heavy vehicle use of roads will not increase level crossing risks.

The level crossing is equipped with railway crossing flashing signal assemblies (RX-5) on each side of the road, supplemented by boom barriers. Railway crossing width marker assemblies (RX-9) are provided on both approaches of Peak Downs Mine Road, and a height clearance of 5.2 m is signposted on each approach due to the live overhead wires along the Norwich Park Branch Railway. The road pavement at the level crossing is marked with stop lines and yellow box markings, with Keep Track Clear (G9-67-2) signs on both approaches.

RAIL X road markings are painted on the travel lanes approaching the level crossing, together with advance warning signs (W74) of the controlled crossing, which are supplemented by Prepare to Stop signs and flashing lights.

The configuration of signage and linemarking at the level crossing is consistent with the requirements of Australian Standard (AS) 1742.7 (2016), and the reduced road speeds are consistent with the key actions identified in the *Queensland Level Crossing Safety Strategy*.

Figure 3.2: Peak Downs Mine Road Northbound at Railway Level Crossing

Image February 2015 sourced from google.com.au/maps, consistent with observed conditions November 2019

Figure 3.3: Peak Downs Mine Road Southbound at Railway Level Crossing

Image February 2015 sourced from google.com.au/maps, consistent with observed conditions November 2019.

3.3 Traffic Conditions on State Controlled Roads

Traffic data for SCRs in the region of the Project were obtained from TMR, as described below.

3.3.1 Annual Average Daily Traffic Volumes

Annual Average Daily Traffic (AADT) data were obtained from TMR for Peak Downs Highway between Clermont and Mackay. AADT is the number of vehicles over 24 hours, averaged over a year. Table 3.1 summarises the AADT in each direction of travel along segments of Peak Downs Highway for 2018.

Table 3.1: Annual Average Daily Traffic on Peak Downs Highway in 2018 (vehicles per day)

Section of Peak Downs Highway	Length (km)	AADT towards North-east	AADT towards South-west	AADT Two Way
Clermont to Nebo				
Clermont to Peak Downs Mine Road	89.1	324	325	649
Peak Downs Mine Road to Moranbah Access Road	1.3	1,912	1,949	3,861
Moranbah Access Road to Isaac Plains Mine	11.4	1,749	1,817	3,566
Isaac Plains Mine to Coppabella	26.2	1,961	1,958	3,919
Coppabella to Fitzroy Developmental Road	21.4	1,689	1,693	3,382
Fitzroy Developmental Road to Oxford Downs Sarina Road	14.3	2,097	2,101	4,198
Oxford Downs Sarina Road to Nebo	14.6	1,977	2,006	3,983
Nebo to Mackay				
Nebo to Blue Mountain Road	44.8	2,011	1,989	4,000
Blue Mountain Road to Eton Homebush Road	17.2	1,796	1,803	3,599
Eton Homebush Road to Kellys Road	14	2,872	2,954	5,826
Kellys Road to Mackay Eungella Road	5.4	4,572	4,905	9,477
Mackay Eungella Road to Horse and Jockey Road	4.7	8,587	8,541	17,128
Horse and Jockey Road to Bernborough Avenue	1.0	4,795	5,097	9,892
Bernborough Avenue to Nebo Road	0.8	5,363	5,476	10,839

Source: TMR

The data indicate that the AADT volume on Peak Downs Highway between Peak Downs Mine Road and Eton on the eastern side of Connors Range is generally in the order of 3,500 to 4,200 vehicles per day. To the north-east of Eton, the volumes increases notably, with up to 17,128 vehicles per day on Peak Downs Highway east of Walkerston.

3.3.2 Traffic Composition

The TMR AADT data for Peak Downs Highway also provide information on the classification of traffic as either light vehicles or heavy vehicles. Light vehicles include motorcycles, cars, vans, four-wheel drives, and utes (including those towing a trailer or caravan). Heavy vehicles include single unit rigid trucks and buses, as well as articulated vehicles (which include semi-trailers and rigid trucks with trailers, B-Doubles and road trains). Table 3.2 summarises the heavy vehicle AADT on segments of Peak Downs Highway between Clermont and Mackay as reported by TMR.

Table 3.2: Heavy Vehicles on Peak Downs Highway in 2018 (heavy vehicles per day)

Section of Peak Downs Highway	AADT towards North-east	AADT towards South-west	AADT Two Way	Percent Two Way
Clermont to Nebo				
Clermont to Peak Downs Mine Road	129	134	263	40.5
Peak Downs Mine Road to Moranbah Access Road	404	791	1,195	31.0
Moranbah Access Road to Isaac Plains Mine	670	318	988	27.7
Isaac Plains Mine to Coppabella	487	592	1,079	27.5
Coppabella to Fitzroy Developmental Road	762	563	1,325	39.2
Fitzroy Developmental Road to Oxford Downs Sarina Road[A]	1,181	315	1,496	35.6
Oxford Downs Sarina Road to Nebo	520	633	1,153	28.9
Nebo to Mackay				
Nebo to Blue Mountain Road	367	601	968	24.2
Blue Mountain Road to Eton Homebush Road	323	500	823	22.9
Eton Homebush Road to Kellys Road	525	569	1,094	18.8
Kellys Road to Mackay Eungella Road	527	590	1,117	11.8
Mackay Eungella Road to Horse and Jockey Road[A]	721	2,203	2,924	17.1
Horse and Jockey Road to Bernborough Avenue	654	650	1,304	13.2
Bernborough Avenue to Nebo Road	928	946	1,874	17.3

Source: TMR
[A] *Probable misclassification of some larger light vehicles as heavy vehicles*

It is noted that the classification of vehicles at some locations appears to include some erroneous data. Consultation with TMR suggests that this is likely due in part to misclassification of some longer wheelbase light vehicles as heavy vehicles. This is consistent with TTPP's experience at mine sites, where there tends to be a significant number of larger four-wheel drives and utilities which are considered to be light vehicles (Austroads Class 1), but which may be misclassified by the counter as a heavy vehicle (Austroads Class 3) due to their longer wheelbase. For example, the Ford Ranger 4X4 XLT Super Cab, Mazda BT-50 and Toyota Hilux 4X4 Workmate are all similarly sized light vehicles, however the Ford and Mazda wheelbase of 3,220 millimetres (mm) results in a heavy vehicle classification, while the 3,085 mm wheelbase of the Toyota results in a light vehicle classification.

Where these "borderline" vehicles do not strike the automatic tube counters (ATCs) at exactly 90 degrees, or minor installation errors occur with the counters, misclassification can result. The volume of total vehicles (Table 3.1) is not however impacted.

The TMR data for Peak Downs Highway also provide information on the Standard Axle Repetitions (SAR), which is a measure defining the cumulative damaging effect to the pavement of the design traffic, and is expressed in terms of the equivalent number of 80 kiloNewton (kN) axles on the pavement. The SARs on Peak Downs Highway have been calculated by TMR based on the AADT and classification of vehicles described above, and applying the default of 3.2 SAR4s per heavy vehicle. The SAR data are summarised in Table 3.3.

Table 3.3: Standard Axle Repetitions on Peak Downs Highway in 2018

Section of Peak Downs Highway	Towards North-east	Towards South-west
Clermont to Nebo		
Clermont to Peak Downs Mine Road	412.8	428.8
Peak Downs Mine Road to Moranbah Access Road	1,292.8	2,531.2
Moranbah Access Road to Isaac Plains Mine	2,144.0	1,017.6
Isaac Plains Mine to Coppabella	1,558.4	1,894.4
Coppabella to Fitzroy Developmental Road	2,438.4	1,801.6
Fitzroy Developmental Road to Oxford Downs Sarina Road[A]	3,779.2	1,008.0
Oxford Downs Sarina Road to Nebo	1,664.0	2,025.6
Nebo to Mackay		
Nebo to Blue Mountain Road	1,174.4	1,923.2
Blue Mountain Road to Eton Homebush Road	1,033.6	1,600.0
Eton Homebush Road to Kellys Road	1,680.0	1,820.8
Kellys Road to Mackay Eungella Road	1,686.4	1,888.0
Mackay Eungella Road to Horse and Jockey Road[A]	2,307.2	7,049.6
Horse and Jockey Road to Bernborough Avenue	2,092.8	2,080.0
Bernborough Avenue to Nebo Road	2,969.6	3,027.2

Source: TMR
[A] *Probable misclassification of some larger light vehicles as heavy vehicles*

It should be noted that as the SAR calculations rely on the classifications of vehicles, some caution should be used regarding the calculated SARs at the locations which appear to include some erroneous classification data as described above.

3.3.3 Historic AADT Growth

The TMR AADT data also provide information on the average annual historic growth rate on each segment of Peak Downs Highway over the past five and ten years. Table 3.4 summarises the average annual growth rate by direction of travel on Peak Downs Highway.

Table 3.4: Average Historic AADT Growth Rates on Peak Downs Highway to 2018 (percent)

Section of Peak Downs Highway	Past 5 Years		Past 10 Years	
	towards North-east	towards South-west	towards North-east	towards South-west
Clermont to Nebo				
Clermont to Peak Downs Mine Road	2.7	3.2	0.8	0.9
Peak Downs Mine Road to Moranbah Access Road	4.2	5.1	4.0	4.4
Moranbah Access Road to Isaac Plains Mine	8.0	9.0	4.2	4.9
Isaac Plains Mine to Coppabella	3.0	2.1	1.9	1.3
Coppabella to Fitzroy Developmental Road	3.0	2.7	1.9	1.9
Fitzroy Developmental Road to Oxford Downs Sarina Road	2.8	2.3	2.0	1.5
Oxford Downs Sarina Road to Nebo	2.8	3.1	1.6	1.6
Nebo to Mackay				
Nebo to Blue Mountain Road	1.0	0.7	0.3	0.0
Blue Mountain Road to Eton Homebush Road	-3.3	-4.6	-2.8	-3.6
Eton Homebush Road to Kellys Road	0.3	1.3	-0.7	-0.1
Kellys Road to Mackay Eungella Road	-1.2	-1.0	-0.6	-0.3
Mackay Eungella Road to Horse and Jockey Road	1.7	2.5	1.3	1.3
Horse and Jockey Road to Bernborough Avenue	-0.8	1.3	-1.7	-0.8
Bernborough Avenue to Nebo Road	-0.3	1.7	-1.6	-0.8

The data indicate that broadly, the traffic growth rates fluctuate along Peak Downs Highway but typically been positive (increase) west of Nebo and negative (decline) east of Nebo.

3.4 Project Traffic Surveys

3.4.1 Traffic Survey Program

To quantify existing traffic conditions on routes of relevance to the Project, a program of traffic surveys was commissioned, which included ATCs over two weeks between 16 October and 22 October 2019 (Week 1), and between 31 October and 6 November 2019 at (Week 2) at the following locations (refer to Figure 3.4):

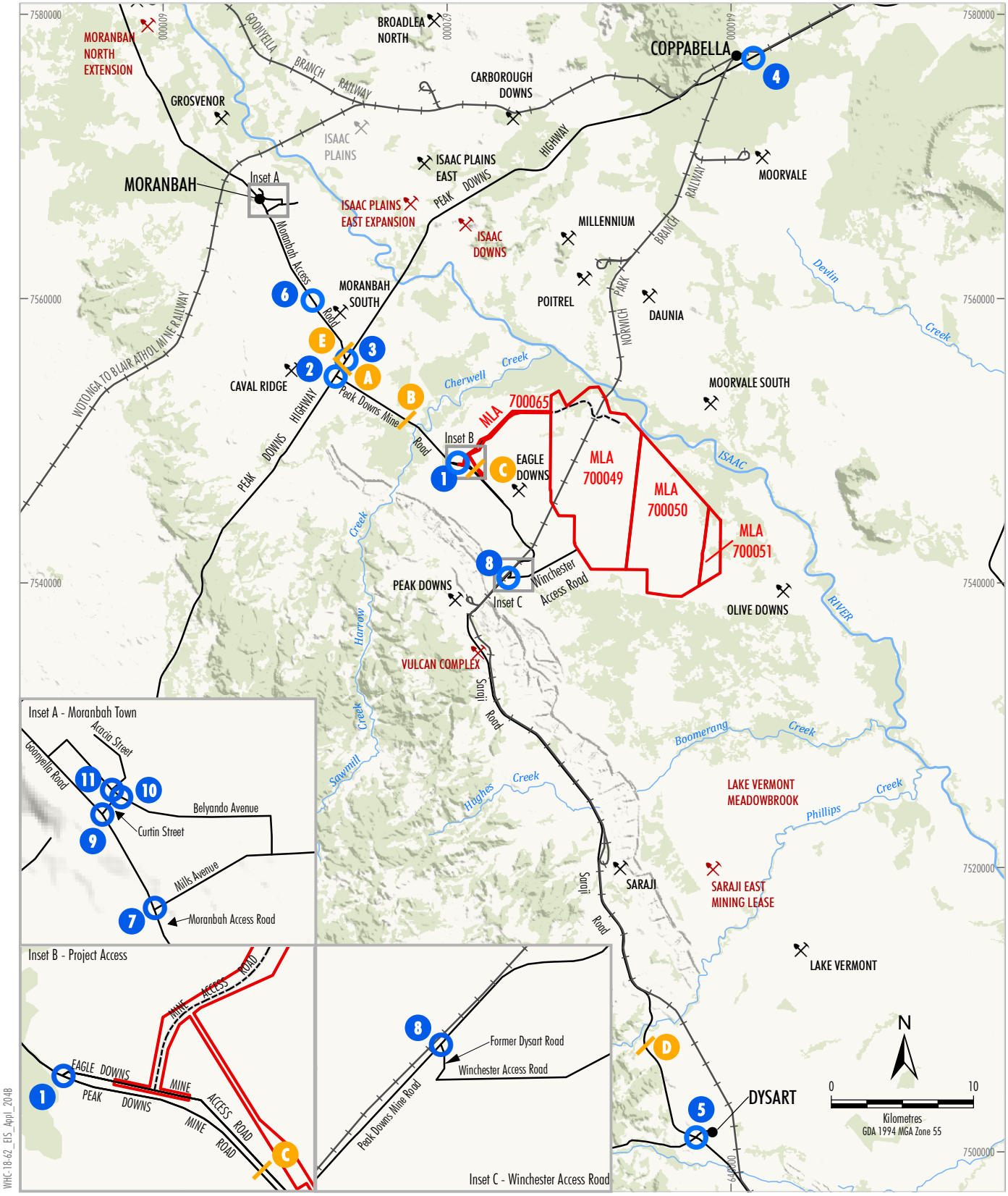
A. Peak Downs Highway north-east of Peak Downs Mine Road;

B. Peak Downs Mine Road north of Eagle Downs Mine Access Road;

C. Peak Downs Mine Road south of Eagle Downs Mine Access Road;

D. Saraji Road north of Dysart (surveyed during Week 2 only); and

E. Moranbah Access Road.



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LEGEND
- Mining Lease Application Boundary
- Railway
- Road
- Automated Tube Counter
- Intersection Survey
- Approved/Operating
- Proposed
- Care and Maintenance

Source: The State of Queensland (2018 - 2020); TTPP (2019 - 2021). Geoscience Australia (2018).

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Traffic Survey Locations

Figure 3.4

To quantify the directional flow of traffic at key intersections, surveys of vehicle turning movements were undertaken over a 12-hour period between 6.00 am and 6.00 pm on Wednesday 16 October 2019 (locations 1 to 8) and Thursday 27 February 2020 (locations 9 to 11), with the number of vehicles undertaking each movement at the intersections being recorded at 15-minute intervals at the following intersections (refer to Figure 3.4):

1. Peak Downs Mine Road and Eagle Downs Mine Access Road;
2. Peak Downs Mine Road and Peak Downs Highway;
3. Peak Downs Highway and Moranbah Access Road;
4. Peak Downs Highway and Maloney Street;
5. Saraji Road, Garnham Drive, Dysart Clermont Road and Dysart Middlemount Road;
6. Moranbah Access Road and Moranbah Airport road;
7. Moranbah Access Road and Mills Avenue;
8. Peak Downs Mine Road and the former Dysart Road (for Winchester Access Road access);
9. Goonyella Road and Curtin Street;
10. Curtin Street and Belyando Avenue; and
11. Belyando Avenue and Acacia Street.

Supplementary intersection turning movement surveys were also completed between 4:00 am and 6:00 am on Friday 8 November 2019 at intersections 2 and 3 above.

3.4.2 Daily Traffic Volumes

The surveyed daily traffic volumes are summarised in Table 3.5.

Table 3.5: Surveyed Daily Traffic Volumes 2019 (vehicles per day)

Site[A]		Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
A	Peak Downs Highway north-east of Peak Downs Mine Road	1 2	3,723 3,749	4,619 4,584	4,392 4,644	4,176 3,949	3,478 3,436	2,120 2,122	2,269 2,218
B	Peak Downs Mine Road north of Eagle Downs Mine Access Road	1 2	2,263 2,293	2,822 2,779	2,704 2,924	2,613 2,453	2,155 2,090	1,261 1,278	1,355 1,409
C	Peak Downs Mine Road south of Eagle Downs Mine Access Road	1 2	1,596 1,481	2,019 1,914	1,828 2,035	1,768 1,657	1,469 1,435	849 806	944 870
D	Saraji Road north of Dysart	2	2,374	2,938	2,963	2,503	2,266	1,606	1,565
E	Moranbah Access Road north of Peak Downs Highway	1 2	5,501 5,387	6,268 6,121	5,811 6,077	5,918 5,828	5,180 5,182	3,133 3,235	3,448 3,228

[A] *Refer to Figure 3.4.*

The results indicate that the traffic volumes are distinctly higher on weekdays compared with weekend days. Moranbah Access Road is the busiest of the surveyed roads, carrying an average of 5,727 vehicles per weekday, and 3,261 vehicles per weekend day. Peak Downs Highway is the next busiest road, carrying an average of 4,075 vehicles per weekday and 2,183 vehicles per weekend day.

The surveys demonstrated that the volumes varied day-to-day, with traffic volumes on the surveyed Fridays and Mondays being lower than the other weekdays, and higher volumes being recorded on the Tuesdays.

3.4.3 Traffic Composition

The ATC surveys collected details of the composition of the traffic based on the Austroads standard vehicle classifications. Light vehicles include motorcycles, cars, vans, four-wheel drives, and utilities (including those towing a trailer or caravan). Rigid heavy vehicles include single unit trucks and buses, and articulated vehicles include semi-trailers, rigid trucks with trailers, B-doubles and road trains. The composition of traffic over the average day at the ATC survey locations are summarised in Table 3.6.

Table 3.6: Surveyed Average Daily Traffic Composition 2019 (vehicles per day)

Site[A]	Road and Location		Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
A	Peak Downs Highway north-east of Peak Downs Mine Road	Vehicles	2,735	491	303	3,529
		Percent	77.5	13.9	8.6	100
B	Peak Downs Mine Road north of Eagle Downs Mine Access Road	Vehicles	1,712	280	183	2,175
		Percent	78.7	12.9	8.4	100
C	Peak Downs Mine Road south of Eagle Downs Mine Access Road	Vehicles	1,012	280	165	1,457
		Percent	69.4	19.2	11.3	100
D	Saraji Road north of Dysart	Vehicles	1,862	358	96	2,316
		Percent	80.4	15.5	4.2	100
E	Moranbah Access Road north of Peak Downs Highway	Vehicles	3,917	738	353	5,008
		Percent	78.2	14.7	7.1	100

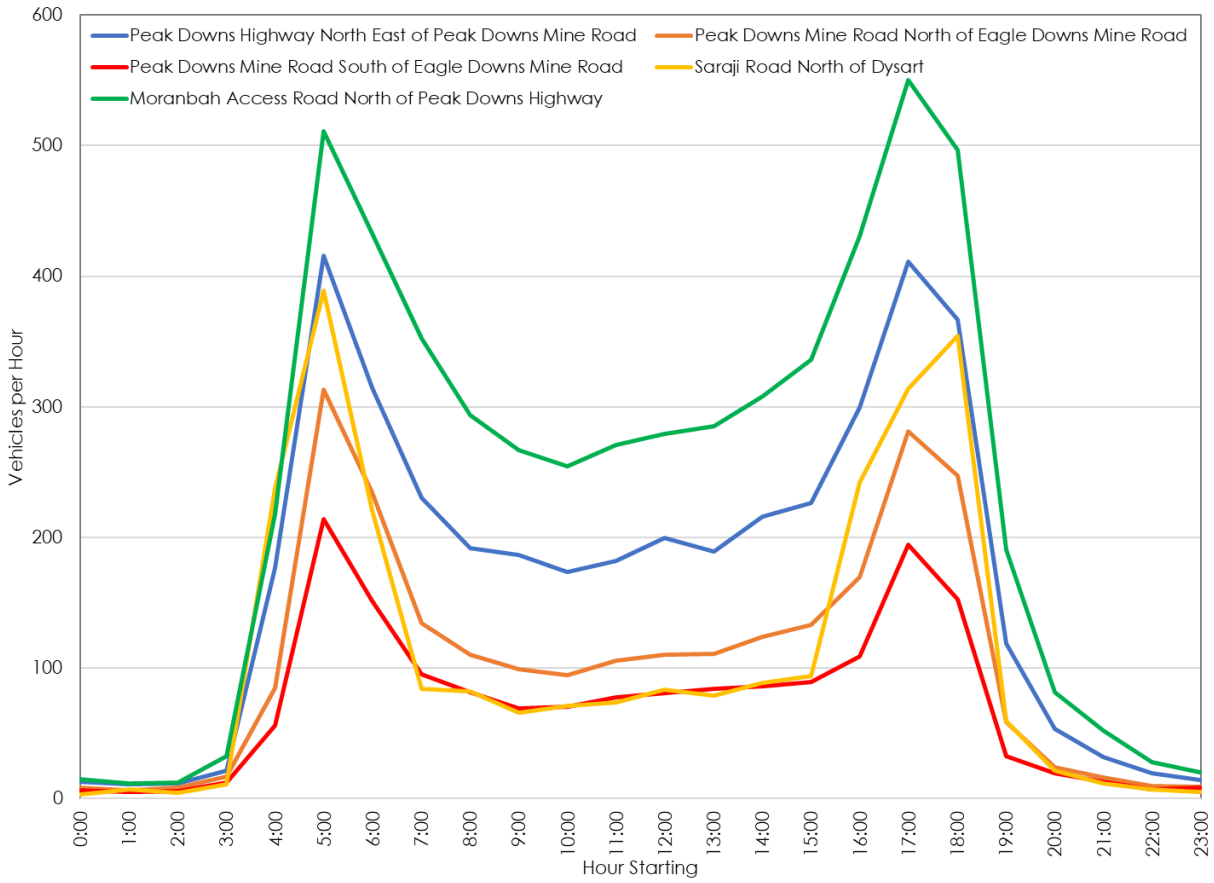
[A] *Refer to Figure 3.4.*
Note a small number of vehicles included in the total are unclassified

The results indicate that the traffic at the surveyed locations is currently comprised of between approximately 20 % and 30 % heavy vehicles. The highest proportion was recorded on Peak Downs Mine Road south of Eagle Downs Mine Access Road, noting however that the overall number of both light and heavy vehicles at this location is actually the lowest of all the surveyed locations.

3.4.4 Average Weekday Peak Hour Traffic

The surveyed temporal distribution of traffic throughout the average weekday is presented in Figure 3.5, which indicates that all locations display distinct peaks in two-way traffic in the morning and evening, with lower volumes carried through the middle of the day, and low volumes carried overnight. As weekdays are typically the busier days, the average weekday peak volumes are higher than average daily peak hour volumes and are therefore more critical with regard to takeup of available road capacity.

Figure 3.5: Average Weekday Hourly Traffic Distribution



The peak hours for vehicle demands at each of the ATC survey locations were identified from the survey results, and are summarised in Table 3.7 for the average weekday. The morning (AM) peak hour is the hour between midnight and midday during which the highest number of vehicles was recorded, and the evening (PM) peak hour is the hour between midday and midnight during which the highest number of vehicles was recorded. The AM peak hour generally occurred between 5:00 am and 6:00 am, and the PM peak hour typically occurred between 5:00 pm and 6:00 pm, with the exception of on Saraji Road north of Dysart, where the PM peak hour occurred between 6:00 pm and 7:00 pm.

Table 3.7: Surveyed Average Weekday Peak Hourly Traffic 2019 (vehicles per hour)

Site[A]	Road and Location	Hour Start	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total
AM Peak Hour						
A	Peak Downs Highway north-east of Peak Downs Mine Road	5:00 am	365	38	13	416
B	Peak Downs Mine Road north of Eagle Downs Mine Access Road	5:00 am	252	54	7	313
C	Peak Downs Mine Road south of Eagle Downs Mine Access Road	5:00 am	164	44	6	214
D	Saraji Road north of Dysart	5:00 am	306	79	4	389
E	Moranbah Access Road north of Peak Downs Highway	5:00 am	398	97	16	511
PM Peak Hour						
A	Peak Downs Highway north-east of Peak Downs Mine Road	5:00 pm	329	64	18	411
B	Peak Downs Mine Road north of Eagle Downs Mine Access Road	5:00 pm	240	31	10	281
C	Peak Downs Mine Road south of Eagle Downs Mine Access Road	5:00 pm	151	35	9	195
D	Saraji Road north of Dysart	6:00 pm	319	32	4	355
E	Moranbah Access Road north of Peak Downs Highway	5:00 pm	460	71	19	550

[A] *Refer to Figure 3.4.*

3.4.5 Intersection Turning Movements

The surveyed busiest AM and PM hours across all intersections during the initial survey period occurred between 6:00 am and 7:00 am, and between 5:00 pm and 6:00 pm. The surveyed total vehicle turning movements at each intersection during those peak hours and over the survey period are tabulated in Appendix B, and summary survey results are also presented in Appendix B.

Noting that the ATC suggested that the peak hour occurred slightly earlier than the intersection surveys commenced, supplementary surveys were conducted at the intersections of Peak Downs Highway with Peak Downs Mine Road and with Moranbah Access Road to capture the turning movements in the hours preceding the 12-hour survey period. Those supplementary surveys found that the morning peak hour at the intersection of Peak Downs Highway with Moranbah Access Road occurred between 4:45 am and 5:45 am, however during that peak hour, there was only five more vehicle movements through the intersection compared with the 6:00 am to 7:00 am hour. At the intersection of Peak Downs Highway with Peaks Downs Mine Road, there was only eight fewer vehicle movements through the intersection between 4:45 am and 5:45 am compared with 6:00 am to 7:00 am.

Key aspects of the intersection turning movement survey results are:

- existing vehicle turning movements into and out of Eagle Downs Mine Access Road and the former Dysart Road (for Winchester Access Road access) are very low;
- the dominant movements at the intersection of Peak Downs Highway and Peak Downs Mine Road are the left turn in and right turn out of Peak Downs Mine Road;
- the directional split of traffic changes quickly, with a peak in outbound traffic from Moranbah during the morning followed quickly by a peak in inbound traffic towards Moranbah;
- over the surveyed 12-hour period, approximately one-third of traffic to and from Moranbah used Curtin Street and two-thirds used Mills Avenue; and
- over the surveyed 12-hour period, over 60 % of traffic to and from Mills Avenue at Moranbah approached or departed to and from the south. Similarly, nearly 70 % of traffic to and from Curtin Street at Moranbah approached or departed to and from the north.

3.5 Public and Active Transport Infrastructure

There is no public transport access nor walking or cycling-specific infrastructure in the region for travel to and from the Project. Some of the mines in the region operate bus services for their workforce when travelling between the mine and local towns such as Moranbah, which reduces the overall demand for vehicle travel on the road network.

3.6 Road Safety

Road crash data for roads of relevance to the Project have been obtained from TMR for the five year period from 1 January 2014 to 31 December 2018, for the IRC LGA. The data include information on location and characteristics of road traffic crashes reported to the police which resulted from the movement of at least one road vehicle on a public road or road related area, in which a person was killed or injured, or at least one vehicle was towed away.

Table 3.8: General Crash Types on Project Access Routes (2014 to 2018)

Route	Route Length (km)	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	Manoeuvring	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Peak Downs Highway												
West of Peak Downs Mine Road	89	-	-	-	-	-	-	1	6	-	-	7
Peak Downs Mine Road to Coppabella	39	-	-	2	2	-	1	-	10	3	-	18
Coppabella to IRC boundary	96	-	-	4	2	-	-	5	13	9	-	33
Peak Downs Mine Road / Saraji Road												
Peak Downs Highway to Level Crossing	19	-	-	-	1	-	-	-	2	1	-	4
Level Crossing to Dysart	50	-	-	-	3	-	-	-	4	3	-	10
Moranbah Access Road / Goonyella Road												
Peak Downs Highway to Curtin Street	12	-	1	2	2	-	-	1	6	2	-	14
Curtin Street to Red Hill Road	16	-	-	1	2	1	-	1	2	1	-	8
Total Crashes by Type		**-**	**1**	**9**	**12**	**1**	**1**	**8**	**43**	**19**	**-**	**94**

The data indicate that the most common general crash type on the routes combined has been single vehicle crashes, particularly run-off-road crashes. This is consistent with the findings of the Centre for Accident Research and Road Safety – Queensland (CARRS-Q, 2017). Australian Road Research Board (2011) states that known causes of run-off-road crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;
- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, livestock or native fauna.

Table 3.9 summarises the severity of the reported crashes on the roads.

Table 3.9: Crash Severities (2014 to 2018)

	Fatal	Hospitalisation	Medical Treatment	Minor Injury	Property Damage Only
Peak Downs Highway					
West of Peak Downs Mine Road	-	3	3	1	-
Peak Downs Mine Road to Coppabella	2	9	3	4	-
Coppabella to IRC boundary	3	24	3	3	-
Peak Downs Mine Road / Saraji Road					
Peak Downs Highway to Level Crossing	-	3	1	-	-
Level Crossing to Dysart	-	4	6	-	-
Moranbah Access Road / Goonyella Road					
Peak Downs Highway to Curtin Street	2	10	2	-	-
Curtin Street to Red Hill Road	-	3	4	1	-
Total Routes	**7**	**56**	**22**	**9**	**-**

With regard to routes which would be used by Project-generated traffic, over the five years investigated, two fatal crashes occurred on Moranbah Access Road/Goonyella Road south of Curtin Street, and two fatal crashes occurred on Peak Downs Highway between Peak Downs Mine Road and Coppabella. These are briefly described below.

- March 2015 on Moranbah Access Road 1.6 km north-west of Moranbah Airport, head-on crash between two cars on straight road. It occurred between 4am and 5am in darkness, in clear weather on a dry road surface;
- December 2017 on Moranbah Access Road 2.0 km north-west of Peak Downs Highway, single vehicle lost control on straight road and overturned. It occurred between 4am and 5am in darkness, in clear weather and on a dry road surface;
- March 2014 on Peak Downs Highway 12.5 km north-east of Moranbah Access Road, head-on crash between a car and a truck on straight road. It occurred at dawn between 5am and 6am in raining weather on a wet road surface; and
- October 2015 on Peak Downs Mine Road 18 km north-west of Moranbah Access Road, rear-end crash between two westbound cars, involving an overtaking manoeuvre. It occurred between 8pm and 9pm, in darkness, in clear weather and on a dry road surface.

A detailed review of the crash characteristics along the main Project access routes is included in Appendix C. Over the five years investigated, no crashes occurred at or near the level crossing on Peak Downs Mine Road. No crashes occurred involving pedestrians or bicycles, and two motorcycles were involved in crashes. Seven trucks were involved in crashes, including six trucks on Peak Downs Highway between Peak Downs Mine Road and Coppabella, and one truck on Peak Downs Mine Road south of the level crossing (being a southbound rear end crash with a motorcycle approximately 1.2 km south-west of the former Dysart Road in 2016 in daylight and clear weather while the sealed road surface was dry).

3.7 Road Network Planning

The *Queensland Transport and Roads Investment Program 2019-20 to 2022-23* (QTRIP) (TMR, 2019a) details the current transport and road infrastructure projects that the Queensland government plans to deliver. A number of capacity improvements are planned on the State and Local road networks in which the vicinity of the Project, as summarised in Table 3.10.

Table 3.10: QTRIP Scheduled Works 2019-20 to 2022-23

Road	Location Description	Investment Decription
State Network		
Peak Downs Highway (Clermont – Nebo)	Wolfang	Rehabilitate and widen
Peak Downs Highway (Clermont – Nebo)	Bee Creek Bridge	Undertake transport project planning
Peak Downs Highway (Clermont – Nebo)	Wuthung Road – Caval Ridge Mine	Widen pavement
Local Network		
Moranbah Access Road	3.50 to 11.00 km	Asphalt resurfacing
Saraji Road	0 to 43.10 km	Rehabilitate pavement

Source: QTRIP

The State Infrastructure Plan (SIP) outlines the Queensland Government's strategic direction for planning and prioritising the investment and delivery of infrastructure, and the identifies Moranbah as a Priority Development Area, being land identified for specific accelerated development, with a focus on community development and economic growth. The SIP identifies that the Eton Range Realignment of Peak Downs Highway which is currently underway through the QTRIP program will remove a capacity constraint on this key freight route.

4 Future Transport Demands

4.1 Non-Project Traffic Demand Changes

The traffic data obtained from TMR and collected by TTPP (Section 3.3) does not include the effects of any planned developments in the region which were not yet operating at the time of the data collection. These projects and their potential effect on background traffic conditions are described below, together with forecast growth in background traffic that may occur regardless of specific developments in the region.

4.1.1 Existing Average Daily Traffic on Project Routes

Comparing the AADT on Peak Downs Highway between Peak Downs Mine Road and Moranbah Access Road (Table 3.1) with the Average Daily Traffic (ADT) volumes surveyed by TTPP at the same location (Table 3.6), it is evident that the surveyed ADT in 2019 is less than the AADT. This may be attributable to seasonal variations, thus to ensure a robust assessment of future conditions, all the surveyed volumes have been increased pro rata to reflect the higher AADT volume, i.e. by approximately 9 %. This assumes that the same seasonal variations apply across all surveyed routes.

Based on the Project survey volumes and distributions of vehicle turning movements over the 12 or 14 hours surveyed at intersections, the existing AADT by direction has been estimated at key locations on the Project access routes (refer to Section 2.5). These are summarised in Table 4.1.

Table 4.1: Existing AADT Estimates by Direction (vehicles per day)

Road and Location	Inbound[A]	Outbound[A]	Two Way
Peak Downs Highway south-west of Peak Downs Mine Road	895	856	1,751
Peak Downs Highway north-east of Peak Downs Mine Road	1,933	1,928	3,861
Peak Downs Highway north-east of Moranbah Access Road	1,739	2,046	3,785
Peak Downs Highway west of Coppabella	2,000	2,002	4,002
Peak Downs Highway east of Coppabella	2,103	1,877	3,980
Peak Downs Mine Road south of Peak Downs Highway	1,186	1,102	2,288
Peak Downs Mine Road north of Eagle Downs Mine Access Road	1,185	1,187	2,372
Peak Downs Mine Road south of Eagle Downs Mine Access Road	795	818	1,613
Peak Downs Mine Road west of the former Dysart Road (Winchester Access Road access)	773	1,081	1,854
Saraji Road north of Dysart	1,262	1,269	2,531
Moranbah Access Road north of Peak Downs Highway	2,732	2,775	5,487
Moranbah Access Road north of Moranbah Airport	2,976	2,981	5,957

[A] *Direction of travel relative to the Project.*
Totals may not add due to rounding.

4.1.2 Planned Developments

4.1.2.1 Eagle Downs Mine

Eagle Downs Mine is an approved metallurgical coal mine located adjacent to the Project, and accessed via Eagle Downs Mine Access Road. At the time of the Project traffic surveys, Eagle Downs Mine was not operating, however as its traffic would use the same roads as the Project traffic, its impact on the road network should also be considered.

South32 has provided information on the estimated traffic movements for the Eagle Downs Mine, noting that a bus service would be provided to transport construction and operational workers between Eagle Downs Mine and the accommodation village in Moranbah. The data provided indicates that 80 % of the generated trips would be to and from the north and 20 % would be to and from the south.

With regard to the Project assessment scenarios, the level of traffic generated each day by the Eagle Downs Mine is assumed to be as provided by South32 for Years 2022, 2023 and 2029. All construction and operational traffic assumed to enter and exit via Eagle Downs Mine Access Road. The estimated peak hourly and daily traffic expected to be generated by Eagle Downs Mine are summarised in Table 4.2.

Table 4.2: Eagle Downs Mine Traffic Generation in Project Assessment Years

	Light Vehicles		Heavy Vehicles		Total Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Year 2022						
AM Peak[A]	96	11	17	6	113	17
PM Peak[A]	11	96	6	17	17	113
Daily[B]	218	218	65	65	283	283
Year 2023						
AM Peak[A]	90	8	14	3	104	11
PM Peak[A]	8	90	3	14	11	104
Daily[B]	181	181	42	42	223	223
Year 2029						
AM Peak[A]	79	5	11	1	90	6
PM Peak[A]	5	79	1	11	6	90
Daily[B]	143	143	22	22	165	165

[A] *vehicles per hour*
[B] *vehicles per day*

4.1.2.2 Olive Downs Coking Coal Project

The Olive Downs Coking Coal Project (herein referred to as the Olive Downs Project) is an approved metallurgical coal mine located south-east of the Project. It comprises the Olive Downs South mining domain, with vehicular access via Annandale Road – Daunia Road and the Willunga mining domain, with vehicular access via Fitzroy Developmental Road. These access roads both intersect with Peak Downs Highway to the north-east of the Project. Traffic generated by the Olive Downs Project is expected to use some of the same roads as Project traffic, notably parts of Peak Downs Highway, Moranbah Access Road, and Peak Downs Mine Road.

GTA Consultants (2018 and 2019) assessed the road transport implications of the Olive Downs Project, which have been updated by TTPP based on information provided by Pembroke Olive Downs through the existing data sharing agreement with surrounding operations. Based on the forecasts prepared for a number of scenarios relating to the construction and operation of the Olive Downs Project, the total traffic generation of the Olive Downs Project has been estimated for the Project assessment years, and is summarised in Table 4.3. It is noted that the peak hourly forecasts are considered to be conservatively high, as they assume 80 % of the workforce traffic at shift change times occurs in the same hour.

Table 4.3: Olive Downs Project Traffic Generation in Project Assessment Years

	Light Vehicles		Heavy Vehicles		Total Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Olive Downs South Domain Year 2022, 2023 and 2029						
AM Peak[A]	168	116	3	3	171	119
PM Peak[A]	116	168	0	0	116	168
Daily[B]	357	357	10	10	367	367
Willunga Domain Year 2029						
AM Peak[A]	61	42	3	3	64	45
PM Peak[A]	42	61	0	0	42	61
Daily[B]	129	129	6	6	135	135
Total Olive Downs Project Year 2022 and 2023						
AM Peak[A]	168	116	3	3	171	119
PM Peak[A]	116	168	0	0	116	168
Daily[B]	357	357	10	10	367	367
Total Olive Downs Project Year 2029						
AM Peak[A]	229	158	6	6	235	164
PM Peak[A]	158	229	0	0	158	229
Daily[B]	486	486	16	16	502	502

[A] *vehicles per hour*
[B] *vehicles per day*

4.1.3 Background Growth

The historical growth rates reported on the SCRs (Table 3.4) demonstrated that growth has fluctuated but has typically been positive over the past 10 years on Peak Downs Highway west of Nebo. Some of the growth is likely to be attributed to the commencement or increase in activity at specific developments in the region, while some may be attributed to changes in travel characteristics.

For the purpose of this assessment, noting that future growth associated with the Eagle Downs Mine and Olive Downs Project has also been specifically included in the forecasts of baseline conditions, a growth rate of 2 % per annum has been adopted above the surveyed conditions in 2019. This growth rate is consistent with that adopted for the assessment of the Olive Downs Project (GTA Consultants, 2018), is considered robust with regard to informing future traffic forecasts given that mine-generated traffic makes up a significant proportion of existing traffic demands on these roads, and has been applied to traffic on all the roads investigated.

4.1.4 Total Future Base Traffic

Table 4.4 summarises the forecasts of baseline average daily traffic on the roads in the region. These forecasts include the cumulative impacts of background growth above the existing AADT volumes (Table 4.1) and additional traffic anticipated as a result of the Eagle Downs Mine and Olive Downs Project projects as described above.

Table 4.4: Future Base Average Daily Traffic (vehicles per day)

Road and Location	2022		2023		2029	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Peak Downs Highway south-west of Peak Downs Mine Road	950	908	969	927	1,091	1,044
Peak Downs Highway north-east of Peak Downs Mine Road	2,372	2,367	2,365	2,360	2,614	2,608
Peak Downs Highway north-east of Moranbah Access Road	2,245	2,571	2,236	2,570	2,533	2,907
Peak Downs Highway west of Coppabella	2,301	2,305	2,298	2,301	2,632	2,651
Peak Downs Highway east of Coppabella	2,408	2,169	2,407	2,163	2,756	2,496
Peak Downs Mine Road south of Peak Downs Highway	1,580	1,491	1,556	1,466	1,704	1,602
Peak Downs Mine Road north of Eagle Downs Mine Access Road	1,579	1,582	1,555	1,558	1,702	1,705
Peak Downs Mine Road south of Eagle Downs Mine Access Road	988	1,013	993	1,018	1,124	1,152
Peak Downs Mine Road west of the former Dysart Road (Winchester Access Road access)	965	1,292	970	1,302	1,097	1,473
Saraji Road north of Dysart	1,484	1,491	1,498	1,506	1,693	1,702
Moranbah Access Road north of Peak Downs Highway	3,170	3,195	3,225	3,250	3,653	3,681
Moranbah Access Road north of Moranbah Airport	3,429	3,434	3,489	3,495	3,951	3,957

Directions of travel are relative to the Project.

Table 4.5 and Table 4.6 summarise the forecasts of baseline AM and PM peak hour average weekday traffic on the roads in the region during the Project peak hours. These forecasts are based on the surveyed hourly volumes increased by approximately 9 % to account for seasonal variations as described previously, and include the cumulative impacts of background growth and additional traffic anticipated as a result of the Eagle Downs Mine and Olive Downs Project as described above.

It is noted that GTA (2018 and 2019) does not identify the hours during which the Olive Downs Project peak hours may occur, and that those forecasts assume all inbound and outbound workforce traffic at shift change times occurs in the same hour. Similarly, the peak hours for traffic generated by the Eagle Downs Mine are not identified in the information provided by South32. The base peak hour traffic volumes estimated here assume that the peak traffic generation of both the Eagle Downs Mine and Olive Downs Project would coincide with the Project peak hours. In reality, variations in shift change times and the spread of traffic arriving and departing is likely to result in lower peak hour volumes than those estimated below.

Table 4.5: Future Base Average Weekday AM Peak Hour Traffic (vehicles per hour)

Road and Location	2022		2023		2029	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Peak Downs Highway south-west of Peak Downs Mine Road	82	56	83	57	94	65
Peak Downs Highway north-east of Peak Downs Mine Road	323	220	320	219	345	251
Peak Downs Highway north-east of Moranbah Access Road	211	303	207	302	248	365
Peak Downs Highway west of Coppabella	161	215	159	213	202	285
Peak Downs Highway east of Coppabella	128	213	125	211	167	283
Peak Downs Mine Road south of Peak Downs Highway	265	158	260	155	278	179
Peak Downs Mine Road north of Eagle Downs Mine Access Road	268	182	264	180	283	207
Peak Downs Mine Road south of Eagle Downs Mine Access Road	136	136	135	136	158	159
Peak Downs Mine Road west of the former Dysart Road (Winchester Access Road access)	130	161	128	163	151	189
Saraji Road north of Dysart	167	185	167	186	195	215
Moranbah Access Road north of Peak Downs Highway	465	251	469	255	533	301
Moranbah Access Road north of Moranbah Airport	474	242	479	245	544	290

Directions of travel are relative to the Project.
Project AM peak hour 6:00 am to 7:00 am

Table 4.6: Future Base Average Weekday PM Peak Hour Traffic (vehicles per hour)

Road and Location	2022		2023		2029	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Peak Downs Highway south-west of Peak Downs Mine Road	39	108	40	110	82	99
Peak Downs Highway north-east of Peak Downs Mine Road	150	454	148	455	268	411
Peak Downs Highway north-east of Moranbah Access Road	261	278	258	277	436	284
Peak Downs Highway west of Coppabella	124	304	122	305	281	301
Peak Downs Highway east of Coppabella	149	201	146	199	341	212
Peak Downs Mine Road south of Peak Downs Highway	131	327	129	324	223	294
Peak Downs Mine Road north of Eagle Downs Mine Access Road	94	373	90	371	213	309
Peak Downs Mine Road south of Eagle Downs Mine Access Road	184	90	186	88	188	167
Peak Downs Mine Road west of the former Dysart Road (Winchester Access Road access)	190	91	192	89	193	169
Saraji Road north of Dysart	56	451	56	457	174	326
Moranbah Access Road north of Peak Downs Highway	165	625	167	633	322	604
Moranbah Access Road north of Moranbah Airport	171	649	173	658	336	625

Directions of travel are relative to the Project.
Project PM peak hour 6:00 pm to 7:00 pm in 2022-23, and 5:00 pm to 6:00 pm in 2029.

4.2 Project Traffic Demand Changes

The Project's contribution to future traffic demands on the road network has been quantified based on the Project transport task, access routes and trip generation described in Section 2.

4.2.1 Initial Construction Stage

Table 4.7 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network during Months 1 to 6 of the initial construction stage, during which time both Winchester Access Road and Eagle Downs Mine Access Road would be used to access the Project.

Table 4.8 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network during Months 7 to 12 of the initial construction stage, during which time only Eagle Downs Mine Access Road would be used to access the Project.

Table 4.7: Project Traffic Distribution Initial Construction Stage – Months 1 to 6

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Project Access Road north of Eagle Downs Mine Access Road	6	2	4	2	38	20
Former Dysart Road (Winchester Access Road access) south of Peak Downs Mine Road	19	6	12	6	118	52
Peak Downs Mine Road Eagle Downs Mine Access Road to Peak Downs Highway	24	8	16	8	154	72
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	24	8	16	8	154	72
Peak Downs Highway Moranbah Access Road to Coppabella	0	4	0	4	2	56
Peak Downs Highway east of Coppabella	0	4	0	4	0	56
Peak Downs Mine Road Eagle Downs Mine Access Road to the former Dysart Road (Winchester Access Road access)	18	6	12	6	116	52
Peak Downs Mine Road and Saraji Road Former Dysart Road (Winchester Access Road access)to Dysart	1	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	24	4	16	4	152	16
Goonyella Road Mills Avenue to Curtin Street	16	4	10	4	64	16
Mills Avenue east of Moranbah Access Road	8	0	6	0	88	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	16	4	10	4	64	16

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

Table 4.8: Project Traffic Distribution Initial Construction Stage – Months 7 to 12

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Project Access Road north of Eagle Downs Mine Access Road	58	21	43	21	444	232
Peak Downs Mine Road Eagle Downs Mine Access Road to Peak Downs Highway	57	21	43	21	442	232
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	57	21	43	21	442	232
Peak Downs Highway Moranbah Access Road to Coppabella	1	15	1	15	4	200
Peak Downs Highway east of Coppabella	0	15	0	15	0	200
Peak Downs Mine Road Eagle Downs Mine Access Road to Saraji Road	1	0	0	0	2	0
Saraji Road Peak Downs Mine Road to Dysart	1	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	56	6	42	6	438	32
Goonyella Road Mills Avenue to Curtin Street	32	6	19	6	130	32
Mills Avenue east of Moranbah Access Road	24	0	23	0	308	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	32	6	19	6	130	32

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

4.2.2 Peak Construction and Initial Coal Production Stage

Table 4.9 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network during the peak construction and initial operation stage.

4.2.3 Peak Operational Stage

Table 4.10 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network during the peak operation stage.

Table 4.9: Project Traffic Distribution Peak Construction and Initial Coal Production Stage

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Project Access Road north of Eagle Downs Mine Access Road	48	16	37	16	326	162
Peak Downs Mine Road Eagle Downs Mine Access Road to Peak Downs Highway	48	16	37	16	324	162
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	48	16	37	16	324	162
Peak Downs Highway Moranbah Access Road to Coppabella	1	10	0	10	4	136
Peak Downs Highway east of Coppabella	0	10	0	10	0	136
Peak Downs Mine Road Eagle Downs Mine Access Road to Saraji Road	0	0	0	0	2	0
Saraji Road Peak Downs Mine Road to Dysart	0	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	47	6	37	6	320	26
Goonyella Road Mills Avenue to Curtin Street	30	6	21	6	114	26
Mills Avenue east of Moranbah Access Road	17	0	16	0	206	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	30	6	21	6	114	26

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

Table 4.10: Project Traffic Distribution Peak Operational Stage

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Project Access Road north of Eagle Downs Mine Access Road	48	6	44	9	222	78
Peak Downs Mine Road Eagle Downs Mine Access Road to Peak Downs Highway	47	6	43	9	218	78
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	47	6	43	9	218	78
Peak Downs Highway Moranbah Access Road to Coppabella	1	0	4	2	52	48
Peak Downs Highway east of Coppabella	0	0	3	2	48	48
Peak Downs Mine Road Eagle Downs Mine Access Road to Saraji Road	1	0	1	0	4	0
Saraji Road Peak Downs Mine Road to Dysart	1	0	1	0	4	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	46	6	39	7	166	30
Goonyella Road Mills Avenue to Curtin Street	39	6	32	5	130	18
Mills Avenue east of Moranbah Access Road	7	0	7	2	36	12
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	39	6	32	5	130	18

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

5 Impact Assessment and Mitigation

5.1 Access and Frontage

The required impact assessment area with regard to access and frontage includes the SCR corridor for the extent of the geometric frontage of the Project, and includes works on both the frontage side and potentially on the opposite side of the road. The Project does not have any frontage to any SCR and does not propose direct access to any SCR, which is consistent with TMR's preference that vehicular access is to be obtained via the local road network. Nevertheless, the Project's accesses to the public local road network have been considered.

With regard to connectivity to the public road network, the Project access arrangements make use of the existing intersection of Peak Downs Mine Road with the former Dysart Road (for Winchester Access Road access) during the initial six months of construction activity, and the existing intersection of Peak Downs Mine Road with Eagle Downs Mine Access Road together with the proposed new intersection of Eagle Downs Mine Access Road with the Mine Access Road thereafter (Figure 1.2 and Figure 3.1). The use of the existing roads for Project access means that no new potential conflict points would be introduced along public roads as a result of the Project. The intersection of the Mine Access Road with Eagle Downs Mine Road would not be used by the general public, as it would cater only for traffic directly associated with the Project and Eagle Downs Mine. The new intersection would be located within a lower speed environment than would occur if direct access from the surrounding public roads were to be provided.

The suitability of the public road access intersections, together with the proposed intersection of the Mine Access Road with Eagle Downs Mine Access Road, has been reviewed with respect to turn warrants, and intersection performance. TMR's preferred minimum intersection treatment on major roads and highways is a CHR(S)/AUL(S) due to the combination of operational and safety factors (TMR, 2014).

5.1.1 Turn Warrant Assessments of Access Intersections

5.1.1.1 Access via Winchester Access Road – Months 1 to 6

While Winchester Access Road is a private road, all traffic using Winchester Access Road passes through the intersection of the former Dysart Road and Peak Downs Mine Road, and so interacts with traffic on the public road network at this intersection. During the first six months of the initial construction stage, the majority of Project access would be via the existing intersection of Peak Downs Mine Road with the former Dysart Road, increasing demand for the turning movements into and out of the former Dysart Road as well as the through movements along Peak Downs Mine Road.

The existing intersection turn treatments in Peak Downs Mine Road include an auxiliary left turn deceleration lane and taper approximately 150 m long, and a channelised right turn lane and taper approximately 165 m long.

The existing lane lengths at the intersection have been compared with the deceleration length requirements of Austroads (2017) for a design speed of 100 km/h on Peak Downs Mine Road. Assuming a right-turning vehicle may need to decelerate to a stop, a deceleration lane length (including taper) of 155 m is required on a level grade. Assuming a left-turning vehicle would need to slow to 20 km/h to negotiate the turn, a deceleration lane length (including taper) of 150 m would be needed, or a 70 m lane for an AUL(S) treatment. The design of the existing intersection turn treatments are therefore consistent with the requirements of Austroads (2017).

The treatment of the intersection has been assessed with regard to the Austroads (2020b) and TMR (2016) warrants for rural road turn treatments for high-speed rural roads. The observed sight lines at the intersection exceed those required for the posted speed limit of 100 km/h, so no change to the warrants would be required as a result of any sight distance constraint. Table 5.1 summarises the turn treatments warranted in Peak Downs Mine Road at the former Dysart Road based on the Project peak hour traffic demands.

Table 5.1: Turn Treatment Warrants in Peak Downs Mine Road at the former Dysart Road[A]

Traffic Demands	AM Peak		PM Peak	
	Right Turn	Left Turn	Right Turn	Left Turn
Surveyed	BAR	BAL	BAR	BAL
Initial Construction Months 1 to 6	CHR(S)	AUL(S)	BAR	BAL
Initial Construction Months 7 to 12	BAR	BAL	BAR	BAL
Initial Operation	BAR	BAL	BAR	BAL
Peak Operation	BAR	BAL	BAR	BAL
Existing Treatment	**CHR**	**AUL**	**CHR**	**AUL**

BA = basic treatment, CH = channelised treatment, AU = auxiliary lane treatment, (S) = shorter deceleration lane
[A] *Winchester Access Road access*

The existing turn treatments in Peak Downs Mine Road therefore meet or exceed those that would be warranted with the Project-generated traffic, and so the Project would not require any upgrade to the existing treatments in Peak Downs Mine Road due to any concerns regarding potential safety impacts.

5.1.1.2 Access via Eagle Downs Mine Access Road

The existing intersection of Peak Downs Mine Road with Eagle Downs Mine Access Road would be used by Project traffic throughout the life of the Project. Project traffic would increase the demand for the turning movements into and out of Eagle Downs Mine Access Road throughout the life of the Project, as well as on the through movements along Peak Downs Mine Road past Eagle Downs Mine Access Road during the initial six months of the Project only. The treatment of the intersection has been assessed with regard to the Austroads (2020b) and TMR (2016) warrants for rural road turn treatments for high-speed rural roads.

The existing intersection turn treatments in Peak Downs Mine Road are:

- auxiliary left turn deceleration lane and taper approximately 140 m long (AUL); and
- channelised right turn lane and taper approximately 165 m long (CHR).

Based on Austroads (2017) for a design speed of 100 km/h on Peak Downs Mine Road, and assuming a right-turning vehicle may need to decelerate to a stop, a deceleration lane length (including taper) of 155 m is required on a level grade. Assuming a left-turning vehicle would need to slow to 20 km/h to negotiate the turn, a deceleration lane length (including taper) of 150 m would be needed, or a 70 m lane for an AUL(S) treatment. The design of the existing intersection turn treatments are therefore consistent with the requirements of Austroads (2017).

Table 5.2 summarises the turn treatments warranted in Peak Downs Mine Road at Eagle Downs Mine Access Road, noting that once Eagle Downs Mine Access Road is used to access both the Project and Eagle Downs Mine, the volume of traffic turning left to enter during the AM peak hour would be higher than the volume range displayed on the Austroads (2020b) warrant chart.

Table 5.2: Turn Treatment Warrants Peak Downs Mine Road at Eagle Downs Mine Access Road

Traffic Demands	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Surveyed	BAL	BAR	BAL	BAR
Initial Construction Months 1 to 6	AUL or CHL	CHR	BAL	BAR
Initial Construction Months 7 to 12	X	CHR	BAL	BAR
Initial Operation	X	CHR	BAL	BAR
Peak Operation	X	CHR	AUL(S)	BAR
Existing Treatment	**AUL**	**CHR**	**AUL**	**CHR**

X = turn volume beyond the extents of the warrant chart in Austroads (2020b)

The existing turn treatments in Peak Downs Mine Road therefore meet or exceed those that would be warranted with the Project-generated traffic, and so the Project would not require any upgrade to the existing treatments in Peak Downs Mine Road due to any concerns regarding potential safety impacts.

5.1.1.3 Mine Access Road

A new intersection would be constructed at the intersection of the Mine Access Road with Eagle Downs Mine Access Road. That intersection is proposed to be designed and constructed in accordance with the relevant TMR and Austroads guidelines. A concept plan has been prepared for a seagull treatment of the intersection, which includes:

- a dedicated 50 m plus taper auxiliary left turn deceleration lane in Eagle Downs Mine Access Road for vehicles entering the Mine Access Road (AUL);
- an acceleration/merge lane in Eagle Downs Mine Access Road, allowing a staged exit for vehicles which have turned right out of the Mine Access Road;
- a dedicated channelised short right turn storage lane (CHR(S)) in Eagle Downs Mine Access Road for vehicles entering the Mine Access Road, noting that the demand for this movement would be negligible;
- single eastbound and westbound through lanes in Eagle Downs Mine Access Road;
- "STOP" sign control for traffic on Mine Access Road;
- a single approach and single departure lane in Mine Access Road;
- sealed shoulders on both roads; and
- overhead lighting.

The length of the auxiliary left turn lane for entry to the Mine Access Road meets the Austroads (2017) requirements for a deceleration lane for a design speed of 60 km/h on Eagle Downs Mine Access Road. The deceleration lane for right turn entry into the Mine Access Road is short of the full deceleration requirements, however is consistent with CHR(S) deceleration length of 25 m plus 15 m taper, noting that the demand for that movement is likely to be negligible.

The treatment of the intersection has been assessed with regard to the Austroads (2020b) and TMR (2016) warrants for rural road intersection treatments for lower speed rural roads with speeds between 70 km/h and 100 km/h, noting that the posted speed limit of Eagle Downs Mine Access Road is 60 km/h. The higher warrant has been used in recognition of the rural higher speed environment operating in the region which may impact drivers' expectations and behaviour. Table 5.3 summarises the turn treatments warranted in Eagle Downs Mine Access Road at the Mine Access Road, noting that the demand for right turns in to the Mine Access Road would be negligible, however as the movement would be permitted, the minimum treatment would be warranted.

Table 5.3: Turn Treatment Warrants in Eagle Downs Mine Access Road at Mine Access Road

Road	AM Peak		PM Peak	
	Left Turn	Right Turn	Left Turn	Right Turn
Initial Construction Months 1 to 6	BAL	BAR	BAL	BAR
Initial Construction Months 7 to 12	BAL	BAR	BAL	BAR
Initial Operation	BAL	BAR	BAL	BAR
Peak Operation	BAL	BAR	BAL	BAR
Proposed Treatment	**AUL**	**CHR(S)**	**AUL**	**CHR(S)**

The proposed turn treatments in Eagle Downs Mine Access Road therefore exceed those that would be warranted with the Project-generated traffic.

5.1.2 Intersection Operation Assessments of Access Intersections

The operating characteristics of the three access intersections was assessed using SIDRA INTERSECTION 8, which determines characteristics of intersection operating conditions including the degree of saturation, average delays, and Levels of Service. The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity. The average delay, expressed in seconds per vehicle, is measured over all movements at signalised intersections, and over the movement with the highest average delay at roundabout and priority intersections. Average vehicle delay is the commonly used measure of intersection performance, and Table 5.4 shows the criteria adopted for assessing the Level of Service, noting that all the intersections serving the Project are under sign control. The target for acceptable operation is generally accepted as Level of Service D.

Table 5.4: Intersection Level of Service Criteria

Level of Service	Control Delay per Vehicle (seconds per vehicle)		
	Signals	Roundabout	Sign Control
A	≤ 10	≤ 10	≤ 10
B	10 to ≤ 20	10 to ≤ 20	10 to ≤ 15
C	20 to ≤ 35	20 to ≤ 35	15 to ≤ 25
D	35 to ≤ 55	35 to ≤ 50	25 to ≤ 35
E	55 to ≤ 80	50 to ≤ 70	35 to ≤ 50
F	> 80	> 70	> 50

Source: SIDRA INTERSECTION User Manual

Table 5.5 summarises the forecast Levels of Service for the worst movement at the access intersections for the Project with the Project-generated traffic.

Table 5.5: Future Access Intersection Levels of Service

Intersection	2022 Months 1 to 6		2022 Months 7 to 12		2023		2029	
	AM	PM	AM	PM	AM	PM	AM	PM
Peak Downs Mine Road and the former Dysart Road	B	B	-	-	-	-	-	-
Peak Downs Mine Road and Eagle Downs Mine Access Road	B	B	B	B	B	B	B	B
Mine Access Road and Eagle Downs Mine Access Road	B	B	C	B	C	B	B	B

The results in Table 5.5 demonstrate that the Project access intersections can be expected to operate at good Levels of Service, with acceptable delays to traffic during the Project peak hours. These results suggest that no additional treatments would be required at the access intersections on safety or capacity grounds to accommodate the Project-generated traffic.

5.1.3 Sight Distances at Access Intersections

Observations on-site indicate that the available sight distances to and from the existing access intersections are satisfactory, and exceed the minimum requirements for Safe Intersection Sight Distance between drivers on the major and minor roads at each intersection.

Detailed observations of sight distance at the proposed intersection of the Mine Access Road with Eagle Downs Mine Access Road were not able to be made however the topography of the land and the proposed layout of the intersection do not highlight any concerns that sight distance to and from that intersection would be substandard in any way.

5.1.4 Winchester Access Road

During the first six months of the Initial Construction Stage, the Project-generated traffic using the former Dysart Road to access the Project would use a private intersection of the former Dysart Road and Winchester Access Road (i.e. construction access road), approximately 400 m south of Peak Downs Mine Access Road. The intersection has a sealed surface on part of the former Dysart Road and a gravel surface on Winchester Access Road. Whitehaven would implement a program of regular watering and maintenance of the unsealed portion of the Winchester Access Road during this phase to minimise dust which could otherwise impair visibility for drivers, and would signpost a reduced advisory speed on the unsealed road.

Signage would be provided at the intersection of the former Dysart Road and Winchester Access Road, to direct Project-related vehicles to the construction site, and to clarify priority. Although the dominant movement would be between the north-eastern and eastern legs, as the former Dysart Road to the south-west is a no through road, the layout of the intersection would be generally understood to reflect the typical T-intersection priority, with the eastern leg (Winchester Access Road) being the minor approach. As line marking of a "GIVE WAY" line would not be possible on the gravel surface, it is recommended that the expected priority be applied as above, with "GIVE WAY" (R1-2) signs and advance warning signs of the T-intersection ahead (W2-3 or W2-14R) installed for traffic on the eastern leg. A temporary sign would also be placed on the north-eastern leg to direct inbound vehicles to turn left to reach the construction site.

5.2 Intersection Delay

The impact area for the assessment of intersection delay impacts includes those intersections identified in Table 5.6, being those intersections where the Project traffic is forecast to exceed five percent of the base traffic for any movement in the design peak hours. It should be noted that the intersection of the former Dysart Road with Winchester Access Road has not been considered in Table 5.6 as the former Dysart Road principally provides access to the Winchester Access Road and use of the south-west leg of the former Dysart Road is limited (i.e. no primary access to other properties, and no through access function).

Table 5.6: Intersection Movements – Project Increase Above Base[B]

Site[A]	Intersection	Construction Months 1 to 6		Construction Months 7 to 12		Initial Operation		Peak Operation	
		AM	PM	AM	PM	AM	PM	AM	PM
-	Mine Access Road and Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
1	Peak Downs Mine Road and Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
2	Peak Downs Mine Road and Peak Downs Highway	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
3	Peak Downs Highway and Moranbah Access Road	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
4	Peak Downs Highway and Maloney Street	-	-	>5%	>5%	>5%	>5%	-	-
5	Saraji Road, Garnham Drive, Dysart Clermont Road and Dysart Middlemount Road	-	-	-	-	-	-	-	-
6	Moranbah Access Road and Moranbah Airport	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
7	Moranbah Access Road and Mills Avenue	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
8	Peak Downs Mine Road and the former Dysart Road	>5%	>5%	-	-	-	-	-	-
9	Goonyella Road and Curtin Street	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
10	Curtin Street and Belyando Avenue	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
11	Belyando Avenue and Acacia Street	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%

[A] *Refer to Figure 3.4.*
[B] *Traffic on any one movement at the intersection.*

The operation of the key intersections under both base conditions and with the Project-generated traffic has been assessed using SIDRA INTERSECTION 8 and the resulting Levels of Service are summarised in Table 5.7 for the base conditions.

Table 5.7: Base Intersection Levels of Service – Existing Intersections

Intersection	2022		2023		2029	
	AM	PM	AM	PM	AM	PM
Peak Downs Mine Road and Eagle Downs Mine Access Road	B	B	B	B	B	B
Peak Downs Mine Road and Peak Downs Highway	B	B	B	B	B	B
Peak Downs Highway and Moranbah Access Road	C	C	C	C	C	C
Moranbah Access Road and Moranbah Airport	C	C	C	C	C	D
Moranbah Access Road and Mills Avenue	C	D	C	D	D	F
Peak Downs Mine Road and the former Dysart Road	A	B	A	B	A	B
Goonyella Road and Curtin Street	C	D	C	D	C	E
Curtin Street and Belyando Avenue	B	A	B	B	B	B
Belyando Avenue and Acacia Street	A	A	A	A	A	A
Peak Downs Highway and Maloney Street	C	C	C	C	C	C

Levels of Service based on the movement with the highest average delay per vehicle (Table 5.4).

The results in Table 5.7 demonstrate that under the base conditions:

- the PM peak operation of the intersection of Goonyella Road with Mills Avenue can be expected to deteriorate to F by 2029, with demand exceeding capacity for the right turn movement exiting Mills Avenue to Goonyella Road (note that the SIDRA modelling has assumed that these drivers do not "shelter" in the median area when making this turn); and
- the PM peak operation of the intersection of Goonyella Road with Curtin Street can be expected to deteriorate to E by 2029, with demand exceeding capacity for the right turn movement exiting Curtin Street to Goonyella Road (note that the SIDRA modelling has assumed that these drivers do not "shelter" in the median area when making this turn).

Using SIDRA INTERSECTION 8, TTPP has investigated what measures may be appropriate to mitigate the deterioration in the performance of those intersections under base conditions in 2029. These are summarised in Table 5.8, and would be required to be implemented prior to 2029.

Table 5.8: Upgrades for Acceptable Levels of Service in 2029 – Base Conditions

Intersection	Description of Upgrade	Level of Service	
		AM	PM
Moranbah Access Road and Mills Avenue	Upgrade to a seagull arrangement, with a separate northbound lane in Goonyella Road to allow a staged right turn exit from Mills Avenue.	C	C
Goonyella Road and Curtin Street	Upgrade to a seagull arrangement, with a separate northbound lane in Goonyella Road to allow a staged right turn exit from Curtin Street.	B	C

Table 5.9 summarises the intersection operating conditions with the Project traffic, assuming that the upgrades described in Table 5.8 to accommodate future base conditions would be implemented prior to 2029.

Table 5.9: With Project Intersection Levels of Service

Intersection	2022 Months 1 to 6		2022 Months 7 to 12		2023		2029 with Upgrades	
	AM	PM	AM	PM	AM	PM	AM	PM
Mine Access Road and Eagle Downs Mine Access Road	B	B	C	B	C	B	B	B
Peak Downs Mine Road and Eagle Downs Mine Access Road	B	B	B	B	B	B	B	B
Peak Downs Mine Road and Peak Downs Highway	B	B	B	B	B	B	B	B
Peak Downs Highway and Moranbah Access Road	C	C	C	C	C	C	D	C
Moranbah Access Road and Moranbah Airport	C	C	C	C	C	C	C	D
Moranbah Access Road and Mills Avenue	C	D	D	D	C	D	C	C
Peak Downs Mine Road and the former Dysart Road	B	B	A	B	A	B	A	B
Goonyella Road and Curtin Street	C	D	C	D	C	D	B	C
Curtin Street and Belyando Avenue	B	A	B	A	B	B	B	B
Belyando Avenue and Acacia Street	A	A	A	A	F	A	A	A
Peak Downs Highway and Maloney Street	C	C	C	C	C	C	C	C

Levels of Service based on the movement with the highest average delay per vehicle (Table 5.4).

Table 5.9 indicates that with the Project traffic and the upgrades to accommodate base traffic conditions, the resulting Levels of Service at all of the intersections would be acceptable (Level of Service D or better) in 2029.

The desired outcome is to ensure the sum of intersection delays on base traffic does not significantly worsen, i.e., does not increase average delays by more than 5 % in aggregate (TMR, 2018). The aggregate intersection delay impact has been calculated in accordance with TMR (2018), being the difference between the base case and "with development" intersection vehicle-minutes, where the "with development" vehicle-minutes is calculated by multiplying the "with development" average delay by movement to the base case volume on each movement. TMR (2018) indicates that these calculations may only apply to those intersections with at least one state-controlled road approach, however results below also present the calculations for the local road intersections, noting the majority of impacted intersections are intersections of local roads only.

Table 5.10 and Table 5.11 present summaries of the AM and PM peak hour intersection delays respectively, calculated as above using SIDRA INTERSECTION 8 to determine characteristics of intersection operating conditions. The analyses assume that the road upgrades described above required for base conditions are (Table 5.8) implemented.

Table 5.10: AM Peak Hour Intersection Delays (vehicle-minutes per hour)

Intersection	Base				With Project			
	Project Months 1 to 6	Project Months 7 to 12	2023	2029	Project Months 1 to 6	Project Months 7 to 12	2023	2029
Peak Downs Mine Road and Eagle Downs Mine Access Road	15.5	15.5	13.7	12.0	15.6	15.9	14.1	12.2
Peak Downs Mine Road and Peak Downs Highway (SCR)	60.1	60.1	59.2	67.7	61.0	63.1	61.6	70.1
Peak Downs Highway (SCR) and Moranbah Access Road	120.0	120.0	120.3	171.5	127.4	139.4	133.7	193.8
Peak Downs Highway (SCR) and Maloney Street	-	26.7	8.8	-	-	27.3	9.2	-
Moranbah Access Road and Moranbah Airport	8.3	8.3	8.7	10.5	8.5	8.6	9.0	10.9
Moranbah Access Road and Mills Avenue	126.8	126.8	130.7	145.1	131.1	155.9	138.4	148.7
Peak Downs Mine Road and the former Dysart Road	1.6	-	-	-	1.6	-	-	-
Goonyella Road and Curtin Street	92.9	92.9	94.9	104.2	93.3	93.3	95.9	105.1
Curtin Street and Belyando Avenue	55.8	55.8	56.1	66.3	56.1	56.4	56.6	67.1
Belyando Avenue and Acacia Street	25.2	25.2	25.5	29.7	25.5	25.2	37.1	29.7
Total All Intersections	**506.2**	**531.3**	**518.0**	**606.9**	**520.2**	**585.2**	**555.6**	**637.6**

Note: Totals may not add exactly due to rounding.

Table 5.11: PM Peak Hour Intersection Delays (vehicle-minutes per hour)

Intersection	Base				With Project			
	Project Months 1 to 6	Project Months 7 to 12	2023	2029	Project Months 1 to 6	Project Months 7 to 12	2023	2029
Peak Downs Mine Road and Eagle Downs Mine Access Road	18.8	18.8	17.2	16.4	19.6	21.2	18.8	17.6
Peak Downs Mine Road and Peak Downs Highway (SCR)	68.0	68.0	70.0	78.2	69.8	72.9	71.1	82.5
Peak Downs Highway (SCR) and Moranbah Access Road	-	128.4	129.5	165.2	-	136.1	136.2	179.8
Peak Downs Highway (SCR) and Maloney Street	-	46.2	13.7	-	-	46.7	13.8	-
Moranbah Access Road and Moranbah Airport	-	9.6	10.2	14.3	-	11.3	10.9	15.7
Moranbah Access Road and Mills Avenue	-	163.6	170.0	175.1	-	171.1	178.7	180.0
Peak Downs Mine Road and the former Dysart Road	1.2	-	-	-	1.2	-	-	-
Goonyella Road and Curtin Street	120.0	120.0	123.2	136.4	121.8	122.8	125.2	137.8
Curtin Street and Belyando Avenue	-	87.9	91.7	112.2	-	88.5	93.5	118.1
Belyando Avenue and Acacia Street	32.4	32.4	32.5	37.6	32.4	32.4	32.5	38.1
Total All Intersections	**240.4**	**674.9**	**658.0**	**735.4**	**245.0**	**702.9**	**681.0**	**769.5**

Note: Totals may not add exactly due to rounding.

On the basis of the above, the intersection delay impact during the design peaks is summarised in Table 5.12, in which the impact is expressed as the percent increase (or decrease) with the intersection delay aggregate with the Project over that of the base conditions.

Table 5.12: Project Intersection Delay Impact (vehicle minutes)

	AM Peak Hour			PM Peak Hour		
	Base	Project	Impact[A]	Base	Project	Impact[A]
2022 Months 1 to 6	506.2	520.2	2.8%	240.4	245.0	1.9%
2022 Months 7 to 12	531.3	585.2	10.1%	674.9	702.9	4.2%
2023	518.0	555.6	7.2%	658.0	681.0	3.5%
2029	606.9	637.6	5.0%	735.4	769.5	4.6%

[A] *Impact calculated as percent increase with Project compared with Base conditions*

From Table 5.12, the 5 % threshold would be exceeded during the AM peak from Months 7 to 12 until 2029. As demonstrated in Table 5.9, the Level of Services for the worst movement at all the intersections at those times would remain acceptable. The threshold exceedances occur during the construction activity periods, and are primarily attributable to impacts at the intersections of Moranbah Access Road with Peak Downs Highway and with Mills Avenue.

As noted (Section 2.3), the assessment assumes that the peak operational workforce at the Project in 2029 is significantly higher than would be required with expected automation. A sensitivity check indicates that with the expected workforce in 2029 with automation, the total intersection delays impacts for the AM peak (Table 5.12), would be below 4 % and thus below the threshold. The need for any mitigation measures to accommodate the peak operational workforce would therefore be appropriately determined once details of the peak operational workforce are confirmed.

5.3 Road Link Capacity

The impact area for the assessment of road link capacity impacts includes those road links identified in Table 5.13, being those road links where the Project traffic is forecast to exceed 5 % of the base traffic in either direction on the link's AADT.

Table 5.13: Road Links – Project Increase Above Base AADT[A]

Road	Construction Months 1-6	Construction Months 7-12	Initial Operation	Peak Operation
Peak Downs Highway south-west of Peak Downs Mine Road	-	-	-	-
Peak Downs Highway north-east of Peak Downs Mine Road	-	>5%	>5%	>5%
Peak Downs Highway north-east of Moranbah Access Road	-	-	-	-
Peak Downs Highway west of Coppabella	-	-	-	-
Peak Downs Highway east of Coppabella	-	-	-	-
Peak Downs Mine Road south of Peak Downs Highway	>5%	>5%	>5%	>5%
Peak Downs Mine Road north of Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%
Peak Downs Mine Road south of Eagle Downs Mine Access Road	>5%	-	-	-
Peak Downs Mine Road west of the former Dysart Road	-	-	-	-
Saraji Road north of Dysart	-	-	-	-
Moranbah Access Road north of Peak Downs Highway	-	>5%	>5%	-
Moranbah Access Road north of Moranbah Airport	-	>5%	-	-

[A] *Traffic in either direction.*

The desired outcome is to ensure that traffic generated by the Project does not significantly worsen the operational capacity of SCR links. The *Guide to Traffic Impact Assessment* indicates that road operational capacity impacts are only considered for major development and link capacity assessments are not required unless new SCR links are needed to be constructed to service the development. Given the scale of the Project, it is considered prudent to consider the impacts of the Project on the capacity of its primary access routes and this assessment has considered all access routes rather than only SCR links.

When considering the operation of the road network in rural areas, the Level of Service perceived by drivers along routes is also a consideration, with increasing traffic demands restricting drivers' freedom of movement along the route.

The capacity of a road is the number of vehicles that can be accommodated on the road infrastructure before it fails to function as it was intended. Austroads (2020a) defines capacity as the maximum sustainable hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane is affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

The Austroads (2020a) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* provides guidelines for the assessment of the capacity and performance of two lane, two-way rural roads, which in turn, refers to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016). Level of Service represents road users' perceptions of the quality of service provided by a road link, and describes operational conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. Levels of Service are designated A through F, with Level of Service A providing the best traffic conditions, with no restriction on desired travel speed or overtaking. Level of Service B to D describes progressively worse traffic conditions. Level of Service E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for Level of Service E is taken as the capacity of a lane or roadway. In rural situations, Level of Service C is generally considered to be acceptable. At Level of Service C, most vehicles are travelling in platoons, and travel speeds are curtailed. At Level of Service D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low. The Level of Service experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road. The target for acceptable conditions is generally accepted as Level of Service D.

The Level of Service experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road, and three classes of road are defined in the HCM. Class I roads are those on which motorists expect to travel at relatively high speeds, and most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes or pass through rugged terrain. Class III roads serve moderately developed areas, and may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas, where local traffic mixes with through traffic, and the density of unsignalised roadside access points increases.

On Class I roads, Level of Service is defined in terms of Percent Time Spent Following (PTSF) and Average Travel Speed (ATS), with the worst of these criteria being adopted as the Level of Service. On Class II roads, Level of Service is defined only in terms of PTSF. The PTSF is a measure of the level of opportunities to overtake, and is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. On Class III roads, Level of Service is defined in terms of Percent of Free-Flow Speed (PFFS), which is the ratio of ATS to the free-flow speed, representing the ability of vehicles to travel at or near the posted speed limit. The Level of Service criteria for two lane roads are as shown in Table 5.14.

Table 5.14: Level of Service Criteria for Two Lane Two Way Roads

Level of Service	Class I		Class II	Class III
	Average Travel Speed (km/h)	PTSF (%)	PTSF (%)	PFFS (%)
A	> 90	≤ 35	≤ 40	> 91.7
B	> 80 – 90	> 35 – 50	> 40 – 55	> 83.3 – 91.7
C	> 70 – 80	> 50 – 65	> 55 – 70	> 75.0 – 83.3
D	> 60 – 70	> 65 – 80	> 70 – 85	> 66.7 – 75.0
E	≤ 60	≥ 80	≥ 85	≤ 66.7

Source: Austroads (2020a)

For the purpose of this review, with the exception of Moranbah Access Road, the Project access routes (Section 2.2) have been considered as Class I routes, which applies more stringent criteria for calculation of Level of Service. The PTSF results in a poorer result for the calculated Level of Service than ATS, hence the results reported herein are based on the PTSF. Moranbah Access Road has been considered a Class II road, due to the access function it performs for Moranbah, with a likely change in the perception of drivers regarding its performance.

It is noted that due to the presence of the merge and diverge lanes on Peak Downs Highway between Peak Downs Mine Road and Moranbah Access Road, the HCM method does not strictly apply, as it assumes a single travel lane in each direction. The results for that road should therefore be considered indicative of the most constrained length of that road, where there is a single travel lane in each direction and overtaking is not permitted. As it is a relatively short length of road, drivers are less likely to perceive a higher PTSF as being restrictive to their freedom of travel.

Table 5.15 summarises the Levels of Service during the AM and PM peak hours respectively in 2022 over the identified impact assessment areas, calculated using the methodology described above.

Table 5.15: AM and PM Project Peak Hour Midblock Levels of Service in 2022

Road	Inbound			Outbound		
	Base	Months 1-6	Months 7-12	Base	Months 1-6	Months 7-12
AM Project Peak Hour						
Peak Downs Highway north-east of Peak Downs Mine Road	C	-	D	B	-	C
Peak Downs Mine Road south of Peak Downs Highway	C	C	C	B	B	B
Peak Downs Mine Road north of Eagle Downs Mine Access Road	C	C	C	B	B	B
Peak Downs Mine Road south of Eagle Downs Mine Access Road	B	B	-	B	B	-
Moranbah Access Road north of Peak Downs Highway	C	-	C	B	-	B
Moranbah Access Road north of Moranbah Airport	C	-	C	B	-	B
PM Project Peak Hour						
Peak Downs Highway north-east of Peak Downs Mine Road	A	-	B	D	-	D
Peak Downs Mine Road south of Peak Downs Highway	A	A	A	C	C	C
Peak Downs Mine Road north of Eagle Downs Mine Access Road	A	A	A	C	C	C
Peak Downs Mine Road south of Eagle Downs Mine Access Road	B	B	-	A	A	-
Moranbah Access Road north of Peak Downs Highway	A	-	A	C	-	C
Moranbah Access Road north of Moranbah Airport	A	-	A	C	-	C

Table 5.16 summarises the Levels of Service during the AM and PM peak hours respectively in 2023 over the identified impact assessment areas, calculated using the methodology described above.

Table 5.16: AM and PM Project Peak Hour Midblock Levels of Service in 2023

Road	AM Project Peak Hour				PM Project Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Base	Project	Base	Project	Base	Project	Base	Project
Peak Downs Highway north-east of Peak Downs Mine Road	D	D	C	C	A	B	D	D
Peak Downs Mine Road south of Peak Downs Highway	C	C	A	A	A	A	C	C
Peak Downs Mine Road north of Eagle Downs Mine Access Road	C	C	B	B	A	A	C	C
Moranbah Access Road north of Peak Downs Highway	C	C	B	B	A	A	C	C

Table 5.17 summarises the Levels of Service during the AM and PM peak hours respectively in 2029 over the identified impact assessment areas, calculated using the methodology described above.

Table 5.17: AM and PM Project Peak Hour Midblock Levels of Service in 2029

Road	AM Project Peak Hour				PM Project Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Base	Project	Base	Project	Base	Project	Base	Project
Peak Downs Highway north-east of Peak Downs Mine Road	D	D	C	C	C	C	D	D
Peak Downs Mine Road south of Peak Downs Highway	C	C	B	B	C	C	C	C
Peak Downs Mine Road north of Eagle Downs Mine Access Road	C	C	B	B	B	C	C	C

The results indicate that the Levels of Service during the Project AM and PM peak hours with the Project traffic would remain within the acceptable range, and that the Levels of Service would remain unchanged from those under base conditions, with the following exceptions:

- Moranbah Access Road north of Peak Downs Highway:
  - 2022 (Months 7-12) AM peak southbound PTSF would increase from 59.1 to 72.6;
  - 2022 (Months 7-12) AM peak northbound PTSF would increase from 44.8 to 51.0; and
  - 2022 (Months 7-12) PM peak southbound PTSF would increase from 34.3 to 36.0.
- Peak Downs Highway north-east of Peak Downs Mine Road (noting the limitations of the HCM method to this road):
  - 2023 AM peak westbound PTSF would increase from 33.7 to 36.2.

- Peak Downs Mine Road north of Eagle Downs Mine Access Road:
  - 2029 PM peak southbound PTSF would increase from 46.2 to 50.3.

The impacts of the Project on road link capacities are therefore:

- limited to the initial construction stage of the Project on Moranbah Access Road, with Levels of Service remaining acceptable during the peak hours;
- negligible for inbound traffic on Peak Downs Highway during the morning peak hour during the initial coal production stage, noting that the limitations of the HCM on this stretch of road; and
- during the PM peak hour on Peak Downs Mine Road north of the Project in the inbound direction, the resulting PTSF is forecast to lie at the bottom of the range for Level of Service C, which is acceptable.

5.4 Road Safety

The impact area for the assessment of road safety impacts includes those intersections and road links identified in Table 5.6 and Table 5.13, being those intersections where the Project traffic is forecast to exceed five percent of the base traffic for any movement in the design peak hours, and those road links where the Project traffic is forecast to exceed five percent of the base traffic in either direction on the link's AADT.

The *Guide to Traffic Impact Assessment* indicates that the desired outcome is for road safety at any location on the SCR network to not be significantly worsened as a result of new development, and that any pre-existing unacceptable safety risk or development-introduced safety risk is addressed. In consideration of the use of local roads for Project access, the risk assessment includes the local roads that would be used by Project-generated traffic.

A road safety impact assessment has been undertaken in accordance with the *Guide to Traffic Impact Assessment*, and has:

- identified existing safety risks relevant to the impact assessment area;
- identified likely new or modified risks resulting from the Project; and
- recommended management or mitigation works to ensure the risk rating is not worsened as a result of the Project and that any unacceptable safety risk is addressed.

Changes to the risk profile within the impact assessment area are expected to be primarily associated with increases in traffic volumes, including additional heavy vehicles. The Project of itself proposes:

- no changes to pedestrian or cyclist desire lines;
- no increases in the posted speed limit;
- no changes in visibility for movements to, from or along the SCR or local road network;

- no introduction of over-dimension or heavy vehicles to roads not currently used by such vehicles;
- no changes in the infrastructure network beyond the new Mine Access Road and its intersection with Eagle Downs Mine Access Road; and
- no additional traffic at intersections that would result in queues in auxiliary lanes overflowing into adjacent lanes.

Traffic safety risks have been identified and scored using the *Guide to Traffic Impact Assessment* risk scoring matrix, presented in Table 5.18.

Table 5.18: 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

Source: TMR, 2018

The consequence of the crashes which occurred as a direct result of the hazard was determined using the ratings in Table 5.19.

Table 5.19: Crash Severity

Consequence Rating	Description
Negligible	No medical treatment required for road users
Low	Medical treatment required for road users
Medium	Serious injury occurs for road users
High	Single fatality occurs for road users
Extreme	Multiple fatalities occur for road users

The review of the crash history of the routes (Table 3.8 and Table 3.9) indicates that of the total of 36 crashes reported in the recent five year period along the primary Project access routes, 22 crashes (61%) resulted in hospitalisation. As such, hospitalisation would be the most likely consequence of the baseline crashes along the access routes comprising two-lane two-way high speed roads. A lower consequence would be rated if it is in a lower speed environment.

The likelihood of crash occurrence has been rated based on frequency of crashes per year on that road in accordance with the criteria stipulated Table 5.20.

Table 5.20: Likelihood Rating

Likelihood Rating	Description	Frequency of incident
Almost certain	The event is expected to occur in most instances.	One incident occurs at least once a month.
Likely	The event will probably occur in most instances.	One incident occurs between once a month and once in three months.
Moderate	The event might occur at some time.	One incident occurs between once in four months and once in a year.
Unlikely	The event could occur at some time.	One incident occurs between once a year and once in three years.
Rare	The event may occur in exceptional circumstances.	One incident occurs less than once in three years.

The likelihood of crash occurrence on Peak Downs Mine Road, Moranbah Access Road, Goonyella Road and Peak Downs Highway has been rated in Table 5.21 based on the number of crashes per year.

Table 5.21: Baseline Likelihood of Crash Occurrence

Access Route	Number of Crashes 2014 to 2018	Crashes Per Year	Baseline Likelihood of Crash Occurrence
Peak Downs Mine Road North of Level Crossing	4	1	Unlikely
Moranbah Access Road and Goonyella Road South of Curtin Street	14	3	Moderate
Peak Downs Highway from Peak Downs Mine Road to Coppabella	18	4	Likely
Former Dysart Road	0	0	Rare

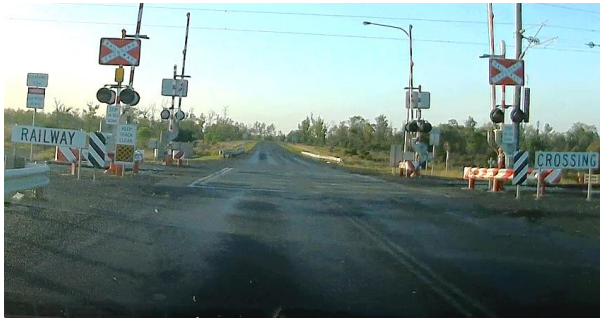
The additional traffic generated by the Project on the access routes (Section 4.2) is expected to increase motorists' exposure to crashes along the access route which are all high speed two-lane two-way roads. The above criteria indicate one additional crash per year would tip over the likelihood from moderate to likely.

While consequence of crashes is expected to remain the same, the likelihood would be rated to a higher level from the existing due to the addition of project traffic. Following implementation of the proposed mitigation measures, the likelihood of crash occurrence would be rated to a lower level from the existing given the identified hazards are managed or removed.

Table 5.22 presents the risk assessment of the likelihood and consequence of safety risks being increased as a consequence of Project-generated traffic.

Table 5.22: Risk Assessment

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
General – Road Links										
The majority of the Project workforce would be accommodated in Moranbah which would require daily travel to the Project using the main access route via Moranbah Access Road, Peak Downs Highway and Peak Downs Mine Road. At its period of peak trip generation during Months 7 to 12 of the initial construction stage, up to 674 daily movements (light vehicles and heavy vehicles) associated with the Project would be generated along this main access route to Moranbah Access Road, with 204 daily trips on Peak Downs Highway east of Moranbah Access Road and 470 daily trips on Moranbah Access Road. Further, the mine access route includes the existing Winchester Access Road and the proposed Mine Access Road. Increased traffic volumes along the access route have the potential to impact not only residents but the wider community and also workforce through an increase in crash risk. Table 3.8 shows the predominant crash type along the main access route is off path type (DCA 700 and 800), represented by 24 (or 66%) out of 36 crashes that were reported between 2014 and 2018. Of these 24 off path crashes, 17 crashes resulted in hospitalisation of road users involved. These off path crashes could be correlated with the road deficiencies in relation to delineation and pavement conditions to be further discussed in Table 5.22. It can be inferred from the crash data that the level of the existing crash risks are generally medium, based on a moderate likelihood with hospitalisation as a consequence under the existing conditions.	Moderate	Hospitalisation	Medium (12)	Likely	Hospitalisation	High (16)	**To minimise traffic increases during construction, Whitehaven would use shuttle buses to transport workers between the accommodation villages in Moranbah and the Project. This would minimise the Project-generated traffic volumes on the road network.** **Whitehaven would also liaise with local communities, IRC and emergency services regarding the proposed changes to the existing road network. Whitehaven would also implement a Fatigue Management Policy for the workforce, including a swipe card system to monitor hours worked, use of buses to transport workers, and coordinated car-pooling arrangements.** **The drivers would be trained for the type of vehicle being operated and inducted with safety information.** **Refer to the recommended measures to mitigate specific risk items further in Table 5.22.**	**Unlikely**	**Hospitalisation**	**Medium (8)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Pavement bleeding in a significant section of Peak Downs Mine Road (both directions), particularly on both approaches to the level crossing. The smooth and shiny surface in the wheel paths has low skid resistance, and the road may become slippery during wet weather conditions. 	Unlikely	Hospitalisation	Medium (8)	Moderate	Hospitalisation	Medium (12)	**Pavement resurfacing to prevent further deterioration under IRC's regular maintenance program.**	**Rare**	**Hospitalisation**	**Medium (4)**
Pavement bleeding in a significant section of Moranbah Access Road (both directions). The smooth and shiny surface in the wheel path has low skid resistance, and the road may become slippery during wet weather conditions.	Moderate	Hospitalisation	Medium (12)	Moderate	Hospitalisation	Medium (12)	**Pavement resurfacing to prevent further deterioration under IRC's regular maintenance program.**	**Unlikely**	**Hospitalisation**	**Medium (8)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Potholing on the former Dysart Road may affect the stability and controllability of the vehicles if motorists travel directly over them. If the small ones are untreated, moisture may infiltrate into the pavement resulting in more significant potholing. 	Rare	Medical Treatment	Low (3)	Unlikely	Medical Treatment	Medium (6)	**Pavement maintenance to keep road pavement in fair condition.**	**Rare**	**Minor Injury**	**Low (2)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of Mine Access Road and Eagle Downs Mine Access Road										
Interaction of the Project traffic and the Eagle Downs Mine traffic on Eagle Downs Mine Access Road.	-	-	-	Unlikely	Medical Treatment	Medium (6)	**Minimise traffic conflicts by separating through and turning vehicles at the intersection, by providing an auxiliary left turn deceleration lane in Eagle Downs Mine Access Road for entry to the Mine Access Road and right turn acceleration lane in Eagle Downs Mine Access Road for exit from the Mine Access Road.** **Minimise the potential consequences of traffic conflicts by signposting 60 km/h speed limits on both roads approaching the intersection.** **Provide ongoing traffic demand management such as shuttle bus services, car pooling and staggering of shift times to minimise traffic conflicts.** **Educate workforce through inductions on road safety.** **Communication equipment (e.g., mobile radios) would be carried by the Project-related truck drivers for communication with the Project site in the event of an incident, that allows Whitehaven to respond accordingly.**	**Rare**	**Medical Treatment**	**Low (3)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of Peak Downs Mine Road and Eagle Downs Mine Access Road										
Interaction of the Project traffic and the Eagle Downs Mine traffic on Eagle Downs Mine Access Road.	-	-	-	Unlikely	Hospitalisation	Medium (8)	**Provide ongoing traffic demand management such as shuttle buses, car pooling and staggering of shift times to minimise traffic conflicts.** **Educate workforce through inductions on road safety.** **Communication equipment (e.g., mobile radios) would be carried by the Project-related truck drivers for communication with the Project site in the event of an incident, that allows Whitehaven to respond accordingly.**	**Rare**	**Hospitalisation**	**Medium (4)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
The centreline marking on Peak Downs Mine Road terminates a few metres too early and may mislead motorists into turning right too early towards the right turn lane on Eagle Downs Mine Access Road. Motorists turning right from Peak Downs Mine Road onto Eagle Downs Mine Access Road may misinterpret the chevron marking as a painted median to separate the northbound southbound traffic, and mistakenly enter the right turn lane on Eagle Downs Mine Access Road. This may result in side-swipe or head-on incidents with the southbound traffic. 	Unlikely	Medical Treatment	Medium (6)	Unlikely	Medical Treatment	Medium (6)	**Extend the centreline marking on Peak Downs Mine Road to provide better delineation guidance for the right turning movement onto Eagle Downs Mine Access Road under IRC's regular maintenance program.**	**Rare**	**Medical Treatment**	**Low (3)**
Intersection of Peak Downs Mine Road and Peak Downs Highway										
No safety issues have been identified	-	-	-	-	-	-	-	-	-	-

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of Peak Downs Highway and Moranbah Access Road										
Two Hazard Markers should be installed along the curve on Moranbah Access Road, north of Peak Downs Highway. Currently, only one Hazard Marker is provided but appears to have low/no retro-reflectivity which would affect night time delineation along the curve.	Moderate	Hospitalisation	Medium (12)	Moderate	Hospitalisation	Medium (12)	**Install two Hazard Markers in accordance with AS1742.2 under IRC's regular maintenance program.**	**Unlikely**	**Hospitalisation**	**Medium (8)**
Intersection of Peak Downs Highway and Maloney Street										
No safety issues have been identified	-	-	-	-	-	-	-	-	-	-
Intersection of Moranbah Access Road and Moranbah Airport										
No safety issues have been identified	-	-	-	-	-	-	-	-	-	-
Intersection of Moranbah Access Road and Mills Avenue										
The southbound kerbside lane south of Mills Avenue has insufficient width to allow a southbound vehicle to pass a vehicle entering the kerbside lane. The width reduces over some 110m, with a significant width reduction at a bend. There is no signage and line marking to warn motorists of the lane drop and the need to merge. There is no provision of a "run-out" area through the merge area to accommodate those vehicles prevented from merging as they approach the end of the lane. The lane line marking is faded and no Raised Reflective Pavement Markers (RRPMs) are provided. Fretted pavement edge makes it difficult for errant vehicles to regain the pavement.	Moderate	Medical treatment	Medium (9)	Likely	Medical treatment	Medium (12)	**Improve delineation by improving line marking and installing RRPMs under IRC's regular maintenance program.** **Provide signage for the merge lane according to AS1742 under IRC's regular maintenance program.** **IRC to consider widening the merge lane and provide a sealed road shoulder with the same width of a travel lane as a "run-out" area.**	**Unlikely**	**Medical treatment**	**Medium (6)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of the former Dysart Road and Winchester Access Road										
A section of Winchester Access Road is a gravel road which causes issues with fugitive dust and subsequently impairs visibility on the road.	Rare	Medical Treatment	Low (3)	Unlikely	Medical Treatment	Medium (6)	**Implement a program of regular watering and maintenance of the unsealed portion of Winchester Access Road to minimise dust.** **Signpost a reduced advisory speed on Winchester Access Road.**	**Rare**	**Minor Injury**	**Low (2)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of Goonyella Road and Curtin Street										
After motorists turn left from Curtin Street onto Goonyella Road, there are two southbound lanes on Goonyella Road. No lane line marking is provided to define the southbound travel lanes on approach to the Grosvenor Drive intersection. The median lane is a shared through and right turn lane however there is only one through lane after the intersection. Risk of side-swipe incidents when two vehicles travelling abreast on the departure side of the intersection. 	Unlikely	Medical Treatment	Medium (6)	Moderate	Medical Treatment	Medium (9)	**Refresh line marking to improve road delineation under IRC's regular maintenance program.** **Remove the straight arrow from the right turn bay under IRC's regular maintenance program.**	**Rare**	**Minor Injury**	**Low (2)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Intersection of Curtin Street and Belyando Avenue										
Changes occur in traffic volume through the neighbourhood. Project workers new in the community may be unfamiliar with local roads.	Rare	Medical treatment	Low (3)	Unlikely	Medical treatment	Medium (6)	**Educate workforce through inductions on road safety and safe driving through local roads.**	**Rare**	**Medical treatment**	**Low (3)**
Intersection of Belyando Avenue and Acacia Street										
Changes occur in traffic volume through the neighbourhood. Project workers new in the community may be unfamiliar with local roads.	Rare	Medical treatment	Low (3)	Unlikely	Medical treatment	Medium (6)	**Educate workforce through inductions on road safety and safe driving through local roads.**	**Rare**	**Medical treatment**	**Low (3)**

5.5 Pavement

The impact assessment area with regard to pavement impacts includes all road links where the Project standard axle repetitions (SARs) exceeds 5% of the base traffic in either direction on the link's SARs. While the Project does not propose road haulage of product coal, the *Guide to Traffic Impact Assessment* (2018) indicates that the pavement impacts of both construction and operational activities should be assessed, and these are discussed herein. IRC requested that consideration be given to pavement impacts on its roads, which are included in the assessment below to inform future assessments of maintenance contributions.

5.5.1 Project Standard Axle Repetitions

The Project-generated SAR4s for the assessment years considered in this report have been assessed based on the forecast number of Project-generated heavy vehicles attending the Project per day, as set out in Table 5.23 for the assessment scenarios years. For the purpose of this assessment, it has been estimated that the Project-generated heavy delivery vehicles would be made up of:

- 10 % 2-axle rigid trucks (Austroads Class 3);
- 10 % 3-axle rigid trucks (Austroads Class 4);
- 40 % Semitrailers (Austroads Class 9); and
- 40 % B-doubles (Austroads Class 10).

Table 5.23: Project Average Heavy Vehicles per Day

	to or from Mackay					to or from Moranbah				
	Bus	Class 3	Class 4	Class 9	Class 10	Bus	Class 3	Class 4	Class 9	Class 10
Initial Construction Stage Months 1 to 6	-	3	3	11	11	8	-	-	-	-
Initial Construction Stage Months 7 to 12	-	10	10	40	40	16	-	-	-	-
Initial Coal Production Stage	-	7	7	27	27	13	-	-	-	-
Peak Operational Stage	-	2	2	10	10	9	1	1	2	2

With the exception of the buses used to transport the workforce between the Project and Moranbah, the heavy vehicles would be a mix of empty and laden vehicles, and have been assumed to be 50 % loaded and 50 % unloaded for the purpose of this assessment, noting that loaded vehicles are considered to be loaded to their legal capacity.

Buses transporting the construction workforce from Moranbah have been assumed to transport passengers in the morning, return to Moranbah during the day, and return to collect passengers in the evening. Therefore, half of both the inbound and outbound buses are assumed to be laden and half unladen. Due to the overlap between the day and night shift workforces, buses transporting the operational workforce from Moranbah have been assumed to both arrive and depart the Project with passengers. Therefore all inbound and outbound buses transporting the operational workforce are assumed to be laden.

The payload of a laden bus transporting the workforce is expected to be significantly lower than that of an equivalent Class 3 two-axle truck or Class 4 three axle truck, noting that the buses would carry some 40 passengers and no luggage. The standard SAR calculations assume a payload of a laden Class 3 (two-axle) vehicle is 6.5 tonnes, and of a Class 4 (three-axle) vehicle is 13 tonnes. For the purpose of the calculation of Project-generated SARs, the buses are assumed to be three-axle buses (Class 4), but with a reduced payload when laden of approximately 40 % of the legal capacity. The other heavy vehicles are assumed to carry their full legal payload when laden. The assumed loadings and SARs for each vehicle type used in the assessment are summarised in Table 5.24.

Table 5.24: Project Heavy Vehicle Loadings and SAR4s per Heavy Vehicle

Heavy Vehicle Type	Vehicle Loading (%)				SAR per Heavy Vehicle	
	Inbound to Project		Outbound from Project			
	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded
Bus – Construction	50	50	50	50	1.03	0.50
Bus – Operational	100	-	100	-	1.03	0.50
Class 3	50	50	50	50	2.98	0.54
Class 4	50	50	50	50	3.57	0.50
Class 9	50	50	50	50	4.93	0.51
Class 10	50	50	50	50	6.30	0.53

The resulting Project-generated daily SARs are summarised in Table 5.25 for the nominated Project assessment years.

Table 5.25: Project SARs per Day

	to/from Mackay		to/from Moranbah	
	Inbound	Outbound	Inbound	Outbound
Initial Construction Stage Months 1 to 6	78.9	78.9	6.1	6.1
Initial Construction Stage Months 7 to 12	283.5	283.5	12.2	12.2
Initial Coal Production Stage	192.3	192.3	10.7	10.7
Peak Operational Stage	69.0	69.0	25.3	25.3

Allowing for periods of inactivity at the Project, and that the forecasts are based on busy daily conditions, it has been assumed that the forecast SARs would occur on the equivalent of 330 days per year (and 165 days each for the different access arrangements during the initial construction stage). For this assessment, the operational traffic generation assessed for delivery vehicles is assumed to commence at approximately 60 % of peak levels upon completion of construction activity at the end of 2023, and increase to the peak level by 2029.

Table 5.26: Annual Project SARs

Year	to/from Mackay		to/from Moranbah	
	Inbound	Outbound	Inbound	Outbound
2022 Months 1 to 6	13,019	13,019	1,009	1,009
2022 Months 7 to 12	46,775	46,775	2,018	2,018
2022 Total	59,795	59,795	3,027	3,027
2023	63,459	63,459	3,543	3,543
2024	13,407	13,407	7,111	7,111
2025	14,658	14,658	7,111	7,111
2026	16,684	16,684	8,362	8,362
2027	18,710	18,710	8,362	8,362
2028	20,736	20,736	8,362	8,362
2029 onwards	22,762	22,762	8,362	8,362

5.5.2 State Controlled Roads

The SAR data provided by TMR for Peak Downs Highway (Table 3.3) are calculated based on the TMR default of 3.2 SAR4s per heavy vehicle. This default has therefore been applied to the background traffic. The contribution of the Eagle Downs Mine and Olive Downs Project to future SARs on the Project routes have been estimated assuming similar assumptions as those described above for the Project-generated traffic.

Based on the foregoing assumptions, the base and Project-generated SARs have been quantified for the period from commencement of the Project through to a longer term scenario up to 20 years following commencement of construction of the Project. This assumes that background growth continues to occur at a rate of 2 % per annum after 2029. Table 5.27 identifies those SCR links which meet the relevant SAR criteria for the Project assessment scenarios with regard to pavement impacts in accordance with *Guide to Traffic Impact Assessment* (2018).

Table 5.27: Pavement Impact Assessment Area: Project SAR More Than 5% Above Base SAR[A]

Road Link	2022 – Project Construction	2023	2024	2025	2026	2027	2028	2029	2030	2032 – 10 years	2042 – 20 years
Peak Downs Mine Road to Moranbah Access Road	>5%	>5%	-	-	-	-	-	>5%	>5%	-	-
Moranbah Access Road to Isaac Plains Mine	>5%	>5%	-	-	-	-	-	-	-	-	-
Isaac Plains Mine to Coppabella	>5%	>5%	-	-	-	-	-	-	-	-	-
Coppabella to Fitzroy Developmental Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Fitzroy Developmental Road to Oxford Downs Sarina Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Oxford Downs Sarina Road to Nebo	>5%	>5%	-	-	-	-	-	-	-	-	-
Nebo to Blue Mountain Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Blue Mountain Road to Eton Homebush Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Eton Homebush Road to Kellys Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Kellys Road to Mackay Eungella Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Mackay Eungella Road to Horse and Jockey Road	>5%	>5%	-	-	-	-	-	-	-	-	-
Horse and Jockey Road to Bernborough Avenue	>5%	>5%	-	-	-	-	-	-	-	-	-
Bernborough Avenue to Nebo Road	-	>5%	-	-	-	-	-	-	-	-	-

[A] *SAR in either direction.*

With regard to road pavements, the desired outcome described in the *Guide to Traffic Impact Assessment* (2018) is to ensure no net worsening to SCR pavements as a result of increased heavy vehicle traffic from the Project. TMR requires development contributions for all roads within the SCR network where development generated SAR4s exceed 5 % of base SAR4s, which are identified in Table 5.27. Contributions may be based on the marginal cost rate method (TMR, 2019b), which applies a cost per SAR-km generated by the Project traffic. Table 5.28 summarises the total SAR-km on each section of Peak Downs Highway within the Project assessment area to inform that calculation.

Table 5.28: Total Project-Generated SAR-km in Project Impact Area ('000 per year)

Road Link	Length (km)	Project SAR		Project SAR-km	
		Inbound	Outbound	Inbound	Outbound
Peak Downs Mine Road to Moranbah Access Road	1.3	192.1	192.1	249.7	249.7
Moranbah Access Road to Isaac Plains Mine	11.4	123.3	123.3	1,405.1	1,405.1
Isaac Plains Mine to Coppabella	26.2	123.3	123.3	3,229.2	3,229.2
Coppabella to Fitzroy Developmental Road	21.4	123.3	123.3	2,637.6	2,637.6
Fitzroy Developmental Road to Oxford Downs Sarina Road	14.3	123.3	123.3	1,762.5	1,762.5
Oxford Downs Sarina Road to Nebo	14.6	123.3	123.3	1,799.5	1,799.5
Nebo to Blue Mountain Road	44.8	123.3	123.3	5,521.8	5,521.8
Blue Mountain Road to Eton Homebush Road	17.2	123.3	123.3	2,120.0	2,120.0
Eton Homebush Road to Kellys Road	14.0	123.3	123.3	1,725.5	1,725.5
Kellys Road to Mackay Eungella Road	5.4	123.3	123.3	665.6	665.6
Mackay Eungella Road to Horse and Jockey Road	4.7	123.3	123.3	579.3	579.3
Horse and Jockey Road to Bernborough Avenue	1.0	123.3	123.3	123.3	123.3
Bernborough Avenue to Nebo Road	0.8	63.5	63.5	50.8	50.8

Totals over the years identified in Table 5.27

5.5.3 Local Roads

As requested by IRC, the Project's contribution to pavement impacts on the local roads have also been quantified. These include Peak Downs Mine Road between the Project and Peak Downs Highway and Moranbah Access Road between Peak Downs Highway and Moranbah. Table 5.29 presents the Project-generated SARs on those local roads to inform assessment of pavement impacts on the local roads.

Table 5.29: Total Project-Generated Annual SAR on Local Roads (SAR per year)

Year	Peak Downs Mine Road Project to Peak Downs Highway		Moranbah Access Road Peak Downs Highway to Mills Avenue	
	Inbound	Outbound	Inbound	Outbound
2022	62,822	62,822	1,009	1,009
2023	67,002	67,002	2,018	2,018
2024	20,518	20,518	3,027	3,027
2025	21,769	21,769	3,543	3,543
2026	25,046	25,046	7,111	7,111
2027	27,072	27,072	7,111	7,111
2028	29,098	29,098	8,362	8,362
2029 and onwards	31,124	31,124	8,362	8,362

5.6 Railway Level Crossings

The Project rail spur and rail loop would connect to the Norwich Park Branch Railway, within the MLA 700049. The Project rail spur would not cross any existing roads.

5.6.1 Project Rail Traffic

Annual volumes of product coal to be transported by rail would vary over the life of the Project, with peak rate of approximately 11 Mtpa. An average of six train movements per day would be required (i.e. three arrivals and departures) with a maximum of 16 train movements per day (i.e. eight arrivals and departures). Train arrivals and departures would occur 24 hours per day.

Coal capacities of trains may vary over the life of the Project due to progressive rail capacity upgrades and changes to train configurations. Train movements may increase or decrease accordingly.

The Project would result in an increased number of trains travelling along the Norwich Park Branch Railway, with a peak of up to eight product coal trains per day (i.e. 16 train movements) being loaded for the Project. This could result in increased traffic delays at the level crossings located along the Norwich Park Branch Railway between the Project and the coal ports.

However, it is anticipated that the Project would not have a significant impact on these rail level crossings, since the number of coal trains associated with the Project would only be minimal in comparison to the large number of trains that travel along this network on a daily basis. It should be noted that:

- The *Network Development Plan 2019* (Aurizon, 2019) states that the coal throughput for the 2019 financial year of the Goonyella System was 124.5 Mtpa.
- The Project proposes up to 11 Mtpa of product coal to be transported along the Goonyella System.
- The Project would only represent approximately 9% of the coal throughput along the rail network.

Furthermore, the Project rail spur would be designed and constructed in consultation with Aurizon to minimise potential impacts on the existing environment in accordance with relevant guidelines, including the *Guide to development in a transport environment: Rail* (TMR, 2015).

5.6.2 Project Road Traffic

Considering the distribution of Project vehicular traffic, its contribution to future traffic at railway level crossings would be greatest at the existing actively controlled level crossing of Peak Downs Mine Road and the Norwich Park Branch Railway (Section 3.2), which is located to the south of the Mine Access Road, and north-east of Winchester Access Road. The Project's contribution to future traffic at that level crossing is summarised in Table 5.30.

Table 5.30: Project Traffic at Peak Downs Mine Road Level Crossing

	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Initial Construction Stage Months 1 to 6	18	6	12	6	116	52
Initial Construction Stage Months 7 to 12	1	0	0	0	2	0
Initial Coal Production Stage	0	0	0	0	2	0
Peak Operational Stage	1	0	1	0	4	0

From Table 5.30, it is evident that the volume of road traffic generated by the Project through the level crossing would be negligible from Month 7 of the initial construction stage, and well within the normal day-to-day variation in traffic such that it would be expected to have an imperceptible impact on the performance of the level crossing.

During Months 1 to 6, the majority of Project-generated traffic would access the Project via Winchester Access Road and have an origin or destination to the north along Peak Downs Mine Road. As a result, the Project would generate 24 and 18 additional vehicles across the level crossing during the AM and PM peak hours respectively. It was observed that when a coal train passes through, Peak Downs Mine Road remains closed to vehicular traffic for approximately 2.5 to 3 minutes, depending on the length and speed of the train. As the railway line is single track through the level crossing, each closure of Peak Downs Mine Road at the level crossing is necessarily followed by a period of several minutes during which the road is open before a following train closes the road.

During the AM peak hour of the Project's initial six months, the Project traffic would generate an average of fewer than two additional vehicles on Peak Downs Mine Road in a 3 minute period. Allowing for variations from the average, the Project may be expected to result in up to an additional six vehicles being stopped by a passing coal train at the level crossing during the PM peak hour. The additional vehicles would result in an increase in the maximum queue of vehicles formed in Peak Downs Mine Road, with the maximum occurring just after the boom gates are opened after the train has passed, and also an increase in the time taken for the queue to dissipate following opening of the boom gates.

The increase in the queue formed in Peak Downs Mine Road would have no impacts on the safety or operation of the road network, as there are no minor roads or property accesses in the vicinity that could potentially be blocked by a queue in either direction, and sight distances for approaching drivers are adequate to observe any queue of vehicles. The additional time required for the longer queue to dissipate would be less than 15 seconds, thus the impact on average delays over all vehicles on Peak Downs Mine Road would be very low. As the road reopens between each and every train, there is adequate time to allow the queue to dissipate completely before the road is closed again.

As the signage and road markings at the level crossing are consistent with AS1742.7, and the additional Project-generated traffic through the crossing during Months 1 to 6 of the Project would have only minor impacts of delays and queues during peak hours as described above, no concerns are raised regarding the impacts of the Project-generated road traffic on the level crossing.

As noted (Section 3.2), the *Queensland Level Crossing Safety Strategy 2012- 2021* (TMR, 2012) sets out a number of key actions and performance indicators with regard to level crossing infrastructure, which support its long term vision of zero harm at level crossings across Queensland. With regard to those actions, the following is noted:

- the level crossing infrastructure and environs are observed to be designed and maintained to be in accordance with AS1742.7 and no changes are planned as a result of the Project;
- appropriate reduced road speeds apply on both approaches to the level crossing;
- additional heavy vehicles through the level crossing as a result of the Project would be limited to the initial six months of construction only, and during daylight hours only;
- the longer term planning of the Project anticipates no additional heavy vehicles using the level crossing after the initial six months of construction, and only a small number of additional light vehicle movements, thus minimising any increase in the level of risk at the level crossing; and
- any continued assessment using ALCAM by the rail or road infrastructure owners should take into consideration the minor increases in Project-generated rail and road traffic outlined above when calculating the exposure factor at this and other level crossings. Infrastructure and consequence factors would not be impacted.

5.7 Other Considerations

The assessment above considers the road transport demands directly generated by the construction and operational activity associated with the Project. Additional indirect vehicular traffic can be expected to result from other activities, such as workers residing in the accommodation camp travelling to and from their usual place of residence at the start or end of their rostered work period, noting that roster details have not yet been developed. This may include trips between the accommodation camps and Moranbah Airport, or between the accommodation camps and larger centres such as Mackay. Such trips may include workers travelling by taxi or bus to and from the Airport, or by bus or light vehicles to and from the larger centres.

Additional demand for flights to and from Moranbah is likely to be met by increasing the number of flights (rather than the seating capacity of the aeroplanes serving the Airport), resulting in an increase daily traffic to and from the Airport with additional peaks in traffic to and from the Airport throughout the day directly linked to additional flights. These trips are unlikely to coincide with the peak hours associated with the Project traffic generated in this assessment, to the extent that this occurs, the background growth in traffic considered in this assessment is considered to adequately allow for these trips.

5.8 Alternative Access Option

An additional access option has been assessed to examine the impacts of the Project should the Mine Access Road from Eagle Downs Mine Access Road not be constructed. Under this alternative access option, all vehicular access would be via the former Dysart Road and Winchester Access Road throughout the construction period and operational life of the Project. This alternative access option would only alter the contribution of the Project-generated traffic on the part of the road network between the proposed Mine Access Road and Winchester Access Road. The outcomes of this assessment are (Appendix E):

- The layout of and sight distance available at the existing intersection of Peak Downs Mine Road with the former Dysart Road meet or exceed requirements based on forecast demands.
- The intersections of Peak Downs Mine Road with the former Dysart Road and with Eagle Downs Mine Access Road would operate at satisfactory levels of service with the alternative access option.
- Midblock Levels of Service during the peak hours are forecast to be acceptable on Peak Downs Mine Road between Eagle Downs Mine Access Road and the former Dysart Road.
- No additional mitigation measures are expected for the alternative access option to those presented in Section 5.4 regarding road safety of the road links and intersections affected by the Project.
- The Project-generated SARs on the local roads would not be impacted by the alternative access option, however the length of Peak Downs Mine Road which would experience those SARs would be increased.
- The increase of Project-generated traffic on the actively controlled level crossing of Peak Downs Mine Road and the Norwich Park Branch Railway would have negligible impact on the delays experienced by vehicles during a closure of the level crossing.
- It is recommended that Winchester Access Road be upgraded in accordance with Austroads road design guidelines, with a minimum sealed width of 8.0 m, plus minimum 1.0 m unsealed shoulder on each side.
- The potential residual impacts of the Project with the alternative access option can be appropriately managed or mitigated through the relevant measures outlined in Sections 5.1 to 5.6, together with design and upgrade of Winchester Access Road consistent with TMR and Austroads guidelines.

6 Summary and Conclusions

6.1 Summary

The Project

The Project involves the development of an open cut coal mine in an existing mining precinct located approximately 200 km south-west of Mackay and 30 km south-east of Moranbah, within the IRC LGA of the Bowen Basin in central Queensland. This study has assessed future scenarios representing busiest conditions expected throughout development of the Project during the initial construction stage, peak construction and initial production stage, and the peak operational stage.

As described in Section 2.3, this study has considered the potential road transport impacts associated with two options for Project vehicular access, via the Mine Access Road from Eagle Downs Road, with use of Winchester Access Road for the first six months of the Project, and via Winchester Access Road for the life of the Project. Below is a summary of the assessment of Project vehicular access via Mine Access Road predominantly, with a summary of the assessment of Project vehicular access via Winchester Access Road presented in Section E.11 of Appendix E.

Aspects of the Project have been refined in consideration of the mitigation hierarchy to avoid potential impacts through design, to manage impacts through operational measures, and to mitigate the residual impacts. Key refinements include:

- for the first six months of the Project, vehicular access to and from the Project would be via Winchester Access Road, minimising long-term potential impacts on Peak Downs Mine Road between Eagle Downs Mine Road and the former Dysart Road;
- all operational vehicular access to and from the Project would be via the new Mine Access Road from Eagle Downs Mine Access Road, minimising potential impacts to through traffic on Peak Downs Mine Road by consolidating interaction with the public road network to a single existing intersection rather than introducing a new intersection;
- management of workforce travel through the use of shuttle bus services to transport the majority of the workforce between the Project and accommodation facilities at Moranbah, thus significantly reducing the potential number of trips generated between the Project and the main accommodation location of the workforce; and
- product coal would be transported from the Project by rail, resulting in no increase in road traffic directly related to coal transport.

The level of activity (i.e. traffic movements) associated with mine closure is expected to be lower than the ongoing operational activity and the longer term implications of the Project would be considered as part of the pavement impact assessment. Therefore, the potential impacts on road transport would be less than the potential impacts of the operational and construction phases, assessed as part of this study.

Access and Frontage Impacts

Consistent with TMR's preference that vehicular access is to be obtained via the local road network, the Project does not have any frontage to any SCR and does not propose direct access to any SCR.

The Project's access arrangements make use of the existing intersections of Peak Downs Mine Road with the former Dysart Road (Winchester Access Road access) (six months only) and Eagle Downs Mine Access Road, both of which are constructed with AUL and CHR treatments in Peak Downs Mine Road which meet or exceed requirements based on forecast future demands. The access intersections are expected to operate at good levels of service with forecast peak demands, and sight distances meet or exceed requirements. The intersection of the Mine Access Road and Eagle Downs Mine Access Road would be designed and constructed in accordance with TMR's guidelines.

Intersection Delay Impacts

Under base conditions without the Project, the intersections that would be used by Project traffic are anticipated to operate at acceptable levels of service, with the exceptions of Goonyella Road with Mills Avenue, and Goonyella Road with Curtin Street. The delays to vehicles exiting the minor roads via a right turn on to Goonyella Road during the PM peak are expected to be unacceptable by 2029. These intersections are the main accesses for Moranbah, and upgrading to a seagull arrangement to allow a staged right turn exit would result in acceptable conditions in 2029 without the Project.

With the Project traffic and upgrades to accommodate base conditions, the resulting operation of all intersections would be acceptable in 2029. No infrastructure works would be required to accommodate the Project-generated traffic beyond construction of the intersection of the Mine Access Road with Eagle Downs Mine Access Road.

Road Link Capacity Impacts

Levels of Service on road links have been assessed using the *Highway Capacity Manual* method used by Austroads. Compared with base conditions, the Project would result in changes to the Levels of Service on Moranbah Access Road in the AM peak hour during the short-term construction stage of the Project only, and on Peak Downs Mine Road north of the Project in the PM peak hour in the peak operational stage of the Project. Under both base conditions and with the Project, Levels of Service during the peak hours are forecast to be acceptable, and additional capacity would not be required to accommodate the Project-generated traffic.

Road Safety Impacts

A road safety impact assessment has been undertaken, and changes to the risk profile within the impact assessment area were generally identified to result from increases in traffic volumes, including additional heavy vehicles. With the implementation of mitigation measures (Table 5.22) the Project is expected to meet the desired outcome of no significant worsening of road safety at any location on the SCR network, nor on the local roads that would be used by Project-generated traffic.

On the SCR network, no specific safety risks were identified, and the Project's travel demand management measures would minimise increases in traffic to reduce the likelihood of road crashes (e.g., shuttle bus services, car pooling, staggering of shift times and workforce education).

On the local roads, the aforementioned demand management measures identified to minimise increases in traffic generated by the Project would reduce the likelihood of road crashes. Specific issues on the local roads have been identified, and mitigation of these has typically been identified as infrastructure works including improvements to line marking, delineation and pavement conditions which may be addressed through IRC's regular maintenance programs.

Pavement Impacts

The assessment of base and Project-generated SARs on the SCR (Peak Downs Highway) has found that the Project's impacts on pavement life, where Project SAR exceed base SAR by more than 5%, would be limited to the short term construction stage of the Project.

The Project's SAR contribution on the local roads has been assessed to inform discussions with IRC, and are presented in Table 5.29 of this assessment.

Railway Level Crossings Impacts

The Project's contribution to road traffic at level crossings would be greatest at the level crossing on Peak Downs Mine Road and the Norwich Park Branch Railway, located to the south of the Project. The Project would contribute only negligible road traffic at that level crossing after the first six months of construction. During the first six months of construction, the additional Project traffic would not raise any concerns regarding the operation of or safety at that level crossing.

Continued assessment of level crossing using ALCAM by rail or road infrastructure owners would take into consideration the Project-generated increases in rail and road traffic on the networks.

6.2 Conclusions

The potential residual impacts of the Project associated with having the predominant vehicular access for the Project via the Mine Access Road have been identified herein and can be appropriately managed or mitigated through:

- continued Project travel demand management through use of shuttle bus service, car pooling and staggering of shift times;
- design and construction of the new intersection of the Mine Access Road with Eagle Downs Mine Access Road consistent with TMR's guidelines;
- appropriate contributions to IRC's maintenance of Moranbah Access Road and Peak Downs Mine Road to address specific safety risks; and
- appropriate contributions to TMR and IRC to support pavement reconstruction and rehabilitation works.

The potential residual impacts of the Project associated with having vehicular access via Winchester Access Road for the life of the Project have also been identified and can be appropriately managed or mitigated through the relevant measures outlined above, with the design and upgrade of Winchester Access Road consistent with TMR and Austroads guidelines instead of the Mine Access Road (Appendix E).

Appendix A

Project Transport Forecasts

Initial Construction Trip Generation – Months 1 to 6 (vehicles per hour)

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	10	0	1	0	0	0	0	0	11	0
6:00 am	**19**	**0**	**3**	**1**	**3**	**1**	**4**	**2**	**29**	**4**
7:00 am	7	0	0	3	3	1	4	2	14	6
8:00 am	0	0	0	0	3	1	4	3	7	4
9:00 am	0	0	0	0	3	1	4	3	7	4
10:00 am	0	0	0	0	3	3	4	4	7	7
11:00 am	0	0	0	0	3	3	4	4	7	7
12:00 pm	0	0	0	0	3	3	4	4	7	7
1:00 pm	0	0	0	0	3	3	4	4	7	7
2:00 pm	0	0	0	0	1	3	3	4	4	7
3:00 pm	0	0	0	0	1	3	3	4	4	7
4:00 pm	0	0	1	0	1	3	2	4	4	7
5:00 pm	**0**	**11**	**3**	**1**	**1**	**3**	**2**	**4**	**6**	**19**
6:00 pm	0	18	0	3	0	0	0	0	1	22
7:00 pm	0	7	0	0	0	0	0	0	0	8
8:00 pm	0	0	0	0	0	0	0	0	0	0
Daily Total[A]	**36**	**36**	**8**	**8**	**28**	**28**	**42**	**42**	**114**	**114**

Includes trips via Winchester Access Road and Eagle Downs Mine Access Road

[A] *Vehicles per day*

Initial Construction Trip Generation – Months 7 to 12 (vehicles per hour)

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	22	0	2	0	0	0	0	0	24	0
6:00 am	**36**	**0**	**4**	**2**	**10**	**5**	**15**	**7**	**65**	**14**
7:00 am	14	0	2	4	10	5	15	7	41	16
8:00 am	0	0	0	2	10	5	15	8	25	15
9:00 am	0	0	0	0	10	5	15	8	25	13
10:00 am	0	0	0	0	10	10	15	15	25	25
11:00 am	0	0	0	0	10	10	15	15	25	25
12:00 pm	0	0	0	0	10	10	15	15	25	25
1:00 pm	0	0	0	0	10	10	15	15	25	25
2:00 pm	0	0	0	0	5	10	8	15	13	25
3:00 pm	0	0	0	0	5	10	8	15	13	25
4:00 pm	0	0	2	0	5	10	7	15	14	25
5:00 pm	**0**	**22**	**4**	**2**	**5**	**10**	**7**	**15**	**16**	**49**
6:00 pm	0	36	2	4	0	0	0	0	2	40
7:00 pm	0	14	0	2	0	0	0	0	0	16
8:00 pm	0	0	0	0	0	0	0	0	0	0
Daily Total[A]	**72**	**72**	**16**	**16**	**100**	**100**	**150**	**150**	**338**	**338**

[A] *Vehicles per day*

Peak Construction and Initial Operational Stage Trip Generation (vehicles per hour)

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	22	0	3	0	0	0	0	0	25	0
6:00 am	**25**	**9**	**3**	**3**	**7**	**3**	**10**	**4**	**45**	**19**
7:00 am	9	0	1	2	7	4	10	5	27	11
8:00 am	0	0	0	1	7	3	10	5	17	9
9:00 am	0	0	0	0	7	4	10	6	17	10
10:00 am	0	0	0	0	7	6	10	9	17	15
11:00 am	0	0	0	0	6	7	9	10	15	17
12:00 pm	0	0	0	0	7	6	10	9	17	15
1:00 pm	0	0	0	0	6	7	9	10	15	17
2:00 pm	0	0	0	0	4	7	6	10	10	17
3:00 pm	0	0	0	0	3	7	5	10	8	17
4:00 pm	0	2	2	0	4	7	5	10	11	19
5:00 pm	**9**	**15**	**3**	**2**	**3**	**7**	**4**	**10**	**19**	**34**
6:00 pm	0	31	1	4	0	0	0	0	1	35
7:00 pm	0	8	0	1	0	0	0	0	0	9
8:00 pm	0	0	0	0	0	0	0	0	0	0
Daily Total[A]	**65**	**65**	**13**	**13**	**68**	**68**	**98**	**98**	**244**	**244**

[A] *Vehicles per day*

Peak Operational Stage Trip Generation (vehicles per hour)

Hour Starting	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	33	0	3	0	0	0	0	0	36	0
6:00 am	**16**	**32**	**2**	**4**	**0**	**0**	**0**	**0**	**18**	**36**
7:00 am	0	0	0	0	3	1	3	1	6	2
8:00 am	0	0	0	0	3	2	3	2	6	4
9:00 am	0	0	0	0	3	3	3	3	6	6
10:00 am	0	0	0	0	3	3	3	3	6	6
11:00 am	0	0	0	0	3	3	3	3	6	6
12:00 pm	0	0	0	0	3	3	3	3	6	6
1:00 pm	0	0	0	0	3	3	3	3	6	6
2:00 pm	0	0	0	0	3	3	3	3	6	6
3:00 pm	0	0	0	0	3	3	3	3	6	6
4:00 pm	0	8	0	1	2	3	2	3	4	15
5:00 pm	**32**	**8**	**4**	**1**	**1**	**3**	**1**	**3**	**38**	**15**
6:00 pm	0	33	0	3	0	0	0	0	0	36
7:00 pm	0	0	0	0	0	0	0	0	0	0
8:00 pm	0	0	0	0	0	0	0	0	0	0
Daily Total[A]	**81**	**81**	**9**	**9**	**30**	**30**	**30**	**30**	**150**	**150**

[A] *Vehicles per day*

Initial Construction Trip Distribution – Months 1 to 6

Origin or Destination	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	3	0	1	0	0	0	0	0	4	0
Moranbah	1	0	0	0	0	0	1	1	2	1
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	1	0	0	0	1	0
AM Peak – via Winchester Access Road (vehicles per hour)										
Camp	13	0	2	1	0	0	0	0	15	1
Moranbah	1	0	0	0	0	0	3	1	4	1
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	1	0	0	0	0	0	0	0	1	0
Mackay	0	0	0	0	2	1	0	0	2	1
PM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	0	2	1	0	0	0	0	0	1	2
Moranbah	0	0	0	0	0	0	1	1	1	1
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	0	1	0	0	0	1
PM Peak – via Winchester Access Road (vehicles per hour)										
Camp	0	8	2	1	0	0	0	0	2	9
Moranbah	0	0	0	0	0	0	1	3	1	3
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	1	2	0	0	1	2
Daily – via Eagle Downs Mine Access Road (vehicles per day)										
Camp	6	6	2	2	0	0	0	0	8	8
Moranbah	1	1	0	0	0	0	12	12	13	13
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	8	8	0	0	8	8
Daily – via Winchester Access Road (vehicles per day)										
Camp	26	26	6	6	0	0	0	0	32	32
Moranbah	1	1	0	0	0	0	30	30	31	31
Coppabella	1	1	0	0	0	0	0	0	1	1
Dysart	1	1	0	0	0	0	0	0	1	1
Mackay	0	0	0	0	20	20	0	0	20	20

Initial Construction Trip Distribution – Months 7 to 12

Origin or Destination	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	32	0	4	2	0	0	0	0	36	2
Moranbah	2	0	0	0	0	0	15	7	17	7
Coppabella	1	0	0	0	0	0	0	0	1	0
Dysart	1	0	0	0	0	0	0	0	1	0
Mackay	0	0	0	0	10	5	0	0	10	5
PM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	0	19	4	2	0	0	0	0	4	21
Moranbah	0	1	0	0	0	0	7	15	7	16
Coppabella	0	1	0	0	0	0	0	0	0	1
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	5	10	0	0	5	10
Daily – via Eagle Downs Mine Access Road (vehicles per day)										
Camp	65	65	16	16	0	0	0	0	81	81
Moranbah	4	4	0	0	0	0	150	150	154	154
Coppabella	2	2	0	0	0	0	0	0	2	2
Dysart	1	1	0	0	0	0	0	0	1	1
Mackay	0	0	0	0	100	100	0	0	100	100

Peak Construction and Initial Coal Production Trip Distribution

Origin or Destination	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	23	7	3	3	0	0	0	0	26	10
Moranbah	2	1	0	0	0	0	10	4	12	5
Coppabella	1	0	0	0	0	0	0	0	1	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	7	3	0	0	7	3
PM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	7	14	4	2	0	0	0	0	11	16
Moranbah	1	1	0	0	0	0	4	10	5	11
Coppabella	0	0	0	0	0	0	0	0	0	0
Dysart	0	0	0	0	0	0	0	0	0	0
Mackay	0	0	0	0	3	7	0	0	3	7
Daily – via Eagle Downs Mine Access Road (vehicles per day)										
Camp	57	57	13	13	0	0	0	0	70	70
Moranbah	5	5	0	0	0	0	98	98	103	103
Coppabella	2	2	0	0	0	0	0	0	2	2
Dysart	1	1	0	0	0	0	0	0	1	1
Mackay	0	0	0	0	68	68	0	0	68	68

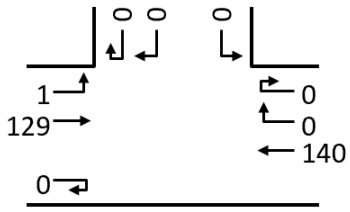
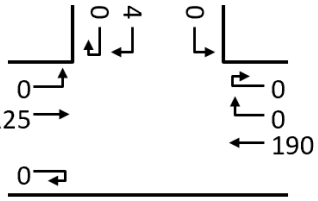
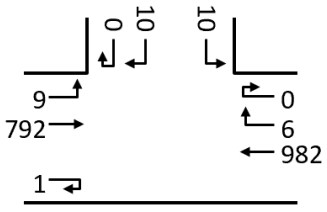
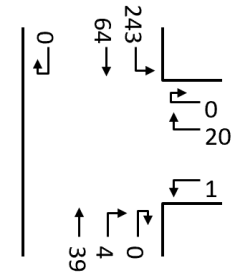
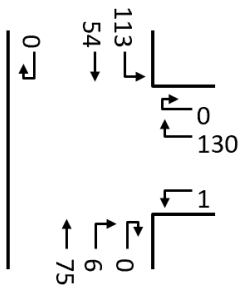
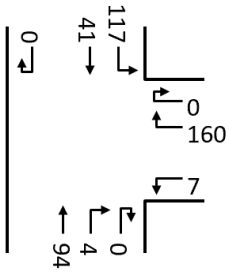
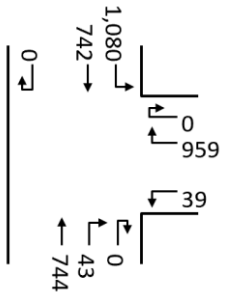
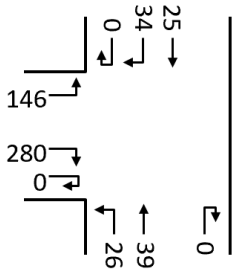
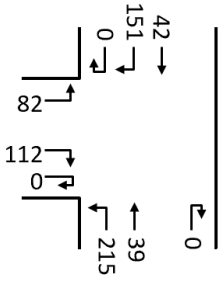
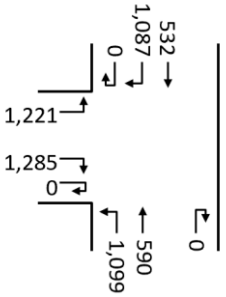
Peak Operational Trip Distribution

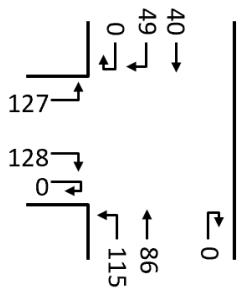
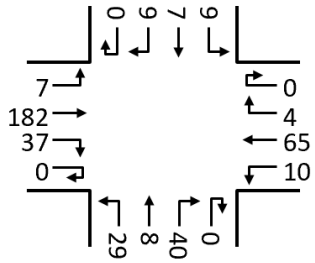
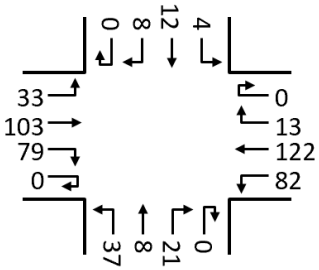
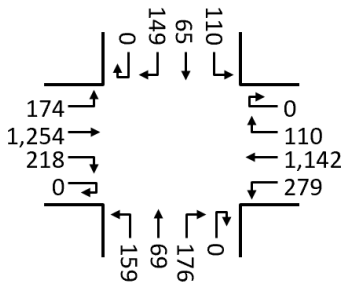
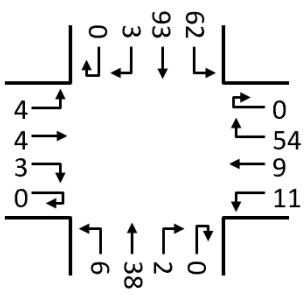
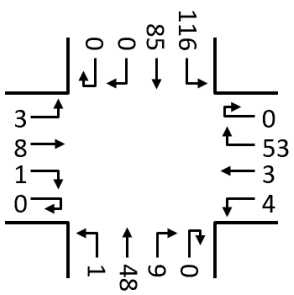
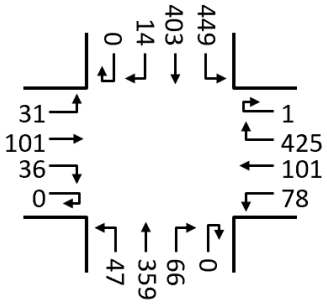
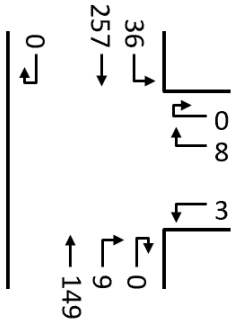
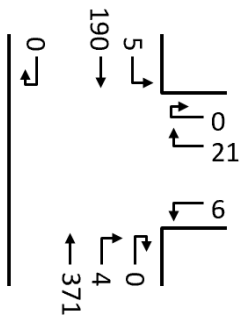
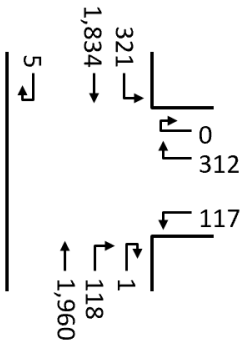
Origin or Destination	Workforce Cars		Workforce Buses		Deliveries		Visitors		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	13	26	2	4	0	0	0	0	15	30
Moranbah	2	5	0	0	0	0	0	0	2	5
Coppabella	0	1	0	0	0	0	0	0	0	1
Dysart	0	1	0	0	0	0	0	0	0	1
Mackay	0	0	0	0	0	0	0	0	0	0
PM Peak – via Eagle Downs Mine Access Road (vehicles per hour)										
Camp	26	6	4	1	0	0	0	0	30	7
Moranbah	5	1	0	0	1	1	1	0	7	2
Coppabella	1	0	0	0	0	0	0	0	1	0
Dysart	1	0	0	0	0	0	0	0	1	0
Mackay	0	0	0	0	0	2	0	3	0	5
Daily – via Eagle Downs Mine Access Road (vehicles per day)										
Camp	65	65	9	9	0	0	0	0	74	74
Moranbah	12	12	0	0	6	6	6	6	24	24
Coppabella	2	2	0	0	0	0	0	0	2	2
Dysart	2	2	0	0	0	0	0	0	2	2
Mackay	0	0	0	0	24	24	24	24	48	48

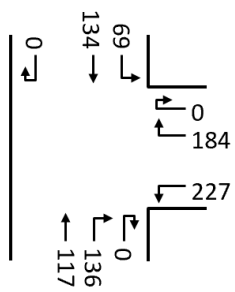
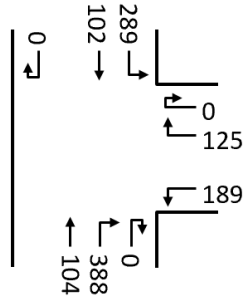
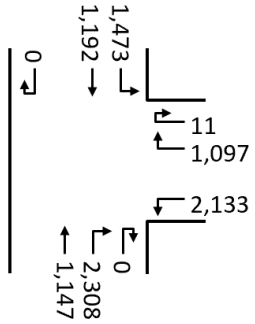
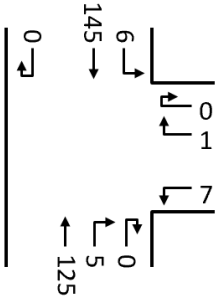
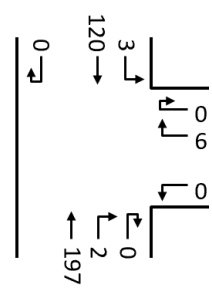
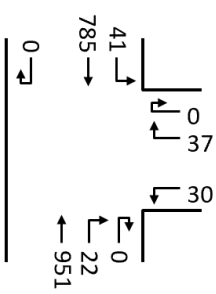
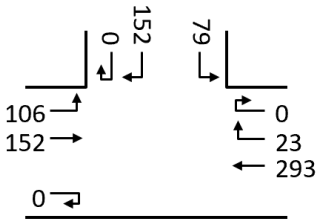
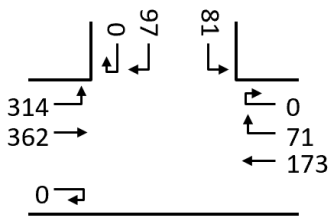
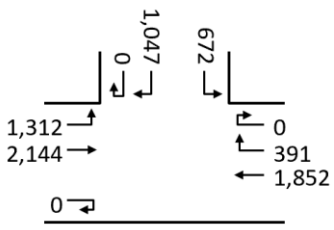
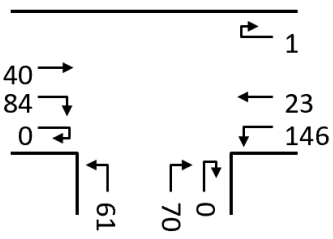
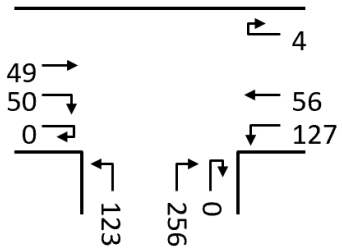
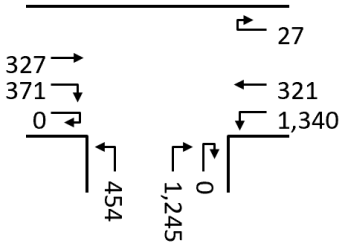
Appendix B

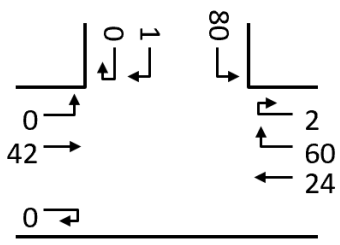
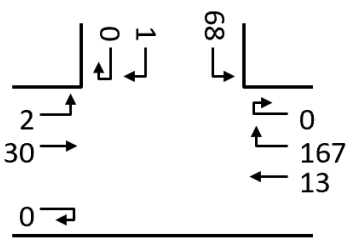
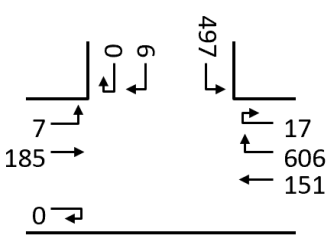
Traffic Surveys

Surveyed Vehicle Turning Movements at Intersections

Site[A]	AM Peak 6:00 am to 7:00 am (vehicles per hour)	PM Peak Hour 5:00 pm to 6:00 pm (vehicles per hour)	Total Survey Day (vehicles per 12 hours)
1	Peak Downs Mine Road and Eagle Downs Mine Access Road		
			
2	Peak Downs Highway and Peak Downs Mine Road		
	4:45 am to 5:45 am  6:00 am to 7:00 am 		14 Hour Total 
3	Peak Downs Highway and Moranbah Access Road		
	4:45 am to 5:45 am 		14 Hour Total 

Site[A]	AM Peak 6:00 am to 7:00 am (vehicles per hour)	PM Peak Hour 5:00 pm to 6:00 pm (vehicles per hour)	Total Survey Day (vehicles per 12 hours)
	6:00 am to 7:00 am 		
4	Peak Downs Highway and Maloney Street		
			
5	Saraji Road and Garnham Drive		
			
6	Moranbah Access Road and Moranbah Airport		
			

Site[A]	AM Peak 6:00 am to 7:00 am (vehicles per hour)	PM Peak Hour 5:00 pm to 6:00 pm (vehicles per hour)	Total Survey Day (vehicles per 12 hours)
7	Moranbah Access Road and Mills Avenue		
			
8	Peak Downs Mine Road and the former Dysart Road (Winchester Access Road access)		
			
9	Goonyella Road and Curtin Street		
			
10	Curtin Street and Belyando Avenue		
			

Site[A]	AM Peak 6:00 am to 7:00 am (vehicles per hour)	PM Peak Hour 5:00 pm to 6:00 pm (vehicles per hour)	Total Survey Day (vehicles per 12 hours)
11	Belyando Avenue and Acacia Street		
			

[A] *Refer to Figure 3.4.*

Appendix C

Crash History on Project Route Segments

Peak Downs Mine Road North of Level Crossing 2014 to 2018

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	Manoeuvring	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous
Total Crashes	-	-	-	1	-	-	-	2	1	-
Road Surface Condition										
Dry Road	-	-	-	1	-	-	-	2	1	-
Weather										
Clear	-	-	-	1	-	-	-	2	1	4
Lighting										
Dawn or Dusk	-	-	-	1	-	-	-	-	-	-
Daylight	-	-	-	-	-	-	-	2	1	-
Vehicles Involved										
Motorcycle	-	-	-	1	-	-	-	-	-	-
Car	-	-	-	1	-	-	-	2	1	-
Severity of Crash										
Medical Treatment	-	-	-	-	-	-	-	1	-	-
Hospitalisation	-	-	-	1	-	-	-	1	1	-
Time of Day										
3am to 9am	-	-	-	1	-	-	-	1	-	-
9am to 3pm	-	-	-	-	-	-	-	1	1	-
3pm to 9pm	-	-	-	-	-	-	-	-	-	-
9pm to 3am	-	-	-	-	-	-	-	-	-	-

Peak Downs Mine Road South of Level Crossing 2014 to 2018

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	Manoeuvring	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous
Total Crashes	-	-	-	3	-	-	-	4	3	-
Road Surface Condition										
Dry Road	-	-	-	3	-	-	-	4	3	-
Weather										
Clear	-	-	-	2	-	-	-	4	3	-
Fog	-	-	-	1	-	-	-	-	-	-
Lighting										
Darkness – not lighted	-	-	-	1	-	-	-	1	2	-
Dawn or Dusk	-	-	-	1	-	-	-	1	1	-
Daylight	-	-	-	1	-	-	-	2	-	-
Vehicles Involved										
Motorcycle	-	-	-	1	-	-	-	-	-	-
Car	-	-	-	4	-	-	-	4	3	-
Truck	-	-	-	1	-	-	-	-	-	-
Severity of Crash										
Medical Treatment	-	-	-	2	-	-	-	3	1	-
Hospitalisation	-	-	-	1	-	-	-	1	2	-
Time of Day										
3am to 9am	-	-	-	2	-	-	-	2	1	-
9am to 3pm	-	-	-	-	-	-	-	1	-	-
3pm to 9pm	-	-	-	1		-	-	-	1	-
9pm to 3am	-	-	-	-	-	-	-	1	1	-

Moranbah Access Road/Goonyella Road South of Curtin Street 2014 to 2018

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	Manoeuvring	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous
Total Crashes	-	1	2	2	-	-	1	6	2	-
Road Surface Condition										
Dry Road	-	1	2	1	-	-	1	6	2	-
Wet Road	-	-	-	1	-	-	-	-	-	-
Weather										
Clear	-	1	2	2	-	-	1	6	2	-
Lighting										
Darkness – not lighted	-	1	2	-	-	-	1	4	-	-
Dawn or Dusk	-	-	-	-	-	-	-	2	-	-
Daylight	-	-	-	2	-	-	-	-	2	-
Vehicles Involved										
Car	-	2	3	5	-	-	-	6	2	-
Bus	-	-	1	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	1	-	-	-
Severity of Crash										
Medical Treatment	-	1	-	1	-	-	-	-	-	-
Hospitalisation	-	-	1	1	-	-	1	5	2	-
Fatal	-	-	1	-	-	-	-	1	-	-
Speed Limit										
60 km/h	-	1	-	1	-	-	-	-	-	-
100 – 110 km/h	-	-	2	1	-	-	1	6	2	-
Time of Day										
3am to 9am	-	1	1	-	-	-	-	2	-	-
9am to 3pm	-	-	-	-	-	-	-	-	1	-
3pm to 9pm	-	-	-	2	-	-	-	1	1	-
9pm to 3am	-	-	1	-	-	-	1	3	-	-

Peak Downs Highway – Peak Downs Mine Road to Coppabella 2014 to 2018

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	Manoeuvring	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous
Total Crashes	-	-	2	2	-	1	-	10	3	-
Road Surface Condition										
Dry Road	-	-	1	2	-	1	-	10	3	-
Wet Road	-	-	1	-	-	-	-	-	-	-
Weather										
Clear	-	-	1	2	-	1	-	10	3	-
Raining	-	-	1	-	-	-	-	-	-	-
Lighting										
Darkness – not lighted	-	-	1	-	-	1	-	3	2	-
Dawn or Dusk	-	-	1	-	-	-	-	1	-	-
Daylight	-	-	-	2	-	-	-	6	1	-
Vehicles Involved										
Car	-	-	3	4	-	2	-	7	3	-
Bus	-	-	-	-	-	-	-	-	-	-
Truck	-	-	2	1	-	-	-	3	-	-
Severity of Crash										
Minor Injury	-	-	-	2	-	-	-	2	-	-
Medical Treatment	-	-	-	-	-	-	-	2	1	-
Hospitalisation	-	-	1	-	-	-	-	6	2	-
Fatal	-	-	1	-	-	1	-	-	-	-
Time of Day										
3am to 9am	-	-	2	-	-	-	-	5	-	-
9am to 3pm	-	-	-	2	-	-	-	3	1	-
3pm to 9pm	-	-	-	-	-	1	-	1	1	-
9pm to 3am	-	-	-	-	-	-	-	1	1	-

Appendix D

Standard Axle Repetitions Summary

Annual Standard Axle Repetitions Inbound to Project 2022 to 2052 ('000 SARs)

Year	Peak Downs Mine Road to Moranbah Access Road		Moranbah Access Road to Isaac Plains Road		Isaac Plains Road to Coppabella		Coppabella to Fitzroy Developmental Road		Fitzroy Developmental Road to Oxford Downs Sarina Road		Oxford Downs Sarina Road to Nebo		Nebo to Blue Mountain Road	
	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project
2022	1,048	63	438	60	788	60	752	60	438	60	840	60	799	60
2023	1,049	67	431	63	788	63	750	63	430	63	840	63	799	63
2024	1,067	21	437	13	801	13	763	13	436	13	854	13	812	13
2025	1,085	22	443	15	815	15	776	15	442	15	869	15	826	15
2026	1,103	25	450	17	829	17	789	17	449	17	884	17	840	17
2027	1,123	27	468	19	854	19	814	19	494	19	938	19	893	19
2028	1,141	29	465	21	859	21	819	21	466	21	918	21	873	21
2029	1,161	31	472	23	874	23	832	23	471	23	933	23	886	23
2030	1,184	31	481	23	891	23	848	23	480	23	951	23	904	23
2031	1,208	31	490	23	908	23	865	23	489	23	970	23	921	23
2032	1,232	31	500	23	926	23	882	23	499	23	989	23	940	23
2033	1,256	31	510	23	944	23	900	23	509	23	1,008	23	958	23
2034	1,281	31	520	23	963	23	917	23	518	23	1,028	23	977	23
2035	1,306	31	530	23	982	23	935	23	529	23	1,049	23	996	23
2036	1,332	31	540	23	1,001	23	954	23	539	23	1,069	23	1,016	23
2037	1,359	31	551	23	1,021	23	972	23	549	23	1,090	23	1,036	23
2038	1,386	31	562	23	1,041	23	992	23	560	23	1,112	23	1,056	23
2039	1,413	31	573	23	1,062	23	1,011	23	571	23	1,134	23	1,077	23
2040	1,441	31	584	23	1,083	23	1,031	23	582	23	1,156	23	1,099	23
2041	1,470	31	596	23	1,104	23	1,051	23	594	23	1,179	23	1,120	23
2042	1,499	31	607	23	1,126	23	1,072	23	605	23	1,203	23	1,142	23
2043	1,528	31	619	23	1,148	23	1,093	23	617	23	1,226	23	1,165	23
2044	1,559	31	632	23	1,171	23	1,115	23	629	23	1,251	23	1,188	23
2045	1,590	31	644	23	1,194	23	1,137	23	641	23	1,275	23	1,212	23
2046	1,621	31	657	23	1,218	23	1,159	23	654	23	1,301	23	1,236	23
2047	1,653	31	670	23	1,242	23	1,182	23	667	23	1,326	23	1,260	23
2048	1,686	31	683	23	1,266	23	1,206	23	680	23	1,353	23	1,285	23
2049	1,720	31	696	23	1,291	23	1,229	23	693	23	1,379	23	1,310	23
2050	1,754	31	710	23	1,317	23	1,254	23	707	23	1,407	23	1,336	23
2051	1,789	31	724	23	1,343	23	1,279	23	721	23	1,435	23	1,363	23
2052	1,824	31	738	23	1,370	23	1,304	23	735	23	1,463	23	1,390	23

Annual Standard Axle Repetitions Inbound to Project 2022 to 2052 ('000 SARs)

Year	Blue Mountain Road to Eton Homebush Road		Eton Homebush Road to Kellys Road		Kellys Road to Mackay Eungella Road		Mackay Eungella Road to Horse and Jockey Road		Horse and Jockey Road to Bernborough Avenue		Bernborough Avenue to Nebo Road	
	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project
2022	671	60	759	60	785	60	2,824	60	861	60	861	60
2023	668	63	757	63	784	63	2,864	63	862	63	862	63
2024	679	13	770	13	798	13	2,919	13	877	13	877	13
2025	691	15	783	15	811	15	2,976	15	892	15	892	15
2026	702	17	797	17	825	17	3,033	17	908	17	908	17
2027	752	19	849	19	878	19	3,129	19	962	19	962	19
2028	729	21	827	21	857	21	3,154	21	943	21	943	21
2029	740	23	840	23	870	23	3,213	23	957	23	957	23
2030	754	23	856	23	887	23	3,277	23	976	23	976	23
2031	769	23	873	23	905	23	3,342	23	995	23	995	23
2032	784	23	890	23	923	23	3,409	23	1,015	23	1,015	23
2033	799	23	908	23	941	23	3,476	23	1,035	23	1,035	23
2034	815	23	926	23	959	23	3,546	23	1,056	23	1,056	23
2035	831	23	944	23	978	23	3,616	23	1,076	23	1,076	23
2036	847	23	963	23	998	23	3,688	23	1,098	23	1,098	23
2037	864	23	982	23	1,017	23	3,762	23	1,119	23	1,119	23
2038	881	23	1,001	23	1,037	23	3,837	23	1,142	23	1,142	23
2039	899	23	1,021	23	1,058	23	3,913	23	1,164	23	1,164	23
2040	916	23	1,041	23	1,079	23	3,991	23	1,187	23	1,187	23
2041	934	23	1,061	23	1,100	23	4,071	23	1,211	23	1,211	23
2042	953	23	1,082	23	1,122	23	4,152	23	1,235	23	1,235	23
2043	972	23	1,104	23	1,144	23	4,235	23	1,259	23	1,259	23
2044	991	23	1,126	23	1,167	23	4,319	23	1,284	23	1,284	23
2045	1,010	23	1,148	23	1,190	23	4,405	23	1,309	23	1,309	23
2046	1,030	23	1,170	23	1,213	23	4,493	23	1,335	23	1,335	23
2047	1,050	23	1,194	23	1,237	23	4,583	23	1,362	23	1,362	23
2048	1,071	23	1,217	23	1,262	23	4,674	23	1,389	23	1,389	23
2049	1,092	23	1,241	23	1,287	23	4,767	23	1,416	23	1,416	23
2050	1,114	23	1,266	23	1,312	23	4,863	23	1,444	23	1,444	23
2051	1,136	23	1,291	23	1,338	23	4,959	23	1,473	23	1,473	23
2052	1,158	23	1,316	23	1,365	23	5,058	23	1,502	23	1,502	23

Annual Standard Axle Repetitions Outbound from Project 2022 to 2052 ('000 SARs)

Year	Peak Downs Mine Road to Moranbah Access Road		Moranbah Access Road to Isaac Plains Road		Isaac Plains Road to Coppabella		Coppabella to Fitzroy Developmental Road		Fitzroy Developmental Road to Oxford Downs Sarina Road		Oxford Downs Sarina Road to Nebo		Nebo to Blue Mountain Road	
	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project
2022	562	63	887	60	659	60	1,007	60	1,536	60	700	60	507	60
2023	551	67	887	63	654	63	1,009	63	1,548	63	696	63	499	63
2024	560	21	902	13	665	13	1,026	13	1,577	13	707	13	506	13
2025	568	22	918	15	675	15	1,044	15	1,606	15	719	15	514	15
2026	574	25	934	17	687	17	1,063	17	1,636	17	731	17	522	17
2027	584	27	969	19	716	19	1,101	19	1,704	19	781	19	568	19
2028	591	29	968	21	711	21	1,103	21	1,700	21	758	21	541	21
2029	600	31	984	23	722	23	1,122	23	1,729	23	769	23	547	23
2030	612	31	1,004	23	736	23	1,144	23	1,764	23	784	23	558	23
2031	624	31	1,024	23	750	23	1,167	23	1,798	23	800	23	569	23
2032	636	31	1,044	23	765	23	1,190	23	1,834	23	815	23	580	23
2033	649	31	1,065	23	780	23	1,213	23	1,871	23	832	23	591	23
2034	661	31	1,086	23	795	23	1,237	23	1,908	23	848	23	603	23
2035	674	31	1,107	23	811	23	1,261	23	1,946	23	865	23	614	23
2036	687	31	1,129	23	827	23	1,286	23	1,984	23	882	23	626	23
2037	701	31	1,151	23	843	23	1,312	23	2,024	23	899	23	639	23
2038	715	31	1,174	23	860	23	1,338	23	2,064	23	917	23	651	23
2039	729	31	1,198	23	877	23	1,364	23	2,105	23	935	23	664	23
2040	743	31	1,221	23	894	23	1,391	23	2,147	23	953	23	677	23
2041	758	31	1,245	23	911	23	1,419	23	2,189	23	972	23	690	23
2042	772	31	1,270	23	929	23	1,447	23	2,233	23	991	23	704	23
2043	788	31	1,295	23	948	23	1,475	23	2,277	23	1,011	23	717	23
2044	803	31	1,321	23	966	23	1,505	23	2,322	23	1,030	23	731	23
2045	819	31	1,347	23	985	23	1,534	23	2,369	23	1,051	23	746	23
2046	835	31	1,374	23	1,005	23	1,565	23	2,416	23	1,072	23	760	23
2047	851	31	1,401	23	1,025	23	1,596	23	2,464	23	1,093	23	775	23
2048	868	31	1,429	23	1,045	23	1,627	23	2,513	23	1,114	23	791	23
2049	885	31	1,457	23	1,065	23	1,660	23	2,563	23	1,136	23	806	23
2050	903	31	1,486	23	1,086	23	1,692	23	2,614	23	1,159	23	822	23
2051	920	31	1,516	23	1,108	23	1,726	23	2,666	23	1,182	23	838	23
2052	939	31	1,546	23	1,130	23	1,760	23	2,719	23	1,205	23	855	23

Annual Standard Axle Repetitions Outbound from Project 2022 to 2052 ('000 SARs)

Year	Blue Mountain Road to Eton Homebush Road		Eton Homebush Road to Kellys Road		Kellys Road to Mackay Eungella Road		Mackay Eungella Road to Horse and Jockey Road		Horse and Jockey Road to Bernborough Avenue		Bernborough Avenue to Nebo Road	
	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project	Base	Project
2022	451	60	707	60	709	60	954	60	870	60	1,216	60
2023	442	63	702	63	705	63	955	63	869	63	1,222	63
2024	448	13	714	13	717	13	972	13	884	13	1,244	13
2025	455	15	726	15	728	15	989	15	899	15	1,266	15
2026	461	17	738	17	741	17	1,006	17	914	17	1,289	17
2027	506	19	788	19	791	19	1,062	19	968	19	1,351	19
2028	478	21	766	21	768	21	1,045	21	949	21	1,339	21
2029	483	23	777	23	779	23	1,061	23	964	23	1,362	23
2030	493	23	792	23	795	23	1,082	23	983	23	1,389	23
2031	502	23	807	23	810	23	1,103	23	1,002	23	1,416	23
2032	512	23	823	23	826	23	1,125	23	1,022	23	1,444	23
2033	522	23	839	23	843	23	1,147	23	1,042	23	1,473	23
2034	532	23	856	23	859	23	1,170	23	1,063	23	1,502	23
2035	542	23	873	23	876	23	1,193	23	1,084	23	1,532	23
2036	553	23	890	23	893	23	1,217	23	1,105	23	1,562	23
2037	564	23	907	23	911	23	1,241	23	1,127	23	1,593	23
2038	575	23	925	23	929	23	1,265	23	1,149	23	1,625	23
2039	586	23	943	23	947	23	1,290	23	1,172	23	1,657	23
2040	597	23	962	23	966	23	1,316	23	1,195	23	1,690	23
2041	609	23	981	23	985	23	1,342	23	1,219	23	1,723	23
2042	621	23	1,000	23	1,004	23	1,369	23	1,243	23	1,757	23
2043	633	23	1,020	23	1,024	23	1,396	23	1,267	23	1,792	23
2044	645	23	1,040	23	1,044	23	1,423	23	1,292	23	1,828	23
2045	658	23	1,061	23	1,065	23	1,451	23	1,318	23	1,864	23
2046	671	23	1,082	23	1,086	23	1,480	23	1,344	23	1,901	23
2047	684	23	1,103	23	1,107	23	1,510	23	1,371	23	1,939	23
2048	697	23	1,125	23	1,129	23	1,539	23	1,398	23	1,977	23
2049	711	23	1,147	23	1,151	23	1,570	23	1,425	23	2,017	23
2050	725	23	1,170	23	1,174	23	1,601	23	1,454	23	2,057	23
2051	739	23	1,193	23	1,197	23	1,633	23	1,482	23	2,098	23
2052	754	23	1,216	23	1,221	23	1,665	23	1,512	23	2,139	23

Appendix E

Alternative Access Option Assessment

E.1 Introduction

An additional access option has been assessed to examine the impacts of the Project should the Mine Access Road from Eagle Downs Mine Access Road not be constructed. Under this alternative access option, all vehicular access would be via the former Dysart Road and Winchester Access Road throughout the construction period and operational life of the Project. This Appendix presents the results of the assessment of the alternative access option with respect to the road transport environment, and should be read in conjunction with the main Road Transport Assessment report.

E.2 Assessment Scenarios

The future assessment scenarios adopted for this assessment of the implications of the alternative access arrangements are consistent with those described in Section 2.3 of the main report in all respects, with the exception of the location of the Project's vehicular access.

E.3 Project Traffic Demands

The total number of vehicle trips generated by the Project would remain unchanged from those presented in Section 2.6 of the main report, and access routes used by Project-generated traffic on the wider road network would remain unchanged, with the exception that the use of the former Dysart Road and Winchester Access Road rather than the proposed Mine Access Road for direct access to the Project would result in localised changes to the access routes in the immediate vicinity of those roads.

The Project's contribution to future traffic demands on the road network with the alternative access option has been quantified and the resulting daily and peak hourly Project-generated traffic on the road network are tabulated in this section for the assessment scenarios.

Compared with the assessment contained in the main text of this Road Transport Assessment, the alternative access option would alter the contribution of Project-generated traffic only on that part of the road network between the proposed Mine Access Road (from Eagle Downs Mine Access) and Winchester Access Road. It would have no implications for the wider public road network to the north of the intersection of Peak Downs Mine Road with Eagle Downs Mine Access Road and to the west and south of the intersection of Peak Downs Mine Road with the former Dysart Road (Winchester Access Road access).

Table E1 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network during Months 1 to 6 of the initial construction stage for the alternative access option.

Table E1: Alternative Access Option Project Traffic Initial Construction Stage – Months 1 to 6

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Winchester Access Road and Former Dysart Road south of Peak Downs Mine Road	25	8	16	8	156	72
Peak Downs Mine Road Former Dysart Road to Peak Downs Highway	24	8	16	8	154	72
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	24	8	16	8	154	72
Peak Downs Highway Moranbah Access Road to Coppabella	0	4	0	4	2	56
Peak Downs Highway east of Coppabella	0	4	0	4	0	56
Peak Downs Mine Road and Saraji Road Former Dysart Road to Dysart	1	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	24	4	16	4	152	16
Goonyella Road Mills Avenue to Curtin Street	16	4	10	4	64	16
Mills Avenue east of Moranbah Access Road	8	0	6	0	88	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	16	4	10	4	64	16

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

Table E2 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network for the alternative access option during Months 7 to 12 of the initial construction stage.

Table E2: Alternative Access Option Project Traffic Initial Construction Stage – Months 7 to 12

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Winchester Access Road and Former Dysart Road south of Peak Downs Mine Road	58	21	43	21	444	232
Peak Downs Mine Road Former Dysart Road to Peak Downs Highway	57	21	43	21	442	232
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	57	21	43	21	442	232
Peak Downs Highway Moranbah Access Road to Coppabella	1	15	1	15	4	200
Peak Downs Highway east of Coppabella	0	15	0	15	0	200
Peak Downs Mine Road and Saraji Road Former Dysart Road to Dysart	1	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	56	6	42	6	438	32
Goonyella Road Mills Avenue to Curtin Street	32	6	19	6	130	32
Mills Avenue east of Moranbah Access Road	24	0	23	0	308	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	32	6	19	6	130	32

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

Table E3 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network for the alternative access option during the peak construction and initial operation stage.

Table E3: Alternative Access Option Project Traffic Peak Construction and Initial Coal Production Stage

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Winchester Access Road and Former Dysart Road south of Peak Downs Mine Road	48	16	37	16	326	162
Peak Downs Mine Road Former Dysart Road to Peak Downs Highway	48	16	37	16	324	162
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	48	16	37	16	324	162
Peak Downs Highway Moranbah Access Road to Coppabella	1	10	0	10	4	136
Peak Downs Highway east of Coppabella	0	10	0	10	0	136
Peak Downs Mine Road and Saraji Road Former Dysart Road to Dysart	0	0	0	0	2	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	47	6	37	6	320	26
Goonyella Road Mills Avenue to Curtin Street	30	6	21	6	114	26
Mills Avenue east of Moranbah Access Road	17	0	16	0	206	0
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	30	6	21	6	114	26

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

Table E4 presents the forecast contribution of the Project to future two-way traffic on the surrounding road network for the alternative access option during the peak operation stage.

Table E4: Alternative Access Option Project Traffic Peak Operational Stage

Road	AM Peak[A]		PM Peak[A]		Daily[B]	
	Light	Heavy	Light	Heavy	Light	Heavy
Winchester Access Road and Former Dysart Road south of Peak Downs Mine Road	48	6	44	9	222	78
Peak Downs Mine Road Former Dysart Road to Peak Downs Highway	47	6	43	9	218	78
Peak Downs Highway Peak Downs Mine Road to Moranbah Access Road	47	6	43	9	218	78
Peak Downs Highway Moranbah Access Road to Coppabella	1	0	4	2	52	48
Peak Downs Highway east of Coppabella	0	0	3	2	48	48
Peak Downs Mine Road and Saraji Road Former Dysart Road to Dysart	1	0	1	0	4	0
Moranbah Access Road Peak Downs Highway to Mills Avenue	46	6	39	7	166	30
Goonyella Road Mills Avenue to Curtin Street	39	6	32	5	130	18
Mills Avenue east of Moranbah Access Road	7	0	7	2	36	12
Curtin Street, Belyando Avenue and Acacia Street Goonyella Road to Accommodation Camp	39	6	32	5	130	18

[A] *vehicles per hour, Project peak hours 6:00am to 7:00am and 5:00pm to 6:00pm*
[B] *vehicles per day*

E.4 Access and Frontage Implications

With the alternative access option, all Project-generated traffic would turn into and out of the former Dysart Road at its existing intersection with Peak Downs Mine Road. The existing lane lengths at the intersection are consistent with the deceleration length requirements of Austroads (2017) for a design speed of 100 km/h on Peak Downs Mine Road, and the observed sight lines at the intersection exceed those required for the posted speed limit of 100 km/h (Section 5.1.1).

The treatment of the intersection of the former Dysart Road with Peak Downs Mine Road has been assessed with regard to the Austroads (2020b) and TMR (2016) warrants for rural road turn treatments for high-speed rural roads for the alternative access option. Table E5 summarises the turn treatments warranted in Peak Downs Mine Road at the former Dysart Road based on the Project peak hour traffic demands with the alternative access option.

Table E5: Alternative Access Option Turn Treatment Warrants in Peak Downs Mine Road at the former Dysart Road[A]

Traffic Demands	AM Peak		PM Peak	
	Right Turn	Left Turn	Right Turn	Left Turn
Surveyed	BAR	BAL	BAR	BAL
Initial Construction Months 1 to 6	CHR(S)	AUL(S)	BAR	BAL
Initial Construction Months 7 to 12	CHR(S)	AUL(S)	BAR	BAL
Initial Operation	CHR(S)	AUL(S)	BAR	BAL
Peak Operation	CHR(S)	AUL(S)	CHR(S)	AUL(S)
Existing Treatment	**CHR**	**AUL**	**CHR**	**AUL**

[A] *Winchester Access Road access*

The existing turn treatments in Peak Downs Mine Road therefore meet or exceed those that would be warranted with the Project-generated traffic for the alternative access option, and so the Project would not require any upgrade to the existing treatments in Peak Downs Mine Road due to any concerns regarding potential safety impacts.

At its intersection with Peak Downs Mine Road, the width of the former Dysart Road does not allow two vehicles to stand abreast while waiting to enter Peak Downs Mine Road. This is the preferred arrangement, as where two vehicles can stand abreast, the two vehicles can each restrict visibility for the other driver. The significant majority of vehicles exiting the former Dysart Road would turn right onto Peak Downs Mine Road, thus there is very limited demand for left turn movements and no upgrading of that approach to provide a separate channelised left turn lane would be warranted.

The operation of the access intersection of Peak Downs Mine Road with the former Dysart Road for the alternative access option is discussed in Section E.5 of this appendix.

E.5 Intersection Delay Implications

The impact area for the assessment of intersection delay for the alternative access option impacts includes those intersections identified in Table E6, being those intersections where the Project traffic is forecast to exceed five percent of the base traffic for any movement in the design peak hours. As in the main assessment, the intersection of the former Dysart Road with Winchester Access Road has not been considered (Section 5.2).

Table E6 demonstrates that the impact area for the assessment of intersection delays for the alternative access option would remain the same as that with the proposed Mine Access Road (Table 5.6), with the exceptions of:

- inclusion of the intersection of Peak Downs Mine Road with the former Dysart Road in all assessment scenarios; and
- exclusion of the intersection of the proposed Mine Access Road with Eagle Downs Mine Access Road from consideration, as it would not be constructed for the alternative access option.

Table E6: Alternative Access Option Intersection Movements – Project Increase Above Base[B]

Site[A]	Intersection	Construction Months 1 to 6		Construction Months 7 to 12		Initial Operation		Peak Operation	
		AM	PM	AM	PM	AM	PM	AM	PM
1	Peak Downs Mine Road and Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
2	Peak Downs Mine Road and Peak Downs Highway	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
3	Peak Downs Highway and Moranbah Access Road	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
4	Peak Downs Highway and Maloney Street	-	-	>5%	>5%	>5%	>5%	-	-
5	Saraji Road, Garnham Drive, Dysart Clermont Road and Dysart Middlemount Road	-	-	-	-	-	-	-	-
6	Moranbah Access Road and Moranbah Airport	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
7	Moranbah Access Road and Mills Avenue	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
8	Peak Downs Mine Road and the former Dysart Road	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
9	Goonyella Road and Curtin Street	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%
10	Curtin Street and Belyando Avenue	>5%	-	>5%	>5%	>5%	>5%	>5%	>5%
11	Belyando Avenue and Acacia Street	>5%	>5%	>5%	>5%	>5%	>5%	>5%	>5%

[A] *Refer to Figure 3.4.*
[B] *Traffic on any one movement at the intersection.*

The alternative access option would have no implications for the wider public road network to the north of the intersection of Peak Downs Mine Road with Eagle Downs Mine Access Road and to the west and south of the intersection of Peak Downs Mine Road with the former Dysart Road (Winchester Access Road access), so would only impact the operation of those two intersections.

The operation of the two intersections at which the alternative access option would alter forecast conditions compared with those assessed in the main report has therefore been reanalysed using SIDRA INTERSECTION 8. Table E7 summarises the intersection Levels of Service with the Project traffic for the alternative access option and assuming no changes are made to the existing layout of either of those intersections.

Table E7: Alternative Access Option Intersection Levels of Service

Intersection	2022 Months 1 to 6		2022 Months 7 to 12		2023		2029	
	AM	PM	AM	PM	AM	PM	AM	PM
Peak Downs Mine Road and Eagle Downs Mine Access Road	B	B	B	B	B	B	B	B
Peak Downs Mine Road and the former Dysart Road	B	B	B	B	B	B	B	B

Levels of Service based on the movement with the highest average delay per vehicle (Table 5.4).

Table E7 indicates that with the alternative access option, the operation of the intersections of Peak Downs Mine Road with Eagle Downs Mine Access Road and with the former Dysart Road would be acceptable (Level of Service D or better) with their current configurations. The Levels of Service at all other intersections would remain as presented in Table 5.9 of the main report.

To assess the desired outcome that the sum of intersection delays on base traffic does not significantly worsen, i.e., does not increase average delays by more than 5 % in aggregate (TMR, 2018), the aggregate intersection delay impact has been calculated for the alternative access option in accordance with TMR (2018), as described in Section 5.2. Consistent with the assessment presented in the main text of this report, the results below present the calculations for the local road intersections as well as intersections with an SCR, noting the majority of Project-impacted intersections are intersections of local roads only.

Table E8 and Table E9 present summaries of the AM and PM peak hour intersection delays for base conditions and with the alternative access option for the relevant impact area for each assessment scenario (Table E6). These assume that the road upgrades described in Table 5.8 of the main report for base conditions are implemented.

Table E8: Alternative Access Option AM Peak Intersection Delays (vehicle-minutes per hour)

Intersection	Base				With Project			
	Project Months 1 to 6	Project Months 7 to 12	2023	2029	Project Months 1 to 6	Project Months 7 to 12	2023	2029
Peak Downs Mine Road and Eagle Downs Mine Access Road	15.5	15.5	13.7	12.0	15.7	15.9	14.0	12.1
Peak Downs Mine Road and Peak Downs Highway (SCR)	60.1	60.1	59.2	67.7	61.0	63.1	61.6	70.1
Peak Downs Highway (SCR) and Moranbah Access Road	120.0	120.0	120.3	171.5	127.4	139.4	133.7	193.8
Peak Downs Highway (SCR) and Maloney Street	-	26.7	8.8	-	-	27.3	9.2	-
Moranbah Access Road and Moranbah Airport	8.3	8.3	8.7	10.5	8.5	8.6	9.0	10.9
Moranbah Access Road and Mills Avenue	126.8	126.8	130.7	145.1	131.1	155.9	138.4	148.7
Peak Downs Mine Road and the former Dysart Road	1.6	1.6	1.6	1.9	1.6	1.6	1.6	2.0
Goonyella Road and Curtin Street	92.9	92.9	94.9	104.2	93.3	93.3	95.9	105.1
Curtin Street and Belyando Avenue	55.8	55.8	56.1	66.3	56.1	56.4	56.6	67.1
Belyando Avenue and Acacia Street	25.2	25.2	25.5	29.7	25.5	25.2	37.1	29.7
Total All Intersections	**506.2**	**532.9**	**519.6**	**608.9**	**520.2**	**586.9**	**557.1**	**639.5**

Note: Totals may not add exactly due to rounding.

Table E9: Alternative Access Option PM Peak Intersection Delays (vehicle-minutes per hour)

Intersection	Base				With Project			
	Project Months 1 to 6	Project Months 7 to 12	2023	2029	Project Months 1 to 6	Project Months 7 to 12	2023	2029
Peak Downs Mine Road and Eagle Downs Mine Access Road	18.8	18.8	17.2	16.4	19.6	21.4	19.0	18.0
Peak Downs Mine Road and Peak Downs Highway (SCR)	68.0	68.0	70.0	78.2	69.8	72.9	71.1	82.5
Peak Downs Highway (SCR) and Moranbah Access Road	-	128.4	129.5	165.2	-	136.1	136.2	179.8
Peak Downs Highway (SCR) and Maloney Street	-	46.2	13.7	-	-	46.7	13.8	-
Moranbah Access Road and Moranbah Airport	-	9.6	10.2	14.3	-	11.3	10.9	15.7
Moranbah Access Road and Mills Avenue	-	163.6	170.0	175.1	-	171.1	178.7	180.0
Peak Downs Mine Road and the former Dysart Road	1.2	1.2	1.3	1.5	1.2	1.3	1.3	1.6
Goonyella Road and Curtin Street	120.0	120.0	123.2	136.4	121.8	122.8	125.2	137.8
Curtin Street and Belyando Avenue	-	87.9	91.7	112.2	-	88.5	93.5	118.1
Belyando Avenue and Acacia Street	32.4	32.4	32.5	37.6	32.4	32.4	32.5	38.1
Total All Intersections	**240.4**	**676.0**	**659.2**	**736.9**	**245.0**	**704.5**	**682.4**	**771.5**

Note: Totals may not add exactly due to rounding.

On the basis of the above, the intersection delay impact during the design peaks with the alternative access option is presented in Table E10, in which the impact is expressed as the percent increase (or decrease) of the intersection delay aggregate with the Project over that of the base conditions. Base conditions remain unchanged from those presented in the main text of this report.

Table E10: Alternative Access Option Project Intersection Delay Impact (vehicle minutes)

	AM Peak Hour			PM Peak Hour		
	Base	Project	Impact[A]	Base	Project	Impact[A]
2022 Months 1 to 6	506.2	520.2	2.8%	240.4	245.0	1.9%
2022 Months 7 to 12	532.9	586.9	10.1%	676.0	704.5	4.2%
2023	519.6	557.1	7.2%	659.2	682.4	3.5%
2029	608.9	639.5	5.0%	736.9	771.5	4.7%

[A] *Impact calculated as percent increase with Project compared with Base conditions*

From Table E10, with the alternative access option, the 5 % threshold would be exceeded during the AM peak from Months 7 to 12 through to 2029. As demonstrated in Table E7 and Table 5.9, the Levels of Service for the worst movement at all the intersections at those times would remain acceptable.

The threshold exceedances occur during the construction activity periods, and are primarily attributable to impacts at the intersections of Moranbah Access Road with Peak Downs Highway and with Mills Avenue. As noted in the main report, the sensitivity test conducted to examine the implications of the lower workforce expected with automation at the Project found that the total intersection delays impacts for the AM peak would be reduced. The need for any mitigation measures to accommodate the peak operational workforce with the alternative access option would therefore also be appropriately determined once details of automation and the operational workforce are confirmed.

E.6 Road Link Capacity Implications

The impact area for the assessment of road link capacity impacts for the alternative access option includes those road links identified in Table E11, being those road links where the Project traffic is forecast to exceed 5 % of the base traffic in either direction on the link's AADT.

Table E11: Alternative Access Option Road Links – Project Increase Above Base AADT[A]

Road	Construction Months 1-6	Construction Months 7-12	Initial Operation	Peak Operation
Peak Downs Highway south-west of Peak Downs Mine Road	-	-	-	-
Peak Downs Highway north-east of Peak Downs Mine Road	-	>5%	>5%	>5%
Peak Downs Highway north-east of Moranbah Access Road	-	-	-	-
Peak Downs Highway west of Coppabella	-	-	-	-
Peak Downs Highway east of Coppabella	-	-	-	-
Peak Downs Mine Road south of Peak Downs Highway	>5%	>5%	>5%	>5%
Peak Downs Mine Road north of Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%
Peak Downs Mine Road south of Eagle Downs Mine Access Road	>5%	>5%	>5%	>5%
Peak Downs Mine Road west of the former Dysart Road	-	-	-	-
Saraji Road north of Dysart	-	-	-	-
Moranbah Access Road north of Peak Downs Highway	-	>5%	>5%	-
Moranbah Access Road north of Moranbah Airport	-	>5%	-	-

[A] *Traffic in either direction.*

Compared with the assessment contained in the main text of this report, the alternative access option would impact the link volumes only on Peak Downs Mine Road between its intersections with Eagle Downs Mine Road and the former Dysart Road. The midblock Levels of Service during the AM and PM peak hours have been analysed for this part of Peak Downs Mine Road using the HCM method, consistent with the main report assessment. Table E12 presents the results. Levels of Service on all other parts of the road network would remain the same as those presented in the main report (Section 5.3).

Table E12: Alternative Access Option AM and PM Project Peak Hour Midblock Levels of Service

	AM Project Peak Hour				PM Project Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Base	Project	Base	Project	Base	Project	Base	Project
Peak Downs Mine Road between Eagle Downs Mine Access Road and former Dysart Road								
2022 – Project Months 1 to 6	B	B	B	B	B	B	A	A
2022 – Project Months 7 – 12	B	B	B	B	B	B	A	A
2023	A	B	B	B	B	B	A	A
2029	B	B	B	B	B	B	B	B

The results indicate that with the alternative access option, the Levels of Service on the length of Peak Downs Mine Road between Eagle Downs Mine Access Road and the former Dysart Road during the Project AM and PM peak hours would remain well within the acceptable range. Levels of Service would remain unchanged from those under base conditions, with the exception of the AM peak hour in 2023, which shows a change from Level of Service A to B for traffic travelling inbound to the Project. It is noted however that under the base conditions, the PTSF would be 34.9, which is at the top of the range for Level of Service A and on the threshold for Level of Service B.

The alternative access option would increase traffic on the former Dysart Road and Winchester Access Road by more than 5 % above the base volumes. The HCM method for assessing link performance applies to roads with a speed limit of approximately 70 km/h or above. The speed environment on the former Dysart Road and Winchester Access Road are expected to be below this minimum and hence their performance has not been directly analysed. The treatment of Winchester Access Road for the alternative access option is discussed in Section E.10.

E.7 Road Safety Implications

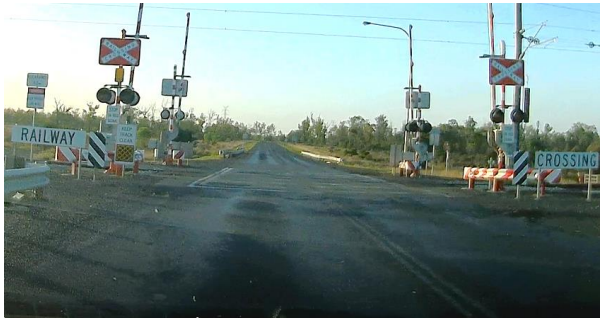
The impact area for the assessment of road safety impacts includes those intersections and road links identified in Table 5.6 and Table 5.13, being those intersections where the Project traffic is forecast to exceed five percent of the base traffic for any movement in the design peak hours, and those road links where the Project traffic is forecast to exceed five percent of the base traffic in either direction on the link's AADT.

A road safety impact assessment has been undertaken in accordance with the *Guide to Traffic Impact Assessment*, for the alternative access option, consistent with that presented in Table 5.22 in the main report, and focussing on that part of the road network on which the alternative access option would alter the future conditions compared with the main report assessment. The risk items in Table 5.22 which relate to locations north of Eagle Downs Mine Access Road and south and west of the former Dysart Road would still apply to the alternative access option however are not repeated here. Traffic safety risks have been identified on the relevant section of Peak Downs Mine Road and scored using the *Guide to Traffic Impact Assessment* risk scoring matrix (Table 5.18).

Table E13 presents the risk assessment of the likelihood and consequence of safety risks being increased as a consequence of Project-generated traffic for the alternative access option.

Table E13: Alternative Access Option Risk Assessment

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
General – Road Links										
The majority of the Project workforce would be accommodated in Moranbah which would require daily travel to the Project using the main access route via Moranbah Access Road, Peak Downs Highway and Peak Downs Mine Road. At its period of peak trip generation during Months 7 to 12 of the initial construction stage, up to 674 daily trips (light vehicles and heavy vehicles) associated with the Project would be generated along Peak Downs Mine Road north of the Project, 204 daily trips on Peak Downs Highway east of Moranbah Access Road and 470 daily trips on Moranbah Access Road. Up to 676 daily trips would be generated on Winchester Access Road and the former Dysart Road. Increased traffic volumes along the access route have the potential to impact not only residents but the wider community and also workforce through an increase in crash risk. Table 3.8 shows the predominant crash type along the main access route between the Project and Coppabella and Moranbah is off path type (DCA 700 and 800), represented by 24 (or 66%) out of 36 crashes that were reported between 2014 and 2018. Of these 24 off path crashes, 17 crashes resulted in hospitalisation of road users involved. These off path crashes could be correlated with the road deficiencies in relation to delineation and pavement conditions to be further discussed in Table E13. It can be inferred from the crash data that the level of the existing crash risks are generally medium, based on a moderate likelihood with hospitalisation as a consequence under the existing conditions.	Moderate	Hospitalisation	Medium (12)	Likely	Hospitalisation	High (16)	**To minimise traffic increases during construction, Whitehaven would use shuttle buses to transport workers between the accommodation villages in Moranbah and the Project. This would minimise the Project-generated traffic volumes on the road network.** **Whitehaven would also liaise with local communities, IRC and emergency services regarding the proposed changes to the existing road network. Whitehaven would also implement a Fatigue Management Policy for the workforce, including a swipe card system to monitor hours worked, use of buses to transport workers, and coordinated car-pooling arrangements.** **The drivers would be trained for the type of vehicle being operated and inducted with safety information.** **Refer to the recommended measures to mitigate specific risk items further in Table E13.**	**Unlikely**	**Hospitalisation**	**Medium (8)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Road Links – Peak Downs Mine Road										
Pavement bleeding in a significant section of Peak Downs Mine Road (both directions), particularly on both approaches to the level crossing. The smooth and shiny surface in the wheel paths has low skid resistance, and the road may become slippery during wet weather conditions. 	Unlikely	Hospitalisation	Medium (8)	Moderate	Hospitalisation	Medium (12)	**Pavement resurfacing to prevent further deterioration under IRC's regular maintenance program.**	**Rare**	**Hospitalisation**	**Medium (4)**

Risk Item	Base			With Project			Mitigation Measures	With Project and Mitigation		
	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Road Links – former Dysart Road										
Potholing on the former Dysart Road may affect the stability and controllability of the vehicles if motorists travel directly over them. If the small ones are untreated, moisture may infiltrate into the pavement resulting in more significant potholing. 	Rare	Medical Treatment	Low (3)	Unlikely	Medical Treatment	Medium (6)	**Pavement maintenance to keep road pavement in fair condition.**	**Rare**	**Minor Injury**	**Low (2)**
Intersection of the former Dysart Road and Winchester Access Road										
A section of Winchester Access Road is a gravel road which causes issues with fugitive dust and subsequently impairs visibility on the road.	Rare	Medical Treatment	Low (3)	Unlikely	Medical Treatment	Medium (6)	**Implement a program of regular watering and maintenance of the unsealed portion of Winchester Access Road to minimise dust. Alternatively, consideration should be given to sealing the road for long term use.** **Signpost a reduced advisory speed on the former Dysart Road and Winchester Access Road.**	**Rare**	**Minor Injury**	**Low (2)**

E.8 Pavement Implications

The Project-generated daily and annual SARs assessed in the main text of this report (Table 5.25 and Table 5.26) would not be impacted by the alternative access option.

The alternative access option would not impact the Project-generated traffic on the SCRs, and hence the pavement assessment area with the alternative access option would remain unchanged from that presented in Table 5.27 and the Project-generated SAR-km in the Project impact area would remain unchanged from that presented in Table 5.28.

The Project-generated SARs on the local roads (Table 5.29) would not be impacted by the alternative access option. The use of the former Dysart Road and Winchester Access Road would however increase the length of Peak Downs Mine Road between the Project and Peak Downs Highway that would be impacted by those Project-generated SARs.

E.9 Railway Level Crossings Implications

The contribution of Project-generated vehicular traffic at the existing actively controlled level crossing of Peak Downs Mine Road and the Norwich Park Branch Railway located to the north-east of Winchester Access Road has been quantified for the alternative access option. The Project's contribution to future traffic at that level crossing is summarised in Table E14.

Table E14: Alternative Access Option Project Traffic at Peak Downs Mine Road Level Crossing

	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily (vehicles per day)	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Initial Construction Stage Months 1 to 6	28	4	6	18	113	113
Initial Construction Stage Months 7 to 12	64	14	16	48	337	337
Initial Coal Production Stage	46	18	19	34	243	243
Peak Operational Stage	17	36	38	14	148	148

From Table E14, it is evident that with the alternative access option, the volume of road traffic generated by the Project through the level crossing would peak between Months 7 to 12 of the initial construction stage.

When a coal train passes through, Peak Downs Mine Road remains closed to vehicular traffic for approximately 2.5 to 3 minutes, depending on the length and speed of the train. As the railway line is single track through the level crossing, each closure of Peak Downs Mine Road at the level crossing is necessarily followed by a period of several minutes during which the road is open before a following train closes the road (Section 5.6.2).

As an indication of the potential implications of the additional Project-generated traffic using the level crossing, an indicative analysis has been conducted using SIDRA INTERSECTION to simulate peak hour conditions during which the level crossing is closed to road traffic for three minutes, and then reopened to road traffic for three minutes on a continuous basis throughout the peak hours. While this is not necessarily representative of actual conditions, it is considered to provide a reasonable basis to compare the potential impacts of the Project-generated traffic on the delays experienced by road-based traffic at the level crossing when the crossing is closed by the presence of a train. The resulting average delays experienced by vehicles on Peak Downs Mine Road are presented in Table E15.

Table E15: Alternative Access Option Average Vehicle Delays for Simulated Level Crossing

Scenario	AM Peak Hour (seconds per vehicle)		PM Peak Hour (seconds per vehicle)	
	Southbound	Northbound	Southbound	Northbound
Baseline				
2022	55.8	55.7	55.7	57.6
2023	55.9	55.8	55.8	57.7
2029	57.0	56.9	56.6	59.2
With Project				
2022 Initial Construction Stage Months 1 to 6	56.9	55.9	56.0	58.3
2022 Initial Construction Stage Months 7 to 12	58.5	56.4	56.5	59.7
2023 Initial Coal Production Stage	57.8	56.6	56.6	59.2
2029 Peak Operational Stage	57.7	58.3	58.3	59.8

Simulation assumes boom gates closed for three minutes then open for three minutes continually during peak hours.

Table E15 suggests that the Project-generated traffic would have negligible impact on the delays experienced by vehicles during a closure of the level crossing on Peak Downs Mine Road.

Although not considered a typical intersection, the same general methodology applicable to assessing intersection delay impacts has been applied to the level crossing as described in Section 5.2 of the main report, i.e. to determine if the delays on base traffic significantly worsens. On this basis, the intersection delay impact has been reviewed by considering the difference between the base case and "with development" vehicle-minutes delay at the level crossing, where the "with development" vehicle-minutes are calculated by multiplying the "with development" average delay by movement to the base case volume on each movement. The results are summarised in Table E16.

Table E16: Alternative Access Option Simulated Level Crossing Delay Impact (vehicle-minutes per hour)

	AM Peak			PM Peak		
	Base	Project	Impact[A]	Base	Project	Impact[A]
2022 Initial Construction Stage Months 1 to 6	337.8	341.7	1.1%	399.9	403.6	0.9%
2022 Initial Construction Stage Months 7 to 12	337.8	348.0	3.0%	399.9	410.8	2.7%
2023 Initial Coal Production Stage	341.8	350.0	2.4%	404.1	412.6	2.1%
2029 Peak Operational Stage	405.3	412.8	1.9%	476.3	485.1	1.8%

[A] *Impact calculated as percent increase with Project compared with Base conditions*

These results suggest that the additional Project-generated traffic would not have a significant impact on the delays experienced by non-Project traffic at the level crossing. The 5 % threshold which applies to intersection delay impacts would not be reached at the level crossing.

The minor increase in the queue formed in Peak Downs Mine Road due to the additional Project-generated traffic would have no impact on the safety or operation of the road network, as there are no minor roads or property accesses in the vicinity that could potentially be blocked by a queue in either direction, and sight distances for approaching drivers are adequate to observe any queue of vehicles.

E.10 Other Considerations

Austroads (2020c) suggests that rural roads carrying 500 to 1,000 vehicles per day should be designed with:

- two 3.5 m wide traffic lanes (minimum 3.1 m);
- 0.5 m sealed shoulder within a total 1.5 m wide shoulder on each side of the travel lanes;
- total carriageway 10.0 m wide (minimum 9.2 m).

Austroads (2020c) suggests that rural roads carrying 150 to 500 vehicles per day should be designed with:

- two 3.1 m wide traffic lanes;
- 0.5 m sealed shoulder within a total 1.5 m wide shoulder on each side of the travel lanes;
- total carriageway 9.2 m wide.

The forecast average daily volumes on Winchester Access Road with the alternative access option are:

- Initial Construction Stage Months 1 to 6: 228 vehicles per day (32 % heavy vehicles);
- Initial Construction Stage Months 7 to 12: 676 vehicles per day (34 % heavy vehicles);

- Initial Coal Production Stage: 488 vehicles per day (33 % heavy vehicles); and
- Peak operational stage: 300 vehicles per day (26 % heavy vehicles).

Winchester Access Road can therefore be expected to carry more than 500 vehicles per day only during Months 7 to 12 of the Initial Construction Stage, but would carry close to 500 vehicles per day during the Initial Production Stage.

It is acknowledged that the Austroads (2020c) widths typically apply to a high speed environment and that Winchester Access Road would be expected to have a reduced speed limit, however considering that the traffic would comprise a relatively high proportion of heavy vehicles, it is recommended that Winchester Access Road be upgraded consistent with the Austroads (2020c) desirable widths for rural roads carrying 500 to 1,000 vehicles per day. The 3.5 m wide travel lanes allow large vehicles to pass or overtake without either vehicle having to move sideways towards the outer edge of the lane. It is therefore recommended that for the alternative access option, Winchester Access Road be upgraded to provide a total minimum sealed width of 8.0 m (3.5 m lane and 0.5 m shoulder sealed on each side), plus minimum 1.0 m unsealed shoulder on each side.

The design and upgrade of Winchester Access Road should be consistent with TMR and Austroads guidelines.

E.11 Summary

Alternative Access Option

For the alternative access option for the Project, all vehicular access to and from the Project would be via Winchester Access Road and the former Dysart Road throughout the life of the Project. The Mine Access Road from Eagle Downs Mine Road would not be constructed.

Aspects of the Project have been refined in consideration of the mitigation hierarchy to avoid potential impacts through design, to manage impacts through operational measures, and to mitigate the residual impacts. Key refinements include:

- all operational vehicular access to and from the Project would be via Winchester Access Road from Peak Downs Mine Road, minimising potential impacts to through traffic on Peak Downs Mine Road by consolidating interaction with the public road network to a single existing intersection rather than introducing a new intersection;
- management of workforce travel through the use of shuttle bus services to transport the majority of the workforce between the Project and accommodation facilities at Moranbah, thus significantly reducing the potential number of trips generated between the Project and the main accommodation location of the workforce; and

- product coal would be transported from the Project by rail, resulting in no increase in road traffic directly related to coal transport.

Assessment Scenarios and Project Traffic Demands

This review considers the same scenarios as those assessed in the main report. The total number of trips generated by the Project would remain unchanged.

Access and Frontage Impacts

The alternative access option does not have any frontage to any SCR and does not propose direct access to any SCR. The alternative access option makes use the existing intersection of Peak Downs Mine Road with the former Dysart Road. The layout of and sight distance available at that intersection meets or exceeds requirements based on forecast demands.

Intersection Delay Impacts

The intersections of Peak Downs Mine Road with the former Dysart Road and with Eagle Downs Mine Access Road would operate at satisfactory levels of service with the alternative access option. Intersection delay impacts would remain below the desirable threshold once the Project is operational.

Road Link Capacity Impacts

With the alternative access option, Levels of Service during the peak hours are forecast to be acceptable on Peak Downs Mine Road between Eagle Downs Mine Access Road and the former Dysart Road.

Road Safety Implications

A risk assessment for the road links and intersections affected by the alterative access option has identified some specific issues on the local roads, and mitigation of these has been identified. No additional mitigation measures are expected for the alternative access option.

Pavement Impacts

The Project-generated SARs on the local roads would not be impacted by the alternative access option, however the length of Peak Downs Mine Road which would experience those SARs would be increased.

Railway Level Crossing

With the alternative access option, the majority of Project-generated traffic would travel through the actively controlled level crossing of Peak Downs Mine Road and the Norwich Park Branch Railway. A simulation of the level crossing was developed, which found that the Project-generated traffic would have negligible impact on the delays experienced by vehicles during a closure of the level crossing on Peak Downs Mine Road.

Although not a traditional intersection, a review of the intersection delay impacts at the level crossing has been conducted using the same methodology as applied to intersection delay impacts. The results indicate that the impact of the Project-generated traffic would be below the 5 % threshold applicable to intersection delays.

Other Considerations

It is recommended that for the alternative access option, Winchester Access Road be upgraded in accordance with Austroads road design guidelines, with a minimum sealed width of 8.0 m, plus minimum 1.0 m unsealed shoulder on each side.

E.12 Conclusions

The potential residual impacts of the Project with the alternative access option have been identified herein and can be appropriately managed or mitigated through the relevant measures outlined in the main report, together with the design and upgrade of Winchester Access Road consistent with TMR and Austroads guidelines.

Appendix F

Certification

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for:

Project title:	**Winchester South Project**

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

(i) I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the *Guide to Traffic Impact Assessment* published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and

(ii) where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that

(iii) the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that

(iv) I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

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RPEQ competencies:	Civil		
Signature:		Date:	16 April 2021
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