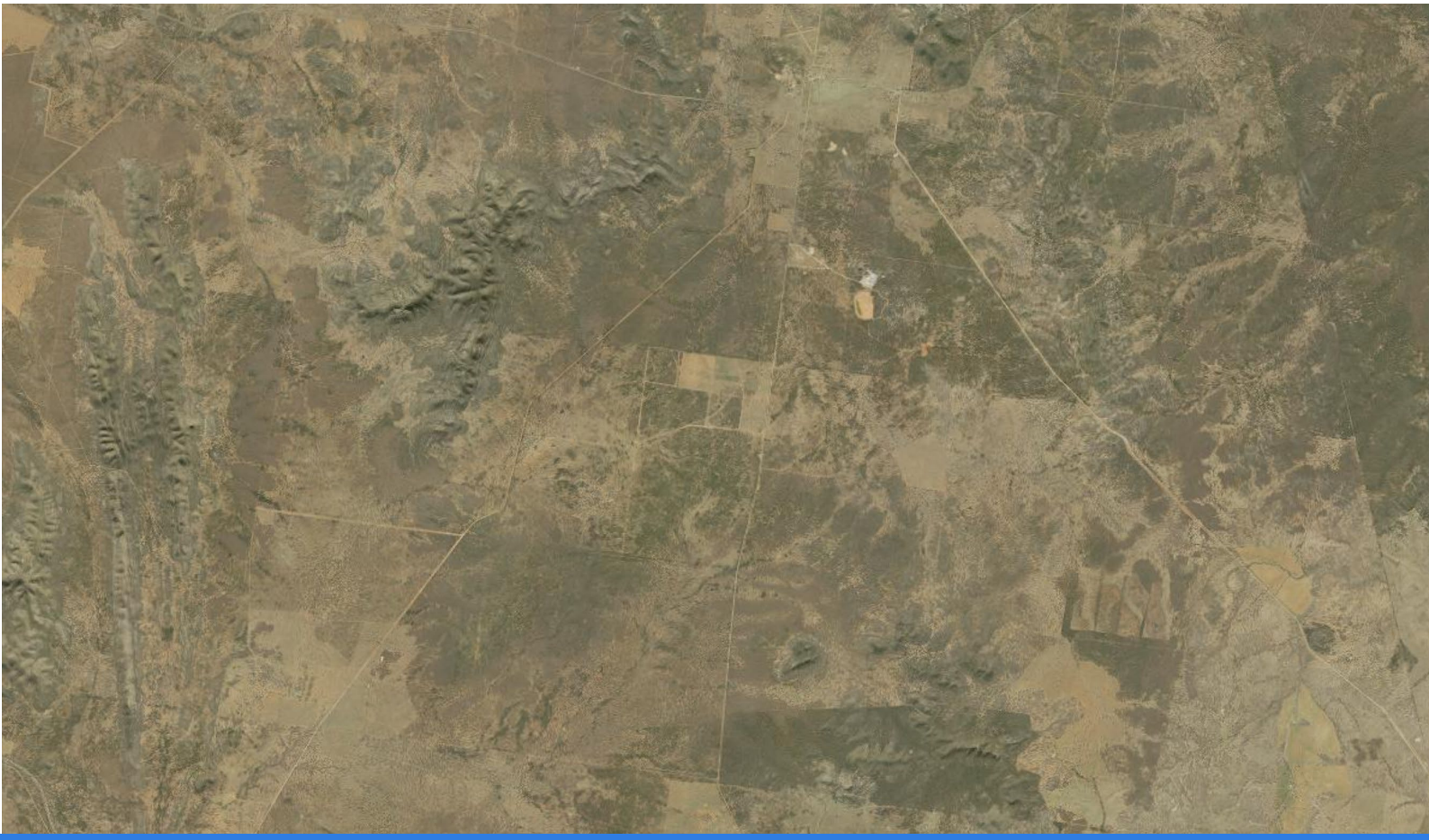

Federation Project
Road Transport Assessment

Prepared for:

Hera Resources Pty Limited

1 October 2021

The Transport Planning Partnership

E: info@ttpp.net.au

Federation Project

Road Transport Assessment

Client: Hera Resources Pty Limited

Version: Final

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Final	01/10/2021	PJD	PJD	

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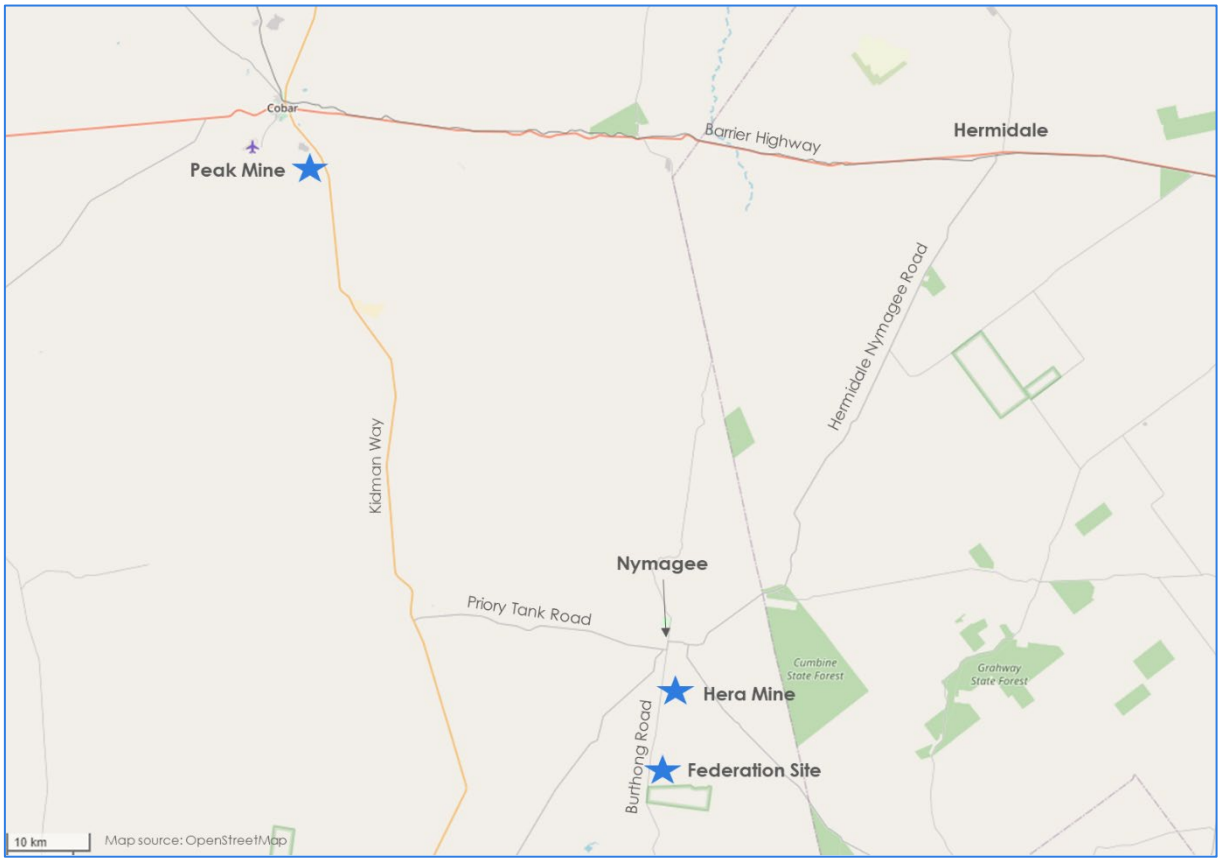
1 Introduction

This report has been prepared on behalf of Hera Resources Pty Limited (Hera Resources) to present the findings of the road transport assessment for the Federation Project (the Project). The Federation Site is located approximately 15 kilometres (km) south of Nymagee, New South Wales (Figure 1.1).

Figure 1.1: Regional Site Location



Hera Resources is a wholly owned subsidiary of Aurelia Metals Limited (Aurelia), which also operates Hera Mine, located approximately 10 km north of the Federation Site, and Peak Mine located approximately 10 km south of Cobar. Road transport activities at the Project would interact with activity at Aurelia's other mining projects in the region.

The Project comprises:

- the Federation Site with an underground mine development and surface infrastructure;
- new activities and infrastructure at Hera Mine; and
- a Services Corridor connecting the Federation Site with Hera Mine.

This Road Transport Assessment forms part of an Environmental Impact Statement, and has been prepared with reference to the road transport components of the Secretary's Environmental Assessment Requirements (SEARs):

Traffic and Transport *– including an assessment of:*

- *the likely traffic and transport impacts of the development on the capacity, condition, safety and efficiency of the road and rail network and any cumulative impacts of other developments in the locality, documented in a Transport Assessment prepared in accordance with relevant guidelines and including a description of:*
    - *the site access routes and site access points in accordance with the* Roads Act 1993; and
    - *measures including upgrade works, that would be implemented to mitigate and/or manage potential traffic impacts developed in consultation with the relevant road authority*.

In addition, the SEARs refer to guidelines which are relevant to the assessment, including the RMS (now Transport for New South Wales [TfNSW] and formerly Roads and Traffic Authority [RTA]) *Guide to Traffic Generating Developments* (RTA, 2002), the RMS's *Road Design Guide* (N.D), relevant Austroads Standards, the Austroads *Guide to Traffic Management Part 12: Traffic Impacts of Development*, and the RMS Supplements to Austroads. It is noted that TfNSW and other road agencies have adopted the Austroads guides and the Australian Standards as the primary technical references, together with the RMS Supplements, rather than the RMS Road Design Guide referred to in the SEARs. This study has therefore been prepared in accordance with RTA (2002) and with reference to the relevant Austroads guides, RMS Supplements to the Austroads guides and Australian Standards.

Throughout this report, this assessment has assumed that transport of materials for the Project would use similar vehicles to those currently used at Hera Mine, i.e., Type 1 A-double road trains and modular B-triple road trains. Should the use of higher capacity vehicles be feasible, the number of trips required to achieve the various transport tasks described herein would be reduced, and the impacts on daily and peak hourly traffic volumes would be reduced. Similarly, the impacts on the levels of service experienced by drivers travelling on the affected routes and delays experienced turning at intersections would be reduced below those identified in this report. The use of higher capacity vehicles would be subject to further investigation and confirmation that the road and intersection geometries are sufficient.

Throughout this report, a vehicle trip is defined as a one way movement of a vehicle. A vehicle arriving and then departing a location therefore generates two vehicle trips.

The remainder of this report is set out as follows:

- Section 2 describes Aurelia's mining projects in the region, and potential changes to those operations.

- Section 3 describes the proposed Project, and its vehicular access arrangements and forecast production characteristics.
- Section 4 describes the background road transport environment, including the supporting road network, its operating conditions, a review of the road crash history of the network, and expected changes to road transport conditions that are unrelated to the Project.
- Section 5 assesses the road transport implications of the Project, including its expected traffic generation, impacts on traffic volumes, road network operations and road safety. Recommendations are made with regard to mitigating potential impacts of the Project.
- Section 6 presents the conclusions of the investigation and its recommendations.

2 Background to Mining Operations

As the road transport characteristics of the Project would interact with those of Aurelia's other mining developments in the region, those operations are described in this section, with particular regard to the number and distribution of vehicle trips on the road network and any potential changes over the life of the Project.

2.1 Hera Mine

Hera Mine is located approximately 10 km north of the Federation Site. Hera Mine consists of an underground mine, a run-of-mine (ROM) pad, waste rock emplacement (WRE), processing plant, tailings storage facility (TSF), and associated infrastructure and ancillary activities. Hera Mine employs approximately 170 full time equivalent workers, of which approximately 90 percent reside in the on-site accommodation village. Hera Mine operates with two 12-hour shifts per day, with shift changeovers occurring at 6:00 am and 6:00 pm. The majority of the workforce work on a roster of seven days on and seven days off, with the major shift change occurring on Tuesdays. The workers typically drive to and from the Hera Mine accommodation village at the start and end of their roster periods.

Vehicular access for Hera Mine is from Burthong Road via a Light Vehicle Access Road and a Main Site Access Road. These access roads meet Burthong Road at T-intersections at which Burthong Road is the priority road, and the site access roads are each the minor road. The Light Vehicle Access intersection on Burthong Road is located at the northern boundary of the Hera Mine Site, and has been upgraded to accommodate light vehicles and light rigid trucks in accordance with Austroads guidelines. The Main Site Access intersection on Burthong Road is located approximately 600 m south of the Light Vehicle Access, and has been constructed to accommodate 36 m road trains.

With regard to the road transport environment, the Project Approval (PA10_0191) for Hera Mine permits:

- transportation of up to 60,000 tonnes per annum (tpa) of zinc/lead concentrate from Hera Mine to Hermidale Rail Siding during daylight hours, with no more than eight vehicle movements (entering and leaving the site) per day average over a calendar month;
- transportation of up to 100,000 tpa of ore from the Hera Mine approximately 94 km by road during daylight hours to the Peak Mine for processing, with backloading of a similar amount of waste rock from the Peak Mine to the Hera Mine, with no more than 44 vehicle movements (entering and exiting the site) per day and no more than eight vehicle movements (entering and exiting the site per hour;
- importation and batch processing of the 20,000 tonne (t) bulk sample and 425,000 t waste rock from the Federation Deposit, pending approval for the exploration activity (known as the Federation Exploration Decline Program, refer to Section 2.2).

2.1.1 Traffic Management Plan

The Hera Mine Traffic Management Plan (TMP) (Aurelia, 2019), was prepared in consultation with Bogan Shire Council and Cobar Shire Council, and outlines measures to manage Hera Mine's traffic, as required by Condition 38 of PA10_0191. A Driver's Code of Conduct has also been implemented, and applies to all drivers of heavy vehicles (above 4.5 t Gross Vehicle Mass or Aggregate Trailer Mass) who visit the site on a frequency of greater than once per month.

The TMP presents traffic management measures to be implemented throughout the life of Hera Mine, including commitments for a number of road and intersection construction and upgrades which have now been completed. Completed work includes construction of the Main Site Entrance intersection and upgrade of the existing (light vehicle) intersection on Burthong Road, which was completed in 2016 including widening and sealing of the road to accommodate heavy vehicles and reduce dust emissions. The required upgrading of the intersection of Hartwood Street and Milford Street was also completed in 2016.

The TMP restricts the transport of concentrates during times of rainfall to reduce damage to roads, and allows use of the Secondary Concentrates Transport Route when required, including during times of road closures following heavy rain. The TMP is periodically reviewed and updated as required.

Planning Agreements (PA) are in place for Hera Mine with Cobar Shire Council and Bogan Shire Council for annual road repair and maintenance contributions.

2.1.2 Concentrates Transport

The transportation of 60,000 tpa of concentrates from Hera Mine to Hermidale Rail Siding is permitted via the Principal Concentrates Transport Route, which is shown on Figure 2.1 to Figure 2.3 and includes:

- Burthong Road;
- Hartwood Street;
- Milford Street;
- Whitbarrow Way;
- Hermidale Nymagee Road;
- Nyngan Street;
- Youngee Street;
- and Barrier Highway.

The approved Secondary Concentrates Transportation Route from Hera Mine to the Hermidale Rail Siding is permitted to be used for transportation of ore only when required, including during times of road closures following heavy rain or when more than eight truck

movements per day averaged over a calendar month is required for transport of concentrates. The transportation of 100,000 tpa of concentrates from Hera Mine to Hermidale Rail Siding is permitted via that part of the Secondary Concentrates Transport Route between Hera Mine and Peak Mine. The Secondary Concentrate Transport Route is shown on Figure 2.1, and includes:

- Burthong Road;
- Priory Tank Road;
- Kidman Way; and
- Barrier Highway.

Figure 2.1: Hera Mine Concentrates Transport Routes

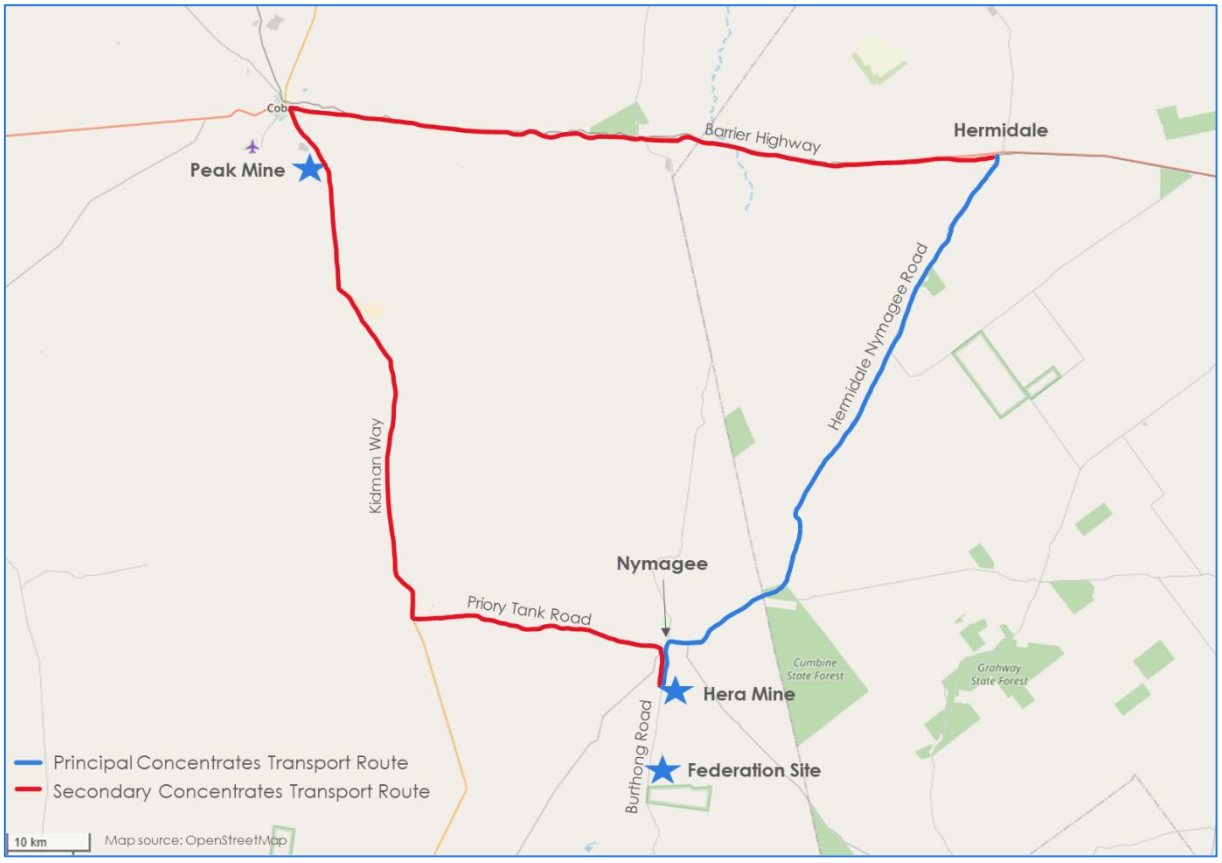


Figure 2.2: Hera Mine Concentrates Transport Routes at Nymagee

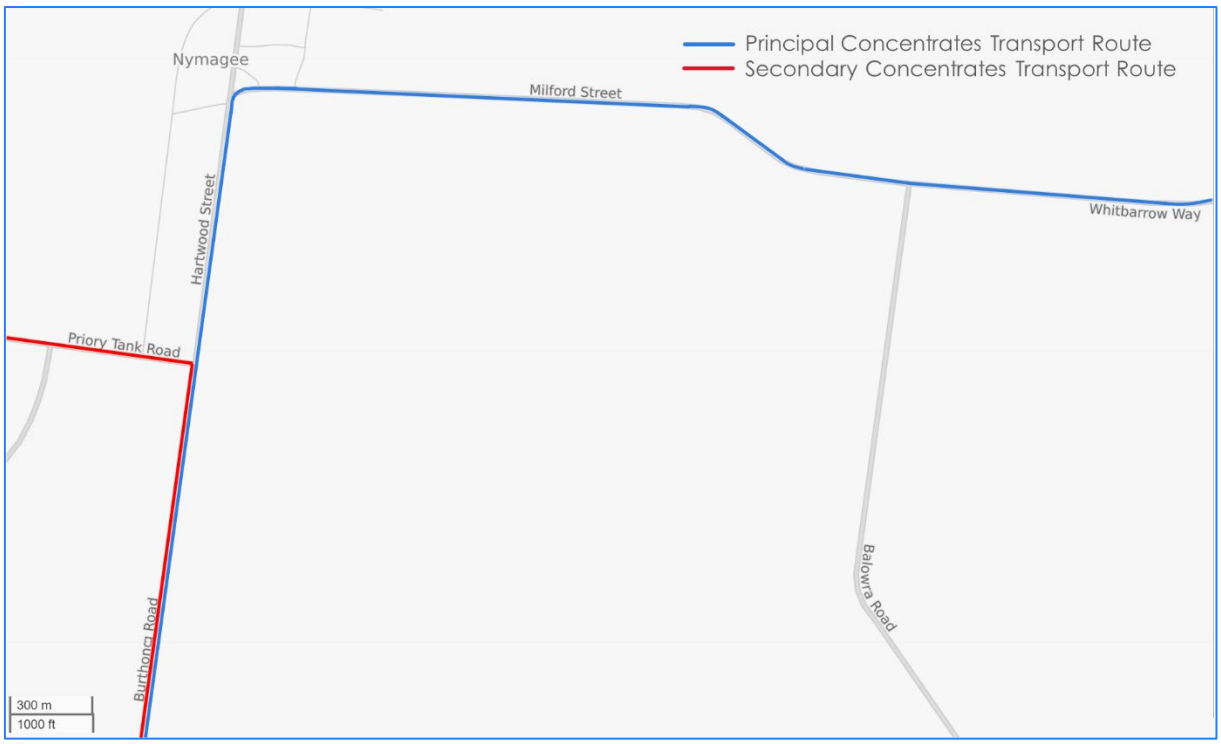
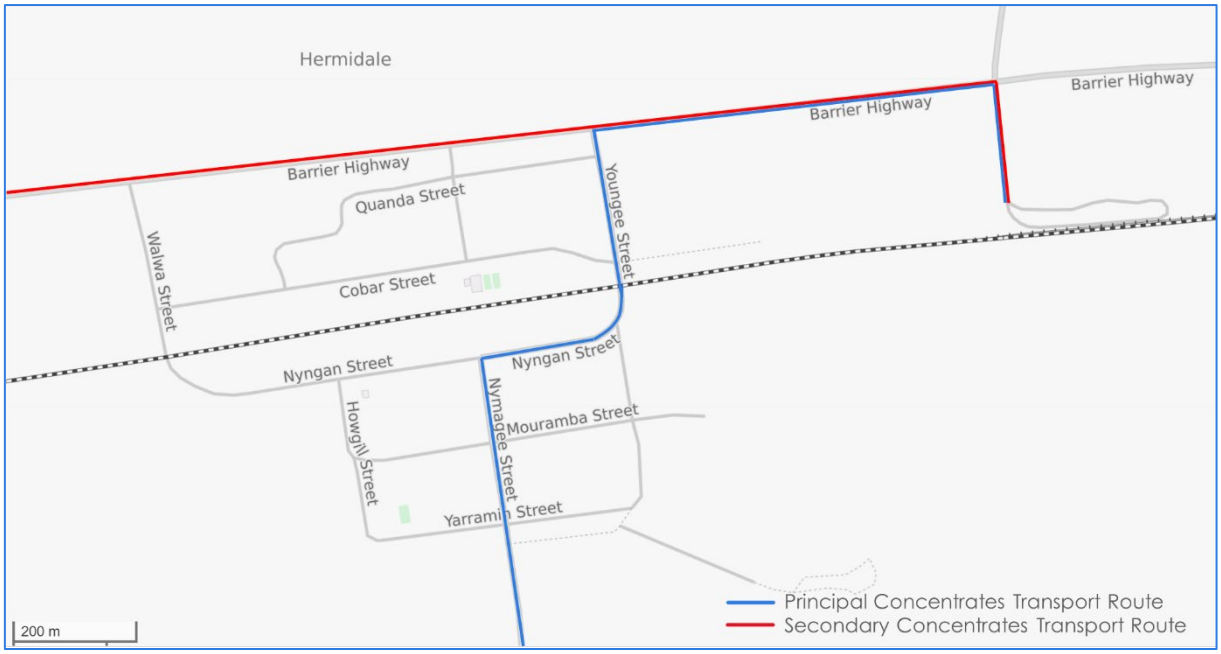


Figure 2.3: Hera Mine Concentrates Transport Routes at Hermidale



Transport of concentrates from Hera Mine is managed in accordance with the TMP, which limits the transportation of concentrates by road to daylight hours, seven days per week. The TMP identifies the daylight transportation hours as being between 7:00 am and 7:30 pm during Daylight Saving Time, and between 7:00 am and 5:00 pm at other times.

Transportation hours may however vary from those hours nominated in the TMP, with first light and last light in the region being approximately 5:40 am and 8:45 pm respectively at Summer Solstice, and 6:45 am and 5:45 pm at Winter Solstice.

Transport of bulk concentrates currently uses sealed containers, transported on Type 1 A-double road trains and modular B-triple road trains. The average payload per vehicle is 50 t, thus the transport of 60,000 tpa of concentrates to Hermidale Rail Siding requires approximately 1,200 loads per year.

TTPP (2020a) reviewed concentrate haulage data over a ten month period at the current annual maximum production rate, and found that the average daily haulage from Hera Mine has generated five heavy vehicle trips per day, with a design day (85th percentile) generation of 10 heavy vehicle trips per day.

2.1.3 Ore Transport

Modification 6 to Hera Mine's Project Approval was granted in June 2021, which permits the transport of up to 100,000 tpa of ore from the Hera Mine approximately 94 km by road to the Peak Mine for processing, with backloading of a similar amount of waste rock from the Peak Mine to the Hera Mine.

TTPP (2020a) assessed the likely road transport implications of Hera Mine Modification 6, which found that, the proposed transport of 100,000 tpa of ore would result in an average of 11 heavy vehicle trips per day on that part of the Secondary Concentrates Transport Route between Hera Mine and Peak Mine. The assessment considered a design day similar to that of concentrates transport, in which the transportation of ore would generate 22 heavy vehicle trips per day on the Secondary Concentrates Transport Route between Hera Mine and Peak Mine.

The approved transport of the waste rock from Peak Mine to Hera Mine will be undertaken via backloading of the same fleet of road trains to be used for the transportation of ore. As such, the transport of the waste rock will not generate any additional trips on the road network.

2.1.4 Federation Deposit Bulk Sample and Waste Rock

Modification 6 to Hera Mine's Project Approval permits the importation and batch processing of a 20,000 t bulk sample and 425,000 t waste rock from the Federation Deposit to Hera Mine, pending approval for the exploration activity (known as the Federation Exploration Decline Program, refer to Section 2.2).

The proposed bulk sample and waste rock transport is expected to occur over a period of approximately 24 to 30 months, generating a combined average of 20 to 40 loads per day, and a maximum of 40 to 80 vehicle trips per day (TTPP, 2020b). The trucks would use Federation Site Access Road, Burthong Road and Hera Mine Main Access Road.

The transport of the bulk sample and waste rock would be undertaken prior to commencement of the Project. The traffic generated by this activity would therefore not occur on the road network at the same time as Project traffic, however it has been robustly assumed that these activities may continue to occur until the end of life of Hera Mine.

2.1.5 Workforce Transport

Considering the 85th percentile design day, the Hera Mine workforce generates very few trips on the public road network, however for the purpose of this assessment and consistent with Traffic Solutions (2011) and TTPP (2020a), the Hera Mine workforce is assumed to generate 30 vehicle trips per day, the majority of which would be between the Hera Mine and Cobar.

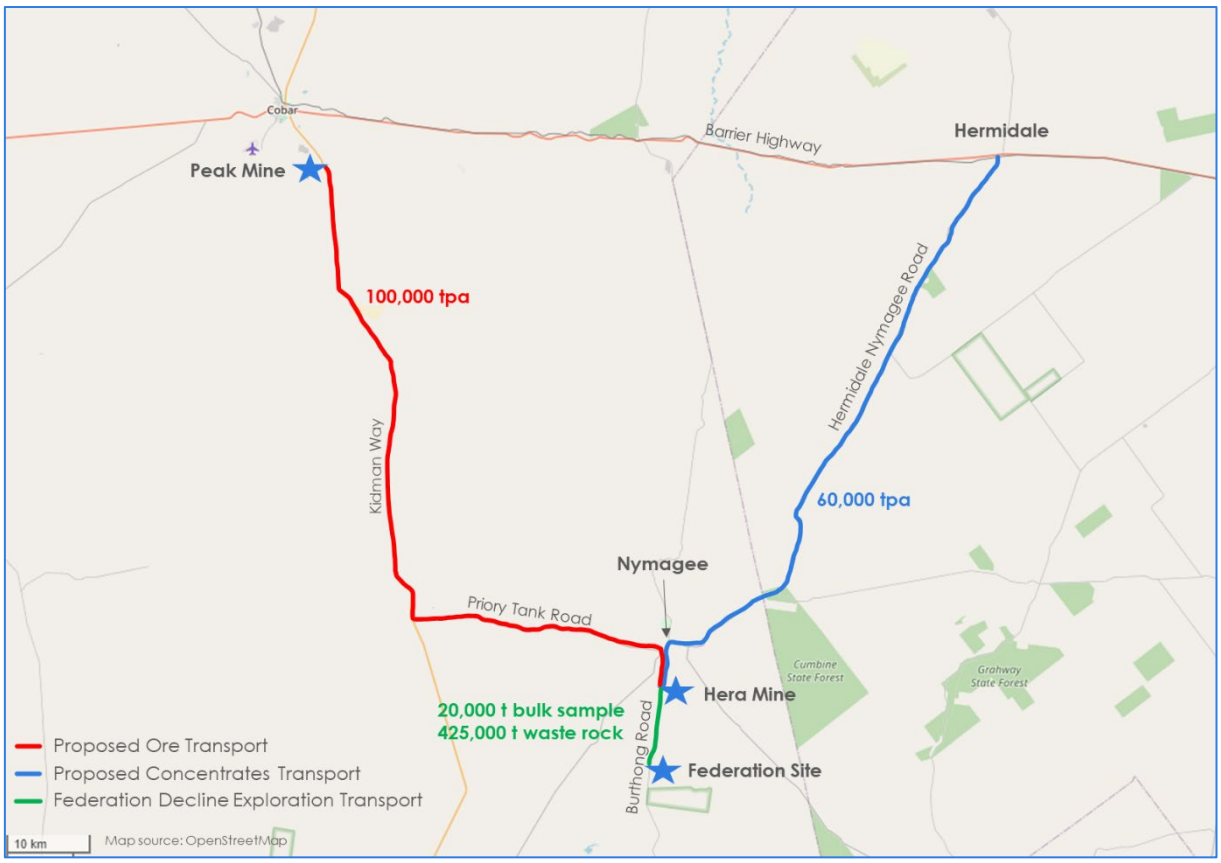
2.1.6 General Deliveries

Deliveries generate approximately eight additional heavy vehicle trips per day, primarily between Hera Mine and Cobar.

2.1.7 Total Hera Mine Transport

Figure 2.4 summarises the approved Hera Mine transportation demands (excluding workforce travel) that is approved to continue until 31 December 2025, pending approval for the Federation Exploration Decline Program (refer to Section 2.2).

Figure 2.4: Hera Mine Approved Transport



Based on the approved and expected conditions at Hera Mine, Table 2.1 summarises the total design day traffic that may be generated by Hera Mine. Table 2.1 assumes that a busy day for concentrates transport coincides with a busy day for ore transport, and that the Federation Exploration Decline is approved. The peak hourly traffic generation may occur at any time during the approved daylight haulage hours, however the combined peak trips in Table 2.1 are assumed to occur at the start or end of shifts, with significant movement of the workforce.

Table 2.1: Approved Hera Mine – Design Day Traffic

Road and Location	Workforce	Deliveries	Concentrate[A]	Ore[B]	Bulk Sample and Waste Rock[C]	Total
Daily (vehicle trips per day)						
Burthong Road Hera Mine to Priory Tank Road	30	8	10	22	0	70
Burthong Road Federation Site to Hera Mine	0	0	0	0	40	40
Federation Site Access Road	0	0	0	0	40	40
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	4	0	10	0	0	14
Hera Mine Access Roads	30	8	10	22	40	110
Kidman Way Barrier Highway to Peak Mine	26	8	0	0	0	34
Kidman Way Peak Mine to Priory Tank Road	26	8	0	22	0	56
Peak Mine Access Road	0	0	0	22	0	22
Priory Tank Road Kidman Way to Burthong Road	26	8	0	22	0	56
Peak Hour (vehicle trips per hour)						
Burthong Road Hera Mine to Priory Tank Road	15	1	1	2	0	19
Burthong Road Federation Site to Hera Mine	0	0	0	0	4	4
Federation Site Access Road	0	0	0	0	4	4
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	2	0	1	0	0	3
Hera Mine Access Roads	15	1	1	2	4	23
Kidman Way Barrier Highway to Peak Mine	13	1	0	0	0	14
Kidman Way Peak Mine to Priory Tank Road	13	1	0	2	0	16
Peak Mine Access Road	0	0	0	2	0	2
Priory Tank Road Kidman Way to Burthong Road	13	1	0	2	0	16

[A] *Assumes the Principal Concentrates Transport Route is available.*
[B] *Includes backloading of waste rock from Peak Mine to Hera Mine.*
[C] *Average day, subject to approval for the Federation Decline Exploration activity.*

TTPP (2020a) recommended that:

- the intersection of Kidman Way with Priory Tank Road be upgraded to provide a BAL treatment in Kidman Way suitable for the movement of road trains, and in accordance with Austroads design guidelines;

- the intersection of Burthong Road with Priory Tank Road and Hartwood Street be upgraded by widening the sealed shoulder to ensure that road trains turning left from Burthong Road into Priory Tank Road remain wholly on the sealed surface;
- the Hera Mine TMP be reviewed and updated to address the use of the route between Peak Mine and Hera Mine by haulage vehicles. Any updating should be conducted in consultation with Cobar Shire Council and include:
  - restricting the transport of ore to Peak Mine to daylight hours only; and
  - restricting the transport of ore to Peak Mine during heavy rainfall to prevent damage to local roads and minimise the risk of road crashes due to wet conditions.
- the Hera Mine Driver's Code of Conduct be updated to address use of the route between Peak Mine and Hera Mine on an ongoing basis, including driver behaviour expectations in the vicinity of school bus stops on Kidman Way; and
- the existing PA with Cobar Shire Council be revised to incorporate the use of the route between Hera Mine and Peak Mine into future annual contributions for road maintenance and repairs.

2.2 Federation Exploration Decline Program

Hera Resources is proposing to construct an exploration decline and associated exploration activity and infrastructure at the Federation Prospect within EL6162 and EL7447. The Federation Exploration Decline Program would include transportation of approximately 425,000 tonnes (t) of waste rock and no more than 20,000 t bulk sample material from the Federation Site deposit to Hera Mine via Burthong Road (as described in Section 2.1.6).

Vehicular access to the site would be via the proposed Federation Site Access Road, to be constructed from Burthong Road approximately 10 km south of the Hera Mine Main Site Access Road.

As described in Section 2.1.6, the proposed Federation Exploration Decline Program is expected to occur over a period of approximately 24 to 30 months, and would be undertaken prior to commencement of the Project. The traffic generated by the Federation Exploration Decline Program (Bulk Sample and Waste Rock trips in Table 2.1) would therefore not occur on the road network at the same time as Project traffic.

TTPP (2020b) recommended that with respect to the Federation Exploration Decline Program:

- the intersection of Burthong Road with the proposed Federation Site Access Road be constructed as a road intersection, with BAL and BAR treatments, designed to accommodate the swept path of the relevant design vehicles;
- signage be installed to alert drivers to the presence of the Federation Site Access Road and of trucks turning at the intersection;

- the drivers of heavy vehicles associated with the Exploration Decline Program be bound by a Driver's Code of Conduct, consistent with that at Hera Mine, and including behavioural expectations for drivers travelling between Hera Mine and Federation REF Area;
- additional signage and guideposts be provided along Burthong Road between Hera Mine and Federation Prospect, including at the existing stock grid; and
- a TMP be prepared to address the use of Burthong Road between Hera Mine and Federation REF Area, including:
  - restricting the transport of ore and waste rock to Hera Mine to daylight hours only;
  - restricting the transport of ore and waste rock to Hera Mine during heavy rainfall to prevent damage to Burthong Road and minimise the risk of road crashes due to wet conditions; and
- Hera Resources enter a PA with Cobar Shire Council regarding annual contributions for road maintenance and repairs on the relevant length of Burthong Road over the life of the Exploration Decline Program.

The Review of Environmental Factors for the Federation Exploration Decline Program included a commitment by Aurelia to prepare a TMP. Aurelia has since developed a TMP for the proposed Federation Exploration Decline Program, which includes a Driver's Code of Conduct, consistent with the TMP for the Hera Mine.

2.3 Peak Gold Mines and New Cobar Complex Project SSD

Peak Gold Mines Pty Ltd (PGM), a wholly owned subsidiary of Aurelia, owns and operates the Peak Gold Mine (PGM) south-east of Cobar. The operation comprises the New Cobar Complex located 3 km to the south-east of Cobar town centre and the Peak Complex located 10 km south-east of the town centre.

The current mining activities at the PGM operate under development approvals issued by Cobar Shire Council, which allow operations to continue indefinitely and process up to 800,000 tpa of ore. Ore processing, tailings storage and concentrate handling is undertaken at the Peak Complex, and ore is transported by road via Kidman Way from the New Cobar Complex to the Peak Complex.

The New Cobar Complex Project SSD proposes an amalgamation of underground mining at the New Cobar, Chesney and Jubilee deposits and development of new underground workings of the Great Cobar and Gladstone deposits to create the New Cobar Complex Project. The New Cobar Complex Project also seeks to consolidate all existing development approvals applicable to the New Cobar Complex into a single consent issued by the Department of Planning, Industry and Environment (DPIE).

With regard to the road transport environment, key aspects of the proposed New Cobar Complex Project SSD include:

- Extension of the end of mine life from 2023 (based on market assumptions) to 2035.
- No change to production rate of 800,000 tpa of ore.
- No change to processing and tailings disposal all occurring at Peak Complex.
- Increase from 25 loads to maximum 50 truck loads of ore per day during daylight hours to be transported from New Cobar Complex to Peak Complex via Kidman Way.
- No change to vehicular access via Kidman Way.
- No change to operating hours.

EMM (2020) anticipates that the New Cobar Complex Project SSD would result in a maximum three additional truck trips per hour between the New Cobar Complex and Peak Complex during the peak hours on a typical weekday. These additional trips would occur when the New Cobar Complex operates at peak production in 2026-27. Ten additional light vehicle trips would be generated at the same time, which EMM (2020) estimates would all occur on Kidman Way to and from the north of the New Cobar Complex access road, i.e., to and from Cobar.

3 The Project

3.1 Project Description

The Project proposes development of an underground mine and processing facilities, with an operational life until 2036. The principal features of the Project include:

- underground mining activities, box cut and surface infrastructure (e.g. administration and offices, roads, water management infrastructure, waste rock storage pads, ROM pad, tailings paste plant and ventilation fans) at the Federation Site;
- construction of a new processing plant at Hera Mine to facilitate processing of ore from the Federation Site;
- construction of a solar farm and connecting power lines at Hera Mine; and
- construction of a water pipeline, powerline and access track within a Services Corridor connecting the Federation Site and Hera Mine.

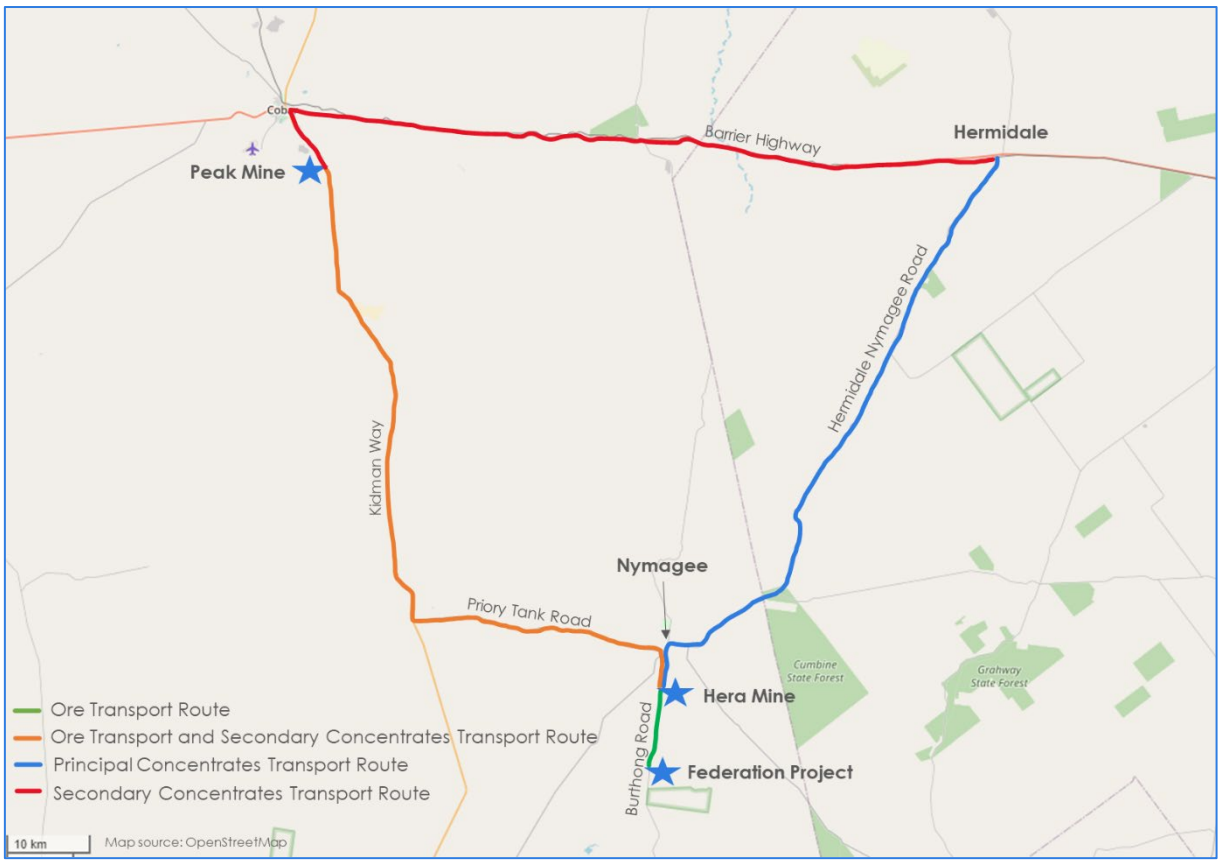
The existing accommodation village at Hera Mine is proposed to be expanded, however this does not form part of the Project, with the expansion development application approved by Cobar Shire Council in July 2021. For the purpose of this assessment, it is assumed that the capacity of the accommodation village will meet the expected demand for accommodation at all times.

Approximately 6.95 million tonnes (Mt) of ore would be mined at the Federation Site over a period of 12 to 14 years, with a maximum annual production rate of 0.75 million tonnes per annum (Mtpa). Approximately 6.2 Mt of ore extracted from the Project would be transported via Burthong Road for processing at a new process plant at Hera Mine. After processing at Hera Mine, concentrates would be hauled to the Hermidale rail siding via the Hera Mine Principal Concentrates Transport Route (or Secondary Concentrates Transport Route when required). The bulk concentrates would be loaded on to trains at Hermidale rail siding and transported to Newcastle for export. Approximately 60% of total tailings from the Project ore would be transported from Hera Mine to Federation Site via Burthong Road.

Approximately 0.75 Mt of ore extracted from the Project would be transported for processing at Peak Mine, via Burthong Road, Priory Tank Road and Kidman Way over four years. After processing at Peak Mine, concentrates would be hauled to the Hermidale or Dubbo rail sidings, consistent with the current Peak Mine operations. The bulk concentrates would be loaded on to trains at either of those rail sidings, and transported to Newcastle for export. Tailings from the Project ore processed at Peak Mine would be deposited within the existing Peak Mine TSF.

The Project Services Corridor contains an access track, which would not be used for road haulage of materials. Figure 3.1 presents the proposed routes for transport of the Project's ore and concentrates.

Figure 3.1: Federation Project Proposed Transport Routes



3.2 Workforce

The construction workforce would be present for a period of six to 12 months, and would reside at the accommodation village located at Hera Mine. The construction workforce is expected to work on a roster basis with 20 days on and 8 days off. Surface construction activities would typically be conducted during daytime hours only, seven days per week. Some specific tasks would be undertaken 24 hours per day, such as large concrete pours.

It is anticipated that the majority of the operational workforce would reside at the accommodation village at Hera Mine, and would work under similar roster and shift arrangements as currently occur at Hera Mine, i.e., with two 12-hour shifts per day, with the majority of the workforce being on a roster of seven days on and seven days off or eight days on and six days off.

The Project's forecast construction and operational workforce are summarised in Table 3.1, which demonstrates that it is forecast to employ up to 239 people between the second half of FY2028 and the first half of FY2034 (i.e., calendar years 2028 to 2033 inclusive).

Table 3.1: Project Workforce Forecasts

Year	Construction Workforce		Operational Workforce		Regional Exploration Workforce	Total Workforce	
	First Half Year	Second Half Year	First Half Year	Second Half Year		First Half Year	Second Half Year
FY2023	0	100	0	40	25	25	165
FY2024	100	0	40	174	25	165	199
FY2025	0	0	174	184	25	199	209
FY2026	0	0	184	194	25	209	219
FY2027	0	0	194	204	25	219	229
FY2028	0	0	204	214	25	229	239
FY2029	0	0	214	214	25	239	239
FY2030	0	0	214	214	25	239	239
FY2031	0	0	214	214	25	239	239
FY2032	0	0	214	214	25	239	239
FY2033	0	0	214	214	25	239	239
FY2034	0	0	214	184	25	239	209
FY2035	0	0	184	174	25	209	199
FY2036	0	0	174	174	25	199	199
FY2037	0	0	174	0	25	199	25

3.3 Ore Processing

Table 3.2 summarises the forecast annual ore processing rates for the Project. This indicates that a maximum of 752,055 t of ore would be transported from the Federation Site to the Hera Mine in any one year, with the peak expected to occur in FY2028 (1 July 2027 to 30 June 2028). It is forecast that a maximum of 200,000 t of ore would be transported from Federation Site to Peak Mine for processing in each of years FY2025 to FY2027.

Table 3.2: Project Annual Ore Processing Rates (tpa)

Year	Project Ore Processed at Hera Mine	Project Ore Processed at Peak Mine	Total Project Ore Processed
FY2023	-	-	-
FY2024	170,120	150,000	320,120
FY2025	359,909	**200,000**	559,909
FY2026	364,507	**200,000**	564,507
FY2027	482,977	**200,000**	682,977
FY2028	**752,055**	-	**752,055**
FY2029	750,000	-	750,000
FY2030	720,193	-	720,193
FY2031	749,892	-	749,892
FY2032	732,302	-	732,302
FY2033	644,407	-	644,407
FY2034	337,413	-	337,413
FY2035	98,108	-	98,108
FY2036	34,631	-	34,631

3.4 Concentrates Production

Table 3.3 summarises the forecast annual concentrates production rates for the Project. This indicates that a maximum of 154,470 t of concentrates from the Project would be transported from Hera Mine to Hermidale Rail Siding in any one year, with the peak expected to occur in FY2029. It is forecast that a maximum of 38,675 t of concentrates from the Project would be produced at Peak Mine in FY2026, and transported from Peak Mine to Hermidale Rail Siding or Dubbo Rail Siding. The transport of concentrates from Peak Mine is permitted under current approval conditions at Peak Mine, and so is not considered further in this assessment.

Table 3.3: Project Annual Concentrates Production (tpa)

Year	Concentrate Production at Hera Mine	Concentrates Production at Peak Mine	Total Concentrates Production
FY2023	-	-	-
FY2024	18,891	16,656	35,547
FY2025	51,573	28,659	80,232
FY2026	70,487	**38,675**	109,161
FY2027	86,011	35,617	121,628
FY2028	142,432	-	142,432
FY2029	**154,470**	-	**154,470**
FY2030	105,350	-	105,350
FY2031	120,009	-	120,009
FY2032	145,588	-	145,588
FY2033	95,496	-	95,496
FY2034	41,342	-	41,342
FY2035	10,237	-	10,237
FY2036	4,334	-	4,334

3.5 Tailings Production and Demand

Table 3.4 summarises the forecast annual tailings production and demand rates for backfilling the underground stopes at the Federation Site. This indicates that a maximum of 377,930 t of tailings from the Project's processing would be transported from Hera Mine to Federation Site in any one year, with the peak expected to occur in FY2029. Tailings from Project ore processed at Peak Mine would be deposited within the existing Peak Mine TSF, and so would not be transported on the public road network. On this basis, the transport of Project-generated tailings at Peak Mine would not have any impact on the public road network, and is not considered further in this assessment.

Table 3.4: Project Annual Tailings Production and Demand (tpa)

Year	Tailings Production at Hera Mine	Tailings Demand by Federation Site
FY2023	-	-
FY2024	151,229	170,744
FY2025	308,336	287,806
FY2026	294,021	273,208
FY2027	396,966	336,809
FY2028	609,623	365,774
FY2029	595,530	357,318
FY2030	614,843	368,906
FY2031	**629,884**	**377,930**
FY2032	586,715	352,029
FY2033	548,911	329,346
FY2034	296,071	177,642
FY2035	87,871	52,723
FY2036	30,296	18,178

While backloading of the ore haulage trucks (i.e. trucks transporting ore from the Federation Site to Hera Mine) with tailings may be achievable, this assessment has assumed that a separate fleet of trucks would be used to transport tailings from Hera Mine to Federation Site to avoid contamination of tailings within the tailings paste plant with ore.

3.6 Federation Site Access

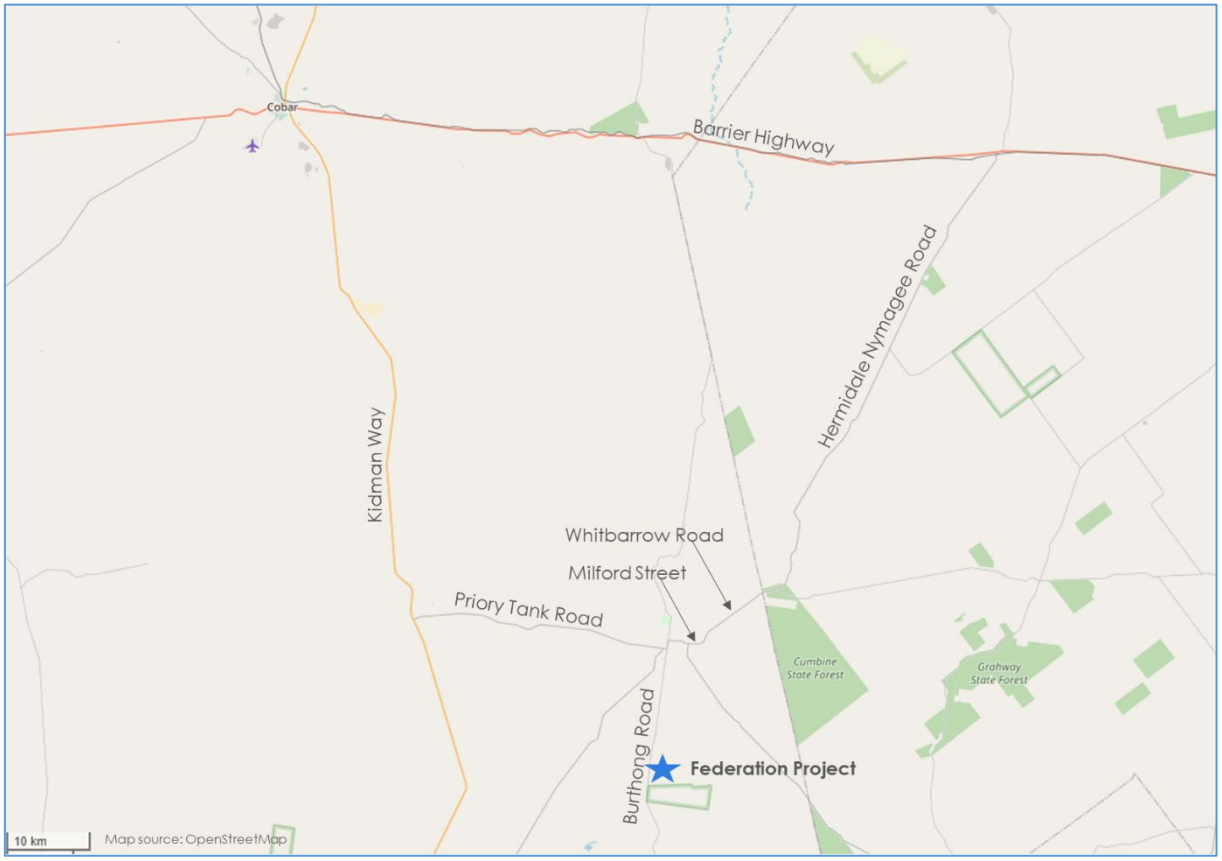
Similar to Hera Mine, vehicular access for the Project is proposed via two access roads from Burthong Road. One access road would accommodate light vehicles and general traffic, and the other would accommodate the heavy vehicles associated with the transport of ore, tailings and concentrates.

4 Road Transport Environment

4.1 Existing Road Network

The road network serving the site is presented in Figure 4.1. TTPP observed the existing road network and the key intersections relevant to the Project during fine and dry weather conditions in October 2020. The observed existing conditions are described below and additional photographs are provide in Appendix A.

Figure 4.1: Road Network



Burthong Road is a local road (Shire Road 19) that provides a connection between Nymagee in the north and Tallebung Road at Eremerang in the south. Burthong Road is sealed for approximately 6 km south of Nymagee and unsealed over the remaining 48 km. The sealed portion of Burthong Road is approximately 7 m wide and allows for a single travel lane in each direction. The road has a posted speed limit of 100 km/h.

Burthong Road provides the only vehicular access route to and from Hera Mine via the **Hera Mine Light Vehicle Access** and the **Hera Mine Main Access**, with the latter being used by the haulage trucks. The light vehicle access is located approximately 3.5 km south of the intersection with Priory Tank Road, while the heavy vehicle access is approximately 600 m farther south of the light vehicle access. The intersections between Burthong Road and the

Hera Mine access roads are both stop-sign priority-controlled T-intersections (devoid of line marking). Sight distances along Burthong Road from both the Hera Mine Light Vehicle Access and Hera Mine Main Access are satisfactory and allow for clear sight lines to oncoming vehicles along Burthong Road.

Figure 4.2 indicates the typical road condition of Burthong Road between the intersection with Priory Tank Road and Hera Mine. The intersection of Burthong Road, Priory Tank Road and Hartwood Street is a T-intersection at which Burthong Road and Hartwood Street form the major leg, and Priory Tank Road forms the minor leg. The intersection is priority-controlled, with "give way" signage (but devoid of linemarking) for vehicles on Priory Tank Road. Sight distances in both directions for vehicles on the Priory Tank Road (minor road) approach of the intersection are satisfactory.

Figure 4.2: Burthong Road between Priory Tank Road and Hera Mine

Looking south from approximately 100m south of Priory Tank Road

Figure 4.3: Burthong Road South of Hera Mine – Sealed

Burthong Road would provide access to the Federation Site, approximately 10.3 km south of the intersection of Burthong Road with the Hera Mine Main Access. From a point approximately 2.2 km south of the Hera Mine Main Access, Burthong Road has a wide gravel surface over a distance of approximately 3 km and follows a generally straight and level alignment. In dry weather conditions, it supports comfortable travel speeds of over 90 km/h. Figure 4.4 indicates the typical road condition of the gravel section of Burthong Road south of Hera Mine.

Figure 4.4: Burthong Road South of Hera Mine – Gravel

Looking south from approximately 2.3km south of Hera Mine Main Site Access Road.

Farther south of that point, Burthong Road is a dirt road, maintained to a standard which supports comfortable travel speeds of approximately 80 to 90 km/h. Approximately 3 km

south of the end of the sealed road, Burthong Road narrows to a single lane at a stock grid, which has no advisory or warning signs to alert drivers to the localised narrower carriageway. The gate lies on a straight and level alignment, so sight distances for drivers travelling in both directions are good.

TTPP (2020) recommended that additional signage and guideposts be provided along Burthong Road between Hera Mine and Federation Prospect, including at the existing stock grid. It is anticipated that some upgrading of the road around in the vicinity of the stock grid would be undertaken as part of the Federation Exploration Decline Program, and may include removal of the stock grid and/or widening of the road. Nevertheless, Figure 4.5 indicates the typical road condition of the dirt section of Burthong Road south of Hera Mine, and the existing restriction at the stock grid.

Figure 4.5: Burthong Road South of Hera Mine – Single Lane Restriction at Stock Grid

Hartwood Street and **Milford Street** extend through the village of Nymagee between Burthong Road and Whitbarrow Way. The posted speed limits along both roads within the vicinity of Nymagee village centre are 50 km/h, with the exception of a 40 km/h school speed zone which operates on Hartwood Street when the school bus is present. Outside of the village centre, the roads have a posted speed limit of 100 km/h.

Whitbarrow Way (MR228) is a sealed Regional Road that, together with **Nymagee Hermidale Road**, provides a connection between Nymagee in the southwest and Hermidale in the northeast. Nymagee Hermidale Road was recently upgraded by widening, strengthening and sealing of 7 km to improve safety and provide all-weather access to the Hermidale Rail Siding on the Narromine to Cobar rail line (TfNSW, 2020a). Whitbarrow Way has a posted

speed limit of 100 km/h which reduces to 50 km/h in the vicinity of the Hermidale village centre.

Priory Tank Road (MR461) is a Regional Road that provides an east-west link between Kidman Way and Nymagee. Priory Tank Road has a single travel lane in each direction across a carriageway of approximately 6.6 m. Figure 4.6 and Figure 4.7 indicate the typical conditions along Priory Tank Road.

Figure 4.6: Priory Tank Road looking east from Kidman Way

Figure 4.7: Priory Tank Road looking east near Burthong Road

The intersection of Priory Tank Road with Kidman Way is a priority-controlled T-intersection, at which Priory Tank Road forms the minor road. Double barrier centre lines are provided on each approach to the intersection, and edgelines on Kidman Way extend into Priory Tank Road. There is a "give way" sign on Priory Tank Road however the give way line across Priory Tank Road is significantly worn and cannot be seen. Sight distances in both directions for vehicles on the Priory Tank Road (minor road) approach at the intersection are satisfactory.

At its intersection with Kidman Way, the sealed surface of Priory Tank Road is splayed, however it appears that trucks turning left do not remain on the seal, and use the unsealed shoulder when manoeuvring. The existing treatment of Priory Tank Road at its intersection with Kidman Way allows turning movements to the left and right from a single lane with a shoulder that is too narrow to be used by left-turning vehicles, to prevent drivers from standing two abreast at the holding line.

Kidman Way (MR410) is a State road which forms part of a regional link through western NSW between Mitchell Highway at Bourke and Newell Highway near Jerilderie, via Cobar, Hillston, and Griffith. Between Cobar and Priory Tank Road, Kidman Way typically has a single travel lane in each direction, with either solid double centrelines or a single broken centreline, with sealed shoulders. Kidman Way has a posted speed limit of 100 km/h that reduces to 90 km/h over approximately 3 km near Cobar, commencing 300 m south of the intersection with Barrier Highway. Figure 4.8 indicates the typical conditions along Kidman Way.

Figure 4.8: Kidman Way

Looking south approximately 9km from Barrier Highway.

The access to Peak Mine is located on the western side of Kidman Way, approximately 7.7 km south of Barrier Highway. Kidman Way is widened at its intersection with the **Peak Mine Access** with an auxiliary southbound lane and widened shoulders that allow additional space

for through vehicles to pass vehicles which have slowed to turn. Sight distances at the intersection are satisfactory for drivers in the Peak Mine Access to observe vehicles approaching in both directions. The Peak Mine Access is used by road trains importing ore from other mines.

Barrier Highway (HW8) is a State Road that provides a link between Mitchell Highway at Nyngan and the South Australian border at Cockburn, via Hermidale, Cobar, Wilcannia and Broken Hill. It extends in an east-west direction approximately 65 km north of Hera Mine, and forms part of the approved Hera Mine Secondary Concentrates Transport Route. Between Cobar and Hermidale, it typically has one travel lane in each direction, separated by either double white lines or a broken white line and a posted speed limit of 110 km/h.

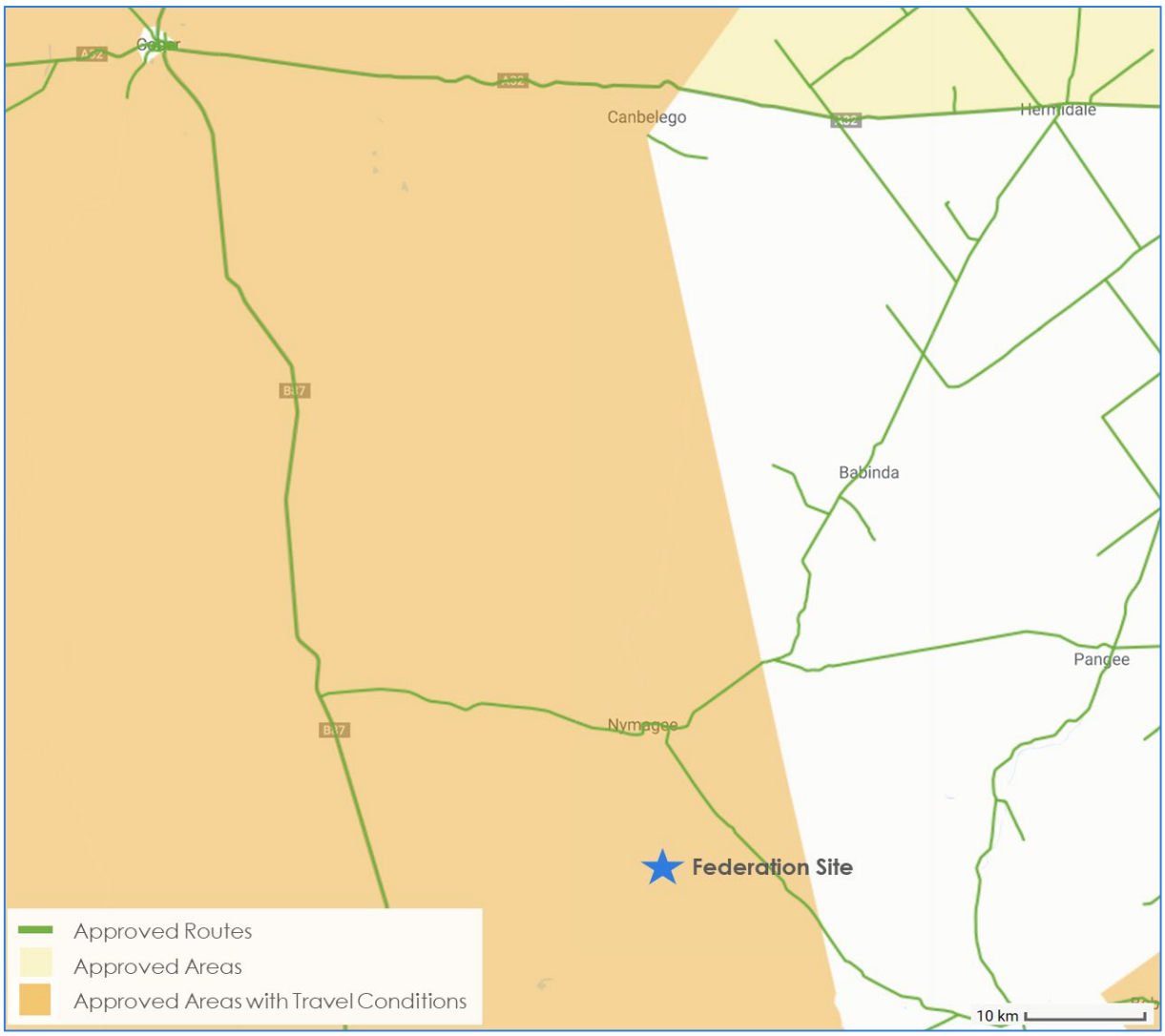
4.2 Approved Heavy Vehicle Routes

Access for General Mass Limit (GML) Type 1 A-double road trains and B-triple modular road trains is permitted on all Regional and Local roads throughout the Cobar Shire Council area (with the exception of those located within Cobar town, Euabalong West town, and Euabalong town), and on specified routes within the Bogan Shire LGA east of the Project and south of Barrier Highway. The specified routes include Nymagee Hermidale Road.

The approved areas and routes for Type 1 A-doubles and B-triples are presented in Figure 4.9, which indicates that GML Type 1 A-double and B-triple modular road train access is permitted on the entirety of the routes expected to be used by Project trucks:

- the Hera Mine Principal Concentrate Transport Route;
- the Hera Mine Secondary Concentrate Transport Route; and
- Burthong Road.

Figure 4.9: Approved Type 1 A-double and Modular B-triple Road Train Access



Source: TfNSW (2020b)

4.3 Traffic Volumes

TfNSW collects and publishes traffic volume data online from selected locations on its roads (TfNSW, 2020c). Available data on roads in the vicinity of Hera Mine were reviewed and collated, noting that only limited data is available in this region, summarised below:

- Hermidale Nymagee Road 1.8 km south of Currans Road (station 96552). The most recent data is from 2008, which shows that at that time, it carried an average of 1,025 vehicles per day, of which 20.6 percent were heavy vehicles.
- Kidman Way 3.95 km south of East Parade, Cobar (station 96089). The most recent data is from 2008, which shows that at that time, it carried an average of 201 vehicles per day, of which 30.4 percent were heavy vehicles.

- Kidman Way 170 m south of Nyngan Road (Barrier Highway) (station 96088). The most recent data is from 2008, which shows that at that time, it carried an average of 832 vehicles per day, of which 13.9 percent were heavy vehicles.
- Nyngan Road (Barrier Highway) 50 m west of Hartman Street (station 96001). The most recent data is from 2009, which shows that at that time, it carried an average of 546 vehicles per day, of which 22.3 percent were heavy vehicles. Data from 2008 shows that at that time, it carried an average of 604 vehicles per day, of which 20.7 percent were heavy vehicles.

Cobar Shire Council's Roads Development Manager, Engineering Services provided TTPP with traffic volume and classification data on a number of the roads relevant to the Project. That data is presented in Table 4.1, noting that Hera Mine commenced operations in 2014.

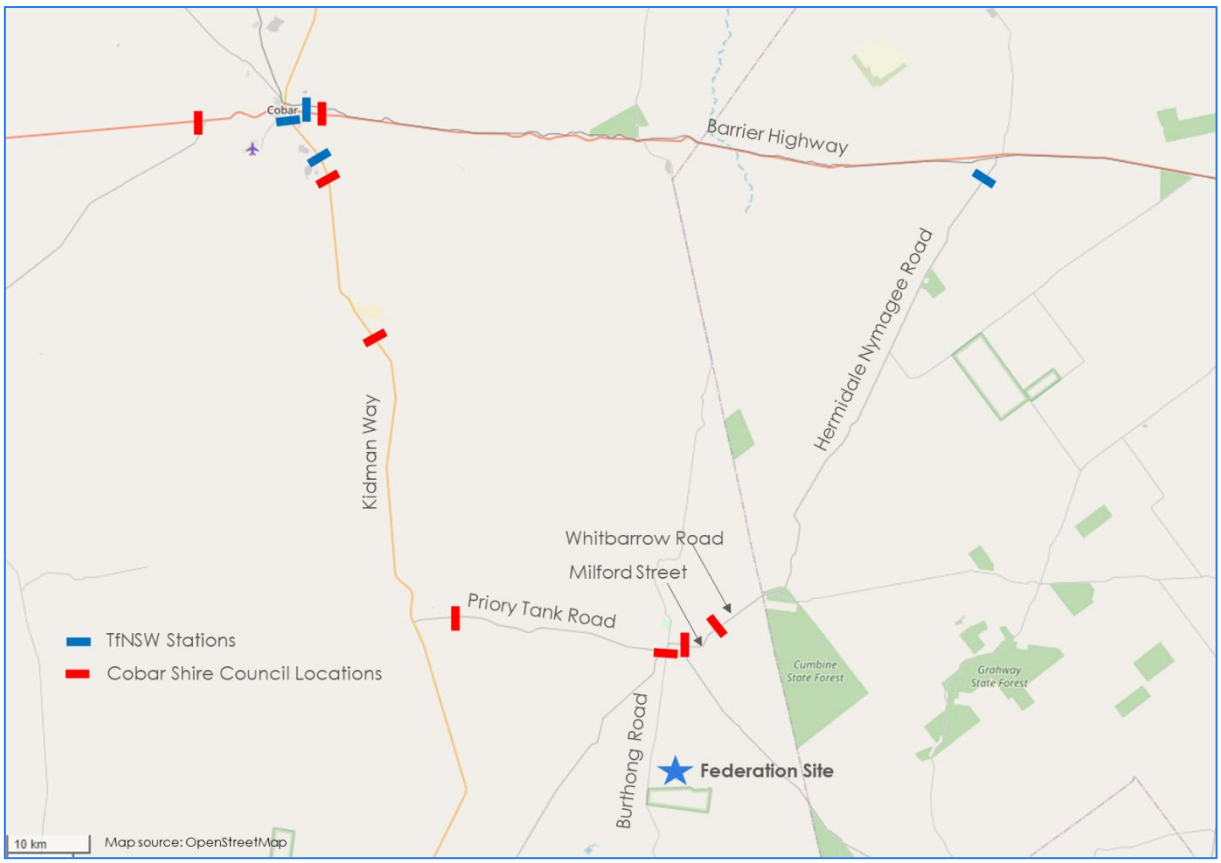
Table 4.1: Average Daily Traffic Volume and Classifications 2013 to 2016

Road	Location	Year	Vehicles per Day	Percent Heavy Vehicles
Barrier Highway	10 km west of Cobar	2013	441	53
Barrier Highway	3 km east of Cobar	2013	710	30
Kidman Way	10 km south of Cobar	2013	851	28.2
Kidman Way	30 km south of Cobar	2013	248	47.9
Priory Tank Road	5 km east of Kidman Way	2013	58	27.3
Whitbarrow Road	4 km east of Nymagee	2014	73	27.6
Hartwood Street (Burthong Road)	50 m south of Pub	2016	126	25.5
Milford Street	50 m east of Pub	2016	90	35.52

Source: Cobar Shire Council by email 27 October 2020 and 15 June 2021.

Peak hourly traffic volumes would be expected to be in the order of 8 to 12 percent of the daily volumes. The locations of the Cobar Shire Council and TfNSW surveys are presented in Figure 4.10.

Figure 4.10: Traffic Survey Locations



EMM (2020) presents additional heavy vehicle daily traffic volume data collected during April 2020 on Kidman Way and the accesses for the New Cobar Complex and Peak Complex. Based on the data presented, the total daily traffic at the time of the surveys has been estimated and is summarised in Table 4.2.

Table 4.2: Daily Traffic Volume and Classifications 2020

Road	Location	Estimated Vehicles per Day	Percent Heavy Vehicles
Kidman Way	South of Barrier Highway	793	17
Kidman Way	North of Peak Complex access	830	15
Kidman Way	South of Peak Complex access	232	22
New Cobar Complex heavy vehicle access	East of Kidman Way	20	100
Peak Complex access road	West of Kidman Way	623	13

Source: EMM, 2020

4.4 Road Safety History

4.4.1 Aurelia Incident Reporting

In accordance with the Hera Mine consent conditions and TMP, in the event of a crash, incident, near miss or complaint, an investigation is initiated to seek to determine the cause and contributing factors to the incident, whether appropriate controls were implemented, and to recommend any corrective or preventative actions to reduce the likelihood of a reoccurrence. Aurelia has advised that no road crashes have occurred that involved injury to a person or property damage.

Hera Resources' complaints register covers complaints made by the community via email or phone regarding any aspects of its operations. Between January 2012 and August 2020, 11 complaints were reported involving vehicles on public roads. These generally related to the following, noting some complainants included more than one issue:

- heavy vehicle speed (5);
- light vehicle interaction (4);
- truck numbers (3); and
- heavy vehicle parking (1).

The number and nature of the complaints recorded do not highlight any serious concern regarding road safety or driver behaviour associated with the historic operations. In accordance with the TMP, investigations into incidents are communicated to all personnel through toolbox meetings and/or company memorandums.

4.4.2 Road Crash Data

Road crash information was obtained from TfNSW over the period between 1 January 2015 and 31 December 2019 for those roads relevant to the Project. The data include crashes which conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data were reviewed for Burthong Road between the Federation Site and Hera Mine, for the Principal Concentrates Transport Route, and the Secondary Concentrates Transport Route:

- Kidman Way between Peak Mine and Priory Tank Road;

- Priory Tank Road;
- Burthong Road;
- Hartwood Street – Milford Street; and
- Whitbarrow Way – Nymagee Hermidale Road.

Over the investigation period and routes reviewed, a total of nine crashes occurred on those routes, resulting in five people being seriously injured, three people being moderately injured, and three people having minor injuries. Table 4.3 demonstrates that over all the roads investigated, all reported crashes involved a single vehicle, the majority of which left the carriageway. These run-off-road (ROR) crashes (including all "off-path" crashes) made up six of the nine reported crashes. Australian Road Research Board (2011) states that known causes of ROR 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, snow, livestock or native fauna.

Table 4.3: Crash Types on Project Access Routes (1 January 2015 to 31 December 2019)

Route	Route Length (km)	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On-Path	Off-Path on Straight	Off-Path on Curve	Total
Kidman Way Peak Mine to Priory Tank Road	57.1	-	-	-	-	-	-	3	5	-	8
Priory Tank Road Kidman Way to Burthong Road	31.7	-	-	-	-	-	-	-	-	-	-
Burthong Road Hera Mine to Priory Tank Road	4.1	-	-	-	-	-	-	-	-	-	-
Hartwood Street – Milford Street in Nymagee	3.4	-	-	-	-	-	-	-	-	-	-
Whitbarrow Way – Nymagee Hermidale Road	72.5	-	-	-	-	-	-	-	-	1	1
Total Crashes by Type		**-**	**-**	**-**	**-**	**-**	**-**	**3**	**5**	**1**	**9**
Fatalities		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Serious Injuries		**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**5**
Moderate Injuries		**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**3**
Minor Injuries		**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**3**

Key findings of the review are summarised below and summary tables of crash characteristics on each route are presented in Appendix B:

- Three of the crashes on Kidman Way involved a vehicle striking a kangaroo on the carriageway, one involved loss of control following a tyre failure/fault, and one involved a driver who was distracted by a passenger.
- Two crashes on Kidman Way involved heavy vehicles, both semitrailers travelling in darkness on a dry road in fine weather.
- Three crashes were reported in close proximity to each other on Kidman Way, being 40 km south of Barrier Highway. Two of these occurred in darkness, and all three occurred in fine weather on a dry road surface. One of these crashes involved a vehicle striking a kangaroo (darkness), one involved a tyre failure/fault (daylight) and one involved a semitrailer which skidded (darkness).
- Neither speeding nor fatigue were nominated as contributing factors to any of the reported crashes on Kidman Way.
- One crash was reported on Nymagee Hermidale Road. It occurred at dusk on a dry road surface in fine weather, and involved an eastbound semitrailer which left the carriageway to the left on a right-hand bend. Both speeding and fatigue were nominated as contributing factors to the crash.
- Four of the crashes occurred in daylight, i.e., during the period that Hera Mine haulage trucks could be operating on the road network. The daylight crashes all occurred on Kidman Way. None of the daylight crashes involved a heavy vehicle.
- Of the three crashes involving semitrailers, none occurred in daylight.

The data do not highlight any specific location with a notably poor crash history that may suggest an inherent concern with the road layout at that location, noting that the three crashes in close proximity on Kidman Way appear to have unrelated causes. The data do not highlight any concerns regarding the existing use of these roads by heavy vehicles.

4.5 Changes to the Road Transport Environment

Changes to the road transport environment can be expected to occur which are unrelated to the Project. These include other approved or proposed developments in the region and non-specific growth in traffic. These potential changes are described below.

4.5.1 Mining Operations

The approved mining operations and proposed changes to those operations are described in Section 2 of this report. The assessment of future conditions in this study assumes that:

- while the Hera Mine Modification 6 would operate until 31 December 2025, mining operations at Hera Mine are likely to decline before its approved life is completed. The forecast level of workforce activity and trip generation described in Section 2.1 is

expected to continue to the middle of 2023, with the Hera Mine workforce declining by approximately half in the latter half of 2023, then declining to zero from 2024 onwards. For the purpose of this assessment of the Project impacts, it has been assumed that the existing Hera Mine traffic generation would continue until the end of 2023.

- Federation Exploration Decline Program would be completed prior to commencement of the Project, and so would not interact with Project construction or operational traffic; and
- New Cobar Complex Project SSD would operate until 2035.

4.5.2 Cobar BioHub

A regional biomass processing facility for vegetation is proposed to be constructed east of Cobar and north of Barrier Highway. The facility would receive vegetation harvested from surrounding agricultural land and process this into goods for sale or export. An Environmental Scoping Report (ESR) (AECOM, 2018) has been submitted to NSW Department of Planning and Environment. That report indicates that approval will be sought for construction and operation of the facility, excluding the harvesting and transport of biomass to the site, the transport of finished products to end markets/customers.

The traffic and transport impacts associated with vehicles entering and exiting the BioHub site via Barrier Highway during construction and operational activities are broadly addressed in the ESR. This indicates that construction would occur over approximately six months (excluding transmission line construction), with construction materials and workforce being transported to the site via Barrier Highway, Kidman Way, Louth Road/Mulya Road and Lerida Road. The ESP does not provide information regarding the likely distribution of the trips on the road network.

Once operational, the BioHub is expected to require up to 30 FTE jobs on a shift basis. It is estimated that each day, 10 light vehicles and one or two maintenance vehicles would access the facility, 20 heavy vehicles would enter the facility with harvested material, and two heavy vehicles would leave the facility daily carrying finished products. The daily traffic generation once operational is therefore in the order of 68 vehicle trips per day. The ESP does not provide information regarding the likely distribution of the trips on the road network.

Should the BioHub proceed, there is the potential for some of its construction or operational traffic to be present on any part of the road network expected to be used by Project traffic. From the information presented in the ESR, it is considered that the number of vehicles generated by the BioHub on roads of relevance to the Project would be very low. In the absence of detailed forecasts relating to the BioHub's potential impacts on the road network, the potential cumulative impacts of the proposed BioHub with the Project have not been considered further in this assessment.

4.5.3 Background Traffic Growth

Regardless of the status of specific developments, other changes in traffic may be expected as a result of general growth or changes in population or travel behaviour. To take account of traffic growth over time that is unrelated to Aurelia's operations in the region, future traffic volumes on the key routes have been forecast by applying a background traffic growth rate of 1.0 percent per annum above the surveyed volumes supplied by Cobar Shire Council (Table 4.1).

With some exceptions, the surveys on these roads were conducted prior to commencement of Hera Mine operations, and so typically exclude any traffic that would be generated on these roads by Hera Mine. The forecasts on Whitbarrow Road, Burthong Road and Milford Street are based on surveys conducted with Hera Mine operational, and so are likely to overestimate future background (non-Hera Mine traffic) volumes. The resulting background daily traffic volumes on roads of relevance to the Project and over the life of the Project are summarised in Table 4.4.

The data provided to TTPP by Cobar Shire Council did not include peak hourly traffic volumes, however as an estimate, it has been assumed that peak hourly traffic volumes would be in the order of 12 percent of the daily volumes, being the upper end of the typical range of between 8 and 12 percent of daily traffic. The resulting background peak hourly traffic volumes on roads of relevance to the Project and over the life of the Project are summarised in Table 4.5.

Table 4.4: Estimated Background[A] Average Daily Traffic 2021 to 2036 (vehicles per day)

Road and Location	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Kidman Way 10 km south of Cobar	912	922	931	940	949	959	969	978	988	998	1,008	1,018	1,028	1,038	1,049	1,059
Kidman Way 30 km south of Cobar	266	269	271	274	277	279	282	285	288	291	294	297	300	303	306	309
Priory Tank Road 5 km east of Kidman Way	62	63	63	64	65	65	66	67	67	68	69	69	70	71	71	72
Whitbarrow Road 4 km east of Nymagee	77	78	79	80	81	81	82	83	84	85	86	86	87	88	89	90
Hartwood Street 50 m south of Pub	131	132	134	135	136	138	139	141	142	143	145	146	148	149	151	152
Milford Street 50 m east of Pub	94	95	96	96	97	98	99	100	101	102	103	104	106	107	108	109
Kidman Way south of Peak Complex	232	234	237	239	241	244	246	249	251	254	256	259	261	264	267	269

[A] *Background traffic is unrelated to Aurelia's operations.*

Table 4.5: Estimated Background[A] Peak Hourly Traffic 2021 to 2036 (vehicles per hour)

Road and Location	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Kidman Way 10 km south of Cobar	110	111	112	113	114	116	117	118	119	120	121	123	124	125	126	128
Kidman Way 30 km south of Cobar	32	33	33	33	34	34	34	35	35	35	36	36	36	37	37	38
Priory Tank Road 5 km east of Kidman Way	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9	9
Whitbarrow Road 4 km east of Nymagee	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11
Hartwood Street 50 m south of Pub	16	16	17	17	17	17	17	17	18	18	18	18	18	18	19	19
Milford Street 50 m east of Pub	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	14
Kidman Way south of Peak Complex	28	29	29	29	29	30	30	30	31	31	31	32	32	32	33	33

[A] *Background traffic is unrelated to Aurelia's operations.*

5 Impacts of the Project

5.1 Construction Activity Trip Generation

5.1.1 Construction Workforce Trips

On a day-to-day basis, the construction workforce would travel between the accommodation village located at Hera Mine and either the new processing plant site at Hera Mine or the Federation Site at the start and end of shifts. Some construction activities would occur 24 hours per day, seven days per week, however the surface construction works would principally be contained to daytime hours only. A shuttle bus would be implemented to transport the construction workforce between the accommodation village and Federation Site, which would use Coaster-style shuttle buses.

The Project's construction workforce of up to 100 people would work 20 days on and 8 days off, such that approximately three-quarters of the workforce would be expected to be present on any one day. On this basis, it is estimated that approximately 75 construction workers would work each day, of which approximately 75% would be working at the processing plant site at Hera Mine, and 25% would be working at the Federation Site. Those workers at the processing plant construction activities would travel between the accommodation village and the construction site entirely within the Hera Mine site, and so would not generate any vehicle trips on the public road network. Those workers at the Federation Site would travel between the accommodation village and the Federation Site to work each day. These workers would travel in one shuttle bus and up to five other vehicles (private cars or work vehicles), generating 12 vehicle trips per day on that part of Burthong Road between the accommodation village and Federation Site.

On a day-to-day basis outside of the shift changeover days, the Project construction workforce is expected to generate very few vehicle trips on the wider road network beyond those trips between the accommodation village and Federation Site. TTPP (2020a) assumed that the Hera Mine operational workforce of 170 people generates some 30 vehicle trips per day on the public road network on a busy day, with the majority of those trips being between Hera Mine and Cobar. This includes trips generated by visitors to the mine such as regulatory authorities. On this basis, the construction workforce of 100 people at the Project is estimated to generate some 18 vehicle trips per day, with the majority being between the accommodation village and Cobar, and would be spread through the day.

At the start and end of their roster period, the construction workers would travel by private car or by a chartered bus to or from a regional centre such as Dubbo. These movements are estimated to generate approximately two bus trips (one inbound, one outbound) and 20 light vehicle trips (ten inbound and ten outbound) on a shift changeover day. For the purpose of this assessment, these trips have been included to represent a busy day of construction

activity, and assume that the majority of these trips use the Principal Concentrates Transport Route to Barrier Highway at Hermidale.

Table 5.1 summarises the forecast total daily and peak hourly trips expected to generated by the construction workforce on a shift changeover day. In this and following tables, for simplicity, the traffic forecasts on the two existing Hera Mine access road are combined, and the forecasts on the two proposed Federation Site access roads are combined.

Table 5.1: Project Construction Workforce Trips on Shift Changeover Days

Road and Location	Daily Travel to/from Work		Shift Change Travel		General Travel	Total Vehicle Trips
	Cars	Buses	Cars	Buses	Cars	
Daily Trips (vehicles per day)						
Burthong Road Hera Mine to Priory Tank Road	0	0	20	2	18	40
Burthong Road Federation Site to Hera Mine	10	2	0	0	0	12
Federation Site Access Roads	10	2	0	0	0	12
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	0	0	18	2	0	20
Hera Mine Access Roads	10	2	20	2	18	52
Kidman Way Priory Tank Road to Barrier Highway	0	0	2	0	18	20
Priory Tank Road Kidman Way to Burthong Road	0	0	2	0	18	20
Peak Hourly Trips (vehicles per hour)						
Burthong Road Hera Mine to Priory Tank Road	0	0	10	1	2	13
Burthong Road Federation Site to Hera Mine	5	1	0	0	0	6
Federation Site Access Roads	5	1	0	0	0	6
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	0	0	9	1	0	10
Hera Mine Access Roads	5	1	10	1	2	19
Kidman Way Priory Tank Road to Barrier Highway	0	0	1	0	2	3
Priory Tank Road Kidman Way to Burthong Road	0	0	1	0	2	3

Trips generated on a shift changeover day.

Table 5.1 indicates that the construction workforce can be expected to generate up to 52 vehicle trips per day on a shift changeover day. Of those, 12 vehicle trips would be contained to that part of Burthong Road between Hera Mine and Federation Site, with up to

20 vehicle trips on the Principal Concentrates Transport Route to Hermidale, and 20 vehicle trips per day on the Secondary Concentrates Transport Route to Cobar.

5.1.2 Construction Deliveries

Construction activity would require deliveries of materials and consumables, using a range of vehicles including semitrailers, B-doubles and road trains. An average of approximately 25 deliveries would be required each week, made up of:

- Deliveries to Hera Mine:
  - 4 gas;
  - 2 diesel;
  - 5 general freight;
  - 1 cement; and
  - 1 sand.
- Deliveries to Federation Site
  - 3 diesel;
  - 5 general freight;
  - 1 cement;
  - 1 sand;
  - 0.5 mesh
  - 0.5 explosives;
  - 0.5 liquid petroleum gas; and
  - 0.5 molasses.

Deliveries would typically occur during daylight hours only, and would be spread across seven days per week. With 25 deliveries per week, there would be an average of three to four deliveries per day. To allow for the variation in trips from day-to-day, and for ongoing deliveries associated with the accommodation village, this assessment has robustly assumed six deliveries may occur per day, and that at least one delivery to each site from each source would occur during the peak hours. The sources of deliveries would vary by commodity, and it has been assumed that on average, half of the deliveries would be sourced from Cobar and half from Dubbo and farther east. The resulting contribution of delivery vehicle trips to daily and peak hour traffic on the road network is summarised in Table 5.2.

Table 5.2: Project Construction Delivery Trips

Road and Location	Daily Trips (vehicles per day)			Peak Hour Trips (vehicles per hour)		
	Hera Mine	Federation Site	Total	Hera Mine	Federation Site	Total
Burthong Road Hera Mine to Priory Tank Road	8	4	12	2	2	4
Burthong Road Federation Site to Hera Mine	0	4	4	0	2	2
Federation Site Access Roads	0	4	4	0	2	2
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	4	2	6	1	1	2
Hera Mine Access Roads	8	0	8	2	0	2
Kidman Way Priory Tank Road to Barrier Highway	4	2	6	1	1	2
Priory Tank Road Kidman Way to Burthong Road	4	2	6	1	1	2

5.1.3 Total Construction Traffic

The total daily and peak hourly traffic expected to be generated during the six to 12 month construction period and its distribution on the road network is summarised in Table 5.3.

Table 5.3: Daily and Peak Hour Project Construction Trips

Road and Location	Daily Trips (vehicles per day)				Peak Hour Trips (vehicles per hour)			
	Cars	Buses	Heavy	Total	Cars	Buses	Heavy	Total
Burthong Road Hera Mine to Priory Tank Road	38	2	12	52	12	1	4	17
Burthong Road Federation Site to Hera Mine	10	2	4	16	5	1	2	8
Federation Site Access Roads	10	2	4	16	5	1	2	8
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	18	2	6	26	9	1	2	12
Hera Mine Access Roads	48	4	8	60	17	2	2	21
Kidman Way Priory Tank Road to Barrier Highway	20	0	6	26	3	0	2	5
Priory Tank Road Kidman Way to Burthong Road	20	0	6	26	3	0	2	5

Table 5.3 indicates that the construction activity can be expected to generate up to 16 vehicle trips per day would be contained to that part of Burthong Road between Hera

Mine and Federation Site, with up to 26 vehicle trips on the Principal Concentrates Transport Route to Hermidale, and 26 vehicle trips per day on the Secondary Concentrates Transport Route to Cobar.

5.2 Operational Activity Trip Generation

5.2.1 Operational Workforce Trips

Similar to the existing operational workforce at Hera Mine, the Project's operational workforce of up to 239 people would be made up of people working principally a roster of seven days on and seven days off, with some working an eight days/six days roster.

On a day-to-day basis, the operational workforce would travel between the accommodation village and the Federation Site at the start and end of shifts. Similar to the construction workforce, a shuttle bus service would be implemented to transport the operational workforce between the accommodation village and Federation Site, using Coaster-style shuttle buses.

With approximately half of the 239-person workforce being rostered on in any one week, it is estimated that approximately 120 workers would travel between the accommodation village and Federation Site to work each day. These workers would travel in three shuttle buses and up to five other vehicles (private cars or work vehicles) each shift. With two shifts each day, the operational workforce would generate 32 vehicle trips per day on that part of Burthong Road between the accommodation village and Federation Site.

On a day-to-day basis outside of the shift changeover days, the Project operational workforce is expected to generate very few vehicle trips on the road network. TTPP (2020a) assumed that the Hera Mine operational workforce of 170 people generates some 30 vehicle trips per day on the public road network on a busy day, with the majority of those trips being between Hera Mine and Cobar. On this basis, the peak operational workforce of 239 people at the Project is estimated to generate some 42 vehicle trips per day, with the majority being between the accommodation village and Cobar. For the purpose of this assessment, it is assumed that half those trips would travel to or from the Federation Site Access and half would travel to and from the Hera Mine access.

On roster changeover days, the operational workers would arrive at and depart from the accommodation camp principally travelling by private car, similar to the existing workforce at Hera Mine. With the proposed shift and roster arrangements, the roster changeovers would be spread rather than all occurring on a single day. For the purpose of this assessment it is estimated that up to one-third of the workforce may start or end a roster on one day, with those workers travelling to and from the accommodation camp. This travel would likely be spread over several hours prior to and following shift changeover times. For the purpose of this assessment, it is assumed that up to one-quarter of the shift changeover traffic may occur in

the same hour as the workforce travels between the accommodation village and the Federation Site.

With car pooling, these movements are estimated to generate approximately 106 car trips (53 inbound, 53 outbound) on a busy shift changeover day. For the purpose of this assessment, these trips have been included to represent a busy day of operational activity, and assume that the majority of these trips use the Principal Concentrates Transport Route to Barrier Highway at Hermidale.

Table 5.4: Project Peak Operational Workforce Trips on Shift Changeover Days

Road and Location	Daily Travel to/from Work		General Travel	Shift Change Travel	Total Vehicle Trips
	Cars	Buses	Cars	Cars	
Daily Trips (vehicles per day)					
Burthong Road Hera Mine to Priory Tank Road	0	0	42	106	148
Burthong Road Federation Site to Hera Mine	20	12	21	0	53
Federation Site Access Roads	20	12	21	0	53
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	0	0	4	96	100
Hera Mine Access Roads	20	12	21	106	159
Kidman Way Priory Tank Road to Barrier Highway	0	0	38	10	48
Priory Tank Road Kidman Way to Burthong Road	0	0	38	10	48
Peak Hourly Trips (vehicles per hour)					
Burthong Road Hera Mine to Priory Tank Road	0	0	4	27	31
Burthong Road Federation Site to Hera Mine	10	6	2	0	18
Federation Site Access Roads	10	6	2	0	18
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	0	0	0	24	24
Hera Mine Access Roads	10	6	2	27	45
Kidman Way Priory Tank Road to Barrier Highway	0	0	4	3	7
Priory Tank Road Kidman Way to Burthong Road	0	0	4	3	7

Trips generated on a shift changeover day.
Peak workforce of 214 workers forecast from 2028 to 2033 inclusive.

5.2.2 Operational Deliveries

Similar to the existing operations at Hera Mine, general deliveries to the Mine and accommodation village can be expected to occur for the Project, for consumables and maintenance requirements. With consideration to the existing delivery trips generated by Hera Mine and its mining rate, it is estimated that the Project would generate approximately eight heavy vehicle deliveries per day (16 heavy vehicle trips per day), primarily between the Project and Cobar. As a robust assessment and allowing for additional deliveries associated with the accommodation village, this assessment assumes the Project would generate approximately 20 heavy vehicle trips per day, of which 12 trips are assumed to be associated with the operational activities and accommodation village at Hera Mine, and eight are assumed to be associated with operational activities at Federation Site. The majority of operational delivery trips would be sourced from Cobar, with an allowance made for trip sourced from Dubbo and farther east.

Table 5.5: Project Operational Delivery Trips

Road and Location	Daily Trips (vehicles per day)		Peak Hour Trips (vehicles per hour)	
	Hera Mine	Federation Site	Hera Mine	Federation Site
Burthong Road Hera Mine to Priory Tank Road	12	8	2	3
Burthong Road Federation Site to Hera Mine	0	8	0	3
Federation Site Access Roads	0	8	0	3
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	2	2	1	2
Hera Mine Access Roads	12	0	2	0
Kidman Way Priory Tank Road to Barrier Highway	10	6	1	1
Priory Tank Road Kidman Way to Burthong Road	10	6	1	1

5.2.3 Combined Operational Non-Haulage Traffic

The total daily and peak hourly traffic expected to be generated by the operational activity of the Project, excluding haulage of ore, concentrates and tailings, and its distribution on the road network is summarised in Table 5.6. The conditions in Table 5.6 are forecast to occur during the period that the peak operational workforce of 239 people are present, which is forecast to occur from 2027 to 2033 inclusive. After 2033, the workforce would decrease, and the traffic generation would be expected to decrease below that presented in Table 5.6.

Table 5.6: Daily and Peak Hour Project Peak Operational Non-Haulage Trips

Road and Location	Daily Trips (vehicles per day)				Peak Hour Trips (vehicles per hour)			
	Cars	Buses	Heavy	Total	Cars	Buses	Heavy	Total
Burthong Road Hera Mine to Priory Tank Road	148	0	20	168	31	0	5	36
Burthong Road Federation Site to Hera Mine	41	12	8	61	12	6	3	21
Federation Site Access Roads	41	12	8	61	12	6	3	21
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	100	0	4	104	24	0	3	27
Hera Mine Access Roads	147	12	12	171	39	6	2	47
Kidman Way Priory Tank Road to Barrier Highway	48	0	16	64	7	0	2	9
Priory Tank Road Kidman Way to Burthong Road	48	0	16	64	7	0	2	9

Assumes peak workforce of 239 workers is present (forecast to occur between 2027 and 2033).

5.2.4 Ore Transport

Based on the forecast ore processing (Table 3.2), the average daily trips generated by the transport of ore have been determined assuming ongoing use of Type 1 A-double road trains and modular B-triple road trains, and are summarised in Table 5.7.

It is reasonable to expect that the number of ore haulage trips on any one day varies from the average, and for the purposes of assessing the road network capacity, a higher than average haulage level has been considered.

The number of trips on any one day would be inherently limited by the capacity offered by the number of trucks in the fleet, the time required for each truck to complete each trip, and the hours available for ore transport. It has been assumed that for each year of the Project, the available fleet of trucks for ore haulage would be varied in response to the average daily haulage demand, with an additional truck utilised when the average daily demand reaches 80 percent of the capacity of the fleet. The maximum number of trips able to be generated by the available fleet is therefore as presented in Table 5.7.

Table 5.7: Project Ore Transport and Daily Vehicle Trips

Year	Project Ore Processed at Hera Mine			Project Ore Processed at Peak Mine		
	tpa	Daily Vehicle Trips		tpa	Daily Vehicle Trips	
		Average	Maximum		Average	Maximum
FY2023	-	0.0	0	0	0	0
FY2024	170,120	18.6	30	150,000	16.4	23
FY2025	359,909	39.4	60	200,000	21.9	30
FY2026	364,507	39.9	60	200,000	21.9	30
FY2027	482,977	52.9	90	200,000	21.9	30
FY2028	752,055	82.4	120	0	0	0
FY2029	750,000	82.2	120	0	0	0
FY2030	720,193	78.9	120	0	0	0
FY2031	749,892	82.2	120	0	0	0
FY2032	732,302	80.3	120	0	0	0
FY2033	644,407	70.6	90	0	0	0
FY2034	337,413	37.0	60	0	0	0
FY2035	98,108	10.8	30	0	0	0
FY2036	34,631	3.8	30	0	0	0

Refer to Appendix C.

5.2.5 Concentrates Transport

Based on the forecast concentrates production (Table 3.3) the average daily trips generated by the transport of concentrates have been determined and are summarised in Table 5.8 throughout the life of the Project. This assumes the Project haulage is undertaken with vehicles similar to those currently in use at Hera Mine, i.e., Type 1 A-double road trains and modular B-triple road trains with a payload of 50 tonnes. Should the use of higher capacity vehicles be feasible, the number of trips required to achieve the various transport tasks described herein would be reduced below that shown on Table 5.8.

It is reasonable to expect that the number of concentrates haulage trips on any one day varies from the average, and for the purposes of assessing the road network capacity, a higher than average haulage level has been considered.

The review of haulage of concentrates from Hera Mine found that over the period from January to October 2020 (inclusive) the 85th percentile demand was equivalent to double the average daily demand, noting that no haulage trips were made on approximately 40 percent of all available days over that period. With the increase in haulage associated with the Project's activities, it is reasonable to consider that the number of days during which no haulage occurs would be reduced, and the spread of daily demand compared with

average would be impacted. Nevertheless, as a robust assessment, a design day representing double the average daily haulage trips has been considered, as also shown in Table 5.8.

Table 5.8: Project Concentrates Transport and Daily Vehicle Trips

Year	Concentrate Production at Hera Mine	Daily Vehicle Trips	
		Average	Design Day
FY2023	-	0.0	0
FY2024	18,891	2.1	5
FY2025	51,573	5.7	12
FY2026	70,487	7.7	16
FY2027	86,011	9.4	19
FY2028	142,432	15.6	32
FY2029	154,470	16.9	34
FY2030	105,350	11.5	24
FY2031	120,009	13.2	27
FY2032	145,588	16.0	32
FY2033	95,496	10.5	21
FY2034	41,342	4.5	10
FY2035	10,237	1.1	3
FY2036	4,334	0.5	1

Refer to Appendix C.

5.2.6 Tailings Transport

Based on the forecast tailings demand (Table 3.4), the average daily trips generated by the transport of tailings have been determined and are summarised in Table 5.9 throughout the life of the Project. This assumes the Project haulage is undertaken with vehicles similar to those currently in use at Hera Mine, i.e., Type 1 A-double road trains and modular B-triple road trains with a payload of 50 tonnes. Should the use of higher capacity vehicles be feasible, the number of trips required to achieve the various transport tasks described herein would be reduced below that shown on Table 5.9.

It is reasonable to expect that the number of tailings haulage trips on any one day varies from the average, and for the purposes of assessing the road network capacity, a higher than average haulage level has been considered.

Similar to ore haulage, the number of trips on any one day would be inherently limited by the capacity offered by the number of trucks in the tailings transport fleet, the time required for each truck to complete each trip, and the hours available for tailings transport. It has been

assumed that for each year of the Project, the available fleet of trucks for tailings haulage would be varied in response to the average daily haulage demand, with an additional truck utilised when the average daily demand reaches 80 percent of the capacity of the fleet. The maximum number of trips able to be generated by the available fleet is therefore as presented in Table 5.9.

Table 5.9: Project Tailings Transport and Daily Vehicle Trips

Year	Tailings Demand by Federation Site	Daily Vehicle Trips	
		Average	Maximum
FY2023	-	0.0	0
FY2024	170,744	18.7	32
FY2025	287,806	31.5	64
FY2026	273,208	29.9	64
FY2027	336,809	36.9	64
FY2028	365,774	40.1	64
FY2029	357,318	39.2	64
FY2030	368,906	40.4	64
FY2031	377,930	41.4	64
FY2032	352,029	38.6	64
FY2033	329,346	36.1	64
FY2034	177,642	19.5	32
FY2035	52,723	5.8	32
FY2036	18,178	2.0	32

Refer to Appendix C.

5.2.7 Combined Materials Transport

Taking into consideration the routes used by the haulage trucks transporting ore, concentrates and tailings on the public road network, the distribution of the Project haulage truck trips on the road network has been determined throughout the life of the Project, as presented in Table 5.10.

Table 5.10: Project Ore, Concentrates and Tailings Transport Daily Trips

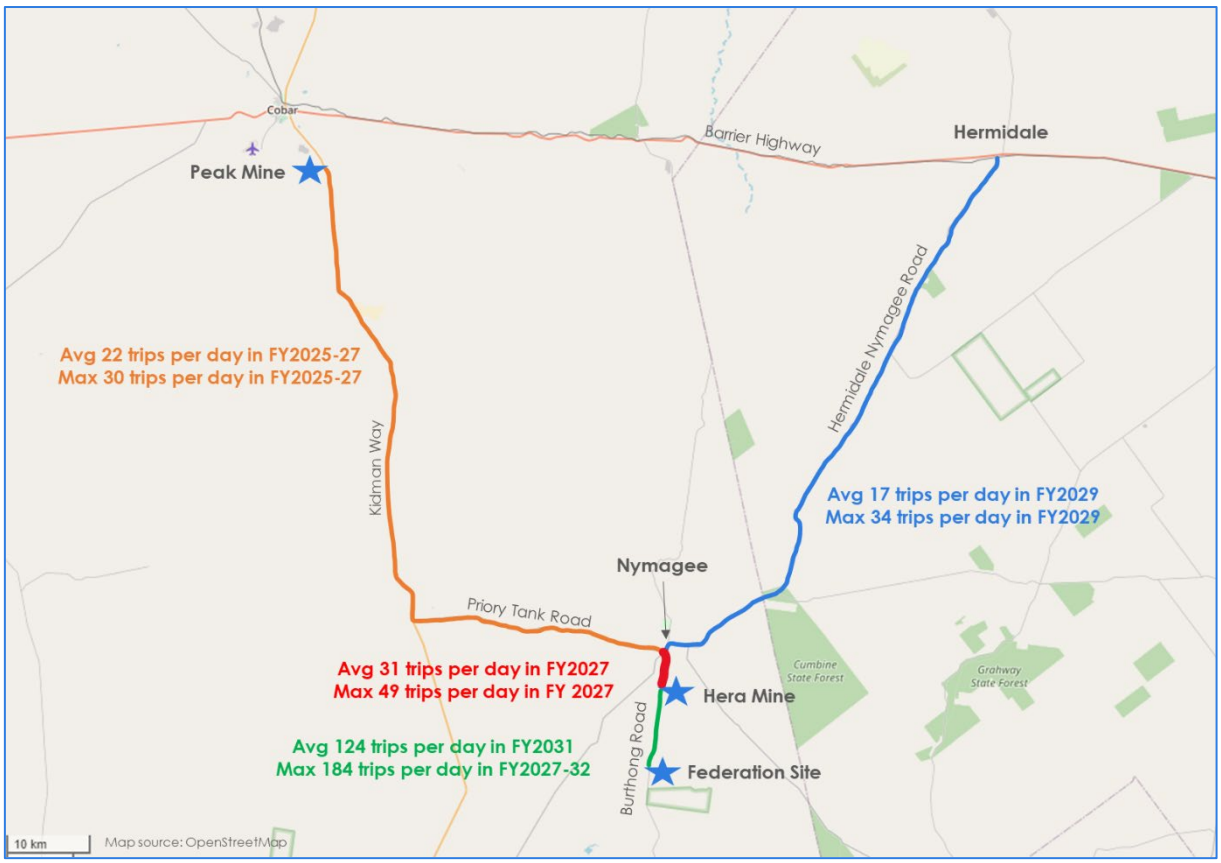
Year	Burthong Road between Federation Site and Hera Mine		Burthong Road between Hera Mine and Priory Tank Road		Principal Concentrates Transport Route between Priory Tank Road and Hermidale		Secondary Concentrates Transport Route between Burthong Road and Peak Mine	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
FY2023	0.0	0	0.0	0	0.0	0	0.0	0.0
FY2024	53.8	85	18.5	28	2.1	5	16.4	23
FY2025	92.9	154	27.6	42	5.7	12	21.9	30
FY2026	91.8	154	29.6	46	7.7	16	21.9	30
FY2027	111.8	184	31.3	49	9.4	19	21.9	30
FY2028	122.5	184	15.6	32	15.6	32	0.0	0
FY2029	121.3	184	16.9	34	16.9	34	0.0	0
FY2030	119.4	184	11.5	24	11.5	24	0.0	0
FY2031	123.6	184	13.2	27	13.2	27	0.0	0
FY2032	118.8	184	16.0	32	16.0	32	0.0	0
FY2033	106.7	154	10.5	21	10.5	21	0.0	0
FY2034	56.4	92	4.5	10	4.5	10	0.0	0
FY2035	16.5	62	1.1	3	1.1	3	0.0	0
FY2036	5.8	62	0.5	1	0.5	1	0.0	0

Refer to Appendix C.

Table 5.10 demonstrates that the peak (shaded) cumulative haulage of ore, tailings and concentrates associated with the Project would occur at different times on different parts of the road network. The highest average daily and the maximum daily trips and timing thereof on each part of the road network are presented in Figure 5.1.

This assessment has assumed that transport of materials for the Project would use similar vehicles to those currently used at Hera Mine, i.e., Type 1 A-double road trains and modular B-triple road trains. Should the use of higher capacity vehicles be feasible, the number of trips required to achieve the various transport tasks described herein would be reduced, and the impacts on daily and peak hourly traffic volumes would be reduced. Similarly, the impacts on the levels of service experienced by drivers travelling on the affected routes and delays experienced turning at intersections would be reduced below those identified in this report. The use of higher capacity vehicles would be subject to further investigation and confirmation that the road and intersection geometries are sufficient.

Figure 5.1: Project Ore, Concentrates and Tailings Haulage on Road Network



Project-generated average and maximum daily trips, excludes haulage associated with Modification 6 to Hera Mine, and assumes use only of the Principal Concentrates Transport Route between Hera Mine and Hermidale.

5.3 Future Combined Traffic Volumes

5.3.1 Project Construction

For the purpose of this assessment of the construction impacts of the Project, the following scenario for cumulative traffic generation has been adopted:

- Background (non-Aurelia) traffic during year 2023 (Table 4.4);
- Hera Mine Modification 6 operating, with design day traffic generation including average day waste rock haulage (Table 2.1); and
- Project construction traffic on a shift change day (Table 5.3).

The resulting daily and peak hourly traffic volumes at key locations on the road network are presented in Table 5.11. It is noted that these forecasts are considered to overestimate future traffic on Burthong Road between Priory Tank Road and the Federation Site, as background (non-Aurelia) volumes are based on the surveyed conditions on Hartwood Street south of Nymagee, which is expected to carry higher volumes than Burthong Road.

Similarly, the forecasts on Kidman Way between Priory Tank Road and Peak Mine are based on the estimated background traffic on Kidman Way 30 km south of Cobar from Cobar Shire Council surveys with growth applied, (Table 4.4) which results in a higher baseline volume than was recorded on Kidman Way south of Peak Mine in 2020 (EMM, 2020 and Table 4.2).

Table 5.11: Forecast Traffic Volumes During Project Construction

Road and Location	Daily Trips (vehicles per day)				Peak Hour Trips (vehicles per hour)			
	Light	Buses	Heavy	Total	Light	Buses	Heavy	Total
Burthong Road Hera Mine to Priory Tank Road	169	2	86	257	40	1	13	54
Burthong Road Federation Site to Hera Mine	111	2	78	191	18	1	11	30
Federation Site Access Roads	10	2	44	56	5	1	6	12
Hartwood Street – Milford Street – Whitbarrow Way – Nymagee Hermidale Road	123	2	50	175	24	1	8	33
Hera Mine Access Roads	78	4	88	170	32	2	10	44
Kidman Way Priory Tank Road to Barrier Highway	189	0	167	356	34	0	19	53
Priory Tank Road Kidman Way to Burthong Road	93	0	53	146	22	0	8	30

5.3.2 Project Operations

For the purpose of this assessment of the operational impacts of the Project, the following cumulative traffic has been considered over the life of the Project:

- Background (non-Aurelia) traffic (Table 4.4);
- Hera Mine Modification 6 operating to the end of 2025, with design day traffic generation (Table 2.1);
- Project operational non-haulage traffic on a shift change day (Table 5.6), robustly assuming that the operational workforce remains at its peak level throughout the life of the Project; and
- Project operational haulage traffic on a design day (Table 5.10).

Due to the varying distributions of the various haulage activities, the timing of the peak conditions varies on different parts of the road. Rather than adopting a single point in time for the assessment, this study has therefore considered the peak conditions on each part of the road regardless of when it occurs. Table 5.12 summarises the forecast peak daily traffic volumes on a design day during the Project operations.

Table 5.12: Maximum Daily Traffic During Project Operations (vehicles per day)

Road and Location	Peak Year	Light	Buses	Heavy[A]	Haulage	Total
Burthong Road Hera Mine to Priory Tank Road	2027	253	0	56	49	358
Burthong Road Federation Site to Hera Mine	2032	151	12	46	184	393
Federation Site Access Roads	2032	41	12	8	184	245
Hartwood Street south of Nymagee	2032	210	0	42	32	284
Hera Mine Access Roads	2029	147	12	12	218	389
Kidman Way Priory Tank Road to Peak Mine	2027	196	0	153	30	379
Priory Tank Road Kidman Way to Burthong Road	2027	97	0	34	30	161

[A] *excluding materials haulage*

Table 5.12 indicates that peak conditions with the Project may occur between 2027 and 2032 at different locations on the road network.

Table 5.13 summarises the forecast peak hourly traffic volumes on a design day during the Project operations.

Table 5.13: Maximum Peak Hourly Traffic During Project Operations (vehicles per hour)

Road and Location	Peak Year	Light	Buses	Heavy[A]	Haulage	Total
Burthong Road Hera Mine to Priory Tank Road	2027	44	0	10	5	59
Burthong Road Federation Site to Hera Mine	2032	55	12	13	18	98
Federation Site Access Roads	2032	12	6	3	18	39
Hartwood Street south of Nymagee	2032	38	0	8	3	49
Hera Mine Access Roads	2029	39	6	2	22	69
Kidman Way Priory Tank Road to Peak Mine	2027	25	0	19	3	47
Priory Tank Road Kidman Way to Burthong Road	2027	13	0	5	3	21

[A] *excluding materials haulage*

Table 5.13 indicates that traffic volumes on the public roads would remain below 100 vehicles per hour throughout the life of the Project.

5.4 Road Network Efficiency

The capacity of a road is defined as the maximum 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 will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Level of Service (LOS) is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. A LOS definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. LOS B to D describe progressively worse traffic conditions. LOS 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 LOS E is taken as the capacity of a lane or roadway. In rural situations, LOS C is generally considered to be acceptable. At LOS C, most vehicles are travelling in platoons, and travel speeds are curtailed. At LOS D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low. The LOS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road.

Austroads (2020a) provides guidelines for 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). The HCM defines three classes of road which relate to drivers' expectations. The surveyed roads would generally be considered as Class I or Class II roads. On Class I roads, LOS is defined in terms of either Percent-Time-Spent-Following (PTSF) or Average Travel Speed (ATS). On Class II roads, LOS is defined in terms of PTSF only. 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. The LOS criteria for Class I and Class II roads are as shown in Table 5.14.

Table 5.14: LOS Criteria for Class I and Class II Two Lane Two Way Roads

Level of Service	Class I		Class II
	ATS (km/h)	PTSF (percent)	PTSF (percent)
A	> 90	≤ 35	≤ 40
B	> 80 – 90	> 40 – 50	> 40 – 55
C	> 70 – 80	> 50 – 65	> 55 – 70
D	> 60 – 70	> 65 – 80	> 70 – 85
E	≤ 60	> 80	> 85

Source: Austroads (2020a)

The forecast peak hourly traffic volumes have been assessed using the HCM model, noting the following assumptions have been made on all the routes assessed:

- 60/40 directional split of peak hour traffic, consistent with the indicative capacities presented in RTA (2002);
- level terrain which allows heavy vehicles to maintain approximately the same speed as passenger cars;
- design speed 100 km/h;
- 3.0 m wide traffic lanes with 0.5 m shoulder each side of all roads; and
- 20 percent of each route does not permit overtaking.

The HCM method applies an adjustment factor to account for the presence of heavy vehicles in the traffic stream, with factors for trucks and recreational vehicles. As a robust assessment, and considering the higher than average contribution of road trains to the heavy vehicles on the roads, the standard adjustment factors have been doubled for this assessment.

Table 5.15 summarises the results of the assessment of midblock LOS with and without the Project construction activity during 2024 on the surveyed roads during the peak hours for the direction of travel with the worst result. The assessment does not include Milford Street, the Hera Mine Access Road or Federation Site Access Road, as the speed limits on those roads lie outside the range to which the HCM method applies. The assessment includes Burthong Road between the Federation Site and Hera Mine, reflecting conditions should that section of road be sealed (refer to Section 5.10).

Table 5.15: Indicative Peak Hour Midblock Level of Service in Peak Travel Direction

Road	During Project Construction			During Peak Project Operations			
	ATS (km/h)	PTSF (%)	LOS	Year	ATS (km/h)	PTSF (%)	LOS
Burthong Road Hera Mine to Priory Tank Road	105	24.3	A	2025	104	24.7	A
Burthong Road Federation Site to Hera Mine	105	22.2	A	2031	105	26.3	A
Hartwood Street south of Nymagee	105	22.1	A	2032	105	23.6	A
Kidman Way Priory Tank Road to Peak Mine	105	24.7	A	2025	105	24.5	A
Priory Tank Road Kidman Way to Burthong Road	105	21.8	A	2025	105	21.0	A

The results indicate that during the peak hours with the Project, the Levels of Service would be good, with drivers experiencing freedom to travel at their desired speed or overtake.

5.5 Operation of Intersections

At unsignalised intersections with minor roads, where there are relatively low volumes of through and turning vehicles, capacity considerations are usually not significant, and detailed analysis of capacity is not warranted. As a guide, at volumes below the following combinations of maximum hourly volumes at a cross intersection with a two lane two-way road, capacity analysis is not warranted:

- major road 400 vehicles per hour, minor road 250 vehicles per hour;
- major road 500 vehicles per hour, minor road 200 vehicles per hour; and
- major road 650 vehicles per hour, minor road 100 vehicles per hour.

Comparing the forecast peak hourly traffic volumes (Table 5.11 and Table 5.13) with the threshold volumes above, it is evident that the peak hourly volumes are well below the threshold volumes for analysis, and as such, there is no capacity concerns regarding the operation of the intersections.

TfNSW previously expressed particular interest in the current capacity of the intersection of Kidman Way and Priory Tank Road, and the proposed intensification of heavy vehicle movements as a result of the Hera Mine Modification 6. In its assessment, TTPP (2020a) recommended that the intersection of Kidman Way with Priory Tank Road be upgraded to provide a BAL treatment in Kidman Way suitable for the movement of road trains, and in accordance with Austroads design guidelines. With the Project, additional heavy vehicle movements would be generated above those forecast with the Hera Mine Modification 6 haulage.

With the Project, both Kidman Way and Priory Tank Road would experience peak volumes during 2027. On a design day in 2027, Kidman Way is forecast to carry up to 47 vehicles per hour, and Priory Tank Road is forecast to carry 21 vehicles per hour (Table 5.13). The peak hour trips generated by vehicles associated with the Project are summarised in Table 5.16.

Table 5.16: Cumulative Aurelia Traffic – Priory Tank Road and Kidman Way Intersection 2025

	Total Peak Hour Trips (vehicles per hour)	Estimated Trips in Peak Direction	Estimated Trips in Contrapeak Direction
Project Workforce	7	5	2
Project Deliveries	2	1	1
Project Haulage	3	2	1
Total	**12**	**8**	**4**

The cumulative impact of the Project with the ongoing operation of Hera Mine would therefore generate up to 12 vehicles turning left in to Priory Tank Road and 8 vehicles turning right out of Priory Tank Road during an inbound peak hour. During an outbound peak hour, the cumulative impact would be up to 8 vehicles turning left in to Priory Tank Road and 12 vehicles turning right out of Priory Tank Road.

An indicative assessment of the operation of the intersection has been conducted using SIDRA INTERSECTION 9, which includes a number of assumptions which will overestimate the demands and underestimate the available capacity at the intersection:

- 40 vehicles per hour (50% heavy vehicles) both northbound and southbound on Kidman Way, and 20 vehicles per hour (60% heavy vehicles) on each and every turning movements into and out of Priory Tank Road (i.e., Kidman Way would be carrying 160 vehicles per hour and Priory Tank Road would be carrying 80 vehicles per hour);
- STOP control on Priory Tank Road; and
- 100% of the heavy vehicles are 36 m long, with double the standard adjustment factors to account for the longer gaps that a road train driver will accept when turning compared with a standard truck.

Under these conditions, the analysis indicates that the movement with the highest average delay per vehicle would be the right turn exit from Priory Tank Road to Kidman Way, which would experience an average delay per vehicle of 13.2 seconds per vehicle. This is consistent with Level of Service A based on the standard level of service criteria adopted by TfNSW (RTA, 2002). The degree of saturation of the intersection, being the demand volumes as a proportion of the capacity volumes would be 0.07, indicating that the intersection would be operating with spare capacity under these conditions. The output from SIDRA INTERSECTION 9 is presented in Appendix D.

5.6 Intersection Treatments

The geometry of the existing intersections along the routes that would be used by Project vehicles have been reviewed with regard to its use by the additional Project-generated vehicles including road trains. Austroads (2020b) sets out warrants for greenfield rural intersection treatments, which focus on safety performance outcomes and are based on the number of turning and through vehicle movements at the intersection. The general minimum preferred treatment at rural road intersections are Basic Auxiliary Left (BAL) and Basic Auxiliary Right (BAR) treatments, which provide widened shoulders on the major road to allow additional space for through vehicles to pass around vehicles which have slowed to turn.

Comparing the expected peak hour demands at the intersections along the transport routes with the Austroads warrants, those intersections would each warrant the minimum BAL or BAR treatments if constructed under greenfield conditions to the current design guidelines.

5.6.1 Kidman Way and Priory Tank Road

At the intersection of Kidman Way and Priory Tank Road, the Project would generate additional road train movements turning left from Kidman Way into Priory Tank Road, which would warrant a BAL treatment in Kidman Way. TTPP (2020a) recommended that the intersection of Kidman Way with Priory Tank Road be upgraded to provide a BAL treatment in

Kidman Way suitable for the movement of road trains, and in accordance with Austroads design guidelines. No further changes to that intersection would be required.

5.6.2 Priory Tank Road, Burthong Road and Hartwood Street

At the intersection of Burthong Road, Hartwood Street and Priory Tank Road, the Project would generate additional road train movements turning left and right between Burthong Road and Priory Tank Road and additional road train movements travelling northbound and southbound between Burthong Road and Hartwood Street. With the forecast conditions with the Project traffic, the Austroads guidelines warrant a BAL treatment in Burthong Road.

TTPP (2020a) recommended that the intersection of Burthong Road with Priory Tank Road and Hartwood Street be upgraded by widening the sealed shoulder to ensure that road trains turning left from Burthong Road into Priory Tank Road remain wholly on the sealed surface. No further changes to the intersection would be required.

5.6.3 Burthong Road and Hera Mine Accesses

Previous upgrades to the intersection of Burthong Road with the Hera Mine Light Vehicle Access Road, and the construction of the intersection of Burthong Road with the Hera Mine Main Site Access Road were undertaken with regard to the requirements for 36 m road trains and no further upgrades would be required as a result of the Project. Should higher capacity vehicles be used for transport between the Hera Mine Main Site Access Road and the Federation Site, the geometry of the Hera Mine Main Site Road intersection with Burthong Road would be assessed with respect to its suitability for use by the largest vehicle expected to use the intersection, and any upgrade requirements identified and implemented to the satisfaction of Cobar Shire Council.

5.6.4 Burthong Road and Federation Site Accesses

The Project proposes two access roads from Burthong Road, with the northern intersection being the main site access used by the workforce and delivery vehicles, and the southern intersection being a haul road used by haulage vehicles only.

At the locations of the proposed intersections of Burthong Road with the Federation Site accesses, the surface of Burthong Road is unsealed, and it follows a straight and level alignment, as shown in Figure 5.2 and Figure 5.3. Subject to ongoing maintenance of roadside vegetation, there is not expected to be any significant constraints on sight distances between drivers and vehicles at the proposed intersection location.

Figure 5.2: Burthong Road Near Proposed Northern Federation Site Intersection

Figure 5.3: Burthong Road Near Proposed Southern Federation Site Intersection

Austroads (2017) indicates that rural property accesses should be designed for the largest vehicle likely to use it, in this case, A-double road trains turning left from Burthong Road and right into Burthong Road. At locations where there is a high demand for articulated vehicles, Austroads (2017) indicates that a road intersection design should be adopted. Should higher capacity vehicles be used for transport between the Hera Mine Main Site Access Road and the Federation Site, the geometry of the Federation Site heavy vehicle access road intersection with Burthong Road would be assessed with respect to its suitability for use by the largest vehicle expected to use the intersection, and any upgrade requirements identified and implemented to the satisfaction of Cobar Shire Council.

It is therefore recommended that road intersection designs be adopted for the proposed intersections of Burthong Road with the Federation Site access roads. The forecast volumes on Burthong Road and the proposed access roads warrant BAL treatment in Burthong Road at each intersection, with the southern intersection treatment designed to accommodate the swept path of the largest vehicles expected to turn left into and right out of the access road without crossing the centreline of Burthong Road. It is recommended that the intersections each be constructed as a road intersection, with BAL and BAR treatments, designed to accommodate the swept path of the relevant design vehicles.

It is considered appropriate to signpost the Federation Site access roads to ensure all drivers are aware of its presence, together with a TRUCKS (CROSSING OR ENTERING) (W5-22) sign for drivers travelling in both directions on Burthong Road.

It is recommended that similar to the Hera Mine TMP, the drivers of Project heavy vehicles be bound by a Driver's Code of Conduct, which would set out expectations regarding driver behaviour when turning at the Federation Site access intersections. Consistent with the current operations at Hera Mine, heavy vehicle drivers would be required to make contact by UHF radio before entering the Federation Site from Burthong Road.

5.7 Oversize Vehicles and Dangerous Goods

While the Project does not propose the movement of any oversize or overmass (OSOM) vehicles, should the need arise, such movements will conform with the relevant permits obtained in accordance with *Additional Access Conditions Oversize and overmass heavy vehicles and loads* (TfNSW, 2020d), and any other licences and escorts as required by the regulatory authorities.

Consistent with the Driver's Code of Conduct for Hera Mine, it is recommended that a Driver's Code of Conduct be implemented for the Project, which would require that any movement of dangerous goods be conducted in accordance with the relevant requirements of the regulatory authorities.

5.8 School Bus Routes

The Project would increase the number of road trains operating on Kidman Way between Priory Tank Road and Peak Mine over the life of the Project. This part of Kidman Way has signposted school bus stops. It is recommended that a Driver's Code of Conduct be implemented for the Project that requires haulage truck drivers to reduce speed in the vicinity of the school bus stops when the school bus is present.

5.9 Road Safety

The review of the road crash history of the surrounding road network (Section 4.4) does not highlight any clustering of crashes by location that might suggest an inherent concern with

the design of the road at that location that may be exacerbated by the increased traffic demands of the Project.

As discussed in Section 5.6, no auxiliary or channelised turn lane treatments would be warranted by Austroads (2020b) on safety grounds at the intersections proposed to be used by heavy vehicles generated by the Project.

Consistent with the Hera Mine TMP, it is recommended that the transport of ore, concentrates and tailings occur during daylight hours only, and be restricted during times of heavy rainfall to minimise the risk of road crashes due to wet conditions.

The general alignment of Burthong Road is typically straight and level, with minimal horizontal or vertical curves. Consistent with the recommendations of TTPP (2020b) regarding the Federation Exploration Decline Program, it is recommended that guideposts with reflective markers be provided along that part of Burthong Road that would be used by vehicles generated by the Project, noting that during winter, the shift changes may occur in darkness.

Consistent with the recommendations of TTPP (2020b) regarding the Federation Decline Exploration Program, it is recommended that the existing stock grid on Burthong Road be reviewed and either removed or widened with appropriate signage.

5.10 Burthong Road Treatment

Burthong Road is sealed for approximately 6 km south of Nymagee and unsealed over its remaining length. That part of Burthong Road between the Federation Site and Hera Mine is thus sealed for approximately 2 km immediately south of the Hera Mine Main Site Access and unsealed over the remaining approximately 8 km to the Federation Site.

Burthong Road between the Federation Site and Hera Mine is expected to carry up to 393 vehicles per day on a design day in 2031 (Table 5.12). Comparison with ARRB (2009) suggests that Burthong Road would be considered a Class 4A unsealed road, which are used for major movements between population centres, on which high volumes occur, and which can carry heavy vehicles. Class 4A roads typically carry greater than 150 vehicles per day (average daily traffic), and are constructed as an all-weather road with an operating speed of 50 to 80 km/h. On flat terrain, a minimum formation width including verges of 11 m would be required, including two 3.5 m wide travel lanes, two 1.0 m wide shoulders and two 1.0 m wide verges.

The ARRB Class 4A road standard would be suitable to accommodate the Project traffic on that part of Burthong Road north of the Project that remains unsealed. To minimise road safety risks, it is recommended that the unsealed length of Burthong Road be maintained at a suitable standard to accommodate road trains throughout the life of the Project.

Should the whole of Burthong Road north of the Project be sealed, it is recommended that the geometric design standards meet the requirements of Cobar Shire Council or Austroads

(2016) for heavy vehicle routes. Based on Austroads (2016) a total carriageway of 10.0 m would be appropriate, including an 8.0 m wide seal (two 3.5 m travel lanes and two 0.5 m shoulders) with a 1.0 m wide unsealed shoulder on each side. Sealing of the road would allow higher operating speeds than the current unsealed surface.

5.11 Mitigation Measures

The assessment results above demonstrate that no specific measures would be required to provide additional capacity to accommodate the Project traffic. In addition to specific intersection upgrades recommended to be implemented as part of Hera Mine's operations and the Federation Decline Exploration program, it is recommended that:

- the intersections of Burthong Road with the proposed Federation Site access roads be constructed as road intersections, with BAL and BAR treatments, designed to accommodate the swept path of the relevant design vehicles;
- signage be installed to alert drivers to the presence of the Federation Site access and of trucks turning at the intersection;
- the drivers of heavy vehicles associated with the Project be bound by a Driver's Code of Conduct, consistent with that at Hera Mine, and including behavioural expectations for regular drivers associated with the Project;
- additional signage and guideposts be provided along Burthong Road between Hera Mine and the Federation Site, including at the existing stock grid (if retained) to meet the requirements of AS1742.2;
- a TMP be prepared in consultation with Cobar Shire Council and Bogan Shire Council to address the use of public roads by Project traffic, including:
  - restricting the transport of ore, concentrates and tailings to daylight hours only; and
  - should Burthong Road remain unsealed, restricting the transport of materials during heavy rainfall to prevent damage and to minimise the risk of road crashes due to wet conditions;
- should Burthong Road remain unsealed, the unsealed length be maintained at a suitable standard consistent with ARRB Class 4A unsealed roads to accommodate road trains throughout the life of the Project;
- should Burthong Road be sealed, it be constructed to a standard to meet the requirements of Cobar Shire Council or Austroads (2016) for heavy vehicle routes;
- Hera Resources enter a Planning Agreement with Cobar Shire Council regarding annual contributions for road maintenance and repairs on the relevant length of Burthong Road over the life of the Project;
- review and update the Planning Agreement between Hera Resources and Bogan Shire Council for annual road repair and maintenance contributions relating to the Principal Concentrates Transport Route to Hermidale;

- Hera Resources investigate opportunities for use of higher capacity vehicles for haulage of ore, tailings and/or concentrates, which would reduce the number of Project-generated trips on the public road network.

6 Conclusions

This study has examined the road transport implications of a proposal to develop an underground mine and processing facilities, known as the Federation Project. It is concluded that the existing road network and intersections have adequate capacity to accommodate the Project-generated traffic together with unrelated traffic changes in the region, while maintaining the efficiency and safety of the road network operations at good standards.

In addition to specific intersection upgrades recommended to be implemented as part of Hera Mine's operations and development of the Federation Exploration Decline Program, it is recommended that the mitigation measures described in Section 5.11 be implemented, including:

- the intersections of Burthong Road with the proposed Federation Site access roads be constructed as road intersections, with BAL and BAR treatments, designed to accommodate the swept path of the relevant design vehicles;
- signage be installed to alert drivers to the presence of the Federation Site access and of trucks turning at the intersection;
- the drivers of heavy vehicles associated with the Project be bound by a Driver's Code of Conduct, consistent with that at Hera Mine, and including behavioural expectations for regular drivers associated with the Project;
- additional signage and guideposts be provided along Burthong Road between Hera Mine and the Federation Site, including at the existing stock grid (if retained) to meet the requirements of AS1742.2;
- a TMP be prepared in consultation with Cobar Shire Council and Bogan Shire Council to address the use of public roads by Project traffic, including:
  - restricting the transport of ore, concentrates and tailings to daylight hours only; and
  - should Burthong Road remain unsealed, restricting the transport of materials during heavy rainfall to prevent damage and to minimise the risk of road crashes due to wet conditions;
- should Burthong Road remain unsealed, the unsealed length be maintained at a suitable standard consistent with ARRB Class 4A unsealed roads to accommodate road trains throughout the life of the Project;
- should Burthong Road be sealed, it be constructed to a standard to meet the requirements of Cobar Shire Council or Austroads (2016) for heavy vehicle routes;
- Hera Resources enter a Planning Agreement with Cobar Shire Council regarding annual contributions for road maintenance and repairs on the relevant length of Burthong Road over the life of the Project;

- review and update the Planning Agreement between Hera Resources and Bogan Shire Council for annual road repair and maintenance contributions relating to the Principal Concentrates Transport Route to Hermidale;
- Hera Resources investigate opportunities for use of higher capacity vehicles for haulage of ore, tailings and/or concentrates, which would reduce the number of Project-generated trips on the public road network.

Appendix A

Photographs

Burthong Road looking south from Hera Mine Light Vehicle Access Road

Burthong Road looking north from Hera Mine Light Vehicle Access Road

Burthong Road looking south from Hera Mine Main Site Access Road

Burthong Road looking north from Hera Mine Main Site Access Road

Kidman Way looking north from Peak Mine Access

Kidman Way looking south from Peak Mine Access

Kidman Way looking north from Priory Tank Road

Kidman Way looking south from Priory Tank Road

Intersection of Burthong Road, Hartwood Street and Priory Tank Road

Dashcam facing east from the northern side of Priory Tank Road

Burthong Road looking south from Priory Tank Road

Hartwood Street looking north from Priory Tank Road

Appendix B

Road Crash Summary

Detailed Crash Report

NSW GOVERNMENT Transport for NSW
Centre for Road Safety

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S	F
Western Region																										
Bogan LGA																										
Babinda																										
Hermidale Rd																										
1186277	P	21/08/2018	Tue	17:00	11.2 km	E	BALOWRA RD	2WY	CRV	Fine	Dry	100	1	SEM	M56	E in HERMIDALE RD	60	Proceeding in lane	SC	0	1	0	0	0	S	F
E69391673								RUM	80	Off left/right bend																
Canbelego																										
Barrier Hwy																										
1222826	S	16/11/2019	Sat	08:00	55 km	E	COBAR TN	2WY	STR	Fine	Dry	110	1	TKU	F21	E in BARRIER HWY	Unk	Proceeding in lane	OC	0	0	0	1	0		
E72770447								RUM	72	Off road to right																
1220568	P	17/10/2019	Thu	00:37	5 km	E	FLORIDA RD	2WY	STR	Fine	Dry	110	1	TKU	M28	E in BARRIER HWY	100	Proceeding in lane	SC	0	1	0	0	0		F
E73618868								RUM	71	Off rd left => obj				Drain/culvert												
1192651	P	22/12/2018	Sat	21:30	50 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	TKU	M18	W in BARRIER HWY	95	Proceeding in lane	MC	0	0	2	0	0	S	
E69864436								RUM	67	Struck animal				Kangaroo												
Hermidale																										
Barrier Hwy																										
1216262	P	11/11/2019	Mon	13:20	75 km	E	COBAR TN	2WY	STR	Fine	Dry	110	2	TKU	M33	E in BARRIER HWY	110	Incorrect side	FC	1	1	0	0	0		F
E73024434								RUM	20	Head on				TKU	M24	W in BARRIER HWY	110	Proceeding in lane								
1088737	P	14/12/2015	Mon	09:37	60 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	CAR	M62	E in BARRIER HWY	110	Proceeding in lane	MC	0	0	1	0	0		
E58589660								RUM	73	Off rd rght => obj				Tree/bush												
1105615	P	23/05/2016	Mon	19:50	61 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	CAR	F28	W in BARRIER HWY	90	Proceeding in lane	MC	0	0	2	0	0		
E60710015								RUM	67	Struck animal				Kangaroo												
1097637	S	03/04/2016	Sun	11:15	65 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	CAR	M21	E in BARRIER HWY	Unk	Proceeding in lane	NC	0	0	0	0	0		
E63072189								RUM	74	On road-out of cont.																
1173674	P	25/04/2018	Wed	10:25	60 km	W	MITCHELL HWY	2WY	STR	Fine	Dry	110	1	CAR	F22	E in BARRIER HWY	110	Proceeding in lane	MC	0	0	1	0	0		
E67380640								RUM	73	Off rd rght => obj				Embankment												
1117292	P	25/10/2016	Tue	11:30	1.45 km	W	NYNGAN ST	2WY	STR	Fine	Dry	110	1	WAG	M50	E in BARRIER HWY	110	Proceeding in lane	FC	1	0	0	0	0		F
E62741576								RUM	71	Off rd left => obj				Tree/bush												
1131274	P	14/01/2017	Sat	17:57	50 km	W	NYNGAN TN	2WY	STR	Fine	Dry	110	1	4WD	F32	W in BARRIER HWY	105	Proceeding in lane	SC	0	1	0	0	0	S	
E63646061								RUM	72	Off road to right																
1156562	S	02/12/2017	Sat	12:00	7 km	W	WALWA ST	2WY	STR	Overcast	Dry	110	1	4WD	F24	E in BARRIER HWY	Unk	Proceeding in lane	MC	0	0	1	0	0		
E66497434								RUM	71	Off rd left => obj				Tree/bush												
1136493	P	07/04/2017	Fri	11:30	2 km	W	WHITE ROCK RD	2WY	STR	Fine	Dry	110	1	M/C	M67	W in BARRIER HWY	100	Proceeding in lane	SC	0	1	0	0	0		
E64547349								RUM	74	On road-out of cont.																

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
Cobar LGA																									
Canbelego																									
Barrier Hwy																									
1195580	P	27/01/2019	Sun	19:30	20 km	E	COBAR TN	2WY	STR	Fine	Dry	110	1	M/C	M41	E in BARRIER HWY	90	Proceeding in lane	SC	0	1	0	0	0	S
E136918602								RUM	67	Struck animal				Kangaroo											
1101269	P	23/04/2016	Sat	10:45	27 km	E	COBAR TN	2WY	CRV	Fine	Dry	110	1	CAR	M39	W in BARRIER HWY	110	Proceeding in lane	MC	0	0	1	0	0	S
E60553837								RUM	81	Off left/rt bnd=>obj				Tree/bush											
1051944	P	01/01/2015	Thu	02:20	30 km	E	COBAR TN	2WY	STR	Fine	Dry	110	1	4WD	M45	E in BARRIER HWY	80	Proceeding in lane	OC	0	0	0	1	0	
E57273871								RUM	67	Struck animal				Kangaroo											
1193417	S	18/01/2019	Fri	13:50	35 km	E	COBAR TN	2WY	STR	Fine	Dry	110	1	CAR	M65	E in BARRIER HWY	Unk	Proceeding in lane	MC	0	0	1	0	0	
E69682144								RUM	71	Off rd left => obj				Falling object											
1169738	P	06/03/2018	Tue	15:37	41 km	E	COBAR TN	2WY	CRV	Fine	Dry	110	1	TKU	F64	W in BARRIER HWY	95	Proceeding in lane	SC	0	2	0	0	0	S
E66934745								RUM	88	Out of cont on bend															
1195515	S	10/03/2019	Sun	01:10	42 km	E	COBAR TN	2WY	CRV	Fine	Dry	110	1	CAR	M28	E in BARRIER HWY	Unk	Proceeding in lane	NC	0	0	0	0	0	
E70289636								RUM	67	Struck animal				Kangaroo											
1170606	P	28/04/2018	Sat	14:45	25 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	M/C	M37	W in BARRIER HWY	100	Proceeding in lane	SC	0	1	0	0	0	
E67730052								RUM	74	On road-out of cont.															
1062781	P	08/03/2015	Sun	23:00	35 km	E	LEWIS ST	2WY	STR	Fine	Dry	110	1	CAR	F49	W in BARRIER HWY	100	Proceeding in lane	MC	0	0	1	0	0	
E56684909								RUM	71	Off rd left => obj				Tree/bush											
Cobar																									
Barrier Hwy																									
1144171	P	21/05/2017	Sun	00:12	1.6 km	E	BARTON ST	2WY	STR	Overcast	Dry	80	1	4WD	M35	E in BARRIER HWY	50	Proceeding in lane	OC	0	0	0	1	0	F
E64770221								RUM	73	Off rd rght => obj				Fence											
1185634	S	04/11/2018	Sun	00:01	10 km	E	COBAR TN	2WY	STR	Fine	Dry	110	1	4WD	F32	E in BARRIER HWY	Unk	Proceeding in lane	MC	0	0	1	0	0	
E68859937								RUM	67	Struck animal				Kangaroo											
1187397	P	19/11/2018	Mon	14:30	3 km	E	KIDMAN WAY	2WY	STR	Fine	Dry	110	1	LOR	M51	E in BARRIER HWY	100	Proceeding in lane	NC	0	0	0	0	0	
E70180763								RUM	71	Off rd left => obj				Guide Post											
Kidman Way																									
1145904	S	11/08/2017	Fri	11:30	10.5 km	S	BARRIER HWY	2WY	STR	Fine	Dry	100	1	TRK	F69	N in KIDMAN WAY	Unk	Proceeding in lane	NC	0	0	0	0	0	
E67794988								RUM	70	Off road to left															
1168694	P	01/10/2017	Sun	19:45	15 km	S	BARRIER HWY	2WY	STR	Fine	Dry	100	1	SEM	M61	N in KIDMAN WAY	Unk	Proceeding in lane	OC	0	0	0	1	0	
E66235854								RUM	73	Off rd rght => obj				Tree/bush											
1154817	P	31/10/2017	Tue	07:33	16 km	S	BARRIER HWY	2WY	STR	Fine	Dry	100	1	TRK	M27	N in KIDMAN WAY	90	Proceeding in lane	SC	0	1	1	1	0	
E398990492								RUM	67	Struck animal				Kangaroo											

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
																									S F
1165043	P	10/02/2018	Sat	16:20	25 km	S	BARRIER HWY	2WY	STR	Fine	Dry	100	1	TKU	F43	N in KIDMAN WAY	90	Proceeding in lane	SC	0	1	1	0	0	
E130439702								RUM	72	Off road to right															
Nymagee																									
Burthong Rd																									
1220710	P	03/12/2019	Tue	23:00	10 km	S	NYMAGEE TN	2WY	CRV	Fine	Dry	60	1	TKU	M32	S in BURTHONG RD	Unk	Proceeding in lane	MC	0	0	1	0	0	S
E72991126								RUM	80	Off left/right bend															
1201553	P	02/04/2019	Tue	17:15	18 km	S	NYMAGEE TN	2WY	STR	Fine	Dry	100	1	TKU	M35	N in BURTHONG RD	100	Proceeding in lane	SC	0	1	0	0	0	
E73354089								RUM	70	Off road to left															
Kidman Way																									
1083138	S	25/10/2015	Sun	01:30	40 km	S	BARRIER HWY	2WY	STR	Fine	Dry	100	1	TRK	M23	N in KIDMAN WAY	Unk	Proceeding in lane	NC	0	0	0	0	0	
E59171432								RUM	67	Struck animal				Kangaroo											
1088146	P	29/11/2015	Sun	12:00	40 km	S	BARRIER HWY	2WY	STR	Fine	Dry	110	1	CAR	F29	S in KIDMAN WAY	110	Proceeding in lane	SC	0	1	1	0	0	
E59328124								RUM	72	Off road to right															
1208775	P	07/08/2019	Wed	00:15	40 km	S	BARRIER HWY	2WY	STR	Fine	Dry	110	1	SEM	M40	N in KIDMAN WAY	Unk	Proceeding in lane	OC	0	0	0	1	0	
E71675036								RUM	70	Off road to left															
1160078	P	13/01/2018	Sat	05:40	50 km	S	BARRIER HWY	2WY	STR	Raining	Wet	110	1	M/C	M37	N in KIDMAN WAY	100	Proceeding in lane	SC	0	1	0	0	0	
E67463374								RUM	67	Struck animal				Kangaroo											

Report Totals: Crashes: 34 Fatal Crashes(FC): 2 Serious Injury Crashes(SC): 12 Moderate Injury Crashes(MC): 10 Minor/Other Injury Crashes(OC): 5 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 5

Killed(K): 2 Seriously Injured(S): 14 Moderately Injured(M): 15 Minor/Other Injured(O): 6 Uncategorised Injured(U): 0

Crashid dataset Hera and Federation Mine - all crashes on selected roads 01.01.2015 to 26.10.2020p

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 & 2020 Q2 onwards contain uncategorised inj crashes.

Hera and Federation Mines, Cobar
All crashes 01.01.2015 to 26.10.2020p

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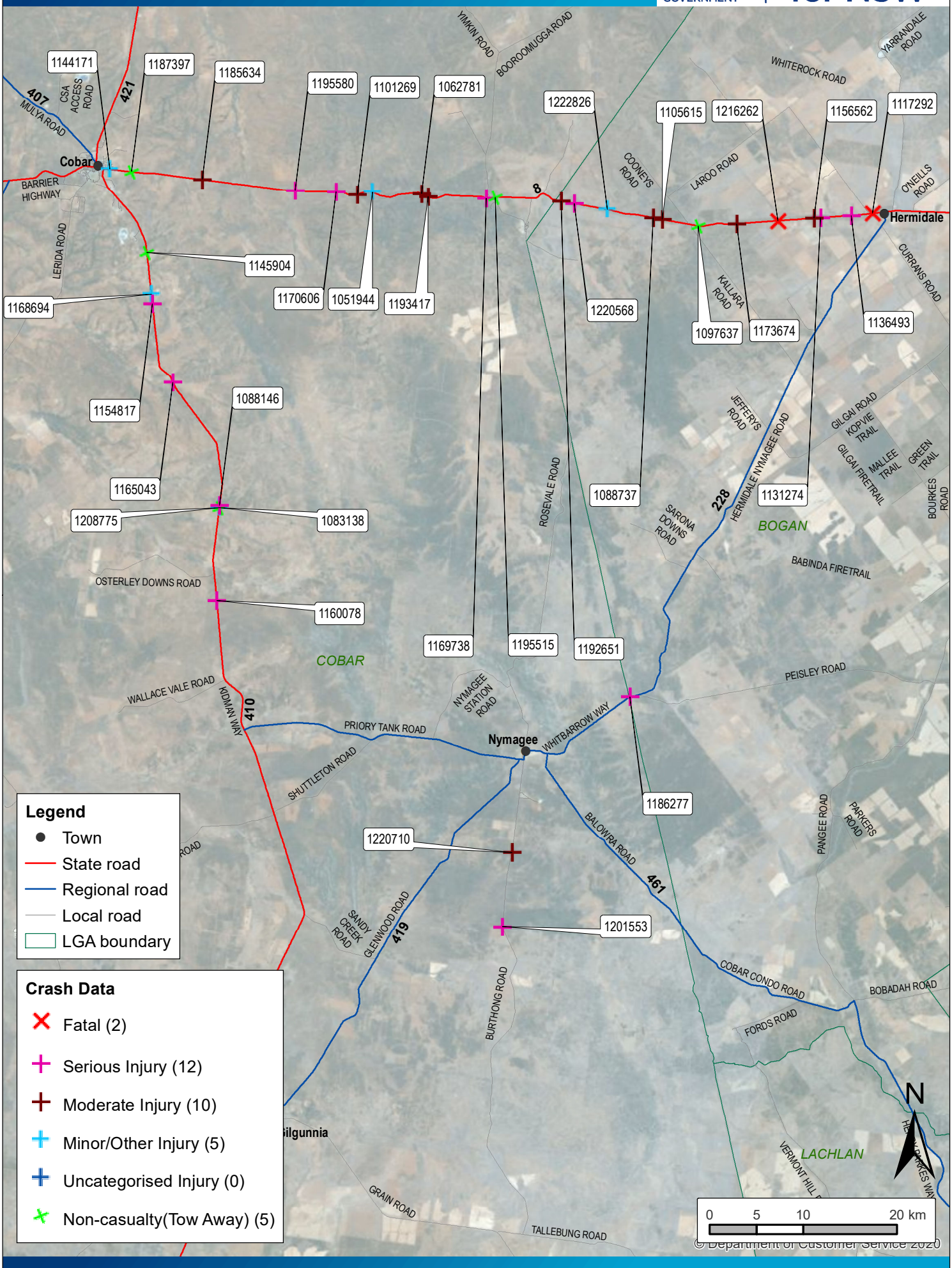

Legend

- Town
- State road
- Regional road
- Local road
- LGA boundary

Crash Data

- Fatal (2)
- Serious Injury (12)
- Moderate Injury (10)
- Minor/Other Injury (5)
- Uncategorised Injury (0)
- Non-casualty(Tow Away) (5)

Kidman Way Crash Summary (1 January 2015 to 31 December 2019)

Route	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	-	-	-	-	-	-	3	5	-	8
Crash Location										
2-way undivided road	-	-	-	-	-	-	3	5	-	-
Road Surface Condition										
Dry	-	-	-	-	-	-	2	5	-	7
Wet	-	-	-	-	-	-	1	-	-	1
Weather										
Fine	-	-	-	-	-	-	2	5	-	7
Raining	-	-	-	-	-	-	1	-	-	1
Natural Lighting										
Dawn	-	-	-	-	-	-	1	-	-	1
Daylight	-	-	-	-	-	-	1	3	-	4
Darkness	-	-	-	-	-	-	1	2	-	3
Severity of Crash										
Serious injury	-	-	-	-	-	-	2	2	-	4
Minor injury	-	-	-	-	-	-	-	2	-	2
Non-casualty (towaway)	-	-	-	-	-	-	1	1	-	2
Vehicle Types Involved										
Motorcycle	-	-	-	-	-	-	1	-	-	1
Car	-	-	-	-	-	-	-	1	-	1
Light Truck Utility	-	-	-	-	-	-	2	2	-	4
Semitrailer	-	-	-	-	-	-	-	2	-	2
First Impact Type										
Vehicle – Animal	-	-	-	-	-	-	3	-	-	3
Vehicle – Object	-	-	-	-	-	-	-	1	-	1
Rollover	-	-	-	-	-	-	-	4	-	4

Nymagee Hermidale Road Crash Summary (1 January 2015 to 31 December 2019)

Route	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	-	-	-	-	-	-	-	-	1	1
Crash Location										
2-way undivided road	-	-	-	-	-	-	-	-	1	1
Road Surface Condition										
Dry	-	-	-	-	-	-	-	-	1	1
Weather										
Fine	-	-	-	-	-	-	-	-	1	1
Natural Lighting										
Dusk	-	-	-	-	-	-	-	-	1	1
Severity of Crash										
Serious injury	-	-	-	-	-	-	-	-	1	1
Vehicle Types Involved										
Semitrailer	-	-	-	-	-	-	-	-	1	1
First Impact Type										
Rollover	-	-	-	-	-	-	-	-	1	1
Contributing Factors										
Speeding	-	-	-	-	-	-	-	-	1	1
Fatigue	-	-	-	-	-	-	-	-	1	1

Appendix C

Project Transport Forecasts

Table C1: Project Ore Transport Annual Materials Transport Summary (tpa)

Year	Ore Processing at Hera Mine				Ore Processing at Peak Mine			
	tpa	Average Daily Trips	Truck Fleet	Maximum Daily Trips	tpa	Average Daily Trips	Truck Fleet	Maximum Daily Trips
FY2023	0	0.0	0	0	0	0.0	0	0
FY2024	170,120	18.6	1	30	150,000	16.4	3	23
FY2025	359,909	39.4	2	60	200,000	21.9	4	30
FY2026	364,507	39.9	2	60	200,000	21.9	4	30
FY2027	482,977	52.9	3	90	200,000	21.9	4	30
FY2028	752,055	82.4	4	120	0	0.0	0	0
FY2029	750,000	82.2	4	120	0	0.0	0	0
FY2030	720,193	78.9	4	120	0	0.0	0	0
FY2031	749,892	82.2	4	120	0	0.0	0	0
FY2032	732,302	80.3	4	120	0	0.0	0	0
FY2033	644,407	70.6	3	90	0	0.0	0	0
FY2034	337,413	37.0	2	60	0	0.0	0	0
FY2035	98,108	10.8	1	30	0	0.0	0	0
FY2036	34,631	3.8	1	30	0	0.0	0	0
Journey Endpoints								
	Federation Site to Hera Mine				Federation Site to Peak Mine			
Route Description								
	Burthong Road Federation Site to Hera Mine				Burthong Road north of Federation Site, and Secondary Concentrates Transport Route to Peak Mine			
Route Reference for Tables C4 and C5								
	A				A, B, D			
Journey time including empty return (minutes)								
	40				160			
Maximum daily trips per truck								
	30				7.5			

Average daily trips assume 50t payload per truck, operating 365 days per year, outbound laden movement and inbound unladen movement generates 2 vehicle trips. Truck fleet assumes an additional truck is utilised when average demand exceeds 80 percent of capacity.

Table C2: Project Concentrates Transport Annual Materials Transport Summary (tpa)

Year	Concentrates Production at Hera Mine		
	tpa	Average Daily Trips	Design Daily Trips
FY2023	-	0.0	0
FY2024	18,891	2.1	5
FY2025	51,573	5.7	12
FY2026	70,487	7.7	16
FY2027	86,011	9.4	19
FY2028	142,432	15.6	32
FY2029	154,470	16.9	34
FY2030	105,350	11.5	24
FY2031	120,009	13.2	27
FY2032	145,588	16.0	32
FY2033	95,496	10.5	21
FY2034	41,342	4.5	10
FY2035	10,237	1.1	3
FY2036	4,334	0.5	1
Journey Endpoints			
	Hera Mine to Hermidale Rail Siding		
Route Description			
	Principal Concentrates Transport Route		
Route Reference for Tables C4 and C5			
	B, C		

Average daily trips assume 50t payload per truck, operating 365 days per year, outbound laden movement and inbound unladen movement generates 2 vehicle trips. Design day rounded up to nearest whole number of trips.

Table C3: Project Tailings Transport Annual Materials Transport Summary (tpa)

Year	Tailings Demand at Federation Site			
	tpa	Average Daily Trips	Truck Fleet	Maximum Daily Trips
FY2023	0	0.0	0	0
FY2024	170,744	9.4	1	32
FY2025	287,806	15.8	2	64
FY2026	273,208	15.0	2	64
FY2027	336,809	18.5	2	64
FY2028	365,774	20.0	2	64
FY2029	357,318	19.6	2	64
FY2030	368,906	20.2	2	64
FY2031	377,930	20.7	2	64
FY2032	352,029	19.3	2	64
FY2033	329,346	18.0	2	64
FY2034	177,642	9.7	1	32
FY2035	52,723	2.9	1	32
FY2036	18,178	1.0	1	32
	Journey Endpoints			
	Hera Mine to Federation Site			
	Route Description			
	Burthong Road Hera Mine to Federation Site			
	Route Reference for Tables C4 and C5			
	A			
	Journey time including empty return (minutes)			
	37.5			
	Maximum daily trips per truck			
	32			

Average daily trips assume 50t payload per truck, operating 365 days per year, outbound laden movement and inbound unladen movement generates 2 vehicle trips. Truck fleet assumes an additional truck is utilised when average demand exceeds 80 percent of capacity.

Table C4: Project Annual Average Daily Vehicle Trips by Route (vehicle trips per day)

Year	Route A Burthong Road Federation Site to Hera Mine			Route B Burthong Road Hera Mine to Priory Tank Road			Route C Principal Route Priory Tank Road to Hermidale Siding			Route D Secondary Route Priory Tank Road to Peak Mine		
	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings
FY2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FY2024	35.1	0.0	18.7	16.4	2.1	0.0	0.0	2.1	0.0	16.4	0.0	0.0
FY2025	61.4	0.0	31.5	21.9	5.7	0.0	0.0	5.7	0.0	21.9	0.0	0.0
FY2026	61.9	0.0	29.9	21.9	7.7	0.0	0.0	7.7	0.0	21.9	0.0	0.0
FY2027	74.8	0.0	36.9	21.9	9.4	0.0	0.0	9.4	0.0	21.9	0.0	0.0
FY2028	82.4	0.0	40.1	0.0	15.6	0.0	0.0	15.6	0.0	0.0	0.0	0.0
FY2029	82.2	0.0	39.2	0.0	16.9	0.0	0.0	16.9	0.0	0.0	0.0	0.0
FY2030	78.9	0.0	40.4	0.0	11.5	0.0	0.0	11.5	0.0	0.0	0.0	0.0
FY2031	82.2	0.0	41.4	0.0	13.2	0.0	0.0	13.2	0.0	0.0	0.0	0.0
FY2032	80.3	0.0	38.6	0.0	16.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0
FY2033	70.6	0.0	36.1	0.0	10.5	0.0	0.0	10.5	0.0	0.0	0.0	0.0
FY2034	37.0	0.0	19.5	0.0	4.5	0.0	0.0	4.5	0.0	0.0	0.0	0.0
FY2035	10.8	0.0	5.8	0.0	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0
FY2036	3.8	0.0	2.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0

Refer to Tables C1 to C3 for allocation of trips by type to each route.

Table C5: Project Annual Maximum Daily Vehicle Trips by Route (vehicle trips per day)

Year	Route A Burthong Road Federation Site to Hera Mine			Route B Burthong Road Hera Mine to Priory Tank Road			Route C Principal Route Priory Tank Road to Hermidale Siding			Route D Secondary Route Priory Tank Road to Peak Mine		
	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings	Ore	Concentrates	Tailings
FY2023	0	0	0	0	0	0	0	0	0	0	0	0
FY2024	53	0	32	23	5	0	0	5	0	23	0	0
FY2025	90	0	64	30	12	0	0	12	0	30	0	0
FY2026	90	0	64	30	16	0	0	16	0	30	0	0
FY2027	120	0	64	30	19	0	0	19	0	30	0	0
FY2028	120	0	64	0	32	0	0	32	0	0	0	0
FY2029	120	0	64	0	34	0	0	34	0	0	0	0
FY2030	120	0	64	0	24	0	0	24	0	0	0	0
FY2031	120	0	64	0	27	0	0	27	0	0	0	0
FY2032	120	0	64	0	32	0	0	32	0	0	0	0
FY2033	90	0	64	0	21	0	0	21	0	0	0	0
FY2034	60	0	32	0	10	0	0	10	0	0	0	0
FY2035	30	0	32	0	3	0	0	3	0	0	0	0
FY2036	30	0	32	0	1	0	0	1	0	0	0	0

Refer to Tables C1 to C3 for allocation of trips by type to each route.

Table C6: Project Annual Average Daily Vehicle Trips by Route (vehicle trips per day)

Year	Burthong Road Federation Site to Hera Mine	Burthong Road Hera Mine to Priory Tank Road	Principal Route Priory Tank Road to Hermidale Rail Siding	Secondary Route Priory Tank Road to Peak Mine
FY2023	0.0	0.0	0.0	0.0
FY2024	53.8	18.5	2.1	16.4
FY2025	92.9	27.6	5.7	21.9
FY2026	91.8	29.6	7.7	21.9
FY2027	111.8	31.3	9.4	21.9
FY2028	122.5	15.6	15.6	0.0
FY2029	121.3	16.9	16.9	0.0
FY2030	119.4	11.5	11.5	0.0
FY2031	123.6	13.2	13.2	0.0
FY2032	118.8	16.0	16.0	0.0
FY2033	106.7	10.5	10.5	0.0
FY2034	56.4	4.5	4.5	0.0
FY2035	16.5	1.1	1.1	0.0
FY2036	5.8	0.5	0.5	0.0

Table C7: Project Annual Maximum Daily Vehicle Trips by Route (vehicle trips per day)

Year	Burthong Road Federation Site to Hera Mine	Burthong Road Hera Mine to Priory Tank Road	Principal Route Priory Tank Road to Hermidale Rail Siding	Secondary Route Priory Tank Road to Peak Mine
FY2023	0	0	0	0
FY2024	85	28	5	23
FY2025	154	42	12	30
FY2026	154	46	16	30
FY2027	184	49	19	30
FY2028	184	32	32	0
FY2029	184	34	34	0
FY2030	184	24	24	0
FY2031	184	27	27	0
FY2032	184	32	32	0
FY2033	154	21	21	0
FY2034	92	10	10	0
FY2035	62	3	3	0
FY2036	62	1	1	0

Appendix D

SIDRA Intersection Outputs

MOVEMENT SUMMARY

Site: 101 [Kidman Way and Priory Tank Road (Site Folder: General)]

Indicative capacity assessment
HV gap acc / opp veh factors 3.0 (default 1.5)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kidman Way S														
2	T1	40	50.0	42	50.0	0.050	0.5	LOS A	0.2	4.5	0.21	0.23	0.21	90.1
3	R2	20	30.0	21	30.0	0.050	9.1	LOS A	0.2	4.5	0.21	0.23	0.21	68.3
Approach		60	43.3	63	43.3	0.050	3.4	NA	0.2	4.5	0.21	0.23	0.21	81.4
East: Priory Tank Road														
4	L2	20	30.0	21	30.0	0.067	12.0	LOS A	0.2	4.1	0.28	0.93	0.28	61.7
6	R2	20	30.0	21	30.0	0.067	13.2	LOS A	0.2	4.1	0.28	0.93	0.28	61.0
Approach		40	30.0	42	30.0	0.067	12.6	LOS A	0.2	4.1	0.28	0.93	0.28	61.4
North: Kidman Way N														
7	L2	20	30.0	21	30.0	0.042	8.6	LOS A	0.0	0.0	0.00	0.23	0.00	70.3
8	T1	40	50.0	42	50.0	0.042	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	91.8
Approach		60	43.3	63	43.3	0.042	2.9	NA	0.0	0.0	0.00	0.23	0.00	83.3
All Vehicles		160	40.0	168	40.0	0.067	5.5	NA	0.2	4.5	0.15	0.40	0.15	75.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@ttpp.net.au

www.ttpp.net.au