

11. Infrastructure and Traffic

11.1 Existing Infrastructure and Facilities

Both rail and road infrastructure are prominent in the Project area. **Figure 11-1** shows the regional road network, and **Figure 2-1** shows the local road network in the vicinity of the Project. The regional rail network is shown in **Figure 1-1**.

11.1.1 Roads

The principal elements of road infrastructure in the Clermont region are:

- the Peak Downs Highway, which connects the towns of Moranbah and Clermont to Mackay and other towns in the Central Highlands district;
- the Gregory Highway, which connects the Peak Downs Highway to Emerald and then to Rockhampton, Gladstone and destinations further south; and
- the Gregory Developmental Road, which connects these two highways to Charters Towers.

The Clermont Connection Road links the town of Clermont with the Gregory Highway and the Peak Downs Highway. It is expected that most of the traffic generated by the development will use this link.

These roads are all under the jurisdiction of the Department of Main Roads, Central Queensland Region (DMR). They are all two-lane two-way roads, sealed to widths varying from approximately 8.0 m to 9.5 m. The grades are generally flat. The general rural speed limit of 100 km/hr applies to these roads, except at the township of Clermont where the speed limit is 60 km/hr.

Other nearby roads, including the Blair Athol Connection Road, the BAM Access Road, and the Kenlogan Road (see **Figure 2-1**) are controlled by the Belyando Shire Council.

All multi-combination vehicles are generally permitted on these roads, including 23 m and 25 m B-Doubles and Type 1 Road Trains. Type 2 Road Trains are allowed on the Gregory Developmental Road and the Gregory Highway (27C). The Clermont Connection Road, Gregory Highway west of the Mobil Roadhouse and the Gregory Developmental Road are specifically nominated routes for these vehicles.

Multi-combination vehicles larger than the 23 m B-Double are prohibited on the BAM Connection Road, but are permitted to access the mine from the Gregory Highway via the BAM Access Road.

11.1.2 Rail

Queensland Rail provides freight services to the coal mines located within Belyando Shire, grain handling at Clermont and Mt Maclaren, and cattle freight in Clermont. The Goonyella rail system is an electrified line that connects coal mines in the central Bowen Basin (from Oaky Creek mine in the south to North Goonyella mine in the north and the BAM in the west) to the ports of Dalrymple Bay and Hay Point. Trains operating on this system typically haul loads of up to 9 000 tonnes of coal.

11.1.3 Port Facilities

Coal from the Project will be transported to the DBCT for export. DBCT is located near Mackay. It commenced operations in 1983 as a common-user facility. At present, DBCT handles the products of 10 northern Bowen Basin coal mines, including BAM.

The DBCT has two berths, each with a shiploading capacity of 7200 t/hr. DBCT throughput capacity in 2000/2001 was 41 Mtpa, but this was increased to 43 Mtpa with the completion of the Stage 5 expansion in early 2002. The Stage 6 expansion completed in 2003, which included an additional berth and shiploader, further increased capacity to its present 54 Mtpa.

11.1.4 Telecommunications

Clermont has good base communications capacity with standard lines available. Mobile telephones are operational in the town areas and in some outlying areas. A Telstra fibre optic cable runs along the western boundary of ML 1904 and is located next to the proposed road reserve boundary for the diverted Gregory Highway. It crosses the western boundary of ML 1904 and traverses inside ML 1904 for a distance of approximately 1 km. The fibre optic cable then exits ML 1904 and follows part of the route of the proposed conveyor and continues along to the BAM.

11.1.5 Power

Electricity supply in the Clermont area is provided by direct connection to the state grid. Electricity for the BAM is currently supplied via the Copperfield substation located to the west of Clermont township. A mine-owned 66 kV feeder carries the BAM's supply from the substation to the mine boundary where a small switching station supplies two feeders – one to the general mine area (preparation plant, general mine load and rail loader) and a second feeder supplying the pit.

11.1.6 Water Supply

The only water supply infrastructure in the vicinity of the Project is an above ground pipeline supplying water to the BAM from an existing borefield on the Clermont MLs.

Belyando Shire Council advise that the existing water treatment plant and distribution system are currently able to meet existing town demand. Particular elements, such as the treatment plant itself and the low level clean water storage, do not have spare capacity.

11.1.7 Stormwater

There is presently no stormwater infrastructure in the vicinity of the Project.

11.1.8 Sewerage

The existing Clermont town sewage treatment system is able to meet current demand.

11.2 Existing Traffic

11.2.1 Existing Traffic Volumes

Traffic volumes on roads in the region of the Project were obtained from the DMR and Belyando Shire Council. The Average Annual Daily Traffic volumes (AADT) (as vehicle trips per day – vpd) and the percentage of commercial vehicles (CVs) for 2002 on the key roads are provided in **Table 11-1**. This is the latest available traffic data. DMR recommends that an average annual growth rate of 3 % p.a. be used in the forecasting of future background traffic on roads throughout this area. This was done for the impact analysis.

Table 11-1 Actual (2002) Traffic Volumes

Road	Average Annual Daily Traffic Volume (AADT) [vpd]	% Commercial (Heavy) Vehicles (CV%)
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	831	21.7 %
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	731	22.0 %
Peak Downs Highway (33A) at Araluen	389	17.6 %
Gregory Developmental Road (98A) near Lodestar Mine	301	27.5 %
Clermont Connection Road (551) near Sandy Creek	1,596	13.0 %
Blair Athol Connection Road west of Gregory Highway	253	19.9 %
Kenlogan Road south of Mt McLaren Road	35	29.8 %

11.2.2 Existing Bus Services

Two school bus routes, P277 and P706, pass through the Project area. Both serve the Clermont State School and travel along the Clermont Connection Road and Gregory Highway (section 27C) to the Gregory Developmental Road/Peak Downs Highway intersection. From this point route P277 continues along the Gregory Developmental Road to the Blair Athol Connection Road, while route P706 continues along the Peak Downs Highway to Russell Park Road. Each of these school buses provide one morning and one afternoon service per school day.

Within the Project area there is only one pickup/setdown point used by school buses. The P706 service currently stops near the Gregory Developmental Road/Peak Downs Highway intersection. Apart from this the nearest stop for the P706 is close to Araluen, approximately 1 km north-east of the mining leases boundary, while the P277's nearest stop is close to the Kenlogan Road/Gregory Developmental Road intersection, approximately 1 km west of the proposed Gregory Developmental Road / Gregory Highway intersection.

A third bus service, the P1348, uses the Peak Downs Highway between Wuthung Road and Moranbah, but this is well outside the area affected by the proposed Project.

11.3 Impact of Road Realignments

Both the Peak Downs Highway and the Gregory Developmental Road pass directly over the coal deposit and therefore both of these State-controlled roads require realignment. The proposed realignment is shown in **Figure 2-1**.

Queensland Transport's strategic plans do not yet cover this region, and DMR's strategic planning for the district does not include any change in the function of these roads. However, DMR has indicated that the proposed realignment is generally acceptable, and is consistent with the ongoing status of the affected roads.

11.3.1 Design of Road, Intersection and Crossings

Figure 2-18 shows the proposed road realignment. Various alternatives to this alignment were considered (see **Sections 2.6.11 and 2.6.12**). Key elements of the current preferred designs are:

- Design life is 20 years to second design standard, i.e. 30 mm rutting criteria;
- Flood immunity to Q10;
- Flood trafficability to Q20 (truck crossing);
- Design speed is 110 km/hr;
- Pavement formation minimum width 9.0 m surfaced, i.e. 2 x 3.5 m lane and 2 x 1.0 m shoulder;
- Design traffic for:
 - Peak Downs Highway (33A) = 389 AADT (17.6% heavy);
 - Gregory Developmental Road (98A) = 301 AADT (27.5% heavy);
 - Gregory Highway (27C) = 831 AADT (21.7% heavy); and
- F1 factor is 3.2.

The current preferred intersection of the Gregory Developmental Road, Gregory Highway and Peak Downs Highway is a priority controlled T-junction with give way control applying to the Gregory Developmental Road. The intersection has been designed to DMR standards and is similar to the existing intersection. Key elements of the design are:

- the intersection does not affect the overland conveyor crossing point on the Peak Downs Highway;
- the intersection minimises the length of the Gregory Developmental Road that will require reconstruction or widening;
- the angle of the intersection (approximately 70 degrees) and the use of traffic islands will discourage traffic on the Gregory Developmental Road continuing into the intersection without stopping;
- turning lanes will be provided on the Peak Downs Highway to minimise delays to through traffic;
- the overland conveyor embankment south of the intersection does not interrupt the view to the south from the stopping point for traffic on the Gregory Developmental Road;

- should a heavy vehicle be unable to stop at the intersection due to excessive speed, there is sufficient space without obstacles to allow it to continue across the intersection. The intersection will be on fill and the side batters can be designed to allow for run through; and
- the existing stock route within the Gregory Developmental Road reserve can join the proposed stock route within the Peak Downs Highway reserve without obstruction or changes to the proposed conveyor corridor boundary.

Consultation is continuing with DMR about the intersection design.

The Peak Downs Highway realignment will require the road to cross Teatree Creek and Gowrie Creek. Low height culverts are planned to enable the Q10 stormwater flow in these creeks to pass under the road, without creating additional flood water effects on agricultural land upstream.

11.3.2 Road Safety

The proposed road realignments are not expected to cause any road safety issues. The new road sections and intersections will all be designed in accordance with the appropriate safety and geometric standards to the satisfaction of DMR. In particular, the realigned Gregory Developmental Road/Peak Downs Highway intersection offers more favourable approach angles for safety than the current layout.

The design speed for the new sections of road will be 110 km/hr.

Appropriate clear zones and standards of delineation will be provided, so that the curves will not present drivers with any difficulty in recognition or negotiation.

11.3.3 Stock Routes

The Peak Downs Highway and the Gregory Developmental Road are both designated stock routes. The realignment of these roads will require that parts of the existing stock routes also be realigned.

RTCA, DNRME and Belyando Shire Council officials have inspected the proposed Gregory Developmental Road / Gregory Highway Road and stock route diversion along the western and southern boundary of ML 1904. It was agreed in principle that stock route along this alignment is acceptable. RTCA has agreed with a DNRME request that:

- the road reserve be widened from a minimum 60 m to a minimum 90 m width along the western boundary of ML 1904 south from intersection with Peak Downs Highway;
- the stock route be selectively cleared and stick-raked along the western boundary of ML 1904 where the timber is quite thick and there is a lot of fallen timber;
- additional fencing be provided so that stock move in a laneway separated from road traffic by a fence, and a post and rail fence (or stock yard fencing) be provided to separate stock from road traffic where the stock will cross under the conveyor (the need and scope of these fences will be confirmed with the stock inspector once road construction and conveyor overpass are complete); and
- additional stock watering be provided (tank and trough or small dam in one of the gullies) at a point midway down the western side of ML 1904.

It was also agreed that the Peak Downs Highway stock route would be separate from the road and be relocated down the eastern side of ML 1884. This is addressed in **Section 3**.

11.3.4 Traffic Management During Construction

Traffic flow along the existing Peak Downs Highway, Gregory Highway and Gregory Developmental Road will not be affected by the construction of the new sections of the Gregory Highway and Peak Downs Highway. The existing roads will remain open to traffic without disruption while work is underway on the new corridor.

Temporary traffic control will be required only for the short period while the new intersections are connected to the existing roads. Traffic disruption during the intersection works will be minimised through appropriate temporary traffic management procedures as approved by DMR during detailed construction planning.

11.3.5 Travel Times

As a consequence of the realignment of the Peak Downs Highway, the north-east bound route will lengthen by approximately 6 km. This will increase travel times between Clermont and Moranbah by approximately 4 minutes. This increase represents a small increase in the total time taken for the long distance trips typical on this route. However, for local traffic, the increase represents a more substantial proportional increase in travel time. For the north-west bound route from Clermont along the Gregory Highway / Gregory Developmental Road the increase in road length due to the realignment of the Gregory Highway, is much smaller – of the order of 200 m – and the effect on travel time will be negligible.

11.3.6 School Buses

School Buses will not be affected by the realignment except for the 4-5 minute increase in travel time. Consultation with Queensland Transport indicates that current contractual arrangements with the bus service provider will not have to change. Queensland Transport will re-measure the length of the route once the realignment is complete, and provide an updated schedule under the contract. The Proponent will liaise with the bus company about the construction of the realignment.

A new bus stop will be provided on the Peak Downs Highway near the Gregory Developmental Road intersection to replace the existing stop. The location and design of the bus stop will conform with the relevant geometric and safety standards.

11.3.7 Consultation with Stakeholders

RTCA will continue to consult with DMR and DNRME and negotiate the approvals for the realignment of the Peak Downs Highway and the Gregory Highway and associated stock routes. The Proponent also proposes to work closely with the Belyando Shire Council throughout the Project to ensure that benefits to the Shire are maximised and potentially adverse impacts are minimised.

11.4 Impacts of Construction Traffic

11.4.1 Construction Traffic Generation

11.4.1.1 Site Construction Village Access

Initially, access to the Site Construction Village will be provided from the existing Gregory Developmental Road. Most service vehicles will also use this access point. A temporary T-intersection will be created at this location.

Following the realignment, access to the Site Construction Village will be from the Mine Access Road (**Figure 2-5**) which will also be the primary access to the mine site for material deliveries. This will also form the permanent access to the mine in the operational stage.

If any temporary connection from the Project to a state road is required, it will be done in agreement with DMR.

All new intersections, temporary and permanent, will be sited and designed in accordance with the appropriate safety and geometric standards and in consultation with DMR.

11.4.1.2 Workforce

Construction work will be undertaken mainly during daylight hours, between 7.00 am to 7.00 pm, over a 6 day period, Monday to Saturday, except for the box-cut construction, which is likely to be 24 hours / day, 7 days / week.

The large majority of the non-local workforce during the construction phase will be accommodated in the 350 bed Site Construction Village. For the purposes of this traffic assessment, it has been conservatively assumed that approximately 100 workers would be travelling to the Site Construction Village each day, during the construction phase. For the purpose of assessing the effect of the construction workforce on traffic, it was assumed that all workers travel to site by light vehicle. Although no bus service is assumed, a significant level of car pooling is likely to occur. The estimated average vehicle occupancy among these workers is 2.0, resulting in approximately 50 cars travelling to and from the site per day (a total of 100 trips per day).

11.4.1.3 Equipment and Materials

Project construction traffic, once on site, will not affect existing transport routes or local roads.

Construction equipment is likely be transported by road to the site on standard or over-dimensional loads. Large items of mining equipment that cannot be divided into smaller components, and the larger coal crushing and handling equipment requiring construction off-site, will be transported on State roads under permit and, where necessary, accompanied by safety escorts. DMR and the local Belyando Shire Council will be consulted prior to the movement of any oversized indivisible loads, to minimise disruption caused by these vehicle movements to the site. For the purposes of this impact assessment, the point of origin of these loads has been estimated on best available information.

Deliveries during construction will be limited to items such as mining equipment, building supplies, fuel, concrete, steel and items for the construction of a crushing plant, coal handling conveyors, stacker/reclaimer workshops, administration buildings and sundry plant. It is estimated that during the period of peak construction activity these deliveries will generate up to 10 truckloads per day over a six-month period. During this time, approximately half of the heavy vehicle traffic is expected to consist of semi-trailers with the remainder consisting of single unit trucks.

It is estimated that 80% of the materials carried by articulated vehicles (including steel and plant items) will be trucked to the site from Mackay and surrounding areas via the Peak Downs Highway, while the remaining 20% will be sourced from further south via the Gregory Highway. Of the materials transported by smaller, rigid bodied trucks (including concrete and fuel), it is estimated that 50% will be sourced from the Mackay region and 50% from further south.

The key construction materials discussed in **Section 2.12.2** are expected to account for approximately 90% of construction deliveries to the site during the total construction period. It is expected that all roadbase material will be obtained from within the site, including the box-cut. Based on a standard semi-trailer payload of 20 t, these materials contribute approximately 750 vehicle loads during the construction phase. During the construction phase, it is anticipated that steel and concrete deliveries will comprise 600 articulated vehicle loads. Other materials and plant items will also comprise 600 articulated loads, single unit truck deliveries will be about 1 200.

11.4.1.4 Service Vehicles

Service vehicle movements to and from the site during the construction phase are most likely to include postal deliveries, canteen and office supplies. Approximately 10 service vehicles per day are expected during this phase. These vehicles are expected to originate from Clermont and approach the site along the Clermont Connection Road.

11.4.1.5 Summary of Estimated Vehicle Trips

The total estimated number of vehicle trips to and from the site during the construction phase is summarised in **Table 11-2**. Daily traffic during the peak construction period is estimated as vehicle trips per day (vpd). The total number of heavy vehicles during the entire construction phase is also estimated.

A small number of oversize loads (likely to be less than 30) delivering indivisible construction and mining equipment are also expected during the construction phase. The origin of these loads is likely to be Brisbane or Mackay. Standard permit approval processes and arrangements for these deliveries, such as escorting vehicles, will apply on a case-by-case basis.

Table 11-2 Estimated Vehicle Trips Generated During Project Construction

Generation Type	Daily Traffic Generation [vpd]			Total Heavy Vehicles During Construction (All Periods)	
	Peak Construction Period			Single Unit Trucks	Articulated Vehicles
	Light Vehicles	Single Unit Trucks/Busses	Articulated Vehicles		
Workforce	100	0	0	0	0
Construction Materials	0	10	10	2 400	2 700
Service Vehicles	0	20	0	8 640	0
Total	100	30	10	11 040	2 700

The daily traffic volume (AADT), commercial vehicle proportion (CV%) and level of service (LOS) on the road links expected to carry construction traffic, both with and without the proposed Project, are summarised in **Table 11-3**.

The traffic increases expected during peak construction periods are minimal and will not affect the LOS experienced by drivers on these roads. Peak hour volumes on these roads are very low and the priority-controlled intersections in the area, including the proposed access intersections, are expected to continue to operate with low delays and a good LOS. The construction works will not affect the range of vehicle types using these major State-controlled roads, so no change in the geometry of existing roads will be required.

Table 11-3 Construction Phase Traffic Volumes

Road	Background Only (Without Project)			With Proposed Construction		
	AADT	CV%	LOS ¹	AADT	CV%	LOS ¹
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	908	21.7 % (197)	A	1,035	21.6 % (224)	A
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	799	22.0 % (176)	A	806	22.7 % (183)	A
Peak Downs Highway (33A) at Araluen	425	17.6 % (75)	A	438	20.0 % (88)	A
Clermont Connection Road (551) near Sandy Creek	1,744	13.0 % (227)	B	1,864	13.2 % (247)	B

Note (1) Level of Service: A – Excellent; B - Good; C -Satisfactory; D -Tolerable; E – Congested; F – Very Congested

No significant construction phase related traffic is expected to use the Gregory Developmental Road or the Council-controlled roads in the Project area. Within Clermont itself, the small Project related traffic volumes will be further diffused and no significant impacts on road or traffic conditions are expected.

11.4.2 Impacts on Road Pavement during Construction

The major state-controlled roads in this area are approved Road Train routes. The small number of additional vehicle trips is not expected to significantly impact on the life of the road pavements.

Table 11-4 summarises the forecast construction traffic impacts in Equivalent Standard Axles (ESAs).

As this table shows, the total heavy vehicle trips generated during the construction phase would represent approximately 0.5% to 1.1% of a standard 20 year design life in ESA's of the affected sections of the Gregory Highway (27C), Clermont Connection Road, and Peak Downs Highway.

The increased traffic therefore represents a small reduction in the design life of between 1 and 3 months. In practice this small change is not expected to affect the timing or cost of pavement maintenance and rehabilitation. In particular, the design, timing and lifespan of the planned pavement rehabilitation and sealing projects on the Gregory Highway and Peak Downs Highway listed in the current DMR Roads Implementation Program (RIP) will not be materially affected.

To avoid potential pavement damage during wet weather, oversize and overmass loads will not be delivered to the site on roads affected by flooding or waterlogging as advised by DMR. Heavy materials haulage will also be avoided under these conditions. Due to the small increase in volumes, the normal range of vehicle sizes, and the design of temporary and permanent access intersections to the appropriate standards, construction traffic will not have a significant impact on road safety, including safety of school bus services. Safety during movement of occasional oversized loads will be managed through the normal permit conditions including vehicle escorts as appropriate.

Overall, construction traffic is not expected to have any significant impact on the local traffic infrastructure. No mitigation works or infrastructure improvements, other than the proposed realignments, are expected to be required. As the LOS is not affected by the construction phase of the Project, no Traffic Management Plan is considered necessary. During detailed construction planning, Traffic Control Plans will be prepared to safely manage roadworks and minimise disruption to traffic during connection of the existing roads to the newly built realigned routes.

Table 11-4 Construction Phase Pavement Impacts (Equivalent Standard Axles)

Road	Background Only (Without Project)		Total Construction Phase Traffic			
	Existing Traffic (ESA/day)	Nominal 20 year design life (ESA) ¹	Peak Project Traffic (ESA/day)	Peak Increase in Daily ESA	Total Project Traffic (ESA)	Proportion of Nominal Design Life
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	577	3.54 x 10 ⁶	76	13.2 %	29.3 x 10 ³	0.8 %
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	515	3.16 x 10 ⁶	20	3.9 %	7.7 x 10 ³	0.2 %
Peak Downs Highway (33A) at Araluen	219	1.34 x 10 ⁶	38	17.3 %	14.7 x 10 ³	1.1 %
Clermont Connection Road (551) near Sandy Creek	663	4.07 x 10 ⁶	56	8.4 %	21.6 x 10 ³	0.5 %

Note (1) Nominal 20 year design life, provided for comparison purposes, calculated from base year of latest traffic data (2002).

11.5 Impacts of Operational Traffic

11.5.1 Operational Traffic Generation

11.5.1.1 Mine Access

The permanent access to the Project site will be via the Mine Access Road which will connect with the realigned Gregory Highway approximately 2.8 km south of the new intersection with the Gregory Developmental Road. This access point will be a priority controlled intersection designed to the appropriate geometric and safety standards including the provision of suitable heavy vehicle turnouts and with space for a northbound Type 2 Road Train to safely pass a vehicle waiting to turn right into the Project site. The detailed layout will be developed in consultation with DMR.

Access to the conveyor service road within the conveyor corridor west of the realigned Gregory Highway will be obtained from the Gregory Developmental Road. Maintenance access from the eastern section of the conveyor corridor to the Gregory Highway in the vicinity of the conveyor crossing will also be provided. Only occasional light vehicles, of the order of one per week will use these maintenance accesses. The conveyor corridor will be fenced by a 2 m high chainlink fence, and access points will be secured with locked gates to prevent unauthorised use. The location of maintenance access from public roads will be determined in accordance with safety standards and operational needs.

11.5.1.2 Employees and Visitors

It is estimated the Project will employ a peak of 450 people during the operational phase. These people are expected to seek housing in Clermont and surrounding districts or be accommodated in the Township Village. Operational staff will work on a three panel - two shift operation. There will be approximately 300 employees on site during a typical 24 hour period. The operational workforce on-site at any one time will therefore be significantly less than that during the construction phase.

For the purpose of assessing the effect of the operational phase workforce on traffic, it was assumed that all of the workforce travelling to the site would travel to site by light vehicle. Although no bus service is assumed, it is expected that a certain level of car-pooling will take place. An average vehicle occupancy of approximately 1.33 employees per vehicle was adopted. On this basis approximately 225 light vehicles would be required to transport employees to and from the site. Employee related traffic will be concentrated into the morning and evening shift change periods. It is estimated that 90% of the light vehicle traffic will travel to the site from Clermont, with the remaining 10% equally split from locations north and south of Clermont.

During operations there is likely to be a number of visitors to the site. A peak figure of five visitors per day, each driving a light vehicle, has been adopted throughout the analysis period. In practice visitor numbers are expected to decrease, as the site becomes fully operational.

Visitor traffic is expected to be distributed across normal working hours. The estimated distribution of visitor traffic includes the majority of visitors travelling between the site and Clermont, with approximately 1 non-local visitor per day from the north via the Peak Downs Highway and one from the south along the Gregory Highway.

11.5.1.3 Service Vehicles

Workshop, canteen and office supplies, fuel and spare parts will be delivered to the Project during the operational phase. It is expected that these deliveries will amount to approximately 10 to 15 single unit trucks per week and 10 to 15 heavier commercial vehicles (semi-trailers) per week. Single unit trucks are expected to be used for local transport between the site and Clermont, with heavier vehicles for longer distance transport. It is estimated that an average of 2 semi-trailers per day will travel between the Project and the south via the Gregory Highway, with one semi-trailer per day between the Project and the north along the Peak Downs Highway. Deliveries to site are expected to occur between 6.00 am and 5.00 pm.

Refuse and general waste will be segregated and collected on-site for recycling or disposal at the Clermont landfill. Regulated wastes, such as oil (hydrocarbon waste) will be collected on-site as required and transported to a licensed recycling facility.

11.5.1.4 Coal Haulage

Generally, there will be no coal haulage by road, except for possible haulage of small tonnages of coal for distribution in the region to customers. Coal will be transported via the overland conveyor from the Project to the BAM coal handling facilities. The Proponent does not plan to haul coal to the BAM if the conveyor is not operational (e.g. maintenance). The coal will be transported via the train loadout at BAM and the existing rail line to the DBCT.

11.5.1.5 Summary of Estimated Vehicle Trips

The total estimated number of vehicle trips to and from the site during the operational phase is summarised in **Table 11-5**.

Table 11-5 Estimated Vehicle Trips Generated Per day During Mine Operation

Generation Type	Daily Traffic Generation [vpd]		
	Light Vehicles	Single Unit Trucks	Articulated Vehicles
Employees and Visitors	460	0	0
Service Vehicles	0	6	6
Coal Haulage	0	0	0
Total	460	6	6

11.5.1.6 Impact of Operational Traffic

Impacts when the BAM and Project are Operating

Table 11-6 shows the predicted traffic volumes when the BAM and the Project are operating. Background growth has been calculated using the uniform 3% p.a. growth rate recommended by DMR.

The traffic increases are minimal and have no effect on the LOS on any of these roads.

Table 11-6 Operational Stage Traffic Volumes – BAM and project Operating

Road	Estimated Background Traffic (2008, Without Project, with BAM)			Estimated Traffic (With Project Operation)		
	AADT	CV%	LOS ¹	AADT	CV%	LOS ¹
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	992	21.7 % (215)	A	1,438	15.7 % (225)	A
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	873	22.0 % (192)	A	902	21.7 % (196)	A
Peak Downs Highway (33A) at Araluen	464	17.6 % (82)	A	490	17.1 % (84)	A
Clermont Connection Road (551) near Sandy Creek	1,906	13.0 % (248)	B	2,323	10.9 % (254)	B

Note (1) Level of Service: A – Excellent; B - Good; C -Satisfactory; D -Tolerable; E – Congested; F – Very Congested

Impacts at the Ten Year Design Horizon

DMR (2000) requires a summary of the anticipated traffic volumes at the ten year assessment horizon, both with and without the proposed Project. This is shown in **Table 11-7**. Background traffic growth after the closure of the BAM has again been calculated using the uniform 3% p.a. growth rate recommended by DMR. The BAM traffic volumes have been estimated from the traffic volume data for the BAM Access Road. The volumes of the BAM traffic on the state-controlled roads were then estimated assuming a similar directional distribution to that expected for the Project. The BAM traffic volumes were then deleted from the 'background'.

Table 11-7 Operational Stage Traffic Volumes – Ten Year Horizon (2018)

Road	Projected Traffic Volumes (Without the BAM or Project)			Projected Traffic Volumes (With Project)		
	AADT	CV%	LOS ¹	AADT	CV%	LOS ¹
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	1,007	25.3 % (255)	A	1,453	18.2 % (264)	B
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	1,131	22.4 % (253)	A	1,160	22.2 % (257)	A
Peak Downs Highway (33A) at Araluen	609	16.3 % (99)	A	635	15.9 % (101)	A
Clermont Connection Road (551) near Sandy Creek	2,255	13.3 % (300)	B	2,672	11.5 % (306)	B

Note (1) Level of Service: A – Excellent; B - Good; C -Satisfactory; D -Tolerable; E – Congested; F – Very Congested

The traffic increases expected during full operation of the Project are minimal and will not affect the LOS experienced by drivers on most of these roads within the design horizon. On section 27C of the Gregory Highway, the small traffic increase contributed by the Project takes total daily traffic just below the LOS A threshold. The resultant LOS B is still a “good” driving experience. Drivers will spend slightly longer travelling in platooned groups of vehicles than in LOS A (for which most vehicles travel singly and are able to overtake freely if desired when another vehicle travelling in the same direction is encountered). The LOS B is still well within the desirable maximum identified by DMR for rural state controlled roads.

Peak hour volumes on all of the roads listed are very low and the priority-controlled intersections in the area, including the proposed access intersection, are expected to continue to operate with low delays

and a good level of service. The mine operation will not affect the range of vehicle types using these major state-controlled roads, so no change in the geometry of existing roads will be required.

No significant mine related traffic is expected to use the Gregory Developmental Road or the Council-controlled roads in the Project area. Within Clermont itself the small Project related traffic volumes will be further dispersed and no significant impacts on road or traffic conditions are expected.

Due to the small increase in volumes, the normal range of vehicle sizes, and the design of the main access intersection as well as conveyor maintenance accesses to the appropriate standards, operational traffic will not have a significant impact on road safety, including safety of school bus services.

Overall, the operational phase traffic generated by the proposed Project is not expected to have a significant impact on either traffic or road conditions. No mitigation works or infrastructure improvements, other than the proposed realignments, are expected to be required. Again, as the LOS is not significantly affected by the Project, no Traffic Management Plan is considered necessary.

11.5.2 Impacts on Road Pavement during Operation

The heavy vehicle traffic during the operational phase is less than that during the construction phase. As the design is capable of handling construction traffic, it will also handle operational traffic. To avoid potential pavement damage during wet weather, heavy materials haulage on roads affected by flooding or waterlogging as advised by DMR will be avoided.

Table 11-8 summarises the forecast operational stage traffic impacts in Equivalent Standard Axles.

Table 11-8 Operational Stage Pavement Impacts (Equivalent Standard Axles)

Road	Background Only (Without Project)		Operational Stage Daily Traffic			
	Existing Traffic [2002] (ESA/day)	Nominal 20 year design life (ESA) ¹	Project Traffic (ESA/day)	Increase in Daily ESA	Design Life Project Traffic (ESA)	Proportion of Nominal Design Life
Gregory Highway (27C) between Clermont Connection Road and Gregory Developmental Road	577	3.54 x 10 ⁶	29	5.0 %	14.7 x 10 ⁴	4.2 %
Gregory Highway (27B) between Clermont Connection Road and Retro Turnout	515	3.16 x 10 ⁶	4	2.3 %	6.1 x 10 ⁴	1.9 %
Peak Downs Highway (33A) at Araluen	219	1.34 x 10 ⁶	6	2.7 %	3.1 x 10 ⁴	2.3 %
Clermont Connection Road (551) near Sandy Creek	663	4.07 x 10 ⁶	17	2.5 %	8.6 x 10 ⁴	2.1 %

Note (1) Nominal 20 year design life, provided for comparison purposes, calculated from base year of latest traffic data (2002).

On the basis of this preliminary assessment heavy vehicle traffic from the Project, considered in isolation, would be sufficient to require scheduled maintenance on the Gregory Highway (27C) south of the realignment to be brought forward by about 10 months. However, the reduction of traffic from the BAM will counter this impact, leading to no net effect on pavement life.

On road sections other than 27C, the daily equivalent standard axles (ESA) generated by the Project will be less than the 5% threshold level for assessment under the DMR (2000) Guidelines. No pavement impacts are expected on the basis of these predicted traffic volumes.

As required by DMR, the effect of heavy vehicle traffic generated by the development on pavement life and maintenance needs will be assessed in detail in accordance with the DMR (2000) Guidelines, and the Proponent will consult with DMR about mitigation of any effects identified.

11.6 Impacts of the Conveyor on Roads and Access

Where the conveyor crosses over the Peak Downs Highway and the Blair Athol Connection Road it will be supported firstly by an earthen embankment either side of the road to lift it 6.5 m above the road. Elevated sections will then be supported on structural columns located 24 m apart to span the road (see **Section 9** and **Figure 2-16**). The only impact may be some minor disruption to traffic during construction of the conveyor over the Peak Downs Highway and the Blair Athol Connection Road. Once constructed, the conveyor will not interfere with the roads, the road reserve or traffic on these roads.

Maintenance of the conveyor will occur periodically. Some light vehicles will use the access track beside the conveyor for maintenance purposes.

Apart from the road reserves, the conveyor crosses only leasehold land between the Project and the BAM. The single leaseholder affected has been fully consulted about the provision of suitable access over the conveyor in two locations. The following facilities are proposed:

- a reinforced concrete pipe/profiled steel pipe/reinforced concrete box culvert (with headwalls) will be provided that will contain the conveyor and provide sufficient space for access for maintenance;
- ramps on both side of the crossing point will be provided to allow farm machinery to cross over the conveyor. It has assumed that ramp slopes of 10% would be used;
- fencing will provide security for the corridor; and
- additional space will be allowed on the access road side of the conveyor corridor to allow vehicles to drive around the start of the ramp. A gate will be provided in the main corridor fence on both sides of the crossing point. A three strand fence or marker posts will also be provided to define the extension to the corridor boundaries.

11.7 Impacts on Infrastructure

11.7.1 Rail

There is not likely to be any impact from the Project on the rail network. Coal from the Project will be railed 280 km via the existing BAM spur line to ship loading facilities at the DBCT. As the coal production phase of the Project is steadily ramped up to full capacity, coal production at the BAM will steadily decrease. Over time, rail movements from the Project will replace those previously from the BAM, and the total will remain at about 1 410 per annum.

11.7.2 Port Facilities

There will be no impact from the Project on the Port. Coal from the Project will replace product from the BAM in the same markets. The development of the Project will occur in conjunction with the wind down of the BAM. At present, there are approximately 150 ship movements per annum of BAM coal. There will be no change in the total number of shipping movements due to the Project, because production from the Project will increase to replace the output from the BAM. Shipping movements will also be scheduled at similar times as those currently used by the BAM.

A representative of the DBCT Harbour Master was consulted regarding the capacity of the Port to deal with coal shipping, including that from the Project and other regional coal projects. The Port will be able to handle the product coal from the Project, as it is progressively replacing the coal supply from the BAM.

11.7.3 Telecommunications

The Project will be provided with a telephone/data link from Clermont, site radio system and network cabling. Part of the Telstra fibre-optic cable running along the western boundary of ML 1904 may have to be realigned with the diverted Gregory Highway, depending on the final location of infrastructure. Minimal disruption to services will result from this minor change.

11.7.4 Power Supply

The Project will not interfere with the existing power supply to the region, nor with existing electricity transmission lines. Power supply to the site will be via a new 66 kV overhead power line connecting to the existing BAM 66 KV line. A substation near the CPP will provide power distribution for the CPP, mine facilities and infrastructure, and mine equipment.

11.7.5 Water Supply

The supply for the various operational demands for the Project will be met by a combination of surface water runoff and groundwater from the Project area. The Project will be self-sufficient in water. Groundwater will be treated in a package water treatment plant to provide potable water for the Project. Testing for cyanobacteria (blue green algae) will be undertaken and treatment will occur if levels are unacceptably high.

Belyando Shire Council advise that the existing water treatment plant and distribution system are currently able to meet existing town demand. Particular elements, such as the treatment plant itself and the low level clean water storage, do not have spare capacity. Therefore, increasing the demand for treated water is likely to require upgrade of some components of the system

11.7.6 Stormwater

The Project will involve the construction of stormwater management infrastructure to manage on-site stormwater and surface run-off.

11.7.7 Sewerage

The existing Clermont town sewage treatment system is able to meet current demand. Belyando Shire Council advise that an increased population in Clermont may require upgrade of sewage pump station infrastructure.