

9

TRANSPORT

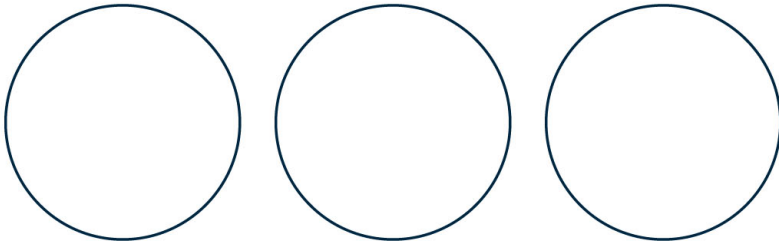


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9 TRANSPORT

This section describes the Transport Impact Assessment for the Ensham Central Project. It includes assessment of project transport impacts on road, rail and port infrastructure.

9.1 INTRODUCTION

The following key transport issues have been identified and considered as part of the environmental impact assessment for the project:

- Traffic generation during construction and operation of the mine expansion;
- The design and safety of the existing Capricorn Highway and Duckponds Road;
- The possibility of increased road traffic on Wyuna Road north of the project;
- The increase in coal freight traffic on the existing Queensland Railways line; and
- The increase in coal volume to be handled at the Port of Gladstone.

Assessment of the impact of the project on existing road transport infrastructure has been undertaken in accordance with the following:

- Queensland Department of Main Roads' (2000) *Guidelines for Assessment of Road Impacts of Development Proposals*;
- Queensland Department of Main Roads' (August 2004) *Road Planning and Design Manual*; and
- Austroads (1988) *Guide to Traffic Engineering Practice*.

9.2 ROADS

9.2.1 Existing Public Road Network

The regional transport network in the vicinity of the project is shown on Figure 9-1. Road access to the project will be exclusively from the south via Duckponds Road, which runs north off the Capricorn Highway between Blackwater and Emerald. Project traffic will include all construction, service, delivery and workforce vehicles.

Access to the existing Ensham Mine is also via Duckponds Road. Mine access from the north via Wyuna Road is limited to a small proportion of the existing Yongala pit workforce. Yongala is located at the northern end of the existing Ensham Mine. This pit has its own distinct and separate workforce which will continue its current access arrangements including the limited use of Wyuna Road. Traffic other than mine vehicles are not permitted to travel through the mine and staff and contractors employed in the Ensham and Yongala Mine areas must travel from the south and north respectively.

The Capricorn Highway is a state controlled road under the jurisdiction of the Department of Main Roads (DMR), Central Queensland Region. It is a two-lane two-way 7.0 m wide sealed road with generally flat grades. The speed limit on the highway in the vicinity of the Duckponds Road intersection is 100 km/hr.

The Capricorn Highway east of Emerald has a right-of-way approval for up to and including Type 1 Road Trains (36.5 m). In addition to the as-of-right vehicles, it is also a nominated heavy vehicle route that carries over-dimensional and excess mass vehicles under a permit system. The width of excess dimension vehicles can typically reach up to 8 m.

Duckponds Road is under the jurisdiction of the Emerald Shire Council. It is a two-lane two-way 6.0 m wide sealed road. It runs north from the Capricorn Highway for a distance of approximately 4.5 km at which point it crosses into private property owned by the proponent. The sealed surface continues for a further 1.2 km after which it becomes a gravel road. This road is used primarily by Ensham Mine traffic and vehicles servicing the adjacent Currimundi property, the owner of which has an arrangement with the proponent to access his property from Duckponds Road.

Duckponds Road crosses Corkscrew Creek on Ensham property approximately 0.8 km north of the mine lease boundary. The road narrows to 4.5 m wide in the vicinity of the crossing with southbound traffic required to give way.

Duckponds Road is an approved Type 1 road and currently has no reduction in speed limit meaning that the Capricorn Highway speed limit of 100 km/hr continues to apply. The mine has provided a 60 km/hr speed sign for northbound traffic within its property at the end of the paved surface.

9.2.2 Existing Road Traffic Volumes

Actual road traffic volumes on the Capricorn Highway, between Blackwater and Emerald, were recorded by the DMR in 2004. These are summarized in Table 9-1.

**Table 9-1
Capricorn Highway Actual Daily Traffic Volumes (2004)**

Average Annual Daily Traffic Volume (AADT) (vehicles per day)	% Commercial / Heavy Vehicles (CV %)
2,361	18.7

Actual road traffic volumes on Duckponds Road were recorded by the Emerald Shire Council in August 2005. These are summarized in Table 9-2.

**Table 9-2
Duckponds Road Actual Daily Traffic Volumes (2005)**

	Light Vehicles	Single Unit Vehicles	Articulated Vehicles	Total
Southbound	185	38	13	236
Northbound	165	56	14	235
Total	350	94	27	471

The Duckponds Road traffic volumes are the week-day averages, which are higher than the daily averages calculated over the full week. Light vehicles include Austroads classes 1 and 2 (cars). Single unit vehicles include Austroads classes 3, 4 and 5 (vans, small trucks and buses). Articulated vehicles include Austroads classes 6 to 12.

9.2.3 Forecast Construction Traffic Volumes

Construction Program

Construction of the project will commence in Year 2 and will involve construction of the following:

- underground mine;
- underground mine surface facilities; and
- washplant and coal handling facilities.

Construction of the new washplant and the initial underground mine access are scheduled for completion in Year 2. Completion of the underground mine surface facilities will be complete by Year 3. Longwall mining operations will commence by the end of Year 3 and the forecast maximum annual coal output of 20 Mtpa will be achieved by Year 5.

All traffic associated with construction and increased operations, including workforce, construction materials and service vehicles, will access the site via Duckponds Road. A small workforce will continue to operate the Yongala pit however more than 50% of these will travel to site on company supplied buses via Duckponds Road and all additional service and delivery vehicles associated with the Yongala camp will also travel via Duckponds Road. There will be no increase in traffic on Wyuna Road due to construction or operation of the project.

Construction Workforce

The construction workforce will peak at 201 employees in Year 2 with 70 and 131 employees employed for construction of the washplant and underground mine, respectively. During Year 3 the construction workforce will reduce to approximately 100 employees. Therefore Year 2 is the worst case year in terms of peak construction traffic generation.

The project's operational workforce will commence on site in Year 3 and immediately reach its maximum level of 138 additional employees. Therefore the combined total project and existing mine workforce will peak at 938 employees in Year 3 when construction of underground facilities is still in progress and the operational workforce will be employed and undergoing training and induction. Therefore Year 3 is considered the worst case year in terms of total combined employee traffic volumes generated by the project and the existing mining operations.

All of the construction employees will be accommodated in the on site camp and will travel to and from the site weekly as their seven day shifts change. In reality there is likely to be some car pooling however, for the purposes of this analysis, it has been assumed that the construction workforce will travel to the project in private cars with only one occupant. This conservative assumption results in a forecast maximum additional traffic on shift change day of approximately 100 cars in each southbound and northbound direction.

Construction Materials and Equipment

Equipment and materials that will be delivered to the site during construction of the project include mining equipment, building supplies, fuel, concrete, gravel, structural steel, and mechanical plant and equipment. Where possible, construction materials will be sourced locally and road materials will be sourced on site. Structural steel will come from coastal ports or interstate.

Mining equipment is likely to be imported and transported to the site by road from Mackay, Gladstone or Brisbane on standard or over-dimensional vehicles. Where necessary some large items of mining or coal handling equipment may need to be transported under permit and with safety escorts. In this event the DMR and local shire councils will be consulted prior to the movement of any oversize indivisible loads, in order to minimize their disruption to other road users.

It is estimated that, during the period of peak construction activity, deliveries of construction equipment and materials will peak at an additional ten vehicles per day, although the average will

be considerably less over the total 18 month construction period. It is estimated that 50% of these additional vehicles will be articulated vehicles (Austroads class 6 and above) and 50% will be single unit trucks.

Construction Service & Delivery Vehicles

Service vehicles currently access the Ensham Mine to provide mine materials (including fuel, explosives and spare parts), camp and office supplies and consumables. Existing mine contractors have provided summaries of the current volume of service and delivery vehicles to and from the existing mine in mid-2005, at which time the existing workforce was 664 people.

It is anticipated that there will be a slight increase in the number of service vehicles which will access the site during construction, above those currently travelling to and from the Ensham Mine, in order to provide additional camp supplies and consumables. Based on the estimated 100 person incremental increase in Year 3 workforce numbers, due only to construction, these traffic volumes have been proportioned accordingly and are included in Table 9-3.

Forecast Total Construction Traffic

The forecast total maximum daily construction traffic predicted to occur during the peak workforce period in Year 3 is summarized in Table 9-3.

**Table 9-3
Duckponds Road Forecast Additional Traffic Volumes due to Construction in Year 3**

Generation Type	Daily Traffic Generation (vehicles per day) Peak Construction Period		
	Light Vehicles	Single Unit Vehicles	Articulated Vehicles
Construction Workforce	100	0	0
Construction Materials	0	5	5
Service Vehicles	10	4	4
Total	110	9	9

9.2.4 Forecast Operational Traffic Volumes

Operational Workforce & Visitors

Operation of the project will commence progressively during Year 3 following completion of construction of the washplant and the underground mine in Years 2 and 3 respectively. As discussed in Section 9.2.3, the additional Ensham Mine workforce required for the project will peak at 238 employees in Year 3 when, for a limited time, the peak operational workforce of 138 employees will overlap with the Year 3 construction workforce of 100 employees. Following this in Year 4, construction will be complete and the Ensham Mine workforce will consist of a total of 838 employees, 138 of whom will be additional employees employed as a result of the project.

The current Ensham workforce consists of two groups – staff who travel to the site daily on weekdays, and mine employees and contractors who are accommodated in on site camps for a seven day shift. The mine typically operates 24 hours per day with workers working a 12 hour shift on a seven day on / seven day off roster. The Ensham Mine policy is to provide on site accommodation for all rostered employees for the duration of their roster. The proportion of the workforce travelling to the site daily, versus travelling at the completion of a seven day shift, will remain substantially the same as in 2005.

On this basis the peak workforce traffic movement to and from the site will occur on a weekday when a shift change occurs. Daily traffic volumes on Duckponds Road calculated as part of this study are based on the recorded weekday averages, which are higher than weekly averages due to less weekend traffic.

In order to forecast Duckponds Road traffic volumes in Year 3, the actual 2005 traffic volumes recorded for Duckponds Road have been referred. The 2005 operational workforce at the existing mine was 664 people, resulting in a forecast increase in operational workforce numbers of 26% in Year 3 due to the project. Assuming that employees will continue similar patterns of travel to the existing mining operations, the 2005 car traffic volumes have therefore been assumed to increase by the same proportion as the workforce.

Mine management policy prohibits the flow of public vehicles through the mine lease area. This includes mine employees meaning that all Ensham employees must travel to and from the site along Duckponds Road. The small number of Yongala employees who travel to the mine in private vehicles must travel independently via Wyuna Road.

Operational Service & Delivery Vehicles

Service vehicles currently access the existing Ensham Mine to provide mine materials (including fuel, explosives and spare parts), camp and office supplies and consumables. The volume of service and delivery vehicles has been considered dependant on mine coal output and so will increase significantly in Year 4 and peak in Year 5 when the project is fully operational and coal production reaches maximum output capacity. Therefore the Year 5 service and delivery vehicle volume forecast will be the worst case single unit and articulated vehicle traffic volume. This will be calculated by comparing actual 2005 mine output with the forecast maximum total Ensham Mine output with the project.

The Ensham Mine's actual 2005 coal output was approximately 8.5 Mt, therefore coal production will increase by 240% to 20 Mtpa when the project achieves maximum production. Allowing for some minor economies of scale in service and delivery vehicle visits, the single unit and articulated vehicle traffic volumes have been conservatively assumed to increase by 200% in calculations of the peak operational traffic volumes.

All recorded single unit and articulated vehicles recorded travelling along Duckponds Road during the 2005 traffic count have been assumed to be existing mine service and delivery vehicles. This is highly conservative as it makes no allowance for those vehicles travelling to the adjacent farms which also use Duckponds Road.

Coal Haulage

All coal from the expanded mining operations, including the project will continue to be transported by rail.

Forecast Total Operational Traffic

The total operational vehicle traffic forecast for the project in Year 5 at peak operation and output is summarised in Table 9-4.

**Table 9-4
 Duckponds Road Forecast Traffic Volumes with the ECP at Peak Operation in Year 5**

Generation Type	Daily Traffic Generation (vehicles per day) ECP at Peak Operation *			
	Light Vehicles	Single Unit Vehicles	Articulated Vehicles	Total
Workforce & Visitors	442	0	0	442
Service Vehicles	0	188	54	242
Total	442	188	54	684

Note: * Includes existing traffic on Duckponds Road due to existing Ensham Mine operations.

9.2.5 Future Combined Construction and Operations Traffic Volumes

The impact of the project on surrounding road traffic volumes has been assessed for the worst case scenarios in Year 3 and Year 5. In Year 3 the peak combined construction and operation workforce of 838 employees is present on site. In Year 5 the project operating workforce has reached its peak and service and delivery vehicle traffic corresponds to maximum total Ensham Mine coal production of 20 Mtpa.

In order to compare the Capricorn Highway traffic volumes with and without the project it has been assumed for this assessment that Project Year 0 will be 2006.

Duckponds Road Traffic Volumes

The Ensham Mine has existing capacity for open cut mining operations corresponding to a total coal output of 12 Mtpa. The background traffic volumes which will occur on Duckponds Road with the mine operating at this level of production without the project have been estimated on the basis of increased coal production from 8.6 Mtpa to 12 Mtpa and an increase in workforce from 664 to 790 employees. The volumes are shown in the first line in Table 9-5.

By conservatively assuming that all Duckponds Road traffic is generated by Ensham Mine, these volumes become the Duckponds Road background traffic volumes for the mine operating at its current maximum output. These may be applied as the background volumes in Years 3 and 5 alike, as the absence of other significant road users means that Duckponds Road is not subject to usual growth.

These background traffic volumes were then added to the forecast maximum incremental changes in traffic volumes on Duckponds Road during the construction and operation phases of the project. The results for the worst cases in Years 3 and 5 are summarised in Table 9-5.

**Table 9-5
Duckponds Road Projected Traffic Volumes**

Generation Type	Total Daily Traffic (vehicles per day) Existing Mine Operation			
	Light vehicles	Single unit vehicles	Articulated vehicles	Total
Background (existing mine operations)	416	131	38	585
Year 3 - with the project at peak construction and operation workforce and current mine maximum output	552	140	47	739
Year 5 - with the project at peak operational workforce and total operations at peak coal output	442	188	54	684

Year 3 Combined Construction and Operational Traffic Volumes

The Capricorn Highway background traffic volumes in Year 3, with the existing mine operating at its 12 Mtpa capacity, but without the project, were forecast by projecting the actual recorded 2004 Capricorn Highway volumes (refer Table 9-1) up to 2005 traffic volumes, subtracting the actual recorded 2005 Duckponds Road traffic volumes (refer Table 9-2), factoring the remaining highway volumes up by 5% annual growth rate (compounded) and adding the forecast Duckponds Road background traffic volumes in Year 3 (refer Table 9-5). The resulting projected Year 3 Capricorn Highway background traffic volumes are given in Table 9-6.

The impact of project construction on the Capricorn Highway and Duckponds Road in Year 3 was then assessed by adding the forecast additional project traffic volumes (refer Table 9-5) to the projected background traffic volumes (refer Table 9-5), to obtain the total forecast daily traffic volumes during peak construction and operation of the project (refer Table 9-6).

Table 9-6 summarizes the forecast daily traffic volumes, commercial vehicle proportion (CV %) and Level of Service (LOS) on Duckponds Road and the Capricorn Highway without the project and during the project construction traffic peak.

**Table 9-6
Capricorn Highway Projected Year 3 Traffic Volumes**

	Background Only (Existing Mine Operations Only)			During Construction of the Project		
	AADT	CV%	LOS	AADT	CV%	LOS
Capricorn Highway	3,026	19.3	B	3,180	19.0	B
Duckponds Road	585	28.9	A	739	25.3	A

Year 5 Peak Operational Traffic Volumes

The Capricorn Highway background traffic volumes in Year 5, with the existing mine operating at its 12 Mtpa capacity, but without the project, were forecast by projecting the actual recorded 2004 Capricorn Highway volumes (Table 9-1) up to 2005 traffic volumes, subtracting the actual recorded 2005 Duckponds Road traffic volumes (Table 9-2), factoring the remaining highway volumes up by 5% annual growth rate (compounded) and adding the forecast Duckponds Road

background traffic volumes in Year 5 (Table 9-5). The resulting projected Year 5 Capricorn Highway background traffic volumes are given in Table 9-7.

The impact of project operation on the Capricorn Highway and Duckponds Road in Year 5 was then assessed by adding the forecast additional project traffic volumes (Table 9-5) to the projected background traffic volumes (Table 9-5), to obtain the total forecast daily traffic volumes during peak operation of the project (Table 9-7).

Table 9-7 summarizes the forecast daily traffic volumes, commercial vehicle proportion (CV %) and Level of Service (LOS) on Duckponds Road and the Capricorn Highway without the project and with the project operations phase traffic peak.

**Table 9-7
Capricorn Highway Projected Year 5 Traffic Volumes**

	Background Only (Existing Mine Operations Only)			Project Operating at Peak Production		
	AADT	CV%	LOS	AADT	CV%	LOS
Capricorn Highway	3,276	19.3	B	3,375	20.8	B
Duckponds Road	585	28.9	A	684	35.4	A

9.2.6 Impacts on Levels of Service

The Level of Service is defined in the Austroads (1988) *Guide to Traffic Engineering Practice Part 2* as a qualitative measure of the operational conditions within a traffic stream as perceived by motorists and passengers. The categories generally describe the conditions in terms of factors including speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. There are six levels of service ranging from A to F. Level A represents the best operating condition of free flow, virtually unaffected by the presence of other vehicles, while Level F represents the worst with forced or break-down flow.

From Table 9-6 and Table 9-7 it can be seen that the increases in traffic volumes forecast for both the peak construction and operational phases of the project will not cause any significant change in the Level of Service experienced by users of the Capricorn Highway or Duckponds Road as they remain as LOS B and A respectively.

9.2.7 Impacts on Road Pavements

The Capricorn Highway and other main roads in the area of the project are approved Type 1 road train routes. The Department of Main Roads' (2000) *Guidelines for Assessment of Road Impacts of Development Proposals* requires that pavement impacts be assessed for any section of a state controlled road where the construction or operational traffic generated by a development equals or exceeds 5% of the existing Equivalent Standard Axles on that section of road.

From Table 9-6 it is seen that the forecast increase in average annual daily traffic (AADT) volumes on the Capricorn Highway in Year 3 due to peak construction phase project traffic is 5.1%. The forecast traffic increase includes an 88% increase in car volumes due to the assumption that all of the construction workforce will travel to the site individually. This is an extremely conservative assumption as this volume will certainly be much lower due to car pooling. If even just 20 of the total 938 peak construction or operational phase employees in Year 3 were to share a car with one other employee, the total forecast Capricorn Highway traffic volume would reduce to 3,160 AADT, resulting in only a 4.4% increase in traffic volumes. As informal carpooling arrangements already exist among employees based in Emerald and other nearby regional centres, the forecast

peak traffic volumes are a conservative worst case and a pavement impact assessment is therefore considered unnecessary.

From Table 9-7 it is seen that the forecast increase in average annual daily traffic volumes on the Capricorn Highway due to the peak traffic in the project operations phase is 3.0%. This increase is not expected to significantly impact the life of the pavement.

9.2.8 Capricorn Highway / Duckponds Road Intersection

The proponent has recently commenced the process to upgrade the intersection of the Capricorn Highway and Duckponds Road to improve the level of service and general safety of the intersection.

Works to be included as part of this upgrade include the following:

- Widening of the road pavement on the southern side of the highway to provide a designated right turn lane for traffic entering into Duckponds Road from the highway, and a passing lane for through traffic; and
- Widening of the road pavement on the northern side of the highway to provide a deceleration lane for traffic turning left into Duckponds Road.

The proposed upgrade works will provide intersection and through-flow capacity in excess of that necessary for peak traffic volumes forecast for Ensham Mine during the construction and operations phases of the project. All designs will be prepared in accordance with the relevant DMR Road Planning and Design standards. Existing services located within the road reserve will be relocated if necessary.

Detailed design has been completed in consultation with the DMR Emerald office. Construction of the upgrade works is scheduled to commence in August 2006 and be complete in October 2006.

9.3 RAIL

9.3.1 Existing Rail Volumes

The existing rail network in the vicinity of the project is shown on the Regional Transport Network Figure 9-1. The project is located approximately 16 km north of the main Rockhampton to Emerald rail line and is serviced by a dedicated spur line off Queensland Rail's Gregory / Norwich Park line.

In 2005, the proponent railed approximately 7 Mt of coal from the Ensham train loading facility and 2 Mt from the Yongala train loading facility. This equated to approximately three trains per day from Ensham and one train per day from Yongala with an average of 25 trains per week in total. Trains have a capacity of 7,000 tonnes.

The proponent has a contract with Queensland Rail (QR) for the haulage of up to 12 Mtpa from the existing Ensham and Yongala train loading facilities (combined) to the Port of Gladstone. This contract covers provision of both above rail haulage services by QR National and below rail network access services by QR Network Access. It also allows for deliveries to alternative unloading points (e.g. Gladstone Power Station).

9.3.2 Future Rail Volumes

The proponent has a contract with QR rail to haul 12 Mtpa. This volume will be reached as the infrastructure projects defined in Table 9-8 are completed by QR.

**Table 9-8
Queensland Rail Infrastructure Projects**

Project	Tonnage Commitment	Estimated Completion Date
Blackwater-Boone-Bluff duplication and third unloading station and balloon loop at port	9.5 Mtpa	September 2006
Aroona to Duaringa duplication	11.0 Mtpa	March 2007
Grantleigh to Tunnel duplication	12.0 Mtpa	December 2007

The forecast volume of coal to be loaded at the existing Ensham train loading facility, with the project operating at maximum production in Year 3, is 18 Mtpa. This will result in a total of seven to eight trains per day. The proponent has commenced discussions with QR Network Access regarding a further increase in haulage capacity to accommodate this increase. QR National has confirmed that additional rolling stock required to haul the additional tonnages can be available from September 2008.

9.4 PORT

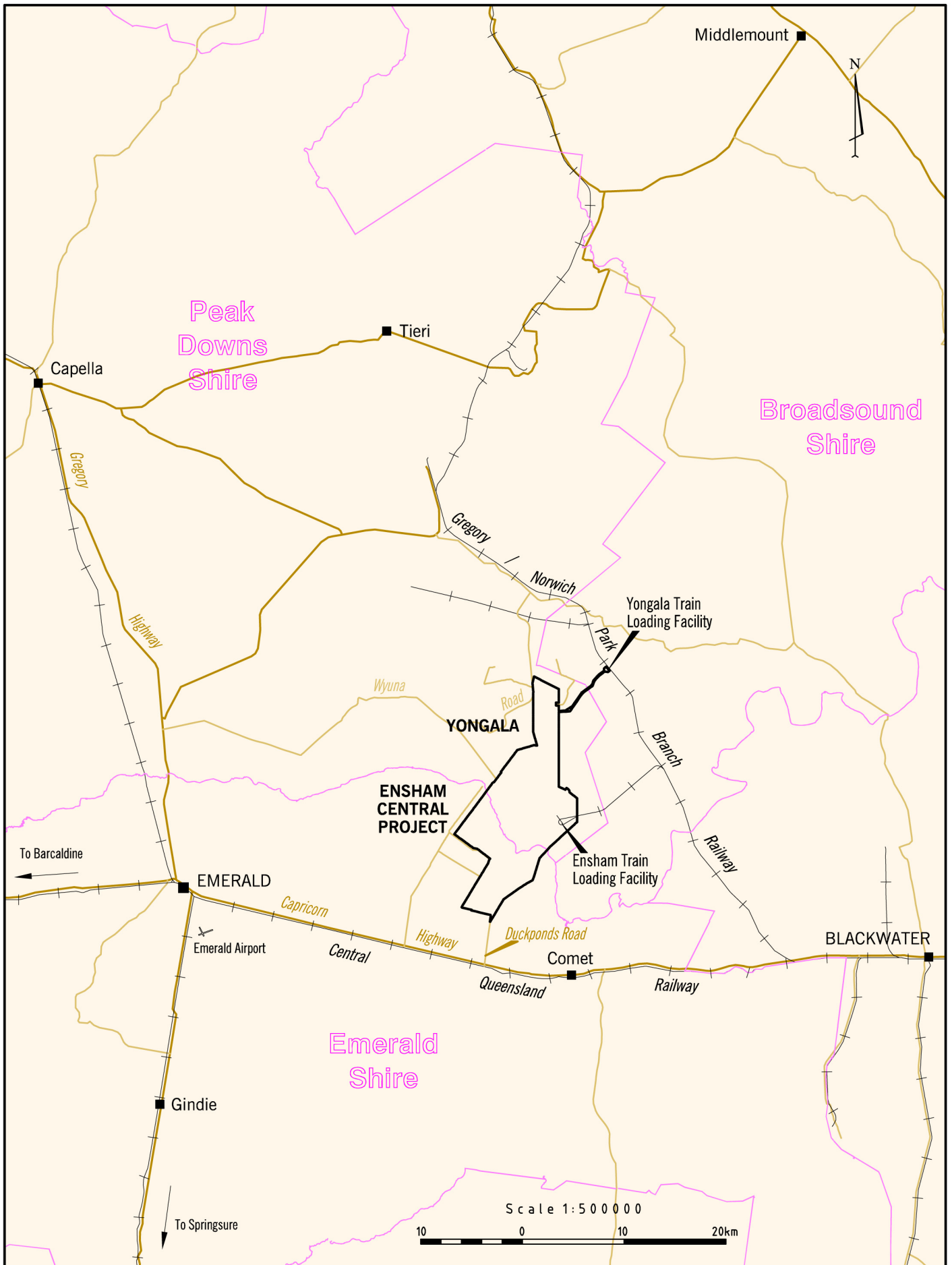
Coal from the project will be transported by rail to the Port of Gladstone. The proponent currently has a contract with Central Queensland Ports Authority (CQPA) for handling of 9 Mtpa. This contracted tonnage will progressively increase to 12.5 Mtpa when the infrastructure improvements defined in Table 9-9 are completed by CQPA.

**Table 9-9
Central Queensland Ports Authority Infrastructure Projects**

Project	Tonnage Commitment	Estimated Completion Date
Completion of 3 rd ship loader	9.5 Mtpa	July 2006
Completion of 4 th ship loader	12.5 Mtpa	July 2007

Discussions regarding further capacity increases are currently underway between the proponent and CQPA. CQPA has indicated that additional capacity can be provided following completion of the proposed Wiggins Island Terminal and associated rail infrastructure at the Port of Gladstone by 2010.

FIGURES



- Major Road
- Minor Road
- Shire Boundary

ENSHAM CENTRAL PROJECT

Regional Transport Network