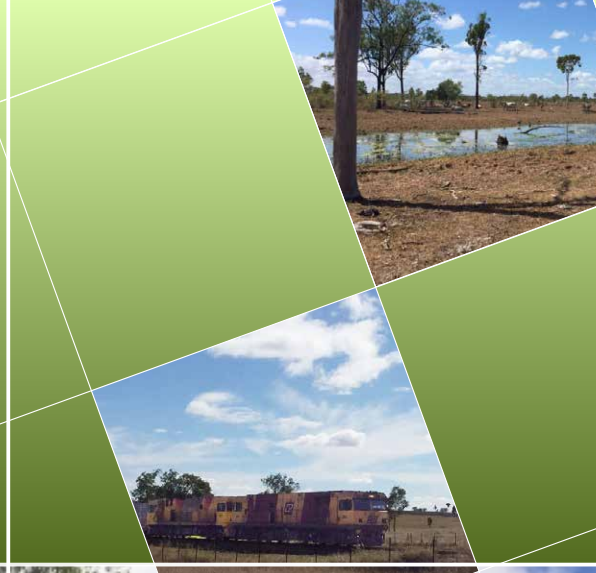


# Central Queensland Coal Project

## Chapter 3 – Description of the Project

### *Supplementary Environmental Impact Statement*





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## Central Queensland Coal Project Chapter 3 – Description of the Project

20 December 2018

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## 3 Description of the Project

### 3.1 Introduction

This chapter describes the Central Queensland Coal Project (the Project) location, resource base and mining methods, including the timing of operations, disturbance areas, processing and products and operational infrastructure and workforce. Additional information regarding the process for identifying the various components of the Project is provided in Chapter 2 – Project Need and Alternatives.

Central Queensland Coal has optimised its original Project design. Material changes to the original Project design are discussed in Section 3.4. An updated Project description incorporating these changes is at Section 3.5. Where submissions have been received regarding the description of the Project they have been included in this updated chapter. The full details of the submissions received for the Project EIS are at Appendix A13.

### 3.2 Project Overview

Central Queensland Coal is proposing to develop the Project, located on Mineral Development Licence (MDL) 324, a greenfield site. The Project includes:

- Two open cut operations, associated mining activities and mining infrastructure;
- A train loadout facility (TLF) to load coal onto trains and provide a new connection to the North Coast Rail Line; and
- A transport corridor to transport coal from the mine to the TLF.

It is proposed that there will be two separate mining leases (ML), which will cover the mining areas and TLF. A more detailed description of the updated Project is at Section 3.5.

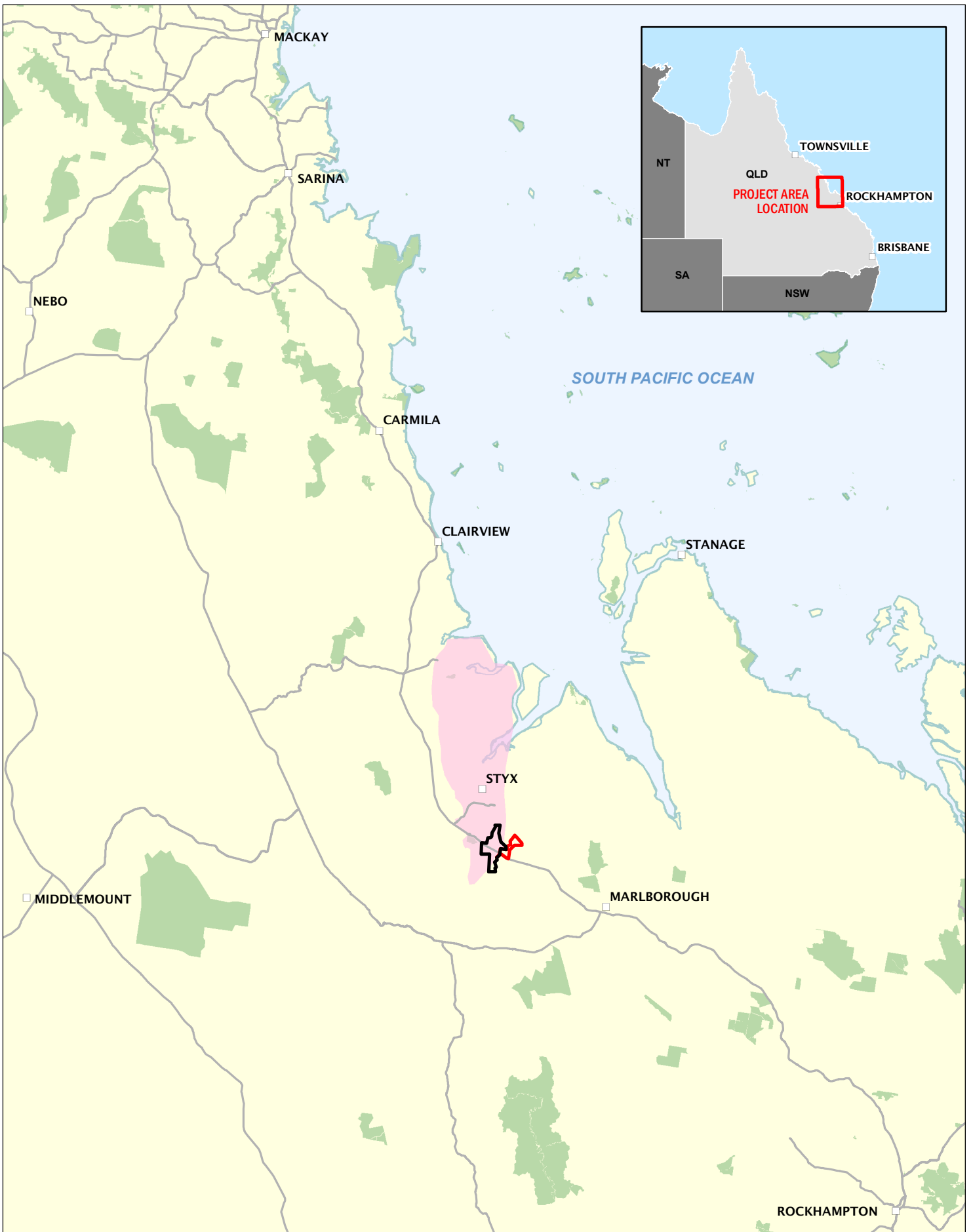
### 3.3 Location

The following sections describe the State, regional and local context of the Project's location.

#### 3.3.1 State Context

The Project is located in the Styx Coal Basin in Queensland, approximately 130 km northwest of Rockhampton. The Styx Coal Basin is an area of historical mining and grazing related communities in Central Queensland that extends over approximately 300 square kilometres (km<sup>2</sup>) onshore and 500 km<sup>2</sup> offshore, under water depths of up to 100 metres (Geoscience Australia, 2017). The Styx Basin is a minor basin compared to the nearby Bowen Basin.

The location of the Project within the Styx Basin and its proximity to major Queensland towns is shown at Figure 3-1.






**Figure 3-1**  
Project location



0 10 20 km

**Legend**

-  ML 80187
-  ML 700022
-  Styx Coal Basin

Scale @ A4 1:1,050,000  
Date: 22/11/18  
Drawn: Gayle B.

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



### 3.3.2 Regional Context

The Project is located within the Livingstone Shire Council (LSC) Local Government Area (LGA) (Figure 3-2). The LSC LGA was established after de-amalgamation on 1 January 2014 and covers approximately 11,776 km<sup>2</sup> with a population of more than 37,000 residents. The major centres include the coastal towns of Yeppoon and Emu Park, with the smaller villages of Byfield, Farnborough, Cawarral, Keppel Sands, The Caves, Marlborough, Ogmore and Stanage Bay.

The nearest town to the Project is Ogmore, located approximately 10 km to the north of the Project. Marlborough, another nearby town, is located approximately 25 km to the southeast. The construction workforce will be sourced from locals. Drive-in drive-out (DiDo) workers will be accommodated at existing accommodation in the Marlborough, Ogmore and St Lawrence region. Yeppoon, Rockhampton and Mackay will likely be used as the main transit locations for the parts of the workforce that will not be local commute residents.

The Environmental Impact Statement (EIS) referred to the proposed establishment of an overflow accommodation camp to be located at Mamelon, on the western side of the Bruce Highway; however, this is now not being pursued. Since the release of the EIS, Central Queensland Coal has been in discussions with the owners of the Marlborough Caravan Park regarding upgrading the facilities there to provide additional accommodation for construction and operational workforce. The Caravan Park owners are currently working with the LSC to explore this option.

The Project will utilise the North Coast Rail Line to transport coal to the Dalrymple Bay Coal Terminal (DBCT) at the Port of Hay Point which is the preferred port facility to be utilised by the Project. The DBCT is located approximately 175 km north of the Project.

### 3.3.3 Local Context

The Project is largely located within the Marlborough Plains subregion, one of the 13 subregions of the Brigalow Belt North bioregion. The southern portion of the ML occurs in the adjacent Nebo-Connors Ranges subregion. The Project area is located close to the boundary of the Brigalow Belt South bioregion located to the south. Vegetation within the Marlborough Plains subregion is dominated by alluvial plains and colluvial slopes, usually supporting woodlands characterised by Poplar Gum (*Eucalyptus platyphylla*), Ghost Gum (*Corymbia dallachiana*), Forest Red Gum (*E. tereticornis*) and paperbarks (*Melaleuca* spp.) with low rises supporting Narrow-Leaved Ironbark (*E. crebra*).

Large sections of the Brigalow Belt North bioregion have been cleared of remnant native vegetation for grazing, agriculture and mining. Remaining vegetation is generally confined to rockier hilly areas, linear strips of roadside vegetation, riparian vegetation and relatively small isolated remnants. Thus, clearing over the past 150 years has resulted in a highly-fragmented landscape with remnant vegetation patches separated by large expanses of cleared land.

Areas to the north and east of the Project area have been substantially impacted by vegetation clearing associated with cattle grazing activity. Connectivity between remaining tracts of vegetation is tenuously maintained by thin strips of riparian vegetation along creek lines such as Tooloombah Creek and Deep Creek which border the Project. Nevertheless, woodland and open forest habitat remaining in the south and east of the site remains contiguous with an extensive tract of remnant vegetation, which includes Tooloombah Creek Conservation Park. To the west of the Project remain extensive tracts of remnant forest associated with the nearby Broadsound Range.

Vegetation within the Project area and immediate surrounds comprises:

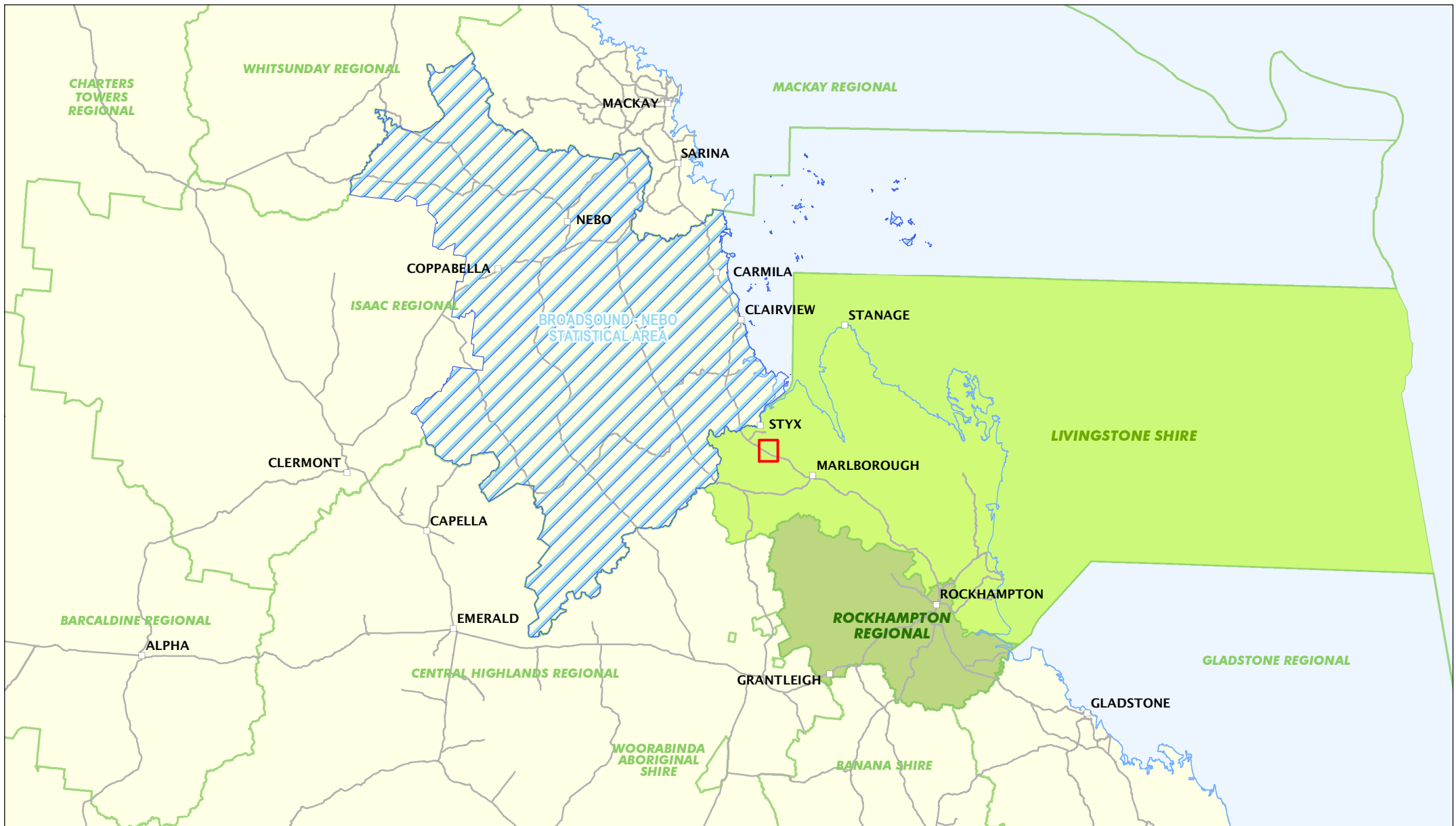


- Heavily disturbed habitats that have previously undergone significant clearing for cattle production. Where this habitat occurs north of the Bruce Highway it is often dominated by patches of regrowth Brigalow;
- Substantial areas of less disturbed eucalypt woodland; and
- Smaller pockets of relatively closed canopy (open forest) vegetation generally with a dense weedy shrub layer. These are largely associated with the creek systems adjacent to the Project (ML) boundary.

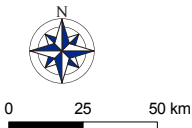
The Project is wholly contained within the Styx River Basin, comprising of Styx River, Waverley and St Lawrence Creeks. The Styx Basin discharges to the Great Barrier Reef Marine Park (GBRMP), which is listed as a World Heritage Area. The Project is bordered by two watercourses as defined under the Water Act, namely Tooloombah Creek and Deep Creek. These creeks meet at a confluence downstream of the Project area to form the Styx River. The coastal zone, commencing downstream of the North Coast Rail Line, is located approximately 10 km downstream of the ML area. The GBRMP is located approximately 40 km downstream of the ML area.

The Fitzroy Basin Association Natural Resource Management (NRM) body manages waters within the Styx Basin. Fitzroy Basin Association NRM body encompasses eight sub-catchments; Lower-Fitzroy, Isaac-Connors, Comet, Upper Dawson, Lower Dawson, Styx-Herbert, Water Park and Boyne-Calliope. Due to the NRM comprising an area over 152,000 km<sup>2</sup>, the region has been split into 192 Neighbourhood Catchments. The Project is located within the F3 Neighbourhood Catchment which is described as having a high sediment delivery ratio to the Great Barrier Reef with a low number of landholders within the basin (Fitzroy Basin Association, 2015). Sediment in the Fitzroy Region is the most significant risk to the Great Barrier Reef, an estimated 1.5 million tonnes of extra sediment deposited each year - 83% of the sediment coming from grazing land. It is estimated that the Styx Basin contributes 97,892 t per year. The load contributions from the Styx Basin are based on limited monitoring results. Cattle grazing is the dominant land use of the area (80%) and the basin contains 14% wetland areas. Many of the wetlands are Estuarine systems (8.8%) with approximately 187 lacustrine/palustrine wetlands (EHP 2017).

The existing land use and the natural features of the Project area are presented in Figure 3-3 and Figure 3-4, respectively.



**Figure 3-2**  
Project location LGA

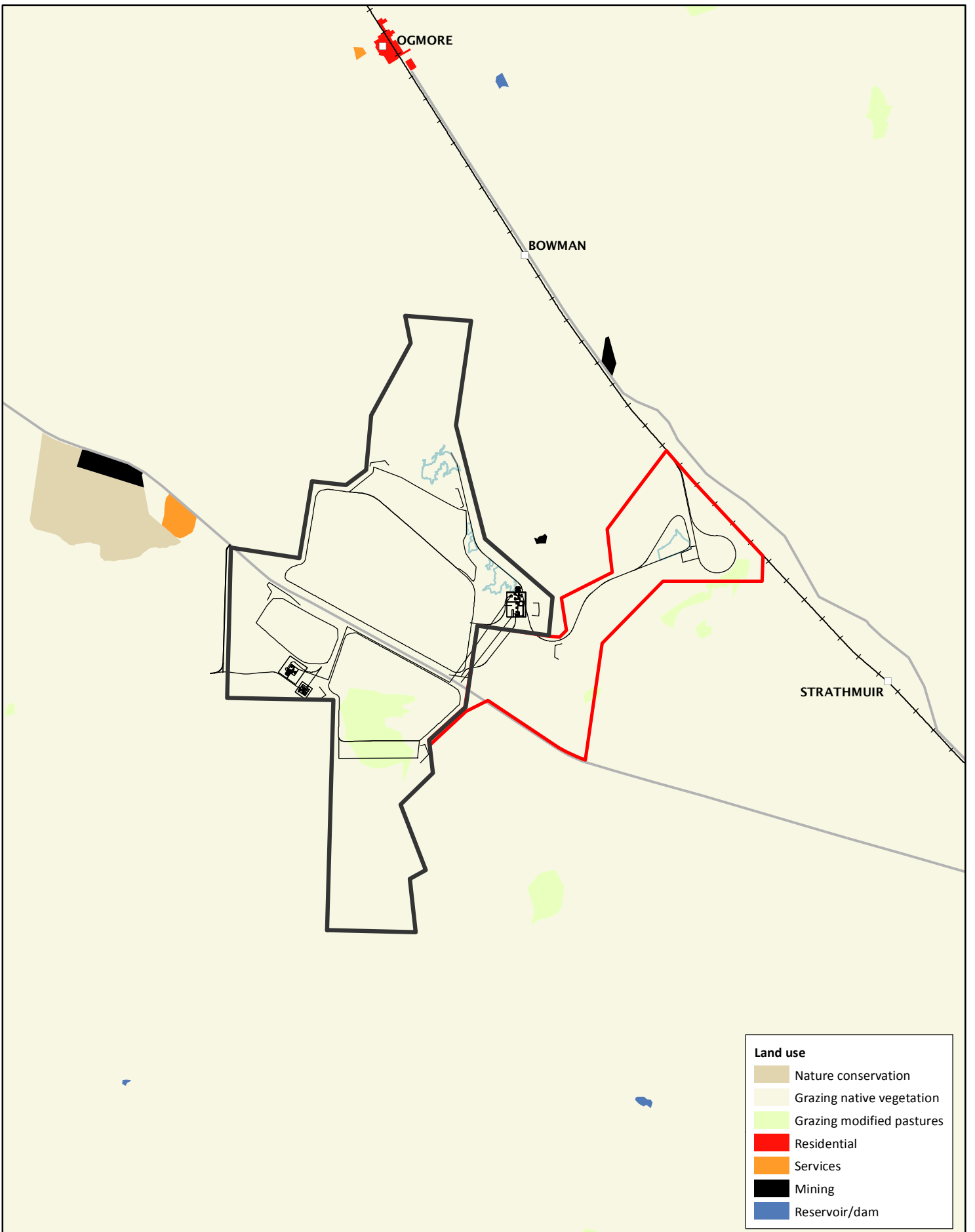


- Legend**
- Project Area
  - Broadsound – Nebo Statistical Area Level 2 (SA2)
  - Livingstone Shire
  - Surrounding LGA boundaries
  - Main road

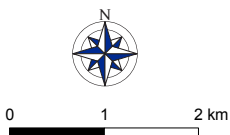
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Drawn: Gayle B.

DATA SOURCE  
QLD Open Source Data, 2018  
Australian Bureau of Statistics, 2011





**Figure 3-3**  
Existing land use in the Project area

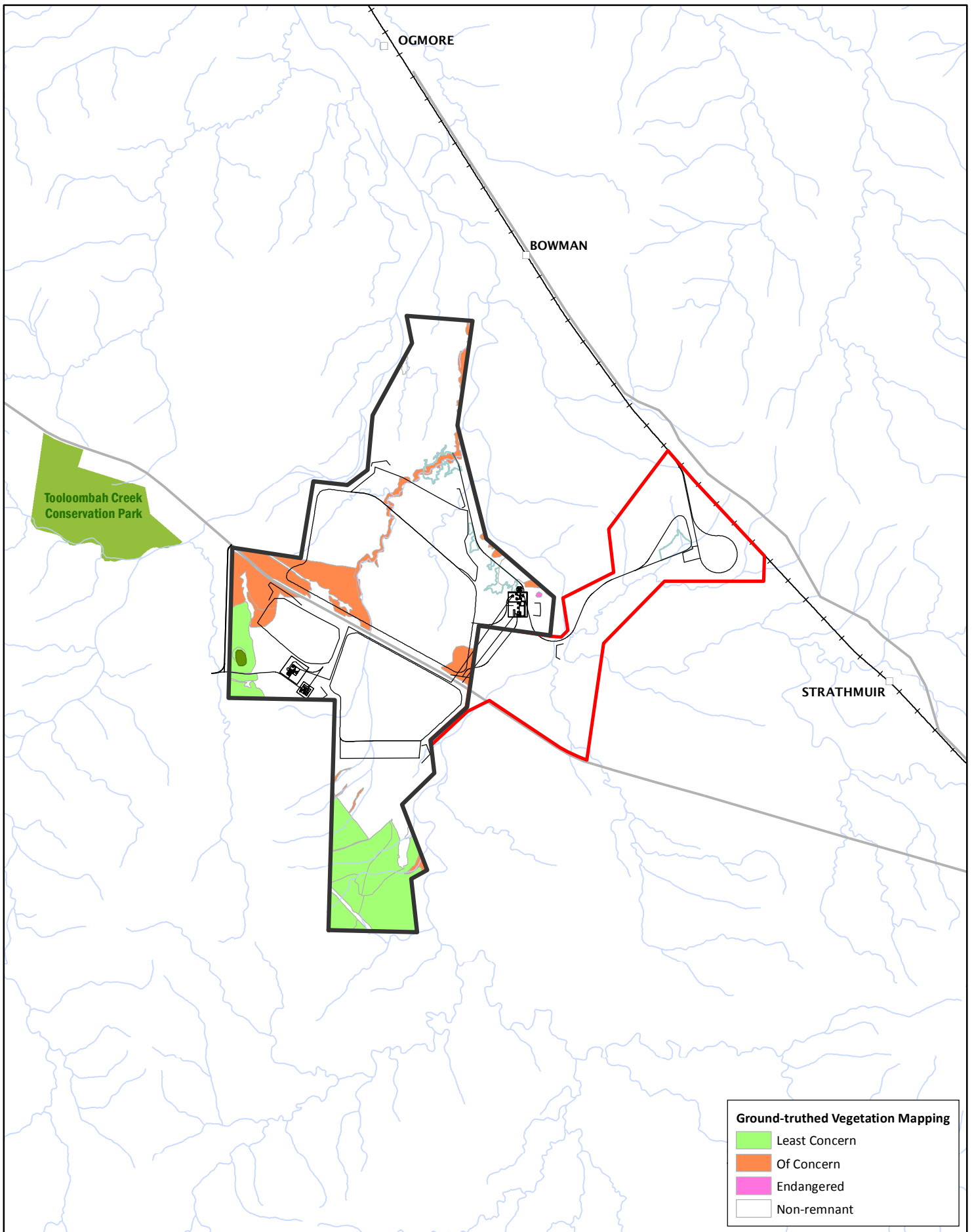


- Legend**
- ML 80187
  - ML 700022
  - Mine infrastructure
  - Main Road
  - North Coast Rail Line
  - Dam

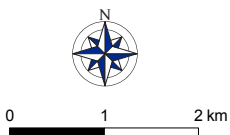
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Drawn: Gayle B.

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018





**Figure 3-4**  
Project area natural features



- Legend**
- Wetland Protection Area
  - Protected Area
  - ML 80187
  - ML 700022
  - Mine infrastructure
  - Main Road
  - North Coast Rail Line
  - Dam

Scale @ A4 1:80,000  
Date: 16/10/18  
Drawn: Gayle B.

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



### 3.3.3.1 Real Property Description

The mine area is located entirely within part of the Mamelon cattle property, situated on Lot 10 on MC493, Lot 1 on RL3001, Lot 11 on MC23 and Lot 9 on MC496, all of which are freehold tenures. The east-west oriented, Mount Bison Road road reserve also traverses the mine area. Central Queensland Coal is working with the Department of Natural Resources, Mines and Energy, Department of Transport and Main Roads (DTMR) and LSC to have the Mount Bison Road realigned, resulting in the road connecting to the Bruce Highway closer to Tooloombah.

Additional road reserves are located to the west of the Bruce Highway (Mount Bison Road and unnamed road reserves) which will be impacted by Project activities. Prior to the commencement of the Project in these areas, Central Queensland Coal will secure all appropriate tenure and gain all necessary approvals and / or consents from all parties holding a lawful interest in the lands. These approvals will be sought outside of this EIS process.

The transport corridor is situated on Lot 10 on MC493 (Mamelon), Lot 85 on SP164785 (Brussels) and Lot 9 on MC230 (Strathmuir), all of which are freehold tenures. The TLF is to be located entirely Lot 9 on MC230 (Strathmuir).

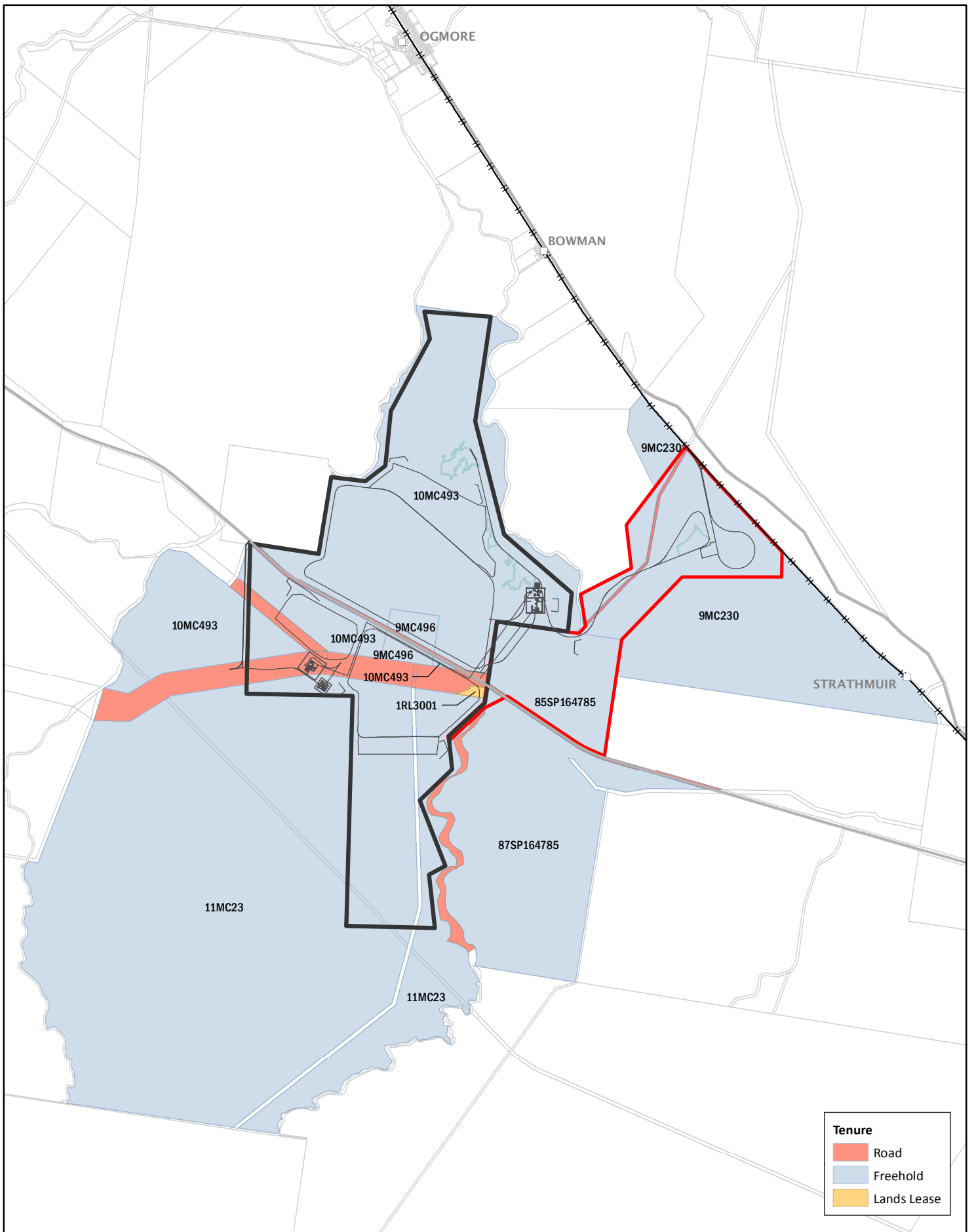
Land tenure details for properties within or intersected by the Project area are included in Table 3-1 and the cadastral boundaries are shown in Figure 3-5.

**Table 3-1 Real property descriptions**

Property description	Property name	Tenure	Current use	Proposed use	Owner and occupier
<b>Project Mine Area</b>					
Lot 10 on MC493	Mamelon	Freehold	Grazing	Mining	QNI Metals PTY LTD
Lot 1 on RL3001					
Lot 11 on MC23					
Lot 9 on MC496					
AAP16117	Mountt Bison Road	Road Reserve	Grazing	Mining	Livingstone Shire Council
<b>Haul Road Corridor</b>					
Lot 9 on MC230	Strathmuir	Freehold	Grazing	Transport Corridor	Russell Charles Smith, Elizabeth Joan Smith and Edward George Smith
Lot 85 on SP164785	Brussels	Freehold	Grazing	Transport Corridor	Scott Robert McCartney
<b>TLF</b>					
Lot 9 on MC230	Strathmuir	Freehold	Grazing	TLF	Russell Charles Smith, Elizabeth Joan Smith and Edward George Smith

### 3.3.3.2 Native Title

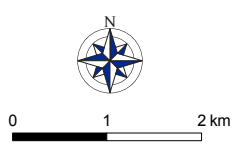
The Barada Kabalbara Yetimarala People #1 have a current Native Title claim over the area where the mine pits, TLF, ancillary infrastructure are proposed (Tribunal Number: QC2013/004) (see Figure 3-6). A second Native Title claim held by the Barada Kabalbara Yetimarala People #2 (QC2013/005) exists over land where the TLF is proposed. That claim is described as a shared county claim with the Darumbal People's active Native Title Native Title claim (QC2012/008) which is over the TLF area. The Darumbal People also have a determined Native Title claim to the east of the Project.



**Tenure**

- Road
- Freehold
- Lands Lease

**Figure 3-5**  
Underlying real property descriptions and cadastre



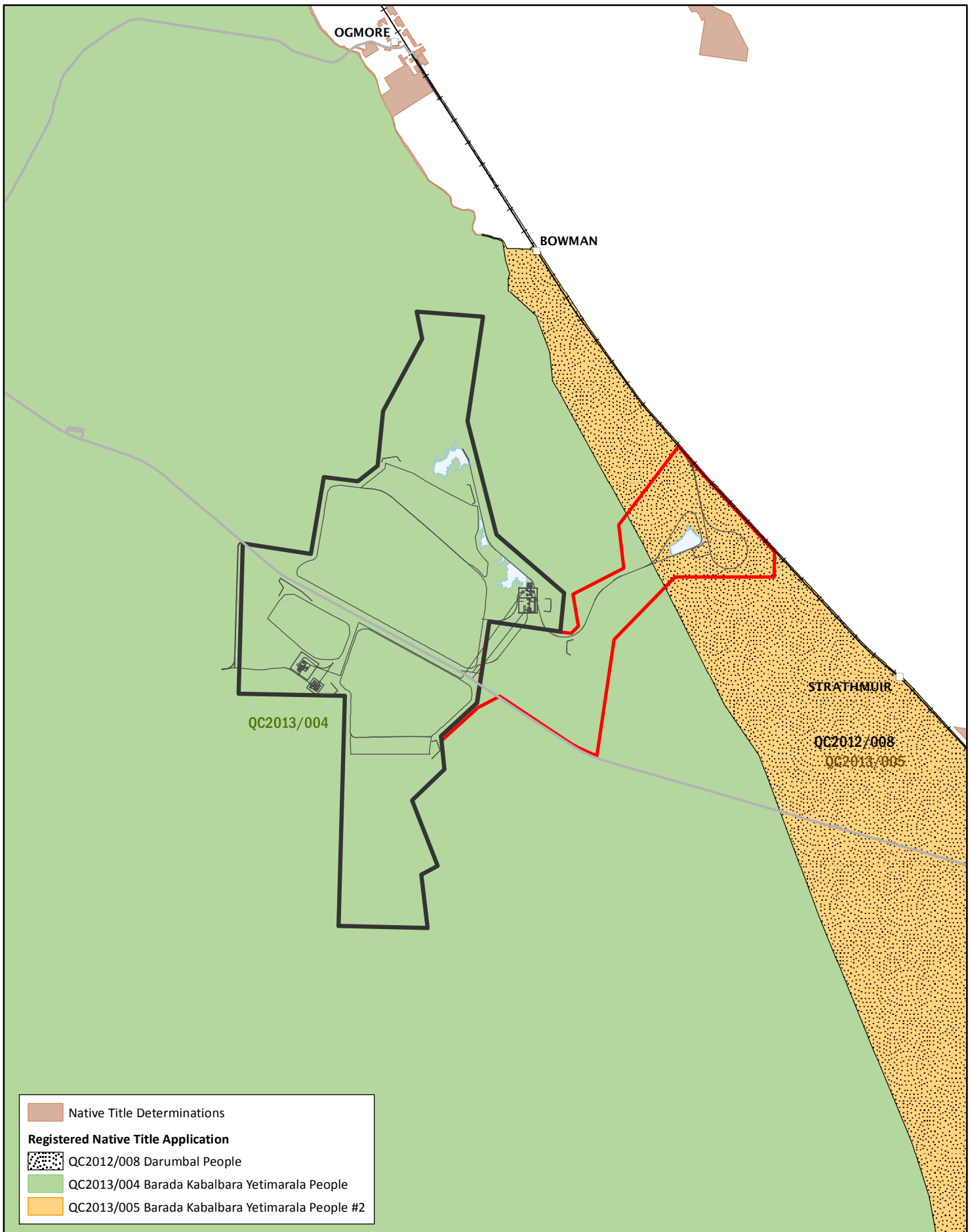
**Legend**

- ML 80187
- ML 700022
- Mine infrastructure
- Cadastral boundary
- Main Road
- North Coast Rail Line
- Dam

Scale @ A4 1:80,000  
Date: 16/10/18  
Drawn: Gayle B.

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018





Native Title Determinations

**Registered Native Title Application**

- QC2012/008 Darumbal People
- QC2013/004 Barada Kabalbara Yetimarala People
- QC2013/005 Barada Kabalbara Yetimarala People #2



**Legend**

- ML 80187
- ML 700022
- Mine infrastructure
- Main road
- North Coast Rail Line
- Dam

Scale @ A4 1:80,000  
 Date: 16/10/18  
 Drawn: Gayle B.

DATA SOURCE  
 National Native Title Tribunal, 2018  
 Waratah Coal, 2018  
 QLD Open Source Data, 2018



**Figure 3-6**  
 Native Title tenure

### 3.3.3.3 Existing Coal and Mineral Tenements

The mine area will be located within ML80187, held by Central Queensland Coal Pty Ltd. ML80187 abuts MDL 468 held by Fairway Coal Pty Ltd to the north and east.

The transport corridor is in part located in ML80187. An additional ML (ML700022) is under application for the remainder of the haul road corridor and the TLF. The additional ML is held by Central Queensland Coal Pty Ltd and Fairway Coal Pty Ltd.

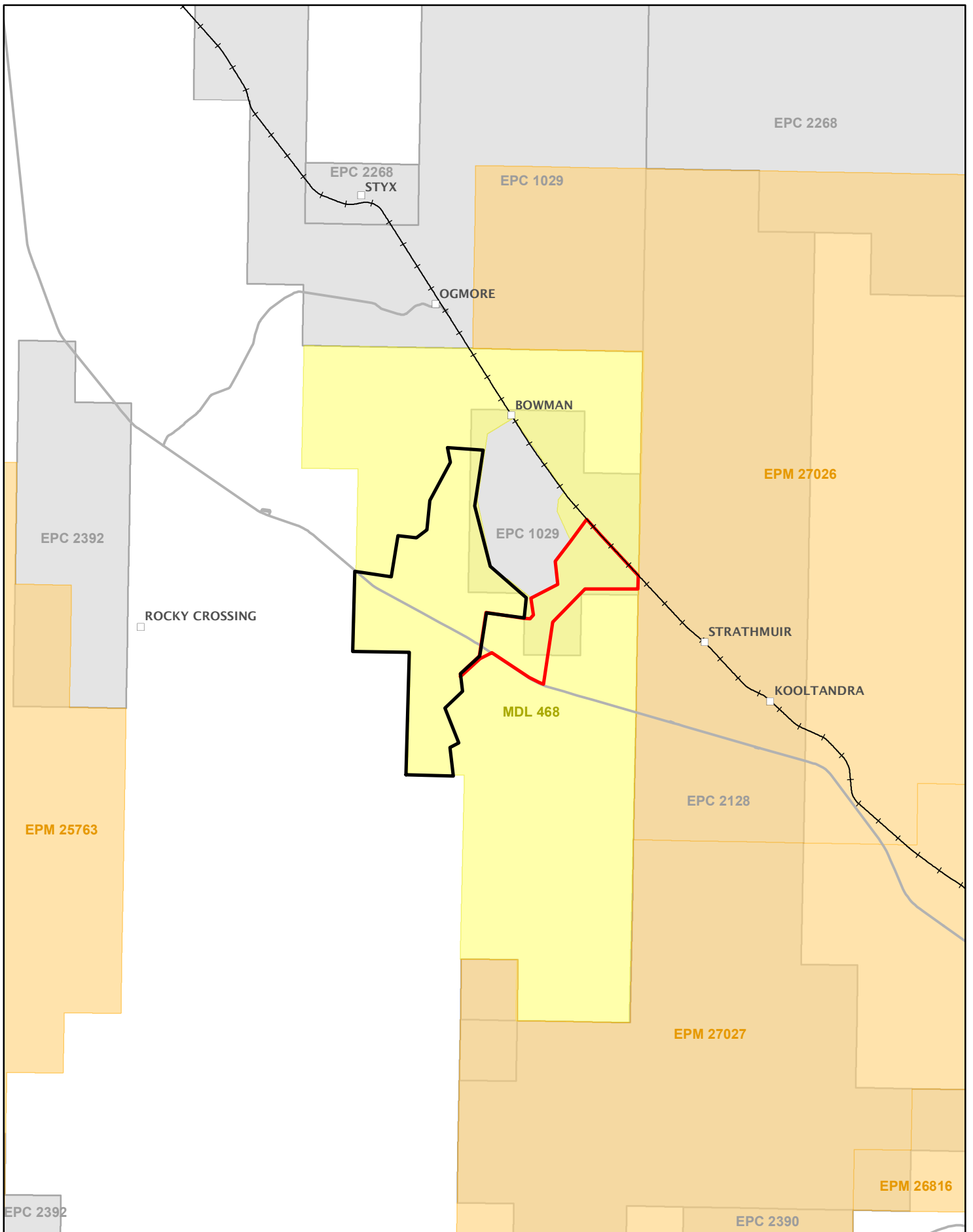
The Project will not overlap with any other mineral tenements including Exploration Permits for Minerals (EPM), Greenhouse Gas or Geothermal leases.

The surrounding area outside the Project footprint comprises EPC1029 held by Fairway Coal Pty Ltd, EPC2128 held by Scorpion Energy Pty Ltd. The EPMs reported in the EIS as held by Bandanna Oil Shale Pty Ltd and Marlborough Nickel no longer exist. Details of the existing EPCs, MDLs and MLs are included at Table 3-2 and shown at Figure 3-7.

**Table 3-2 Mining tenements in the immediate vicinity of the Project**

Tenement	Tenure Holder	Granted	Expires
<b>Mining Leases</b>			
EPC 1029	Fairway Coal Pty Ltd	20/04/2006	19/04/2016*
EPC 2268	Waratah Coal Pty Ltd	27/06/2011	26/06/2019
EPC 2128	Scorpion Energy Pty Ltd	05/02/2013	04/02/2018
EPC 2392	Civil and Mining Resources Pty Ltd	22/04/2015	21/04/2020
EPM 19574	Marlborough Nickel Pty Ltd	13/12/2012	12/12/2017
EPM 16553	Bandanna Oil Shale Pty Ltd	14/01/2008	13/01/2019
EPM 25763	Orion Mineral Ltd	15/05/2015	13/05/2020
EPM 25703	Orion Mineral Ltd	30/10/2015	29/10/2020
EPM 25122	Orion Mineral Ltd	12/02/2013	12/01/2018
EPM 19825	Orion Mineral Ltd	12/02/2013	12/02/2018
MDL 468	Fairway Coal Pty Ltd	22/01/2014	21/01/2019
ML 80187	Central Queensland Coal Pty Ltd	15/06/2012	TBA
ML 700022	Central Queensland Coal Pty Ltd	23/05/2017	TBA





**Figure 3-7**  
Mining tenements surrounding  
the Project area



0 1 2 km

Scale @ A4 1:150,000  
Date: 19/10/18  
Drawn: Gayle B.

**Legend**

- ML 80187
- ML 700022
- North Coast Rail Line
- Main road
- Exploration Permit for Mineral (EPM)
- Mineral Development Licence (MDL)
- Exploration Permit for Coal (EPC)

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



### 3.3.3.4 Petroleum Tenements

No Authority to Prospect or petroleum production tenements (PLs) overlap with the Project's components. The previous nearby petroleum tenement shown in the EIS as held by Arrow Bowen Pipeline Pty Ltd no longer exists.

### 3.3.3.5 Sterilisation of Resources

Infrastructure has been located on the mine in areas where it allows for the most economical recovery of the coal resource and will not result in the sterilisation of future reserves. Coal seam extraction will take place in the targeted coal seams. Central Queensland Coal will ensure maximum resource utilisation, which will ensure that low grade or uneconomic deposits are not sterilised for future extraction. Residual overburden and uneconomic in-situ deposits will be monitored and evaluated and managed in accordance with Chapter 11 – Rehabilitation and Decommissioning.

## 3.3.4 Disturbance Areas

The disturbance area for the mine is approximately 1,124.8 ha in total. A breakdown of the disturbance area for key infrastructure is shown at Table 3-3. Descriptions of the disturbance areas for the mine pit and related mining infrastructure, haul road and TLF are provided in Sections 4.3.4.1, 3.3.4.2 and 4.3.4.3. It should be noted that there are no easements within the Project footprint. There is a farm residence complex (refer to Chapter 18 – Cultural Heritage), including an unused tennis court, shed, uninhabited house (currently used as the site office), stockyards and two windmills.

**Table 3-3 Disturbance areas for key Project components**

Project Component	Approximate area (ha)
<b>Mining and Infrastructure Area</b>	<b>1,090.8</b>
Open Cut 1	247.7
Open Cut 2	500
Waste Rock Stockpile 1a	35.6
Waste Rock Stockpile 1b	83.2
Waste Rock Stockpile 2	124.5
Environmental Dams	24.6
Dam 1	13.7
Dam 2	11.0
Dam 3	3.1
CHPP 1 and 2	27.8
Dam access road	4.6
Mine access and internal roads – Open Cut 1	3.6
Mine access and internal roads – Open Cut 2	4.2
Power supply	1.4
Conveyor	5.8
<b>Haul Road to TLF, Dam 4 and TLF</b>	<b>26</b>
<b>Rail loop and spur line</b>	<b>8</b>
<b>TOTAL</b>	<b>1,124.8</b>

### 3.3.4.1 Mine Area

The extraction and processing of coal will take place on ML 80187. The ML application area is 2,275 ha in size. The Project will occupy an area of 1,090.8 ha within the ML application area. The general arrangement of the mine area is shown at Figure 3-8.

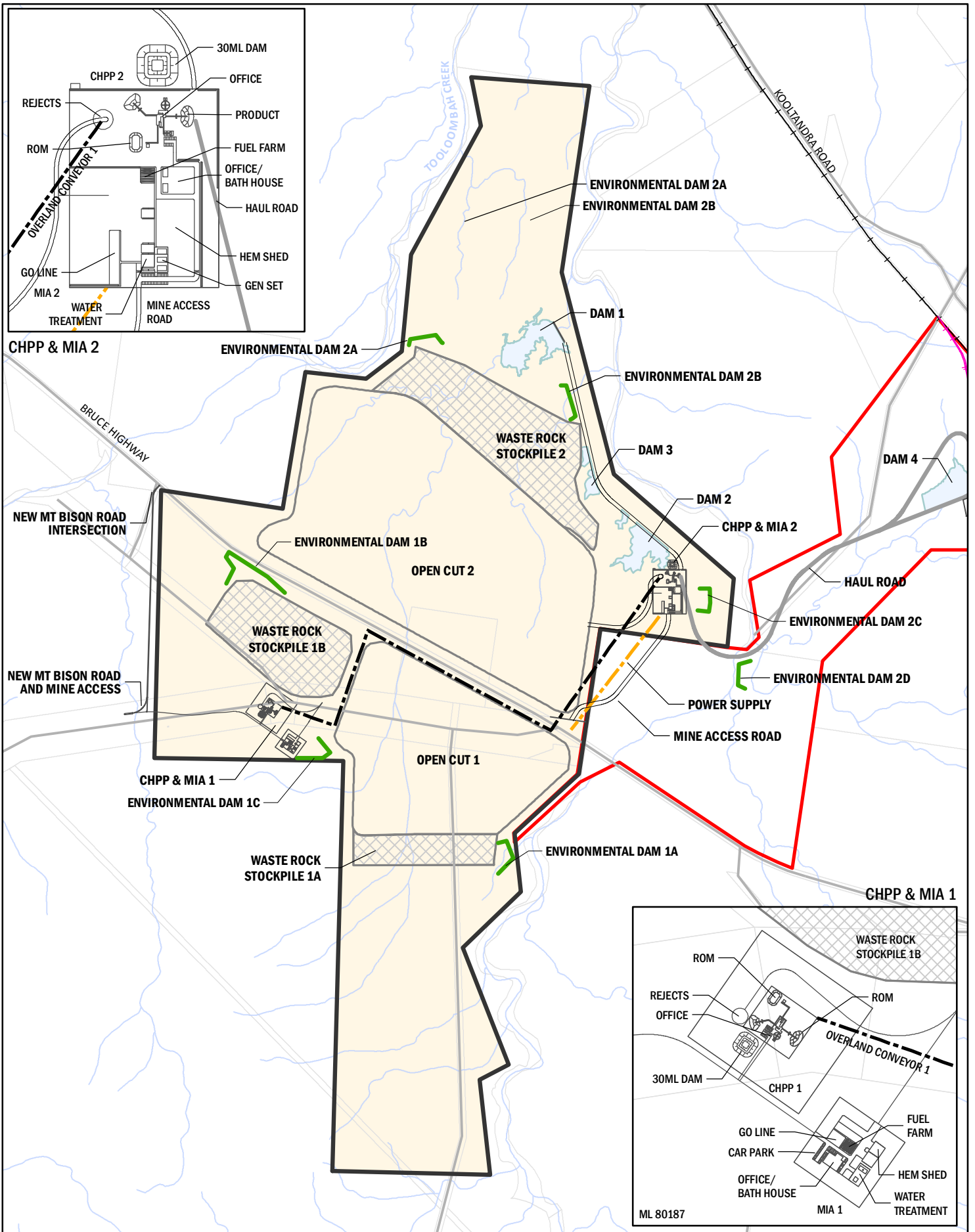
The mine area comprises of two open cut operations, three waste rock stockpiles, dams, and initially a single mine industrial area (MIA), Coal Handling Preparation Plant (CHPP) and conveyor. A second CHPP and MIA will be introduced adjacent to Open Cut 1 as ROM volumes increase towards 10 Mtpa. Buffer zones will be provided within the mine layout to separate the Project's activities from retained ecological features including Deep and Tooloombah Creeks and associated riparian vegetation.

The final landform footprint including the rehabilitated waste rock stockpiles, backfilled pits and infrastructure required over mine life all of which will be decommissioned and rehabilitated are discussed in Chapter 11 – Rehabilitation and Decommissioning.

### 3.3.4.2 Haul Road Corridor

The transportation of coal from the product stockpiles to the TLF will be via the proposed transport corridor. The ML for the transport corridor will be approximately 750.2 ha. Central Queensland Coal will haul coal by truck along a transport corridor from the product stockpiles to the TLF. The proposed transport corridor originates from the area adjacent to the northern corner of the eastern end of the Open Cut 2 and ends at the TLF approximately 4.5 km to the east (see Figure 3-9). The disturbance area of the haul road will be approximately 5.48 km x 25 m, which includes the return haul road loop. Dam 4 will be located adjacent to the TLF but within the haul road domain. A total area of approximately 26 ha will be disturbed for the total haul road including return loop and Dam 4.

Haul road design drawings are presented in Appendix A16. The corridor crosses Deep Creek at the existing crossing point in the road reserve. The crossing will be upgraded and constructed to provide sufficient access to the TLF during normal weather conditions. The crossing upgrade will be designed to limit works within the watercourse and constructed to allow ongoing movement of vehicles and stock around properties if required by landholders.



**Figure 3-8**  
 Mine arrangement and haul road corridor



Scale @ A4 1:45,000  
 Date: 17/10/18  
 Drawn: Gayle B.

- Legend**
- Haul Road
  - - - Infrastructure
  - - - Overland Conveyor
  - Power
  - Road

- ML 80187
- ML 700022
- Open-cut Mine Pit
- ▨ Waste Rock Area
- Environmental Dams

- Cadastral boundary
- Main road
- North Coast Rail Line
- Watercourse
- Dam

DATA SOURCE  
 Waratah Coal, 2018  
 QLD Open Source Data, 2018

### 3.3.4.3 Train Loadout Facility

Product coal will be stockpiled and loaded onto trains at the TLF. The ML area for the TLF is approximately 750.2 ha and the disturbance area for the TLF within the ML area will be approximately 8 ha.

The TLF will comprise a product coal stockpile, train loading infrastructure, veneering station, rail loop and rail spur. The TLF will be constructed for the transfer of coal via the Queensland Rail (QR) North Coast Line and then a short section of the Aurizon Goonyella rail corridor to the DBCT. The TLF plan and longitudinal section is shown in Figure 3-9 and the general layout of the TLF is at Figure 3-10.

The TLF will be constructed entirely on freehold land known as part of Lot 9 on MC230. The northern boundary of the TLF abuts the QR North Coast Line shown as Lot 450 on SP108288. Works within the adjacent QR North Coast Line corridor to connect the Project rail loop to the existing QR North Coast Line at the QR North Coast Line / Project land boundary, will be carried out by QR as separate works to those authorised by this EIS.

The loaded train will be one diesel-electric locomotive, initially hauling 44 coal wagons with a load limit of 20 tonne per axle due to the QR North Coast Line characteristics. This will be expanded to 66 coal wagons once upgrades to the North Coast Rail Line are completed by Queensland Rail.

QR will be providing the piece of rail infrastructure that connects the Central Queensland rail loop to the QR North Coast Line mainline rail infrastructure. In providing this connecting rail infrastructure, QR will make any necessary changes to the signalling system that currently exists on its North Coast Line for the safe working of coal trains on and off the Project rail loop.

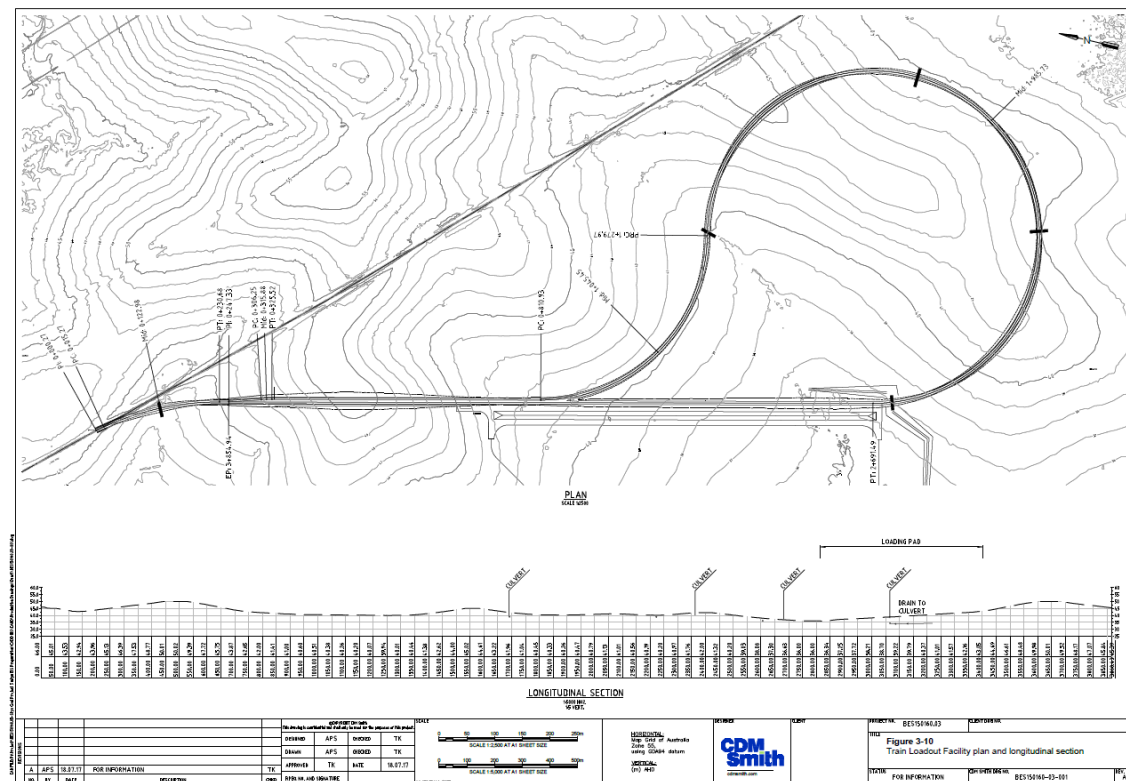
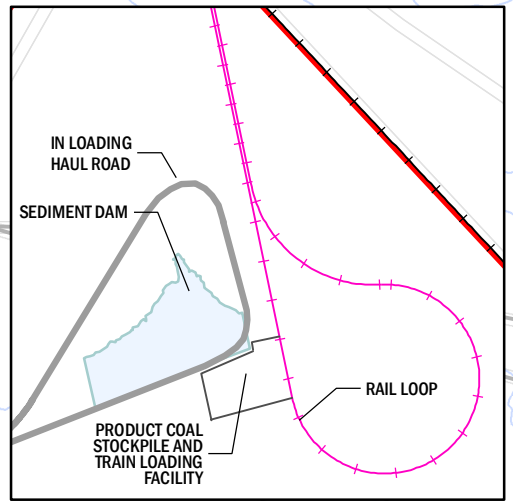
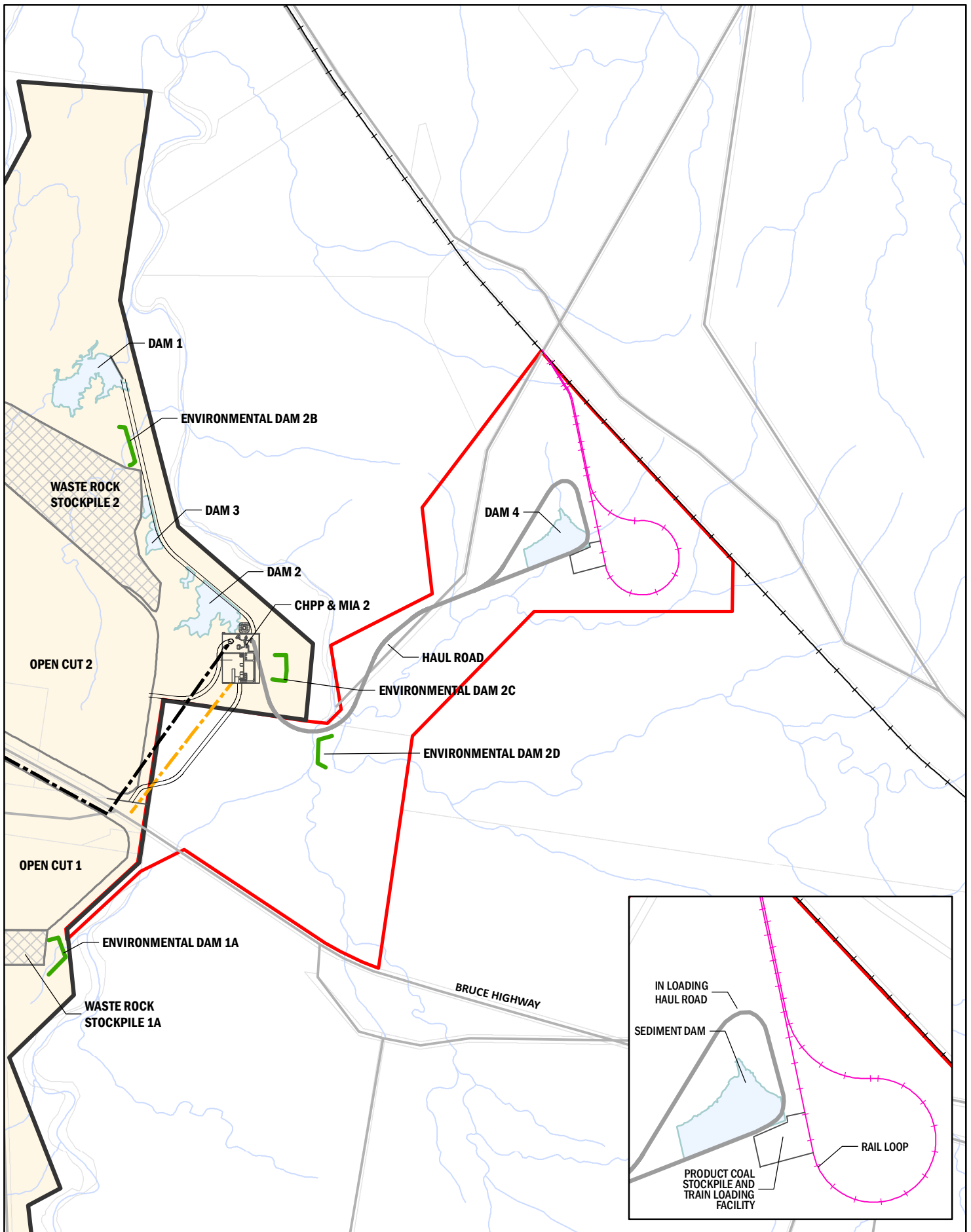


Figure 3-9 Train Loadout Facility plan and longitudinal section



0 0.5 1 km

Scale @ A4 1:40,000  
 Date: 17/10/18  
 Drawn: Gayle B.

**Legend**

- Haul Road
- Infrastructure
- Overland Conveyor
- Power
- Rail Balloon Loop
- Road
- ML 80187
- ML 700022
- Open-cut Mine Pit
- Waste Rock Area
- Cadastral boundary
- Environmental Dams
- North Coast Rail Line
- Main road
- Watercourse
- Dam

**Figure 3-10**

TLF infrastructure connection points



DATA SOURCE  
 Waratah Coal, 2018  
 QLD Open Source Data, 2018

### 3.4 Amendments to the Project Description

Project optimisation studies finalised since the release of the EIS have resulted in several material changes to the description of the Project. Similarly, comments provided to the EIS and original SEIS have resulted in additional changes. These changes are outlined in Table 3-4 and described in the following sections. An amended Project description is at Section 3.5.

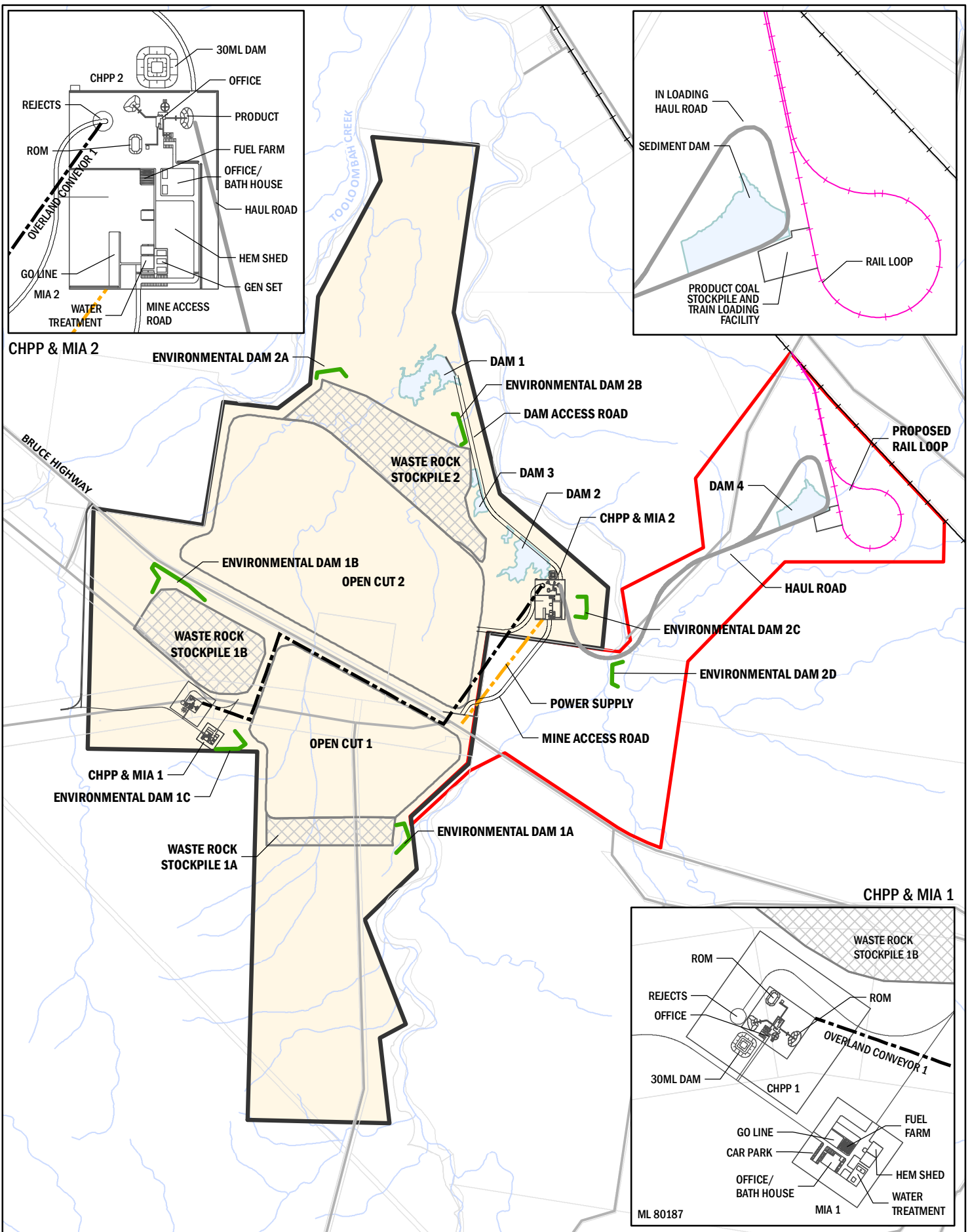
**Table 3-4 Material changes to the Project description since the EIS release**

Aspect	EIS Project Description	SEIS Project Description
<b>Mine Pits and Waste Stockpile</b>		
Mine Pit Layout – Pit 2 and Pit 4	The EIS proposed two pits (Open Cut 2 and Open Cut 4) on the eastern side of the Bruce Highway.	The supplementary environmental impact statement (SEIS) proposes one pit on the eastern side of the Bruce Highway. The single pit is a result of combining Open Cut 2 and Open Cut 4. This pit is now referred to as Open Cut 2.
Mine Pit Layout – Pit 1	The EIS proposed a single mine pit (Open Cut 1) on the western side of the Bruce Highway.	The SEIS still proposes a single mine on the western side of the Bruce Highway; however, the pit is now significantly smaller than proposed in EIS.
Mining Sequence	The EIS proposed a south to north mining direction in Open Cut 1 and Open Cut 2.	The SEIS proposes a north to south mining direction in Open Cut 2 and a west to east mining direction in Open Cut 1.
Open Cut 1 void	The EIS was based on a void being retained in Open Cut 1.	Open Cut 1 will now be back-filled and no void will be retained.
Open Cut 4 void	The EIS was based on a void being retained in Open Cut 4.	Open Cut 4 now forms part of Open Cut 2. No void will be retained in Open Cut 2.
Waste Rock Stockpile 1	The EIS proposed a single waste rock stockpile on the western side of the Bruce Highway.	The SEIS proposes two waste rock stockpiles on the western side of the Bruce Highway. Waste Rock Stockpile 1b will be removed during rehabilitation.
Waste rock stockpile areas	The EIS proposed a disturbance area of 133 ha for Waste Rock Stockpile area 1 and 164 ha for Waste Rock Stockpile 2.	The SEIS proposed a combined disturbance area of 161 ha for Waste Rock Stockpile 1a (72.7 ha) and 1b (88.5 ha) and 245 ha for Waste Rock Stockpile 2.
		The updated SEIS proposes a combined disturbance area of 118.8 ha for Waste Rock Stockpile 1a (35.6 ha) and 1b (83.2 ha) and 124.5 ha for Waste Rock Stockpile 2. This amounts to a total disturbance area of 243.5 ha for the three waste rock stockpiles compared to a total of 406 ha for the three waste rock stockpiles as proposed in the original SEIS.
Redesign of Open Cut 4 (now incorporated in Open Cut 2) to avoid Semi-Evergreen Vine Thicket (SEVT)	The Open Cut 4 area was predicted to clear the edge (0.4 ha) of a SEVT Threatened Ecological Community (TEC) adjacent to Tooloombah Creek.	Open Cut 2 has been redesigned to avoid impacts to SEVT and includes a 100 m buffer between Open Cut 2 and the TEC.
Blasting activities requiring the closure of the Bruce Highway	The EIS identified the requirement to close the Bruce Highway during blasting activities within a 500 m distance.	Following discussions with DTMR, it has been determined by Central Queensland Coal that no blasting will be undertaken requiring the closure of the Bruce Highway.
<b>Conveyor Arrangement</b>		
Location of the conveyor	The EIS proposed the conveyor between CHPP 1 and MIA 2 would be located beneath the Deep Creek road bridge.	The SEIS proposes the conveyor will now be located outside of the Deep Creek channel and constructed in a new culvert arrangement passing beneath the Bruce Highway.

Aspect	EIS Project Description	SEIS Project Description
<b>Site Access and Internal Roads</b>		
Entry point to the eastern infrastructure area and Open Cut 2 and Open Cut 4	The EIS proposed the entry point to the eastern infrastructure approximately 3.3 km from Deep Creek, travelling to the north along the Bruce Highway.	The new access road to the eastern infrastructure will be located approximately 600 m from Deep Creek, travelling to the north along the Bruce Highway.
Internal access and overburden haul between eastern entry point and the CHPP and MIA 2	The EIS proposed a small internal access and overburden haul road between the eastern entry point and CHPP and MIA 2.	The Project will now utilise a smaller internal access road (1.5 km in length) from the new eastern entry point to the CHPP and MIA 2.
Relocation of MIA 2 access road to avoid Brigalow	The proposed access road to MIA 2 impacts 0.2 ha of a small patch of Brigalow TEC.	The new access road to MIA avoids the Brigalow TEC altogether.
Light Vehicle access road to Dam 1	The EIS did not include a light vehicle access road between CHPP and MIA 2 and Dam 1.	A light vehicle access road has been included to provide access from the CHPP and MIA 2 to Water Dam 1.
Bruce Highway closure	The EIS proposed periodic closures to the Bruce Highway may be required during blasting activities.	The Project commits to ensuring all Project related activities are conducted in a manner that avoids the need for any closure to the Bruce Highway. No closures to the Bruce Highway are proposed.
<b>Train Loadout Facility</b>		
Train loading method	The EIS proposed coal would be loaded into wagons by front end loaders, with a separate veneering station.	The TLF design now includes an overhead bin, flood loading the rail wagons. A veneering station will be attached to the overhead loader.
<b>Water Supply and Dams</b>		
Construction and operation water supply from Tooloombah Creek	The EIS indicated water permits will be sought to provide a construction and operation water supply.	No water permits to harvest water from Tooloombah Creek are anticipated.
Additional Water Supply Dams		Two additional water supply dams have been located on the eastern side of the Bruce Highway and included in the mine water balance
Dam 5	A pit dewater dam (Dam 5) located on the western side of the Bruce Highway and nearby to two listed wetlands was proposed in the EIS and original SEIS.	To address the concern around perceived impacts to the Wetland 2, Dam 5 will no longer form part of the Project.
<b>Power Supply</b>		
Power connection to the Project	The EIS indicated an option to connect to existing the 11kV transmission line.	The connection has now been confirmed with Ergon Energy. The existing line is 22kV not 11kV as originally reported.

The updated general arrangement for the Project is shown at Figure 3-11.





**Figure 3-11**  
Project area layout



DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



0 0.5 1 km

Scale @ A4 1:50,000  
Date: 18/10/18  
Drawn: Gayle B.

**Legend**

- Haul Road
- Mine infrastructure
- Overland Conveyor
- Power
- Rail Balloon Loop
- Mine Access Road
- ML 80187
- ML 700022
- Cadastral boundary
- Open-cut Mine Pit
- Waste Rock Area
- Environmental Dams
- Main Road
- North Coast Rail Line
- Watercourse
- Dam

### 3.4.1 Mine Pits and Mineral Waste Rock Stockpiles

The following sections describe changes from the EIS in respect to mine pits and waste rock stockpiles.

#### 3.4.1.1 Mine Layout

Since the EIS and the original SEIS the mine layout has been modified. The changes have been as a result of mine optimisation studies associated with the mine design and mine sequencing, and also in response to comments received on the EIS and original SEIS. The following provides a summary of the material changes to the mine layout.

##### Open Cut 2

Changes to the mine layout have resulted in Open Cut 2 and Open Cut 4 being amalgamated. The amalgamation of the two pits facilitates a mining sequence that enables earlier backfilling of Open Cut 2, and consequently, earlier commencement of the progressive rehabilitation program. The new disturbance area for Open Cut 2 is 500 ha compared to a combined disturbance area of 400 ha for Open Cut 2 and Open Cut 4. This represent an increase in the mining area of 100 ha.

##### Open Cut 1

The EIS layout for Open Cut 1 covered a disturbance area of 311 ha. Following the mine design and mine sequencing optimisation studies, the area of Open Cut 1 has been significantly reduced. The new disturbance area for Open Cut 1 is 247.7 ha representing a reduction in the mining area of approximately 64 ha.

##### Open Cut 4

Open Cut 4 has been amalgamated into Open Cut 2 and is no longer considered a standalone pit.

#### 3.4.1.2 Mine Schedule

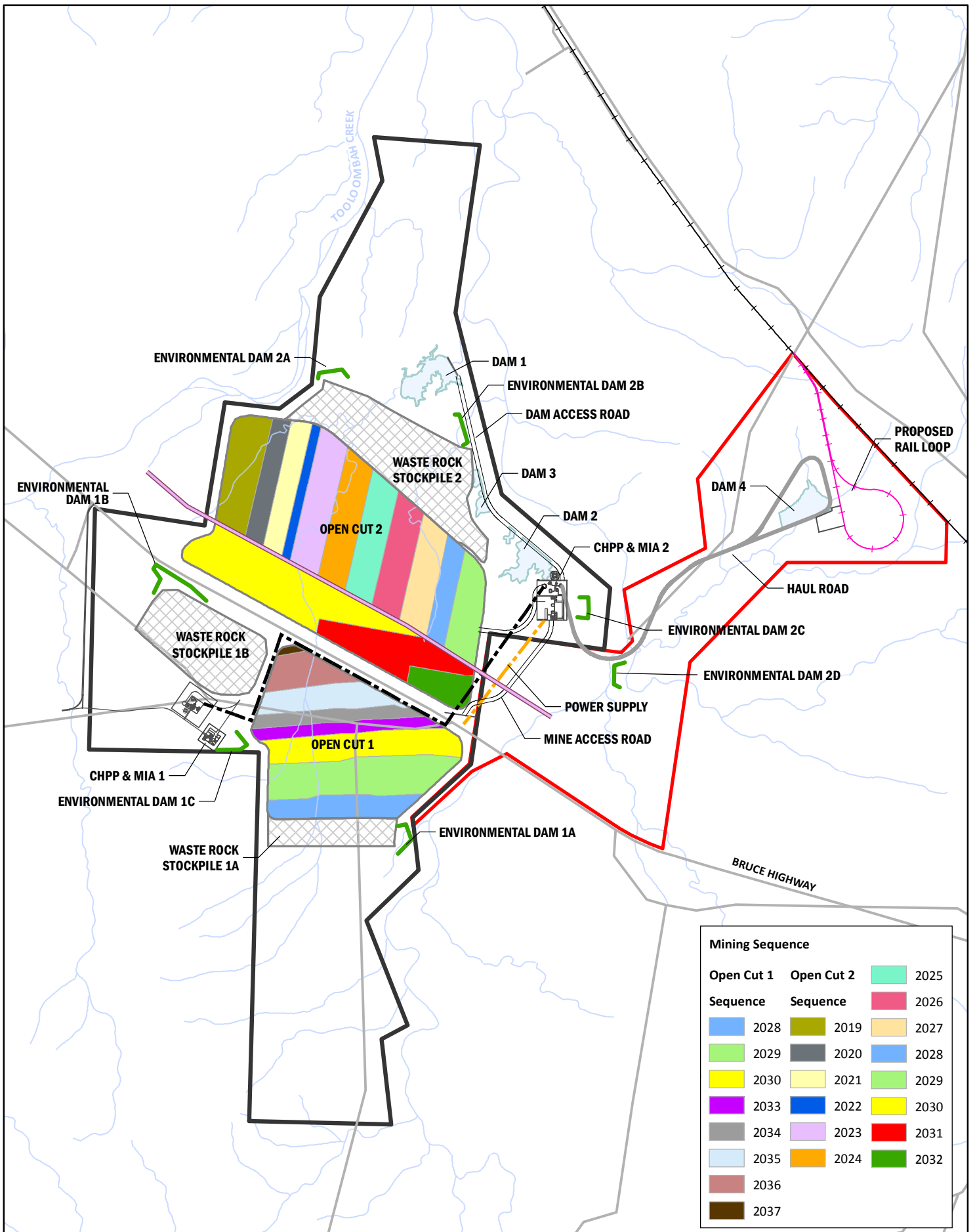
The mining schedule is now based on the development of two open cut operations producing a total of up to 10 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Open Cut 2, on the eastern side of the Bruce Highway, will remain as the initial development area. Open Cut 1 is due to commence development in 2027.

Subject to statutory approvals, soil removal from Open Cut 2 is scheduled to commence in Q1 2019. First shipment of product coal is scheduled in the Q1 of 2020. Construction of mine facilities will commence immediately after grant of the MLs. Mining is to commence on the MLs simultaneously with construction of the mine facilities, as select fill from Open Cut 2 will be used in the civil works. The years of mining for each of the open cut operations are shown at Table 3-5.

**Table 3-5 Mining schedule**

Mine operation	Construction	Years of operation
Open Cut 2 (east)	2019 - 2020	2019 – 2032
Open Cut 1 (west)	2027 – 2029	2028 – 2037
Mine Closure	-	2036 – 2038

Mine sequencing within Open Cut 1 and Open Cut 2 has changed since from the sequencing described in the EIS and original SEIS. The following sections describe the rational and sequencing for Open Cut 1 and 2. The proposed open cut mine layouts and updated sequencing of each open cut are shown in Figure 3-12.



0 0.5 1 km

Scale @ A4 1:50,000  
Date: 01/11/18  
Drawn: Gayle B.

**Legend**

- Haul Road
- Mine infrastructure
- Overland Conveyor
- Power
- Rail Balloon Loop
- Mine Access Road
- ML 80187
- ML 700022
- Open-cut Mine Pit
- Waste Rock Area
- Environmental Dams
- Main Road
- North Coast Rail Line
- Watercourse
- Dam
- 500 m Bruce Highway buffer zone

**Figure 3-12**  
Mine development sequences

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



## Open Cut 1

The Open Cut 1 geological model was updated with the most recent exploration information which then created a more accurate economic model for the Open Cut 1 mining area. Subsequently the mining sequence was changed in line with the new economic model, such that mining operations in Open Cut 1 will now commence operations in the southern end and progress in a west to easterly direction.

Aside from the economic benefits that will result from the updated mine schedule for Open Cut 1, the updated schedule will result in a reduction in the amount of overburden waste material that is required to report to Waste Rock Stockpile 1a and Waste Rock Stockpile 1b.

## Open Cut 2

The Project will commence operations in the northern end of the pit and progress in a south-westerly direction operating outside the 500 m buffer off the Bruce Highway. Once the buffer is reached mining operations will progress to the eastern point of the pit and repeat the mining process in a south westerly direction. This approach is planned to continue until 2029.

The 500 m buffer has been established off the Bruce Highway following ongoing discussions with DTMR. No blasting or mining is proposed within the buffer area until further geotechnical investigations are undertaken. The geotechnical data will be used to inform the Project with respect to any potential geotechnical issues associated with conducting mining activities within 500 m of the Bruce Highway. Geotechnical assessments will be undertaken within six months of mining activities commencing.

Starting the mining in the northern area, away from the Bruce Highway, together with the avoidance of mining within the buffer area will allow mining activities, particularly drill and blast activities, to be honed over the early years of operations, preparing for mining operations adjacent to the Bruce Highway. The data obtained from blasting outside of the buffer area will be used to inform a specific Blast Management Plan which will be prepared prior to the commencement of blast activities that may impact upon the safety of users of the Bruce Highway. This Plan will be submitted to DTMR for review a minimum of three months prior to blasting with the key fundamental of the plan being no decrease in the Level of Service (LOS) to the Bruce Highway due to blasting activities associated with the Project.

Aside from the above, further exploration information has been added to the geological model, creating a more accurate economic model for the Project. A slightly lower strip ratio and the availability of better quality raw coal, enhances the economic benefits available in Open Cut 2 and strengthens the commercial security of the Project.

Implementing the updated mining schedule will also result in a decrease in disturbance area associated with Waste Rock Stockpile 2. The change in the Open Cut 2 mining schedule allows the mine to reach a steady state mining sequence moving from north to south, where the overburden waste material is placed directly back into the excavated pit area, much earlier than commencing mining operations using the mining plans reported in the EIS and original SEIS.

### 3.4.1.3 Waste Rock Stockpiles

#### Waste Rock Stockpiles 1a and 1b

The EIS originally proposed a single waste rock stockpile on the western side of the Bruce Highway and to the south of Open Cut 1. A retained void in Open Cut 1 was also proposed in the EIS. Since the release of the EIS, further planning and design has been carried around in respect of Waste Rock

Stockpile 1. There will now be two waste rock stockpiles associated with Open Cut 1, these being Waste Rock Stockpile 1a and Waste Rock Stockpile 1b.

The original Waste Rock Stockpile 1 design progressed into an area of juvenile Brigalow regrowth and also into an area of preferred Koala (*Phascolarctos cinereus*) habitat. The reduction in the pit area for Open Cut 1 (as discussed previously) has provided an opportunity to reduce potential impacts to the Brigalow regrowth and preferred Koala habitat by enabling a second overburden waste rock stockpile to be located in a section of the area of the original Open Cut 1 pit.

The newly proposed Waste Rock Stockpile 1b has been located in an area of previously cleared non-remnant vegetation and outside of the Wetland Protection Area buffer zone. As a consequence of having the second waste rock stockpile, the disturbance footprint for Waste Rock Stockpile 1a has been reduced such that it reduces disturbance to areas of preferred Koala habitat that would have previously been disturbed and it further avoids a large area of the juvenile Brigalow regrowth. This is discussed further in SEIS Chapter 14 – Terrestrial Ecology and Chapter 16 – MNES.

The overburden material from both waste rock stockpiles but commencing with material from Waste Rock Stockpile 1b, will be pushed back into Open Cut 1 as mine development permits as part of the progressive rehabilitation program. During mine closure activities, the remaining overburden material in Waste Rock Stockpile 1b will be used to infill Open Cut 1. Overburden waste material from Waste Rock Stockpile 1a will be used for the final infill of Open Cut 1. Once landforming of the final surface for Open Cut 1 is complete, remaining mineral waste material in Waste Rock Stockpile 1a will be reshaped and rehabilitated. Rehabilitation of Waste Rock Stockpile 1a is discussed further in Chapter 11 – Rehabilitation and Decommissioning.

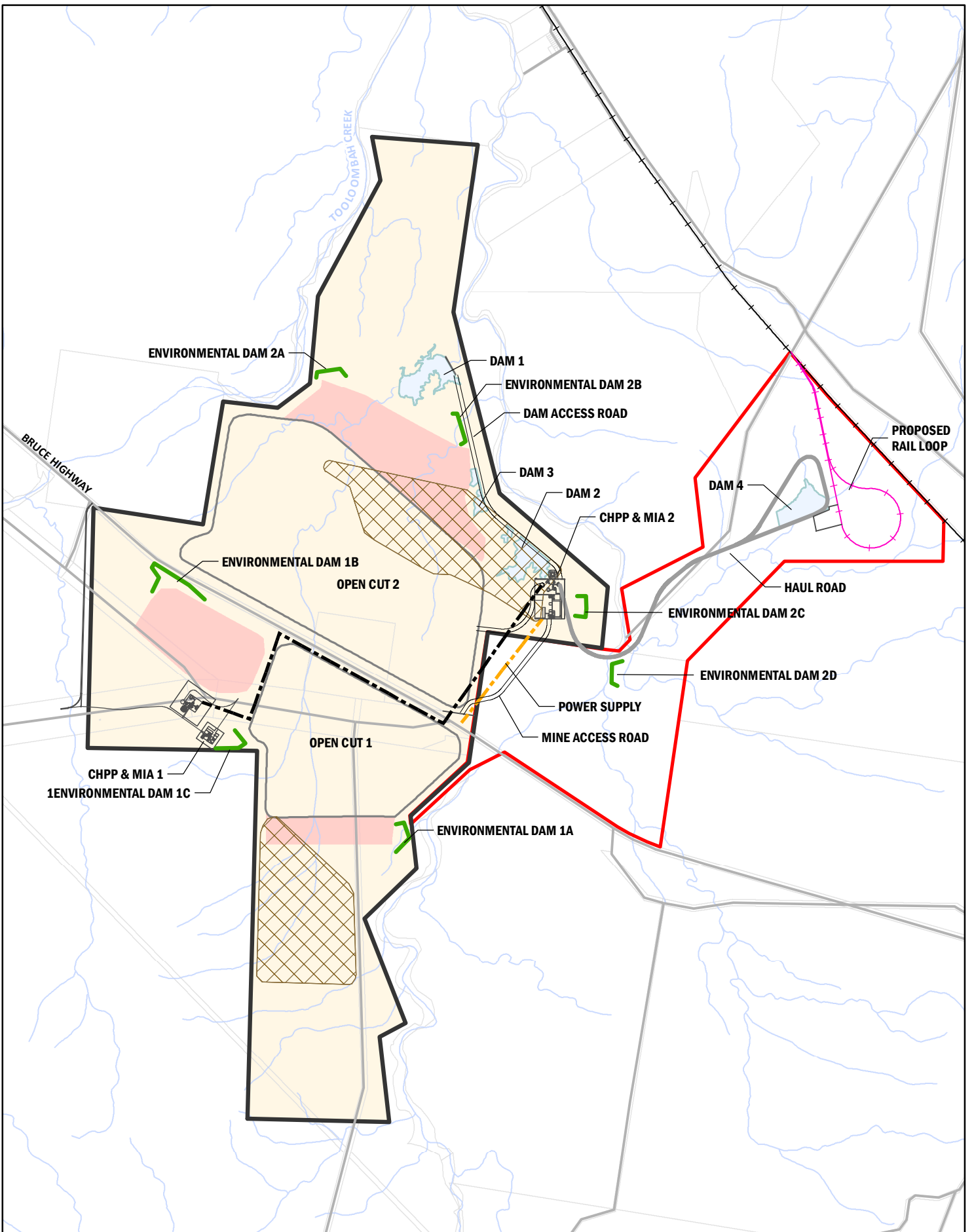
## Waste Rock Stockpile 2

The disturbance area for Waste Rock Stockpile 2 was 164 ha as proposed in the EIS. The revised disturbance area for Waste Rock Stockpile 2 following the change in mining operations and reported in the original SEIS was 245 ha. This amounted to an increase in the Waste Rock Stockpile 2 disturbance area of 81 ha to that reported in the EIS. Following stakeholder comments about the increased size of Waste Rock Stockpile 2, the mine plan was redesigned, enabling a significant reduction in the disturbance area as proposed in the original SEIS and original EIS.

The amended SEIS reports a new disturbance area for Waste Rock Stockpile 2 of 124.5 ha compared to 164 ha in the original EIS and 245 ha in the original SEIS. The disturbance footprints for Waste Rock Stockpile 2 presented in the original SEIS and the amended SEIS is shown at Figure 3-13.

The benefits of redesigning Waste Rock Stockpile 2 include enabling reduced disturbance of Squatter Pigeon, Greater Glider and Koala habitat and the avoidance of clearing a small section of SEVT. This is discussed further in SEIS Chapter 14 – Terrestrial Ecology and Chapter 16 – MNES. Further benefits from the redesign of Waste Rock Stockpile 2 include:

- Increasing the distance of the final disturbance area from the confluence of the Tooloombah and Deep Creeks and Styx River;
- Avoidance of disturbance to two drainage lines that report to Tooloombah Creek;
- Optimised placement of Environmental Dam 2a to better manage the risk of sediment from the waste rockpile reporting to Tooloombah Creek;
- Optimised management of dirty water from the waste rock stockpile through the site water management system; and
- The opportunity to increase the rate of backfilling the void and thereby increase the rate of rehabilitation.



**Figure 3-13**  
Waste Rock Stockpiles Comparison



0 0.5 1 km

Scale @ A4 1:50,000  
Date: 18/10/18  
Drawn: Gayle B.

**Legend**

- New Waste Rock Stockpiles
- Previous Waste Rock Stockpiles
- Open-cut Mine Pit
- ML 80187
- ML 70022
- Cadastral boundary

- Haul Road
- Mine infrastructure
- Overland Conveyor
- Power
- Rail Balloon Loop
- Mine Access Road

- Environmental Dams
- Main Road
- North Coast Rail Line
- Watercourse
- Dam

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



#### **3.4.1.4 Retained Voids**

No void will be retained in Open Cut 1. The original mine plan had a void retained in Open Cut 1. Through optimisation of the mine plan to minimise the volume of overburden waste retained in out of pit mineral waste rock stockpile areas, this void was removed. The removal of these voids will have positive benefits in terms of rehabilitation, minimising potential for negative impacts to water quality and reducing potential depressurisation and drawdown impacts to groundwater. These benefits are discussed variously in the relevant chapters (i.e. Chapter 9 – Surface Water, Chapter 10 – Groundwater, Chapter 15 - Aquatic Ecology).

The original mine plan also had a void retained in Open Cut 4. Open Cut 4 has now been incorporated into Open Cut 2. The mine plan originally had no void retained in Open Cut 2 and this is still the case notwithstanding the incorporation of Open Cut 4 into the pit design.

#### **3.4.1.5 Avoidance of Semi-Evergreen Vine Thicket TEC**

The EIS reported Open Cut 4 is predicted to clear the edge (0.4 ha) of a SEVT threatened ecological community (TEC) adjacent to Tooloombah Creek. As discussed Open Cut 4 now forms part of Open Cut 2.

As part of the optimisation of the mine design and mine schedule, Central Queensland Coal has redesigned the north edge of Open Cut 2 to avoid this area of SEVT TEC. In addition, a buffer of 100 m has been applied between the SEVT TEC community and the edge of Open Cut 2. This is discussed further in Chapter 16 – MNES. The new design of Open Cut 2 including the buffer to avoid SEVT is shown at Figure 3-14.

#### **3.4.1.6 Avoidance of Blasting that Requires the Closure of the Bruce Highway**

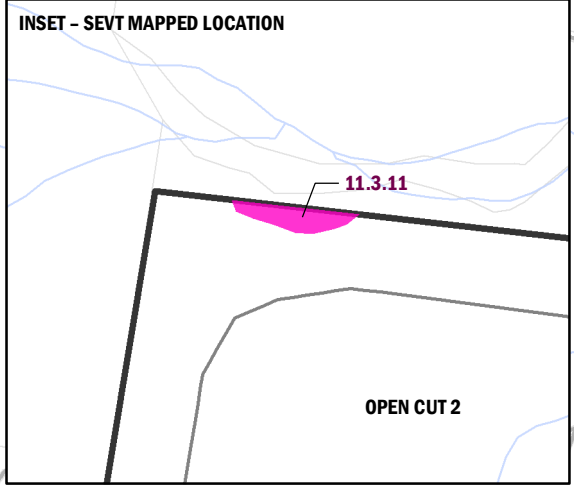
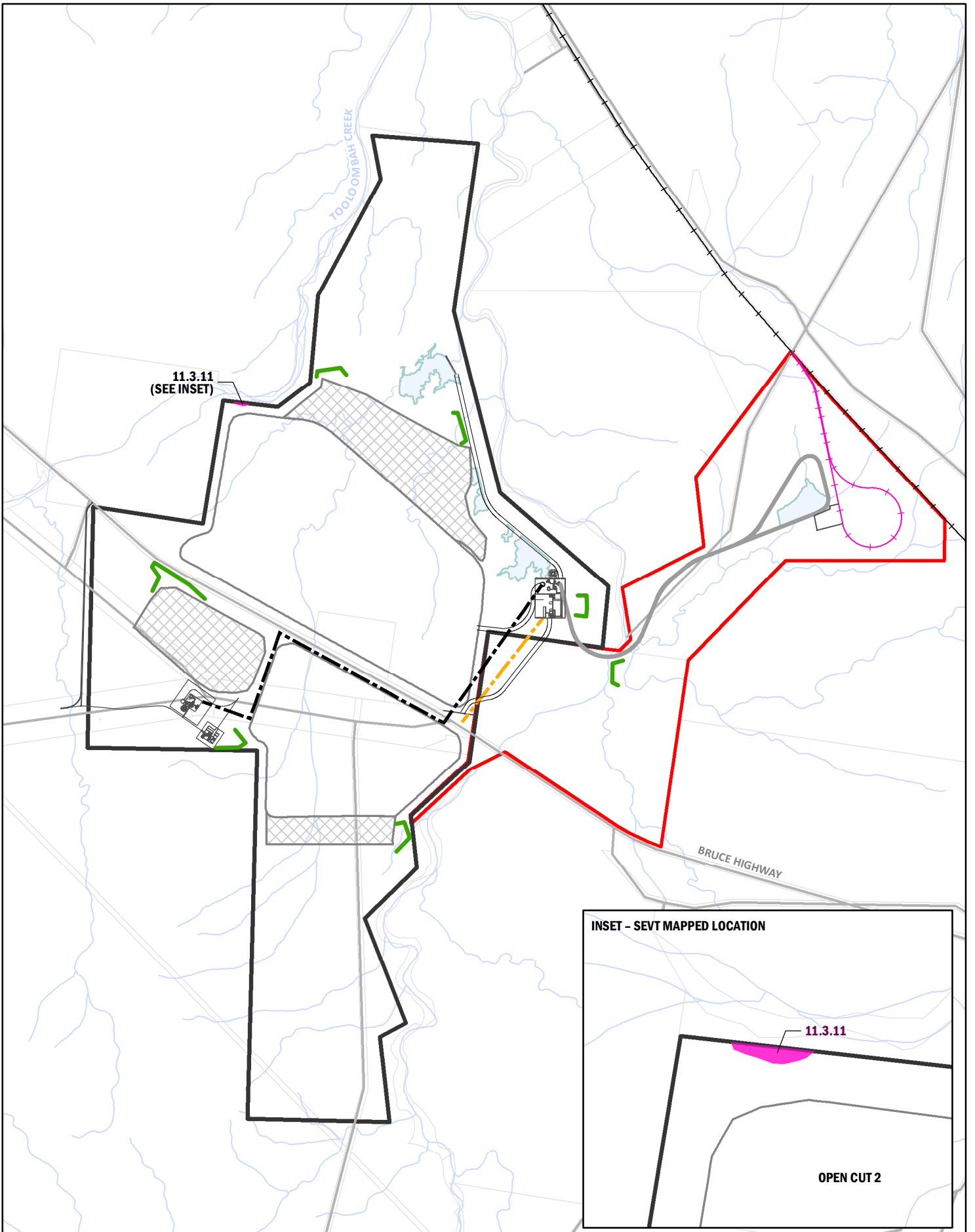
Following discussions with DTMR since the release of the EIS and original SEIS, Central Queensland Coal has agreed to avoid undertaking blasting activities that will require any closure of the Bruce Highway. For clarity, Central Queensland Coal is not proposing any Project related activity that will require the closure of the Bruce Highway. Central Queensland Coal will continue to work with DTMR to establish appropriate blasting programs that facilitate the mining of coal in proximity of the Bruce Highway and avoid the need for road closures during blast periods.

Procedures to safely manage blasting will be articulated in a Blast Management Plan which will be prepared prior to the commencement of blast activities that may impact upon the safety of users of the Bruce Highway. This Plan will be submitted to DTMR for review a minimum of three months prior to blasting. As these procedures will be developed in conjunction with DTMR it is not anticipated that there will be a decrease in the LOS to the Bruce Highway due to blasting activities associated with the Project.

### **3.4.2 Conveyor Arrangement**

The conveyor arrangement proposed in the EIS has been redesigned and repositioned and will no longer be located under the existing Deep Creek road bridge. The conveyor will now pass beneath the Bruce Highway at a location that will be determined in conjunction with DTMR. As the conveyor will not be required until 2028, the design of the culvert and conveyor arrangement has not been finalised. An indicative design is; however, shown in Section 3.5.4.1.

The final design and construction of the culvert arrangement that will accommodate the conveyor beneath the Bruce Highway will be undertaken to be consistent with the DTMR design guidelines and standards in place at the time of construction. It is; however, anticipated that a small section of the Bruce Highway will require minor diversions to enable the construction of the culvert.



0 0.5 1 km

Scale @ A4 1:50,000  
 Date: 17/10/18  
 Drawn: Gayle B.

**Legend**

- |                       |                      |                         |
|-----------------------|----------------------|-------------------------|
| — Haul Road           | — ML 80187           | — Main road             |
| — Mine infrastructure | — ML 700022          | — North Coast Rail Line |
| — Overland Conveyor   | — Cadastral boundary | — Watercourse           |
| — Power               | — Open-cut Mine Pit  | — Dam                   |
| — Rail Balloon Loop   | — Waste Rock Area    |                         |
| — Road                | — Environmental Dams |                         |

**Figure 3-14**  
 Avoidance of Mapped SEVT  
 (Semi Evergreen Vine Thicket)



DATA SOURCE  
 Waratah Coal, 2018  
 QLD Open Source Data, 2018



### 3.4.3 Site Access and Internal Roads

#### 3.4.3.1 Eastern Mine Entry Point

The original entry point to the Project infrastructure on the eastern side of the Bruce Highway was located approximately 3.3 km from Deep Creek and approximately 28.3 km north of Marlborough when travelling north along the Bruce Highway. After optimisation of the mine design, the entry point will now be located at 7485879.29N 774297.14E, approximately 600 m north of Deep Creek and approximately 25 km north of Marlborough.

The location of the new entry point provides a shorter and more direct route to the CHPP and MIA 2 avoiding unnecessary disturbance that would have occurred with the construction of the original access point.

The road intersection has been designed in accordance with the DTMR design guidelines and standards for a posted speed of 100 kilometres per hour (kph) and design speed of 110 kph. The design allows for 85 m turning lanes with 110 m painted chevron median warning features. Key design guidelines are the Austroads Guide to Road Design (Austroads 2012) (particularly Part 4 Intersections and Crossings – General) as well as DTMR, Road Planning and Design Manual (DTMR 2013).

The location of the original and new entry points is shown at Figure 3-15 and a general arrangement of the new entry point is at Figure 3-16. Construction design drawings are provided in Appendix A16.

#### 3.4.3.2 Western Mine Entry Point

The western access from the Central Queensland Coal mine site to the Bruce Highway will not be required until approximately 2027 commensurate with the commencement of construction activities on the western side of the Bruce Highway. The entry point is indicatively located at 7488079.9N 770623.9E, which is approximately 29 km north of Marlborough.

The road intersection will be designed in accordance with the DTMR design guidelines and standards in place at the time of design for a posted speed of 100 kilometres per hour (kph) and design speed of 110 kph.

The location of the indicative entry point is shown at Figure 3-15 and an indicative general arrangement of the entry point is at Figure 3-17. Construction design drawings are provided in Appendix A16.

#### 3.4.3.3 Avoidance of Brigalow TEC

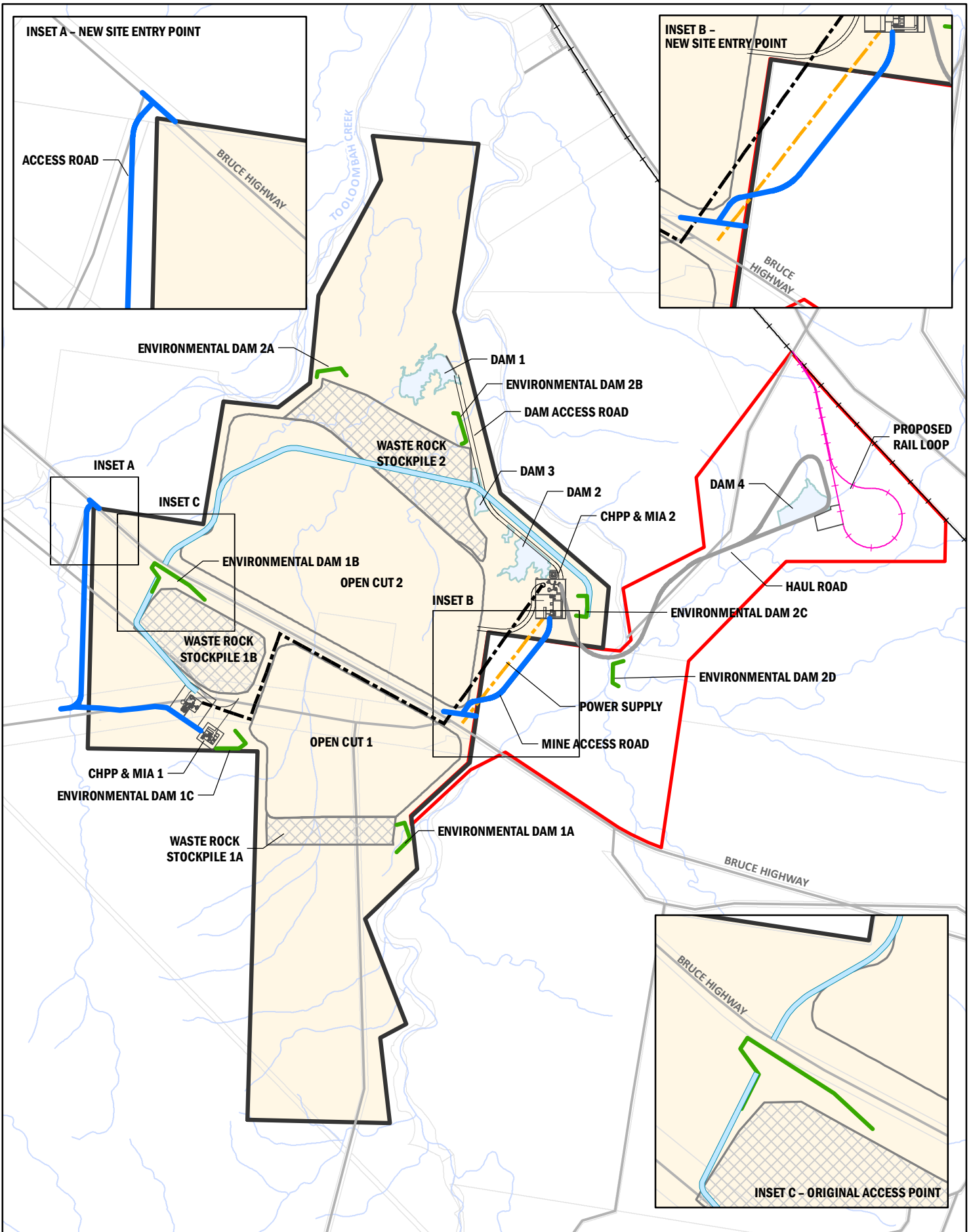
The original access road to the CHPP and MIA 2 would have disturbed 0.2 ha of Brigalow TEC. As this access road is no longer required due to the new entry point to the infrastructure on the eastern side of the Bruce Highway, the area of Brigalow TEC will no longer be disturbed.

This is discussed further in Chapter 16 – MNES.

The location of the original and new access road design relative to the patch of Brigalow is shown at Figure 3-18.

#### 3.4.3.4 Light Vehicle Access Road to Water Dam 1

A light vehicle road connecting CHPP and MIA 2 to Water Dam 1 has been added to the Project's infrastructure requirement. The design of the light vehicle road will follow the design criteria as described in Section 3.5.4.1. The location of the light vehicle access road is shown at Figure 3-11.



**Figure 3-15**  
Site entry point comparison



0 0.5 1 km

Scale @ A4 1:50,000  
Date: 17/10/18  
Drawn: Gayle B.

**Legend**

- New mine access road
- Original mine access road
- ML 80187
- ML 700022
- Open-cut Mine Pit
- Waste Rock Area
- Haul Road
- Mine infrastructure
- Overland Conveyor
- Power
- Rail Balloon Loop
- Road
- Environmental Dams
- Main road
- Cadastral boundary
- North Coast Rail Line
- Watercourse
- Dam

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



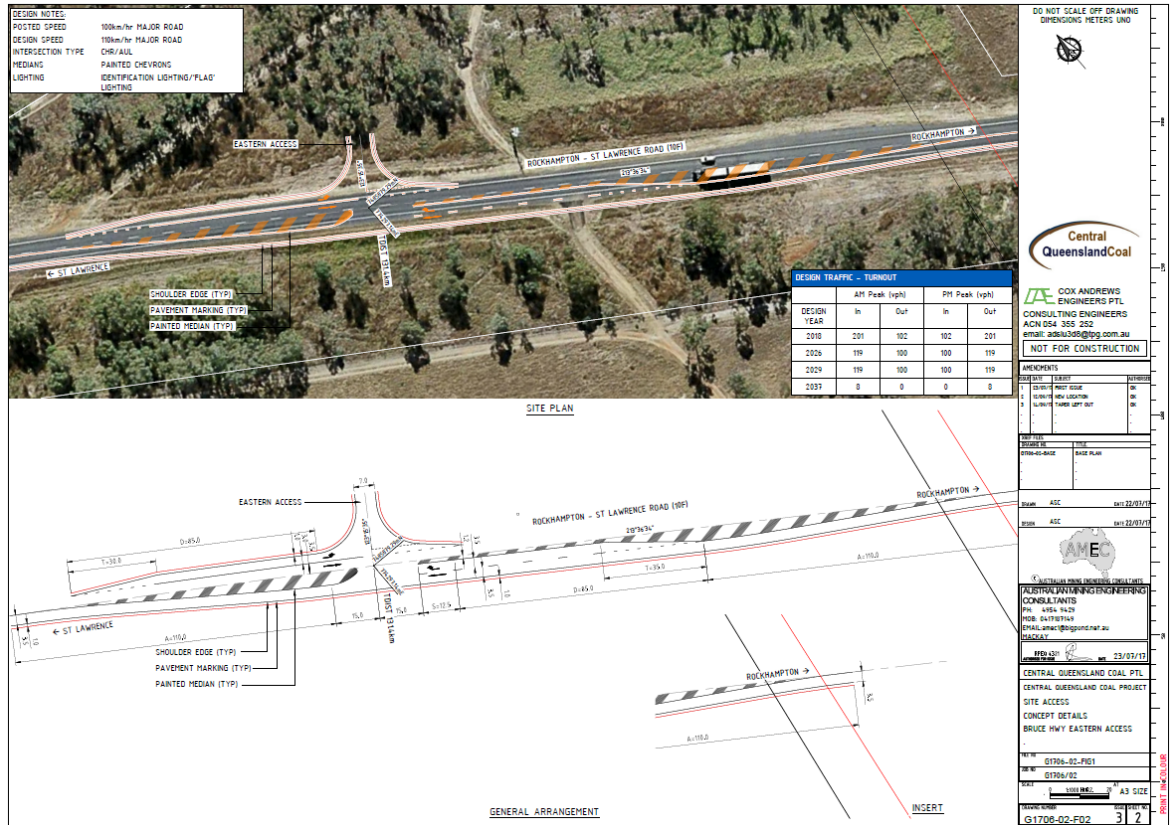


Figure 3-16 Revised site access concept details Bruce Highway eastern access

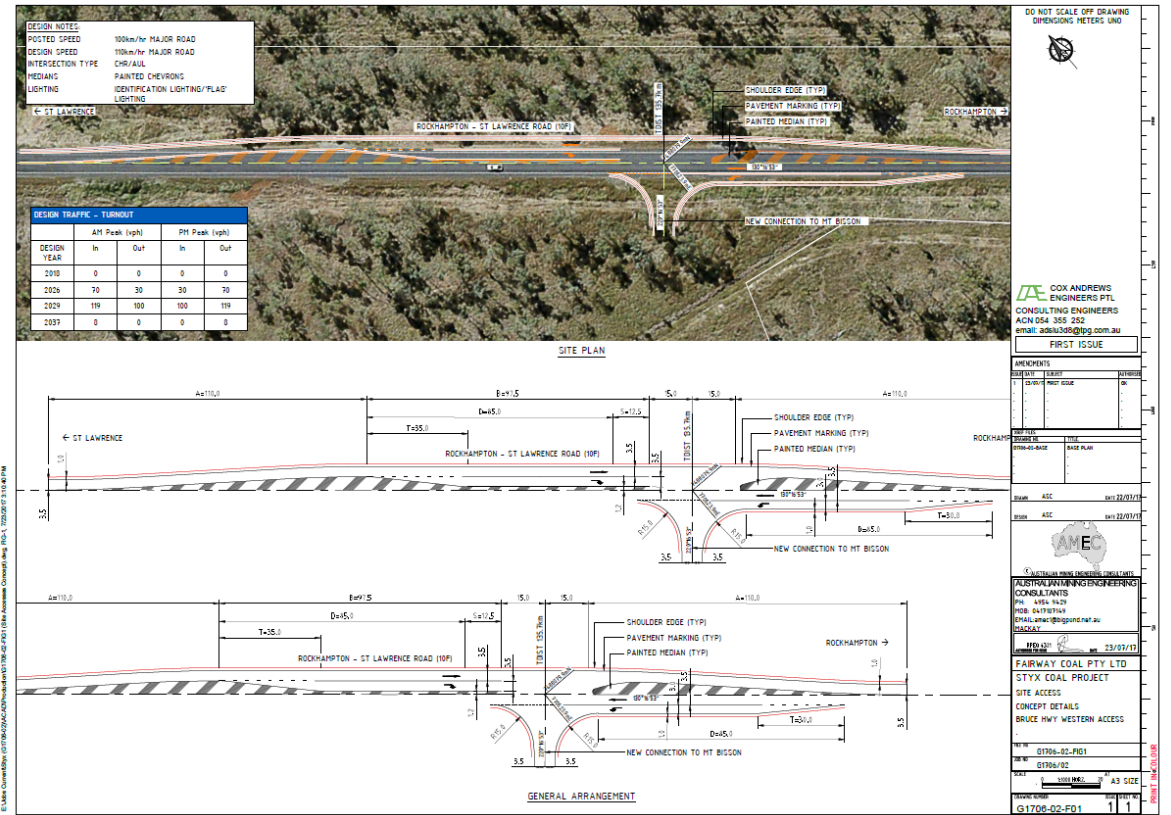
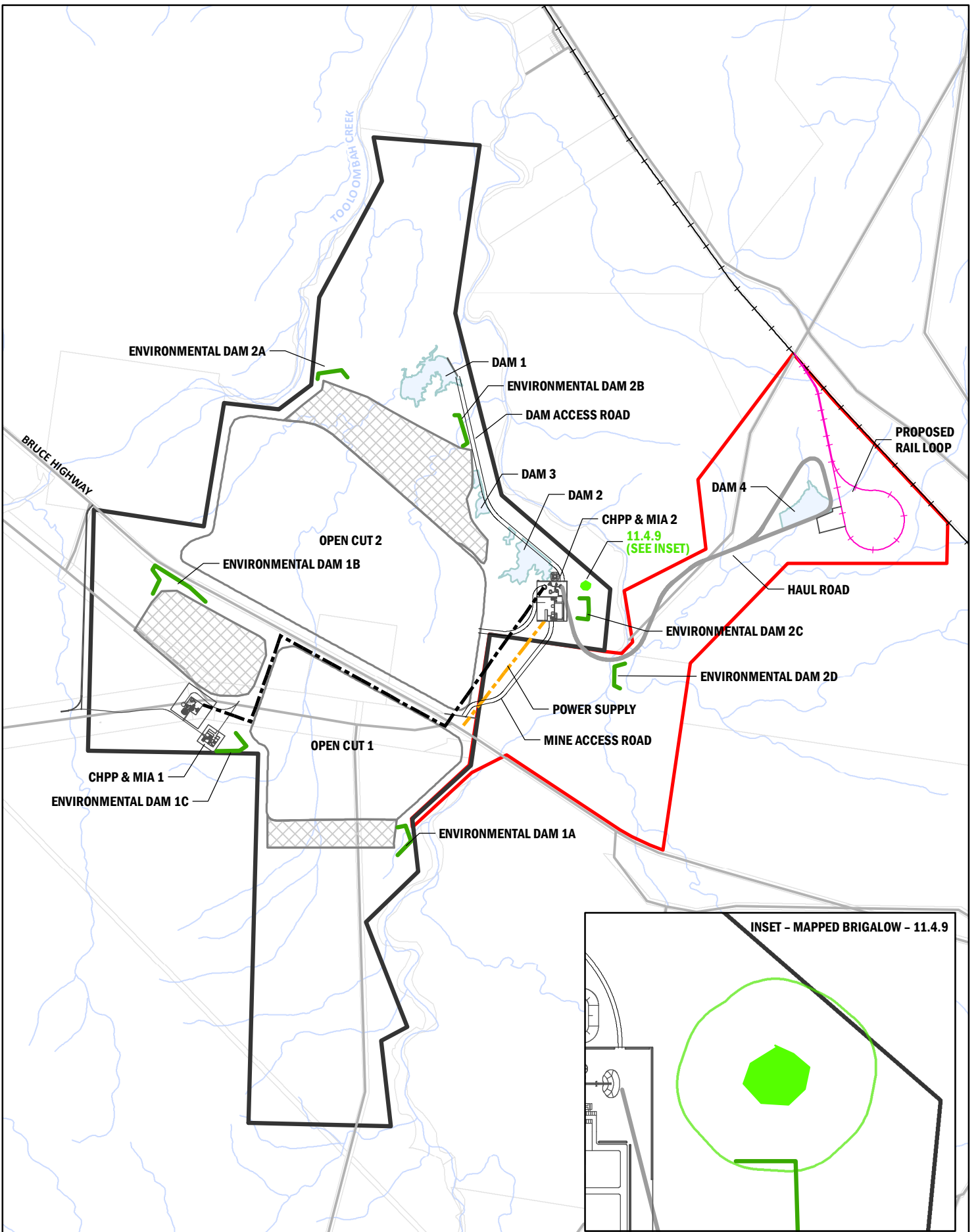


Figure 3-17 Indicative site access concept details Bruce Highway western access



0 0.5 1 km

Scale @ A4 1:50,000  
 Date: 18/10/18  
 Drawn: Gayle B.

**Legend**

- Haul Road
- Mine infrastructure
- - - Overland Conveyor
- - - Power
- Rail Balloon Loop
- Mine Access Road

- Mapped Brigalow
- 100m Disturbance Buffer
- ML 80187
- ML 700022
- Cadastral boundary
- Open-cut Mine Pit

- ▨ Waste Rock Area
- Environmental Dams
- Main Road
- North Coast Rail Line
- Watercourse
- Dam

DATA SOURCE  
 Waratah Coal, 2018  
 QLD Open Source Data, 2018

**Figure 3-18**  
 Avoidance of Mapped  
 Brigalow



### 3.4.4 Train Loadout Facility

The original TLF design reported in the EIS incorporated loading of the wagons by front end loader directly from product coal stockpiles into awaiting wagons. Since the release of the EIS further design of the TLF has been completed. The TLF will now include overhead loading of the wagons which includes the veneering station.

Product coal will now be reclaimed from the TLF product coal stockpile via bulldozer and coal valve operation discharging coal onto a single reclaim tunnel conveyor. Reclaimed coal will be conveyed to the train load-out bin for loading into the wagons.

The TLF will include equipment for spraying of a chemical veneer on coal after loading to minimise dust generation during transportation. The TLF construction design drawings are provided in Appendix A16.

### 3.4.5 Water Supply and Dams

#### 3.4.5.1 Water Permits

The EIS reported water permits will be sought to take water from Tooloombah Creek during construction. Since the EIS, further water demand assessment has been undertaken. This assessment has confirmed that there will be adequate water availability through using existing farm dam water supplies until the Raw Water Dam becomes operational. Should make-up water be required during construction, this will be trucked to site.

The operational water requirement will be supplied from catchment of on-lease stormwater runoff, mine affected water from pit dewatering activities and water reuse within the CHPP.

Consequently, permits to harvest water from Tooloombah Creek will not be required.

#### 3.4.5.2 Dam 5

Dam 5 was originally proposed to be located on the western side of the Bruce Highway, capturing overland flows to support mining operations associated with Open Cut 1, CHPP 1 and MIA 1. This dam has been removed to avoid potential for negative impacts to the mapped wetland (as described under the Queensland *Vegetation Management Act 1999*) located on the western boundary of the ML. Water will now be pumped from Dam 1 to the dam located at MIA 1, via the conveyor culvert when operational.

Overland flows will continue to be diverted away from the operational mining area on the western side of the Bruce Highway. Flows will continue to report to the existing wetland and to Tooloombah Creek as currently occurs.

### 3.4.6 Power Supply

The EIS reported an option to connect into the existing 11 kilovolt (kV) transmission line maintained by Ergon Energy which provides power to the nearby township of Ogmoo is under consideration. It was originally considered that there was limited capacity within this transmission line to support the Project. After discussions with Ergon it was identified that the existing transmission line was 22kV, rather than 11 kV, and that there was some capacity to support the Project. Consequently, Ergon has agreed to terms to provide the Project access to the transmission line. The available capacity is limited and as such, will be used as a power supply to office and administration areas. Generators will still be required for the operations of the two MIAs and CHPPs. The location of the access and termination points are shown at Figure 3-11.

### 3.4.7 Accommodation Camp

The EIS referred to the proposed establishment of an overflow accommodation camp to be located at Mamelon, on the western side of the Bruce Highway. The establishment of the camp also included the realignment of the Mount Bison Road to provide access to the camp, and to also allow access to the mine infrastructure on the western side of the Bruce Highway. Since the release of the EIS Central Queensland Coal has been in discussions with the owners of the Marlborough Caravan Park in regard to upgrading their facilities to provide additional accommodation for construction and operational workforce, as they have done in the past for another mining company.

The Caravan Park owners are currently working with the LSC to explore this option. Any approvals required for the expansion of the Marlborough Caravan Park will be sought by the owners. The expansion of the Marlborough Caravan Park is expected to provide increased local employment and services opportunities in the Marlborough area. As the operation of the workers camp would have been under contract from an external service provider, the expansion of the Marlborough Caravan Park and the opportunity for local employment is a better outcome for the Marlborough area.

Based on the changes to the accommodation camp, the requirement to realign the entry to Mount Bison Road has been pushed out to at least 2027, to be ready for the commencement of construction activities on the western side of the Bruce Highway.

## 3.5 Updated Project Description

### 3.5.1 The Central Queensland Coal Project

Central Queensland Coal Proprietary Limited (Central Queensland Coal) and Fairway Coal Proprietary Limited (Fairway Coal) (the joint Proponents) propose to develop the Central Queensland Coal Mine Project (the Project). As Central Queensland Coal is the senior proponent, Central Queensland Coal is referred to throughout this SEIS. The Project comprises the Central Queensland Coal Mine where coal mining and processing activities will occur along with a TLF.

The Project is located 130 km northwest of Rockhampton in the Styx Coal Basin in Central Queensland (see Figure 3-1). The Project is located within the LSC LGA. The Project is generally located on the “Mamelon” property, described as real property Lot 11 on MC23, Lot 10 on MC493 and Lot 9 on MC496. The TLF is located on the “Strathmuir” property, described as real property Lot 9 on MC230. A small section of the haul road to the TLF is located on the “Brussels” property described as real property Lot 85 on SP164785.

The Project will involve mining a maximum combined tonnage of up to 10 Mtpa of semi-soft coking coal (SSCC) and high grade thermal coal (HGTC). The Project will be located within ML 80187 and ML 700022, which are adjacent to MDL 468 and Exploration Permit for Coal (EPC) 1029, both of which are held by the Proponent. It is intended that all aspects of the Project will be authorised by a site specific EA.

Development of the Project will commence in 2019 with initial early construction works and extend operationally for approximately 19 years (2038) until the depletion of the current reserve, and rehabilitation and mine closure activities are successfully completed.

The Project consists of two open cut operations that will be mined using a truck and shovel methodology. The run of mine (ROM) coal will ramp up to approximately 2 Mtpa during Stage 1 (2019 - 2022), where coal will be crushed, screened and washed to SSCC grade with an estimate 80% yield. Stage 2 of the Project (2023 - 2038) will include further processing of up to an additional 4 Mtpa ROM coal within another CHPP to SSCC and up to 4 Mtpa of HGTC with an estimated 95% yield.

At full production two CHPPs, one servicing Open Cut 1 and the other servicing Open Cut 2, will be in operation. Rehabilitation works will occur progressively through mine operation, with final rehabilitation and mine closure activities occurring between 2036 and 2038.

A new TLF will be developed to connect into the existing Queensland Rail North Coast Rail Line. This connection will allow the product coal to be transported to the established coal loading infrastructure at the DBCT.

Access to the Project will be via the Bruce Highway. The Project will employ a peak workforce of approximately 275 people during construction and between 100 (2019) to 500 (2030) during operation, with the workforce reducing to approximately 20 during decommissioning. Central Queensland Coal will manage the Project construction and ongoing operations with the assistance of contractors.

### 3.5.2 Construction Program

The construction of the Open Cut 2, the initial CHPP, the haul road and TLF and associated mine infrastructure located on the east of the Bruce Highway is planned to commence simultaneously in 2019 and will continue into 2020. Open Cut 1 will commence development at approximately 2027 and will continue into 2029.

The commencement date for construction is dependent upon the timing of the Project approvals process. Due to the additional work being undertaken in response to the comments on the EIS, Year one is now set as 2019. This schedule incorporates the receipt of the ML and EA for the Project and an expedited construction period commencing in the first half of 2019.

The timing for the Project development is shown at Figure 3-19.

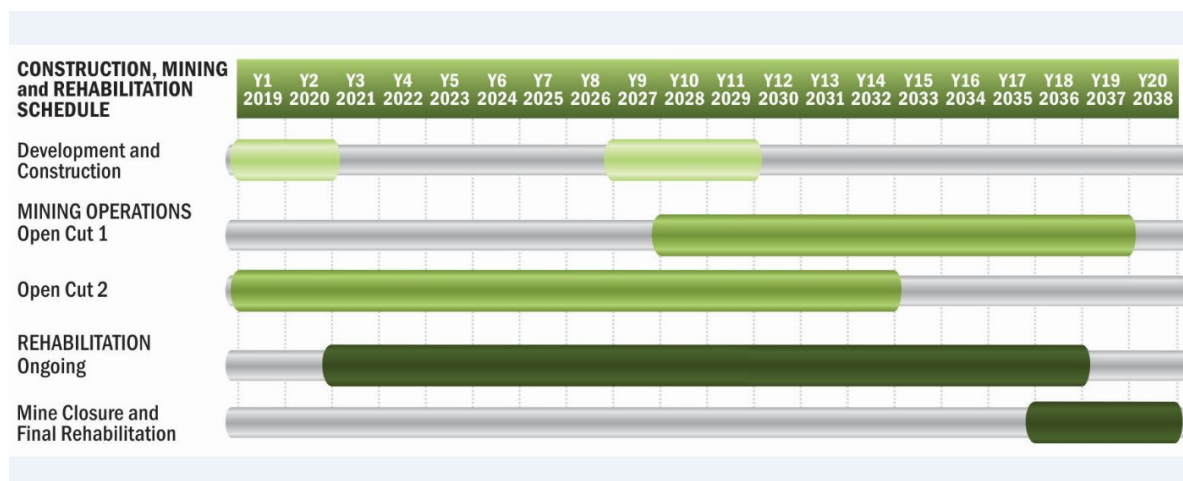


Figure 3-19 Indicative Project development schedule

### 3.5.3 Site Preparation

The initial site clearance works will occur in 2019 and will be focused on the site access road, internal access roads, dams and laydown areas for construction, MIA 2, CHPP 2 and TLF. These are all located in the eastern side of the Bruce Highway. Site preparation for the infrastructure associated with Open Cut 1, on the western side of the Bruce Highway will commence in 2027 continuing into 2029 (see schedule at Figure 3-19).

Site clearance will include clearance of vegetation, soil removal and storage, bulk earthworks and temporary drainage works. These works will be conducted in accordance with the Project's vegetation and soil management measures.

Site clearance activities will be staged during the construction phase on an as needed basis to coincide with construction requirements and to minimise the extent and duration of cleared areas at any one time. Suitable soil resources for use in rehabilitation will be stripped from areas where construction and mining operations will occur. Topsoils and subsoils will be stripped, handled and stored in a manner in line with industry best practice to prevent the deterioration of soil quality (refer to Chapter 11 – Rehabilitation and Decommissioning). This includes the separation of topsoil and subsoil. Topsoil contains a higher nutrient content and therefore must be kept separate from the subsoil to be utilised in the rehabilitation phase to promote vegetative growth. Topsoils can be stored as a berm around active worksites and utilised as an erosion and sediment control (ESC) provided adequate controls (including sediment fence and appropriate cover) are in place to manage the erosion risk of the topsoil stockpile or bund itself. An inventory of available soils will be maintained to ensure adequate materials are available for planned rehabilitation activities.

Stripped topsoil may also be used to improve the quality of in situ topsoil outside the proposed area of disturbance if within the same soil class. Soil ameliorates such as gypsum and / or fertilisers shall be applied to the topsoil prior to stripping, if required.

Site preparation activities for the mine will include:

- Construction of the mine access points on the Bruce Highway;
- Site security;
- Site clearance;
- Civil works;
- Environmental protection measures;
- Washdown facilities;
- Erosion and sediment controls;
- Concrete batch plant (concrete will be batched onsite, with suitable batching materials delivered to site by contracted supplier);
- Mobilisation to site;
- Crib hut;
- Fencing;
- Amenities;
- Access road / haul road establishment;
- Establishment of yards;
- Installation of temporary water supply with potable water trucked to the site until a water treatment plant (WTP) is installed;
- Sewerage management infrastructure with effluent trucked from site by a licensed contractor to a licensed offsite waste disposal facility;
- Demountable offices;
- Car park; and
- Establishment of laydown and storage areas.



### 3.5.4 Construction and Description of Key Infrastructure

Infrastructure to be constructed for the Project includes:

- Two open cut pits (Open Cut 1 and Open Cut 2);
- Three waste rock stockpiles (1a, 1b and 2);
- Two CHPPs (CHPP 1 and CHPP 2) and product coal stockpiles;
- Two ROM coal stockpile areas and ROM dump stations (comprising dump hopper, product conveyor, crushers and surge bin);
- ROM coal haul roads and waste rock haul roads;
- Product stockpile and conveyor from Open Cut 1 to the product coal stockpile East;
- Waste management facilities;
- Water supply pipeline and management facilities, including raw water supply, storage and a WTP to treat water to potable quality;
- Mine affected water dams, sediment affected water dams and clean water dams;
- Light and heavy vehicle internal roads;
- Main gate and security building;
- Power distribution lines and substation; and
- Product coal haul road from the CHPP 2 to the TLF, TLF product coal stockpile area, rail loop and rail spur.

#### 3.5.4.1 Civil Works

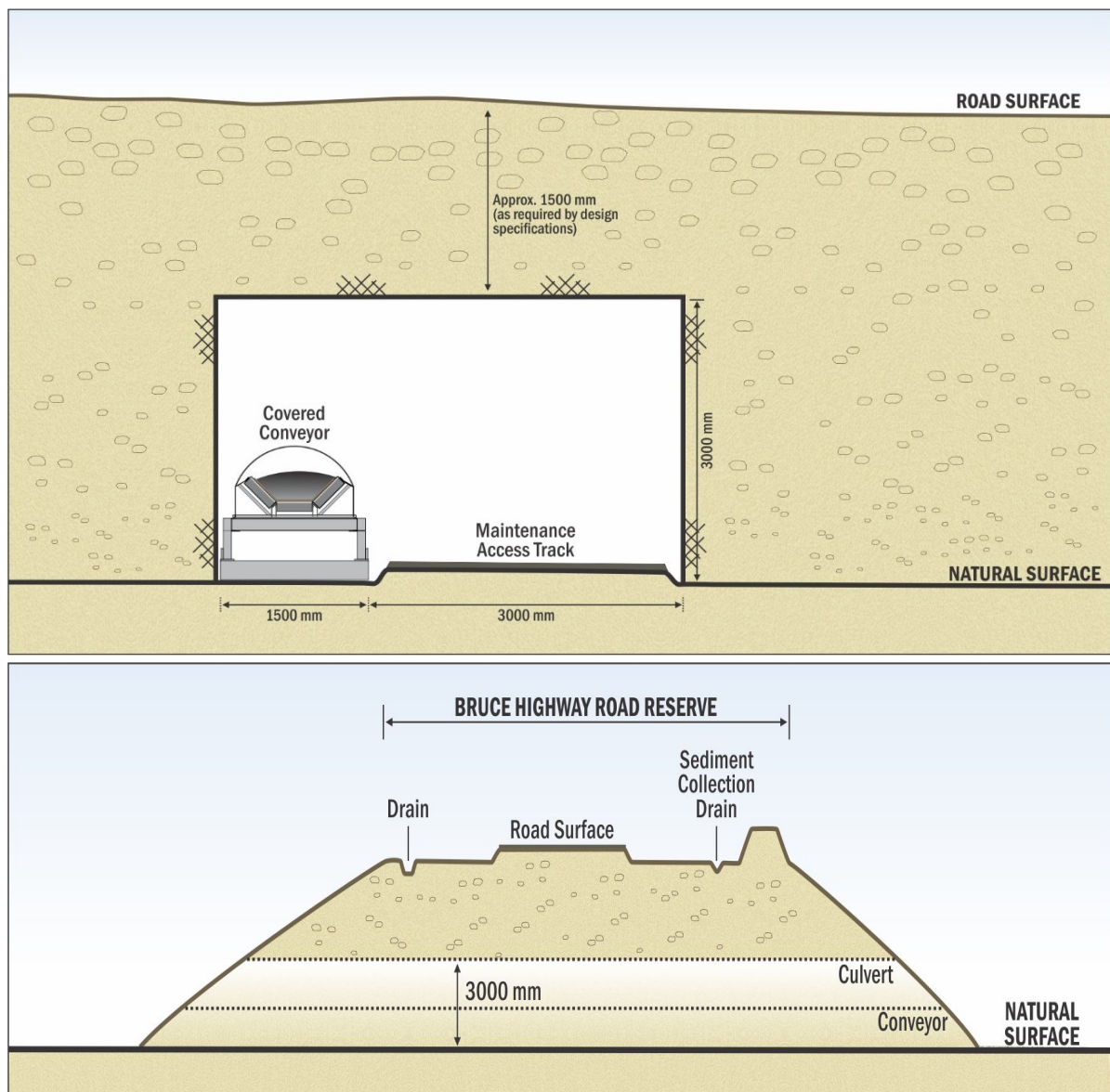
Civil works including construction of structure foundations, permanent laydown areas and hardstands will commence following grant of the ML and EA. It is expected that civil works required during the construction phase will be completed within 12 months; however, there may be requirements for further civil works during the operations and decommissioning phases. Civil works for the infrastructure on the western side of the Bruce Highway will not commence until 2027. Typical civil works that will be undertaken as part of the Project include, but are not limited to:

- Civil earthworks, including foundation construction;
- Installation of permanent and temporary drainage;
- Trenching and laying of reticulated services and any other underground pipelines and services;
- Installation of powerlines and substations;
- Road formation construction, surfacing and finishing required for unsealed roads;
- Conveyor footings;
- Earthworks for the establishment of drainage diversions;
- Dams, including raw water dams, sediment affected water dams, mine affected water dams and clean water; and
- TLF, rail loop and rail spur formation construction, track laying and finishing for TLF.

Installation of permanent drainage will be undertaken to accommodate drainage requirements for both the construction and operational phase where possible. Where permanent drainage for the operational phase cannot be installed, temporary drainage for the construction period will be designed to the relevant standards.

A conveyor is proposed to transport product coal from Open Cut 1, under the Bruce Highway via a new culvert arrangement, to the product coal stockpiles located on the eastern side of the Bruce Highway. The conveyor was originally proposed to be located under the existing Deep Creek road bridge; however, because of concerns regarding potential impacts to water quality during periods of flood, the conveyor has been repositioned away from Deep Creek.

The conveyor culvert general arrangement is shown in Figure 3-20. The final location of the culvert will be determined in consultation with the DTMR.



**Figure 3-20 New conveyor arrangement under the Bruce Highway (from 2028 onwards)**

Roads associated with the Project’s MLs include ROM coal and waste rock haul roads, site access roads and light and heavy vehicle internal roads. Construction of ROM coal and waste rock haul, light and heavy vehicle internal roads will be phased over the life of the construction and operations

of the mine. The new intersection required for access to the Project on the north eastern and south western sides of the Bruce Highway, will be designed to conform with the Austroads Guide to Road Design (Austroads 2012) (particularly Part 4 Intersections and Crossings – General) as well as DTMR, Road Planning and Design Manual (DTMR 2013).

Indicative haul road cross sections are shown at Figure 3-21 (at cut and fill) and Figure 3-22 (at grade) and light vehicle road cross sections at Figure 3-23 (at cut and fill) and Figure 3-24 (at grade). Haul road design drawings are provided in Appendix A16.

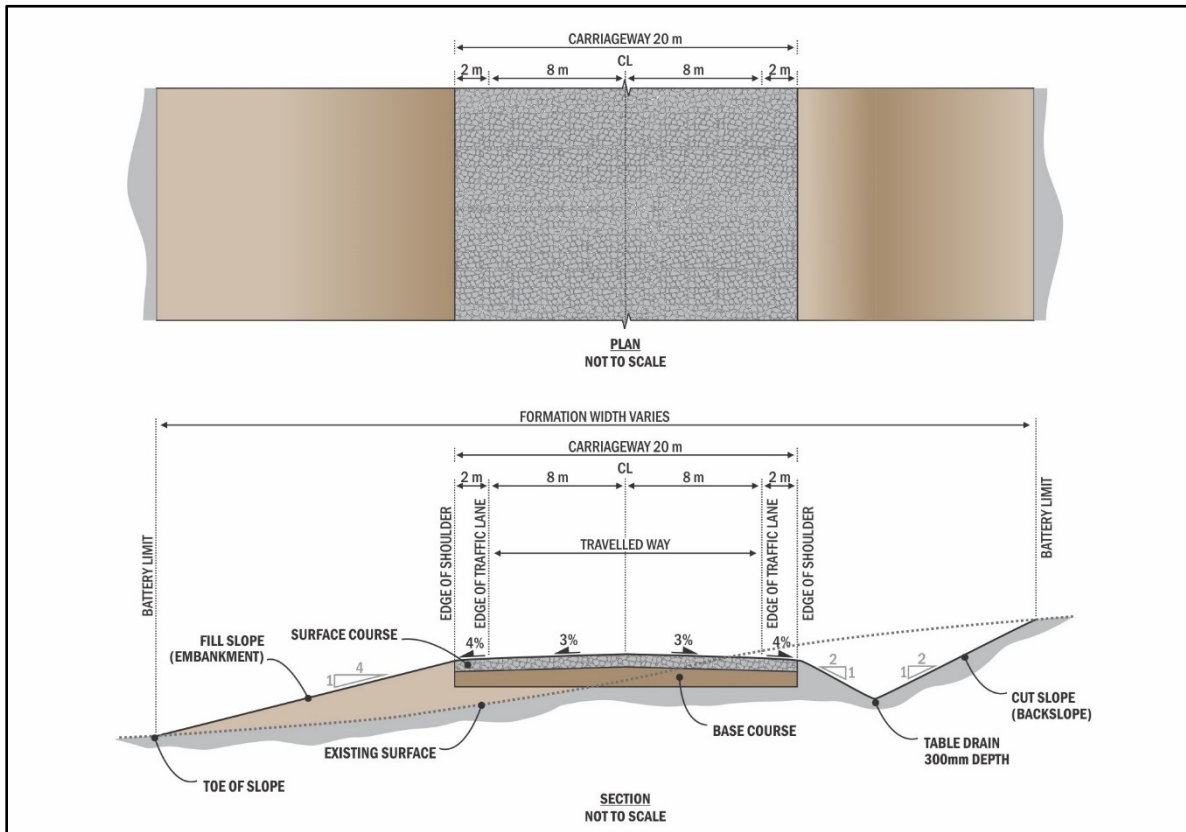


Figure 3-21 Typical haul road layout at cut and fill

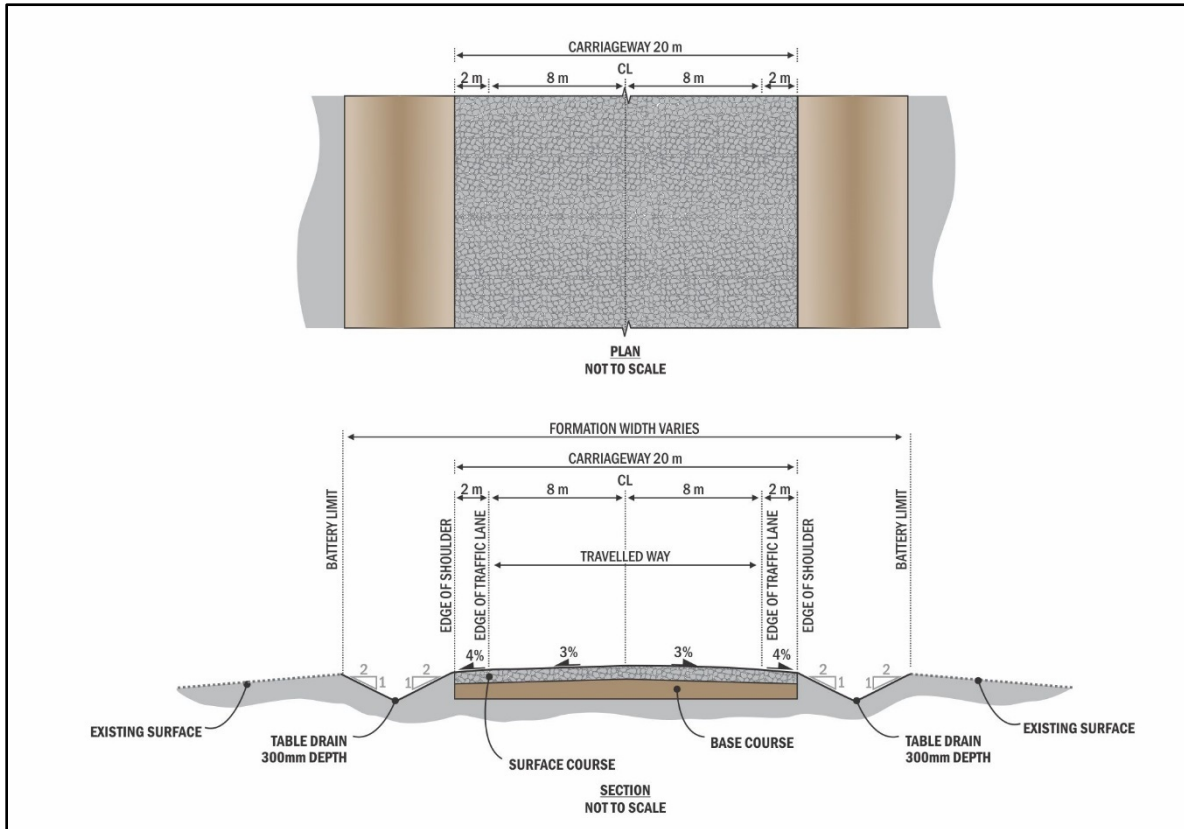


Figure 3-22 Typical haul road layout at grade

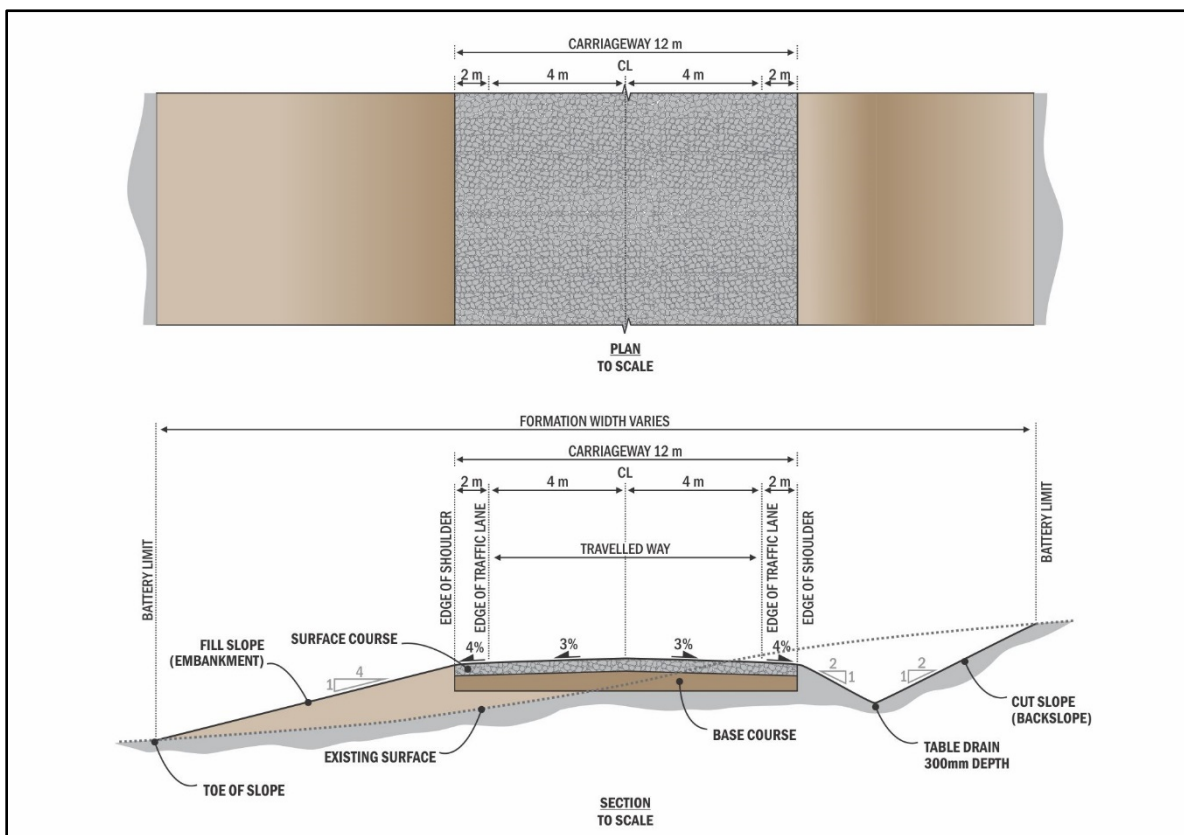


Figure 3-23 Typical light vehicle road layout at cut and fill

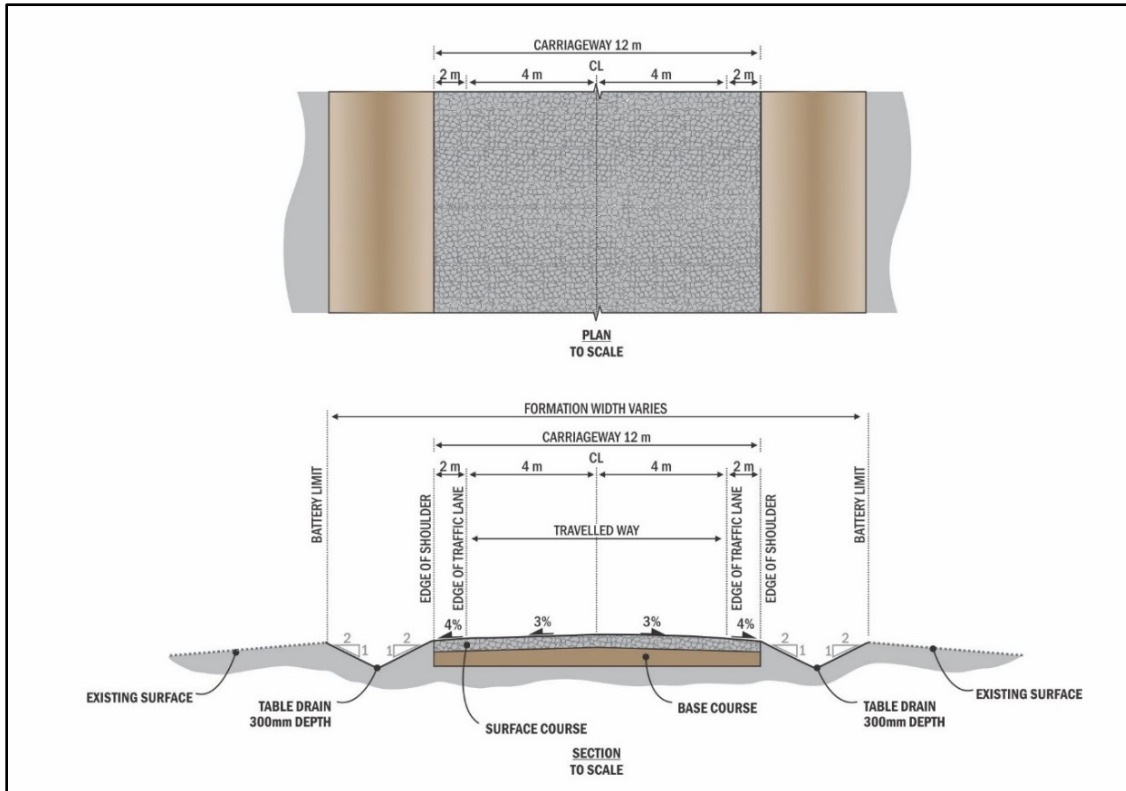


Figure 3-24 Typical light vehicle road layout at grade

The basic design criteria adopted for the indicative haul road and light vehicle road design process are presented in Table 3-6 and Table 3-7. Road design and construction will include suitable culverts and over flow structures to allow the free flow of water during the wet season.

Table 3-6 Indicative haul road design criteria

Design Element	Criteria
<b>Typical Cross Section</b>	
Design vehicle	Multi-train haul truck
Number of traffic lanes	2 lanes (one lane each travel direction) except across culverts where one way traffic is designated to minimise area of disturbance
Traffic lane width	8 m
Traffic lane crossfall	3%
Shoulder width	2 m
Shoulder crossfall	4%
Cut batter slope	2H:1V
Fill batter slope	4H:1V
<b>Horizontal Alignment</b>	
Design vehicle	Truck
Design speed	90 km/h
Minimum curve radius	250 m
<b>Vertical Alignment</b>	
Design vehicle	Truck
Design speed	90 km/h
Maximum longitudinal gradient	8%
Minimum K value for crest curves	40
Minimum K value for sag curves	35

**Table 3-7 Indicative light vehicle road design criteria**

Design Element	Criteria
<b>Typical Cross Section</b>	
Design vehicle	Multi-train haul truck
Number of traffic lanes	2 lanes (one lane each travel direction) except across culverts where one way traffic is designated to minimise area of disturbance
Traffic lane width	4 m
Traffic lane crossfall	3%
Shoulder width	2 m
Shoulder crossfall	4%
Cut batter slope	2H:1V
Fill batter slope	4H:1V
<b>Horizontal Alignment</b>	
Design vehicle	Truck
Design speed	90 km/h
Minimum curve radius	250 m
<b>Vertical Alignment</b>	
Design vehicle	Truck
Design speed	90 km/h
Maximum longitudinal gradient	8%
Minimum K value for crest curves	40
Minimum K value for sag curves	35

A new power distribution network will be installed to provide electricity across the site. The realignment of an existing 22kV power line which runs adjacent to the eastern side of the Bruce Highway along Open Cut 2 is required. This will be completed early in the Project's development phase so there will be no power supply interruptions to current users. Works within proximity of electricity infrastructure will be carried out in accordance with the *Electrical Safety Act 2002*, Electrical Safety Regulations 2013, and the Code of Practice for Working Near Exposed Live Parts.

Quarry materials will be sourced from a combination of existing commercial quarries and competent materials from within the MLs for use as road base, select fill, rail ballast, rock protection, sealing aggregates and other construction materials. Further investigations are required to determine the quality and suitability of the deposits within the MLs for construction purposes. It is not anticipated that any new borrow pits, stream bed excavations, or expanded quarry and screening operations outside of the MLs will be required to service the construction or operation of the Project.

Both MLs are generally located on freehold land with no forest products or quarry material reserves to the State. As such, it is not anticipated that any State-owned quarry material administered under the *Forestry Act 1959* will possibly be sterilised or restricted from utilisation (including offsets and loss of access for existing operations authorised under the *Forestry Act 1959*). Should it be the case that State-owned quarry material will possibly be sterilised or restricted from utilisation, Central Queensland Coal will negotiate suitable arrangements with the Department of Agriculture and Fisheries and other affected parties before any work commences.

The requirements of the *Forestry Act 1959* will continue to apply to land converted to freehold where there is an issued deed of grant for the State's continued ownership or reservation of quarry material. Any approvals that are required pursuant to the requirements of the *Forestry Act 1959* will be sought outside of this EIS process.

### 3.5.4.2 Building and Structures

Construction of buildings and structures will occur after the civil works. Installation of plant and related building components will follow superstructure erection, including the installation of pipe works, cables and instrumentation. Where possible, main plant components will be pre-fabricated and delivered complete to site to minimise the requirement for on-site assembly work.

The construction management office area will be located near the MIA 2. The facilities will be of a temporary nature and will be replaced by the permanent administration facilities towards the end of construction. The temporary facilities will include:

- Demountable buildings including offices, workshops, meeting rooms, crib rooms / kitchen, toilets, first aid, communications and storage;
- Car park;
- A light vehicle wash down slab;
- Power supply from diesel generators;
- Temporary construction water storage;
- A temporary potable water storage, until permanent facilities are installed; and
- Temporary wastewater storage, until permanent facilities are installed.

### 3.5.4.3 Coal Handling and Preparation Plant

Construction of the two CHPPs, ROM coal and product conveyors and stockpiles is anticipated to last approximately 12 months. Given the height and size of the CHPP modules, product stockpiles, surge bin and crushing facilities, the use of cranes, lifts and multistorey scaffolding is anticipated. All work will be in accordance with recognised building standards and regulations.

### 3.5.4.4 Construction Water Requirements

Both potable and construction water will be required for the construction phase of the Project. For construction water, existing farm dams and a newly constructed Dam 1 will be used to supply water. Potable water will either be transported to site by water tankers during construction or involve treatment of groundwater bore or raw water supplies to drinking water standard via a batch water treatment plant (WTP). All potable water will be procured, transported, treated, monitored and stored in compliance with the Australian Drinking Water Guideline 2011 (NHMRC and NRMMC 2018).

### 3.5.4.5 Construction Materials, Plant and Equipment

Quarry materials for the construction of the access road and haul road base material will be sourced from existing quarries or from competent materials located within the MLs. Once access to site is established, materials will be sourced from a combination of on-lease deposits where possible and licensed offsite quarries. It is not anticipated that forestry materials will be required by the Project.

The exact location and quality / suitability of the competent material deposits existing within the MLs are yet to be determined, although it is expected that appropriate materials for foundations can be sourced on-lease. This will also include the overburden extracted as part of the mining operations.

Hazardous materials will be used and stored onsite during the construction of the mine. Hazardous materials that will be used during construction include diesel fuels, lubrication oils, paints and thinners, explosives and protective coatings. Further details regarding the usage and storage are discussed in EIS Chapter 21 – Hazard and Risk.

All materials, plant and equipment will be delivered to the Project via road. An assessment of the traffic and transportation is discussed at EIS Chapter 6 – Traffic and Transport and the technical assessment at Appendix A4a –Road Impact Assessment. Large and oversize loads are anticipated, particularly during the CHPP, dump station, stacker / reclaimer and heavy mining equipment construction and installation phase. Loads will mostly be hauled from the Port of Brisbane, Port of Mackay or the Port of Gladstone. The transportation of oversize and some large loads will take place according to permits issued by DTMR and LSC to minimise disruption to other road users.

Construction traffic will involve rigid and articulated vehicles, and light goods vehicles. Traffic flows and vehicles types are expected to vary over the construction period, reflecting the types of materials and equipment required at a specific time.

The Project will use standard construction equipment, general trade equipment and specialised equipment as required. The indicative number and type of construction equipment required is shown in Table 3-8. Construction equipment will, where practicable, be serviced and maintained at the site workshop.

**Table 3-8 Indicative construction equipment**

Equipment	Quantity
Generator (1MW)	1
CAT 631G Scraper	2
785D Haul Truck	4
789D Haul Truck	4
793D Haul Truck	5
RH170 Excavator	1
Liebherr 996 Excavator	1
EX1200 Excavator	1
960 Front End Loader	1
980 Front End Loader	1
992 Front End Loader	1
Volvo Semi-Tippers	8
UDR800 Drill	1
D9 Dozer	1
D11 Dozer	1
D10 Dozer	1
HD605 Water Cart	1
16 Grader	1
Service Truck	1
Pump Truck	1
Fuel Truck	1
Franner Crane	1



### **3.5.4.6 Construction Waste Management**

The management of the waste streams associated with the construction of the Project, in addition to the operation and decommissioning, are discussed in EIS Chapter 7 – Waste Management. Inert waste will typically be disposed of in-pit, whilst recyclable materials and other wastes will be separated and taken from site by appropriately licenced contractors to licenced recycling and disposal facilities. Waste generation from emissions that will contribute to existing local air quality are discussed in Chapter 12 – Air Quality.

### **3.5.4.7 Construction Site Management and Security**

#### **Site Management**

The Site Senior Executive (SSE) will be responsible for site management during the construction phase. The SSE will be supported in this role by a senior site representative from the principal construction contractor. The SSE will oversee the principal contractor during the construction of the Project including monitoring the principal contractors' performance to ensure that the mitigation measures established for the construction phase are implemented and that construction impacts and nuisance are minimised. A site Safety and Health Manager and a site Environmental and Community Manager will also be appointed by Central Queensland Coal and will be present on the site during the construction phase.

#### **Emergency Response**

An Emergency Response Plan (ERP) will be implemented at the site as part of the overall Safety and Health Management System (SHMS) prior to the commencement of construction activities. The system will be modified as the site transitions into operations. The ERP will include specific procedures aimed at identifying and minimising risks in an emergency response situation, address rescue and escape procedures, provide for regular testing and review of emergency response procedures and prescribe the requirement for routine auditing to ensure the consistency and effectiveness of the system.

Designated first aid and emergency rescue facilities and equipment will be established at the site prior to the commencement of construction and then will remain onsite throughout the life of the Project. Appropriately trained personnel will be onsite always to implement emergency response procedures when required.

Site inductions will include specific discussions in relation to emergency response procedures for the site. This will include Standard Operating Procedures associated with rescue and escape procedures in addition to onsite first aid resources and processes.

#### **Access and Security**

The site access will be restricted to authorised personnel only. Access to the site will be via a swipe card system monitored by CCTV with remote communications, augmented with an internal access security system. Secondary external access points will always be locked and will only be used by authorised mine site personnel.

Access to the site by visitors will be permissible under a strictly controlled system with defined Standard Operating Procedures. The system will incorporate procedures to ensure visitors are fully authorised to access the site, have satisfactorily completed a visitor's induction, are escorted on-site by suitably qualified personnel and are registered into the site SHMS. The site security system will be routinely reviewed to ensure procedures remain current and continue to achieve security objectives.

### 3.5.5 Operations

#### 3.5.5.1 Mine Sequencing

The mining schedule is based on the development of two open cut operations producing up to 10 Mtpa of ROM. Open Cut 2 will commence development in 2019 and is anticipated to operate until 2032. Open Cut 1 is anticipated to commence development in 2027, operations in 2029 and continue operations until 2037. The proposed open cut mine layouts and sequencing of each open cut are shown in Table 3-5. Mining operations will be up to seven days a week and 24 hours per day.

Mining of Open Cut 1 will commence at the western edge of the pit with mining operations then progressing towards the east. Mining of Open Cut 2 will commence in the northern end of the pit and progress generally in a southern direction.

Being terraced mines both open cut operations will advance across strike. The mining schedule for both pits was established to commence operations in areas where the Margin Ranking for that pit was acceptable, focused on all seams suitable for mining, maximising coal recovery and minimising interaction with the Bruce Highway. It is anticipated that operations in the open cuts will continue for approximately 19 years between 2019 and 2038, which comprises 18 years of mining (2019 – 2037) and three years (2036 – 2038) to finalise the rehabilitation program. The rehabilitation program will be ongoing through the life of the Project commencing from 2020.

Whilst the initial mining approach is based around truck and shovel operations, Central Queensland Coal will continue to review alternative mining methods to optimise product coal outputs. Other mining methods to improve resource recovery may be considered as the Project progresses.

Subject to statutory approvals, initial soil removal from Open Cut 2 is scheduled to commence in 2019. First shipment of product coal is scheduled in the Q1 2020. Construction of mine facilities will commence immediately after grant of the MLs. Mining is to commence on the MLs simultaneously with the construction of the mine facilities. The years of mining for each of the open cut operations are shown at Table 3-5.

#### 3.5.5.2 Mining Method

Open cut mining methods will target the multiple seams during mining of both pits. Mine development will commence with the removal of vegetation and topsoil by scrapers in accordance with relevant management plans to avoid and minimise impacts. Cleared material will be placed on dedicated topsoil stockpiles or placed directly onto reshaped final landforms if available. The initial box cut will be developed utilising a ramp formed in the low wall of each of the two pits. It is proposed that most of the waste rock will be dumped to the ex-pit waste dumps (see Figure 3-11) for the initial strips and then in-pit for the remaining strips.

The coal bearing strata are known as the Styx Coal Measures and consists of quartzose, calcareous lithic and pebbly conglomerate, sandstone, siltstone, mudstone, carbonaceous shale, with a proportion of weathered material near the surface. The upper portion of weathered overburden, where possible, will be free dug and removed. Where the overburden materials become competent and the free digging operations cease, a drill and blast operation will be utilised to fracture strata. Some of the weathered sandstones and fresh sandstones will be used for concurrent civil works and construction of haul roads.

Coal mining will be undertaken using a fleet consisting of excavators, front end loaders and trucks to mine the coal seams, with the coal hauled to the CHPP for benefaction. Interburden waste between the main coal seams is then blasted, if required, and this waste is mined by the excavators

and hauled by trucks to waste rock stockpiles in the previous strips. The next coal seam is mined in the block, with the coal mining and parting operation planned to be performed in a series of sections along the pit.

Initial out-of-pit dumping to waste rock stockpiles is required as the box cuts are developed. The ex-pit dumping for Open Cut 1 occurs in 2027 and 2029 and will be to an indicative maximum height of approximately 40 m (Reduced Level (RL) 80 m). The ex-pit dumping for Open Cut 2 will commence in 2019 and continue until 2024 and will be to an indicative maximum height of 45 m (RL 75 m). Rehabilitation of the out-of-pit dumps will continue through the life of the mine (refer to Chapter 11 – Rehabilitation and Decommissioning for discussion about the rehabilitation approach for the Project).

## **Blasting**

Blasting will be required to break and fragment the overburden and interburden horizons in each of the two open cut pits. This allows the fragmented rocks to be excavated and transported to the waste rock stockpile and for the coal seam to be mined productively. Blasting may not be required to break the coal seam as generally the coal seams are less than 3 m thick.

Blasting will be carried out in accordance to blasting management standard operating procedures. Blasting will generally occur on Monday to Sunday between 6 am and 6 pm. Blasting outside these hours will be covered by a specific Blast Management Plan developed for each individual occurrence and will incorporate a notification procedure informing all related and impacted parties. Blasting activities will be carried out in accordance with the Project's EA so that ground vibration and airblast overpressure (the wave explosive energy released into the atmosphere) are within approved blasting limits (see Chapter 23 – Draft EA Conditions). Blasting activities will account for the direction the wind is blowing to reduce the risk of potential airblast overpressure impacts at noise sensitive receptors.

It is envisaged that an explosives contractor will provide the explosives for the site. The preferred option for storage and supply of bulk explosives is for the blasting contractor to store the chemicals in a remote location offsite, and then transport the explosives to site in specially designed trucks for loading into the blast holes. The blasting contractor, through a specifically designed initiation system, connects each primed blast hole together with detonating cord. The speed at which each blast progresses is determined by the site Blast Engineer to minimise noise and vibration.

Over the life of the mine, the volume of bulk explosives used per annum will average approximately 18,400 tonnes per year.

Following discussions with DTMR since the release of the EIS and original SEIS, Central Queensland Coal has agreed to avoid undertaking blasting activities that will require any closure of the Bruce Highway. For clarity, Central Queensland Coal is not proposing any Project related activity that will require the closure of the Bruce Highway. Central Queensland Coal will continue to work with DTMR to establish appropriate blasting programs that facilitate the mining of coal in proximity of the Bruce Highway and avoid the need for road closures during blast periods.

Procedures to safely manage blasting will be articulated in a Blast Management Plan which will be prepared prior to the commencement of blast activities that may impact upon the safety of users of the Bruce Highway. This Plan will be submitted to DTMR for review a minimum of three months prior to blasting. As these procedures will be developed in conjunction with DTMR it is not anticipated that there will be a decrease in the LOS to the Bruce Highway due to blasting activities associated with the Project.

### 3.5.5.3 Mining Equipment

The proposed mining method involves large truck and excavator mining with truck haulage direct to the crusher dump hopper or the ROM pad adjacent to each of the CHPPs. Based on this scenario the following equipment listed at Table 3-9 will be required to support open cut mining throughout the duration of the Project.

**Table 3-9 Mining equipment schedule**

Equipment Specification	Quantity			
	Operation 2022	Operation 2026	Operation 2030	Operation 2034
CAT 631G Scraper	1	1	1	1
789D Haul Truck	4	4	8	4
793D Haul Truck	8	12	36	4
RH170 Excavator	1	1	2	1
Liebherr 996 Excavator	2	3	9	1
SKS 270mm Drill	1	2	4	1
MD5150C Track Drill	1	2	3	1
D9 Dozer	1	4	4	1
D10 Dozer	2	3	5	2
D11 Dozer	2	3	4	2
HD605 Water Cart	2	3	4	2
16M Grader	2	2	2	2
24H Grader	1	2	2	1
B-Double Coal Haulage Units	2	3	8	2
992 Front End Loader	3	4	6	3
Service Truck	1	2	2	1
Pump Truck	1	2	2	1
Fuel Truck	1	1	3	1
Franner Crane	1	1	2	1
Service vehicles	10	14	19	10
Generator (520kVA)	3	6	6	3
Generator (300kVA)	3	5	5	3

### 3.5.5.4 Coal Handling System

The coal handling system consists of a ROM coal system, a product coal system and a rejects waste system. This incorporates simultaneous coal feed from the two open cut pits supplying the CHPPs. Materials handling capacity has been set at a maximum of 2.5 Mtpa of ROM coal for each CHPP. A schematic showing the coal handling system is shown in Figure 3-25.

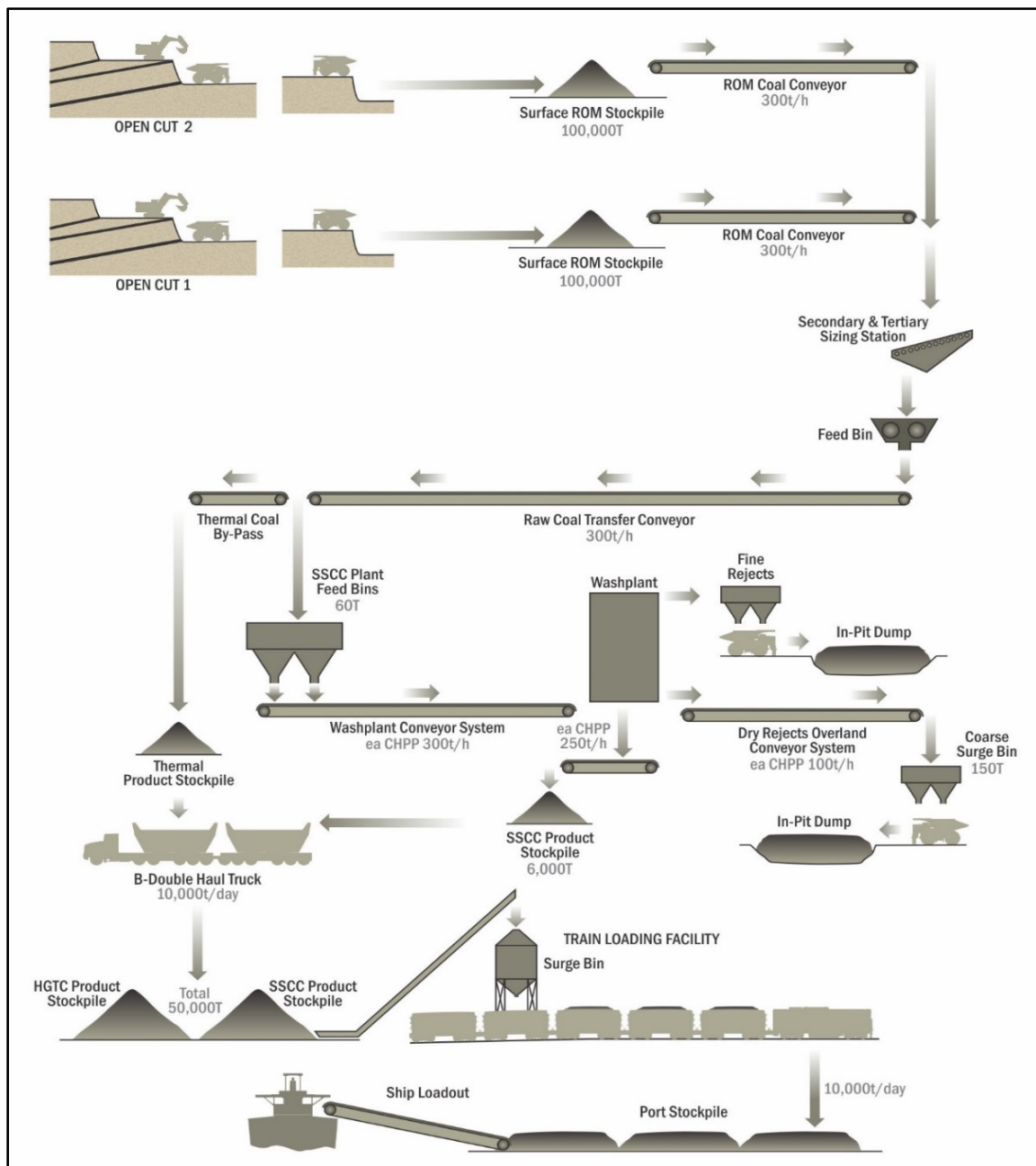


Figure 3-25 Coal handling system

### Raw Coal Plant Layout

Raw coal from the open cut operations will be transferred by truck to one of two 100,000 t capacity ROM pads. There will be one ROM pad, ROM bin and primary crusher arrangement servicing each of the open cut operations. Secondary and tertiary crushing stations will be located immediately after the primary crushing station. This stockpile will be no more than 30 m high.

Coal will be dumped directly into a ROM bin when the CHPPs are running at capacity or deposited into the ROM stockpiles to allow surge capacity. Reclaim feed to the ROM bin from the stockpile will be by front end loader. An elevated ROM pad will be constructed using a reinforced concrete design around the crusher pocket.

Primary crushing takes place immediately under the ROM feed bin. The primary sizer is a low speed sizer, a combination of high torque and low roll speeds with a unique tooth profile.

## Raw Coal Conveyor Configuration

ROM coal conveyors sized at 300 t/hour will deliver sized ROM coal to the overland conveyor streams. A single ROM coal conveyor will service each CHPP. Overland conveyors will then transfer the ROM coal from the crushers to the plant feed bin which will then feed into the CHPP.

## Coal Handling Preparation Plant

Two CHPPs will be required to process ROM coal delivered from each of the pits and increase the recovery of the coal resource. Each CHPP will remove (wash) the unwanted sediment and rock from the coal to improve the quality of coal exported to market. The first CHPP will be established to support operations at Open Cut 2. The second CHPP will be established to support operations at Open Cut 1.

A single conveyor sized at 300 t/hour will feed each of the CHPPs from the ROM stockpiles. At this point the feed will become a slurry through addition of water to transport and optimise feed conditions to de-sliming screens. The de-sliming screen will remove sub-sized particles from, and dewater, the dense medium cyclone feed. Screening is achieved by presenting particles to the screen deck surface and moving particles smaller than the aperture through the sieve surface. Vibration of the screen assists this process by stratifying the bed, giving particles more opportunity to present to the screen surface.

Both CHPPs will be based on conventional wet beneficiation processes using proven technology that is used extensively throughout the Australian coal industry, for example Daunia, Caval Ridge, Maules Creek and Bengalla. The coarse coal fraction (>1 mm to 50 mm) will be beneficiated in dense medium cyclones. In this process, the coarse material from the de-sliming screens is mixed with a magnetite / water medium and pumped to a single large diameter dense medium cyclone. Dense medium cyclones separate based on density with the high-density non-coal material reporting to coarse rejects stockpile and the lower density coal reporting to the product coal stockpile after dewatering in coarse coal centrifuges.

The fine ROM coal slurry from the de-sliming screens is pumped to a classifying cyclone module to remove the fine material and the bulk of the water from this stream. The fine coal fraction (<1 mm) will be beneficiated using spirals in a water-based separation. This produces dewatered fine coal that report to the product stockpile. Spirals reject is dewatered on high frequency screens with the coarse spirals reject particles reporting with the dense medium cyclone reject on the plant reject conveyor and the fine spiral reject particles reporting to the tailings thickener.

The proposed tailings system will be a simple filter press system. The filter press system requires the fine particles to be conditioned with flocculants, a process carried out within thickening tanks. The thickening process forms an aqueous tailings slurry allowing tailings to be transported via a pipe network to the filter press system. The filter press method utilizes filter presses to dewater tailings forming a dry paste. The water is recycled to each of the CHPPs while the tailings paste is conveyed to the rejects surge bin for disposal amongst the significantly more prolific overburden waste material. Excess water from the rejects containment structures is also recycled.

Coarse rejects will report from the CHPP to awaiting empty haul trucks via the coarse rejects conveyor which is sized at 100 t/hour. Loaded haul trucks will empty the coarse rejects to the coarse rejects emplacement area.

The reagents required to operate the flotation cell (diesel and Methyl Isobutyl Carbinol) will be provided and stored in a purpose-built storage. The storage will consist of one storage tank for each of the reagents located in a fully bunded area. Pumps and piping will transport the reagents from the storage tanks to the flotation circuit.

## Product Coal Handling

Both CHPPs will have a single product coal conveyor sized at 250 t/hour discharging washed coal to a product coal stockpile sized at 15,000 t capacity. Product coal stacking will be via a conventional elevated gantry conveyor.

The product coal stockpile at the TLF will have an operational capacity of 100,000 t. Product coal will be reclaimed from the TLF product coal stockpile via bulldozer and coal valve operation discharging coal onto a single reclaim tunnel conveyor. Reclaimed coal will be conveyed to the train load-out bin for loading into the wagons.

There will be approximately 1,110 train movements per year on average, subject to train and shipping schedules. A rail haulage provider will contract the rolling stock to transport coal. Product coal stockpiles will be less than 20 m high.

### 3.5.5.5 Rejects Disposal

Rejects and tailings disposal will be conducted in accordance with the Project's Mineral Waste Management Plan. Over the life of the mine, the total volume of excavated waste rock from open cut activities (i.e. overburden, interburden and fines from the CHPPs) is expected to be approximately 745 million bank cubic metres (Mbcm). This equates to approximately 893 million loose cubic metres (Mlcm) due to an average swell factor of 20%. The estimation of tonnage and volumes of waste rock and subsoils to be excavated during each year both annually and cumulatively is presented in Table 3-11.

The preferred method to dispose of mine waste is to truck rejects initially to ex-pit mineral waste rock stockpile areas and as the open cuts develop, coarse rejects and filter press tailings will be blended with overburden and disposed of within the overburden waste. These materials will be hauled as back loads to disposal areas using coal haulage trucks after they deliver ROM coal to the ROM stockpile. An estimation of the dump schedule presented in Table 3-12 and is shown at Figure 3-26 to Figure 3-28. Because of the optimised mine plan, there will be no retained voids at the completion of mine closure.

The waste materials as a whole (including waste rock and fine / coarse rejects) are expected to have low acid production potential. Geochemical characterisation was undertaken for a total of 195 samples (including overburden, potential rejects, and fine coal reject samples) from 15 bore holes covering a range of depths from 11.6 meters below ground level (mbgl) to 147 mbgl in various lithologies. The majority of samples were classifiable as non-acid forming (NAF). A total of four samples had positive Net Acid Production Potential (NAPP), two of which were classifiable as potentially acid forming (PAF; with ANC / MPA ratio <2 and NAPP >10 kg H<sub>2</sub>SO<sub>4</sub>/t), two as low capacity PAF (with Sulphide-sulphur (SCR) >0.2 % and NAPP between 0 and 10 kg H<sub>2</sub>SO<sub>4</sub>/t) and one sample was classified as uncertain (UC; with ANC / MPA ratio <2 and NAPP <0 kg H<sub>2</sub>SO<sub>4</sub>/t).

There was no discernible trend for which type of materials (waste rock or potential coal reject) would be more likely to contain PAF. As such fine coal rejects (21 samples) were also analysed to provide an indication of the acid potential and composition of the coal processing waste stream. Similar to the potential rejects and waste rock results the fine rejects were largely classifiable as NAF with ANC/MPA ratios indicative of negligible risk.

The acid potential for the fine rejects (tested to date) were summarised as follows:

- One sample was potentially acid forming (PAF-low capacity) (with NAPP 4.2 kg H<sub>2</sub>SO<sub>4</sub>/t);
- All other samples were non-acid forming (NAF) (most with relatively high buffering capacity); and
- Seven samples were acid consuming with acid neutralization capacity greater than 100 kg H<sub>2</sub>SO<sub>4</sub>/t.

The elemental composition of fine rejects was also similar to the potential rejects and waste rock samples which would suggest that components (in feed stocks) do not concentrate as a result of processing.

The estimated salinity of the waste materials produced during the operation is considered to be moderate (average electrical conductivity for waste rock fine/coarse rejects ranged from 0.5 dS/cm to 0.61 dS/cm) compared to the surface water electrical conductivity range (0.259 to 1.554 dS/cm) recorded in creeks and ponded surface water onsite.

The management of rejects will follow the principles of waste rock management. Fine rejects will be dewatered prior to their disposal using filter press technology to treat the rejects. Dried coarse rejects and filter pressed rejects will be mixed with overburden waste and strategically placed within both the out-of-pit waste rock stockpiles (during early stages of mining) and in the open cut mine void (latter stages).

Further discussion on the geochemical characteristics of the waste rock material is at Chapter 8 – Waste Rock.



**Table 3-10 Estimated waste generation schedule**

Project Period	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Overburden (Mbcm)	17.5	23.5	21.8	19.3	45.1	45.3	48.9	50.7	51.0	51.7	90.4	108.5	46.9	37.4	20.7	18.9	24.3	20.4	2.8	-
ROM (Mt)	1.0	2.0	2.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	7.0	10.0	4.0	4.0	2.0	2.0	2.0	2.0	0.3	-
SSCC Yield (%)	78%	78%	79%	78%	78%	77%	78%	77%	78%	80%	79%	76%	79%	79%	77%	77%	78%	79%	79%	-
HGTC Yield (%)	-	-	-	-	-	-	-	-	-	-	95.0%	95.0%	-	-	-	-	-	-	-	-
Total Product Coal (Mt)	0.8	1.6	1.6	1.6	3.1	3.1	3.1	3.1	3.1	3.2	5.7	8.6	3.2	3.1	1.5	1.5	1.6	1.6	0.2	-

**Table 3-11 Estimated waste material dump schedule**

Year	Volume (bcm)	Accumulative Volume (bcm)	In-Pit Dump (lcm)*	Ex-Pit Dump (lcm)*	In-Pit Pit-2 (lcm)*	In-Pit Pit-1 (lcm)*	Ex-Pit Pit-2 (lcm)*	Ex-Pit Pit-1 (lcm)*	CHPP Total Reject (lcm)*	CHPP-1 (lcm)*	CHPP-2 (lcm)*
2019	17,466,943	17,466,943	-	20,652,602	-	-	20,652,602	-	0.16	0.16	-
2020	23,484,680	40,951,623	23,013,018	5,852,812	23,013,018	-	5,852,812	-	0.32	0.32	-
2021	21,795,756	62,747,379	18,745,012	8,407,100	18,745,012	-	8,407,100	-	0.30	0.30	-
2022	19,294,231	82,041,610	15,110,425	7,860,845	15,110,425	-	7,860,845	-	0.32	0.32	-
2023	45,088,050	127,129,660	50,699,732	4,952,988	50,699,732	-	4,952,988	-	0.64	0.32	0.32
2024	45,323,248	172,452,908	53,640,488	1,435,232	53,640,488	-	1,435,232	-	0.65	0.33	0.33
2025	48,878,434	221,331,342	58,505,644	-	58,505,644	-	-	-	0.64	0.32	0.32
2026	50,704,658	272,036,000	58,743,568	-	58,743,568	-	-	-	0.67	0.33	0.33
2027	51,034,114	323,070,114	58,168,936	-	58,168,936	-	-	-	0.63	0.31	0.31
2028	51,747,828	374,817,942	40,020,392	12,330,058	40,020,392	-	-	12,330,058	0.59	0.29	0.29
2029	90,415,084	465,233,026	81,995,222	28,240,654	59,312,848	22,682,374	-	28,240,654	0.92	0.46	0.46
2030	108,488,055	573,721,082	129,691,066	-	77,789,870	51,901,196	-	-	1.01	0.51	0.51
2031	46,947,572	620,668,653	58,004,920	-	58,004,920	0	-	-	0.59	0.29	0.29
2032	37,370,775	658,039,429	48,077,593	-	42,381,452	5,696,141	-	-	0.61	0.31	0.31
2033	20,660,061	678,699,490	27,021,770	-	-	27,021,770	-	-	0.33	0.33	-
2034	18,913,056	697,612,546	21,629,290	-	-	21,629,290	-	-	0.33	0.33	-
2035	24,254,908	721,867,454	28,835,770	-	-	28,835,770	-	-	0.32	0.32	-

Year	Volume (bcm)	Accumulative Volume (bcm)	In-Pit Dump (lcm)*	Ex-Pit Dump (lcm)*	In-Pit Pit-2 (lcm)*	In-Pit Pit-1 (lcm)*	Ex-Pit Pit-2 (lcm)*	Ex-Pit Pit-1 (lcm)*	CHPP Total Reject (lcm)*	CHPP-1 (lcm)*	CHPP-2 (lcm)*
2036	20,372,822	742,240,276	25,875,336	-	-	25,875,336	-	-	0.30	0.30	-
2037	2,805,754	745,046,029	2,521,695	-	-	2,521,695	-	-	0.05	0.05	-
<b>Total</b>	<b>745,046,029</b>	<b>745,046,029</b>	<b>800,299,877</b>	<b>89,732,291</b>	<b>614,136,305</b>	<b>186,163,572</b>	<b>49,161,579</b>	<b>40,570,712</b>	<b>9.36</b>	<b>5.89</b>	<b>3.47</b>

\* The difference between BCM and LCM is due to a swell factor of approximately 20%

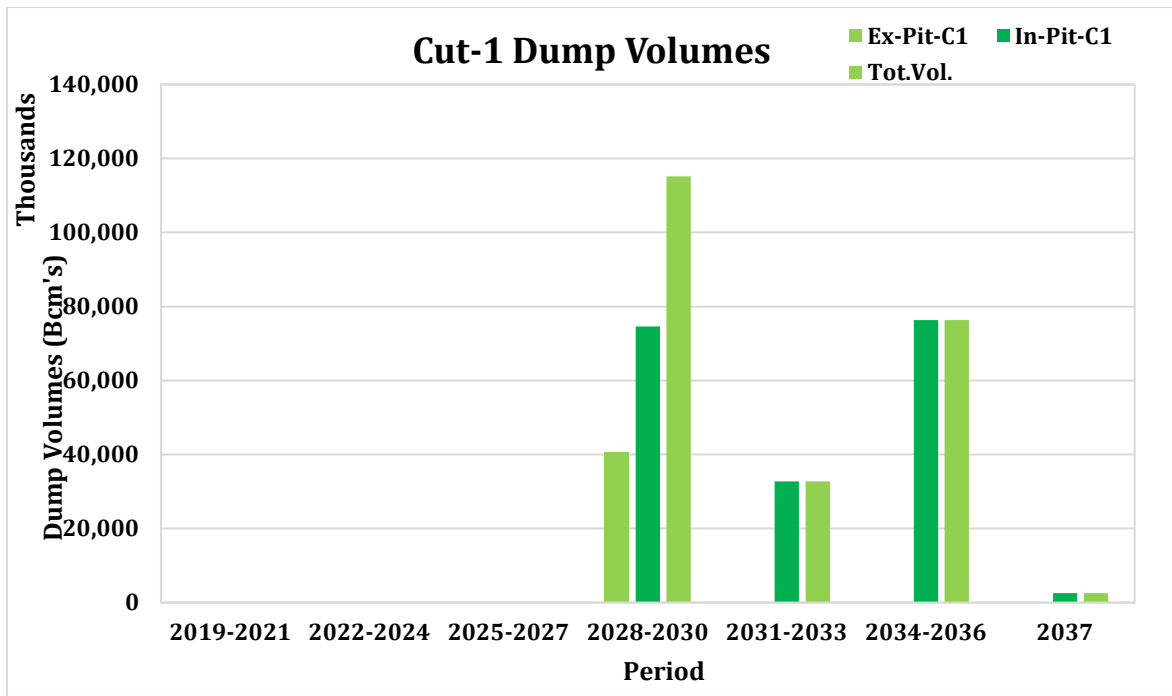


Figure 3-26 Waste material dump schedule – Open Cut 1

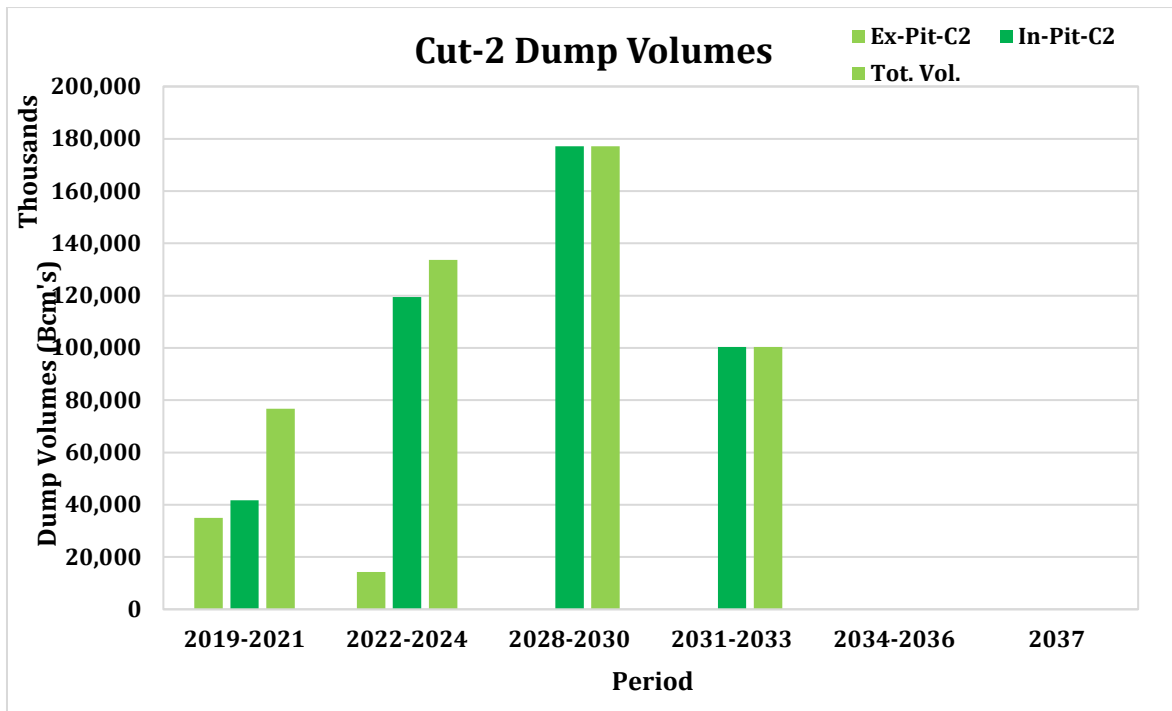


Figure 3-27 Waste material dump schedule – Open Cut 2

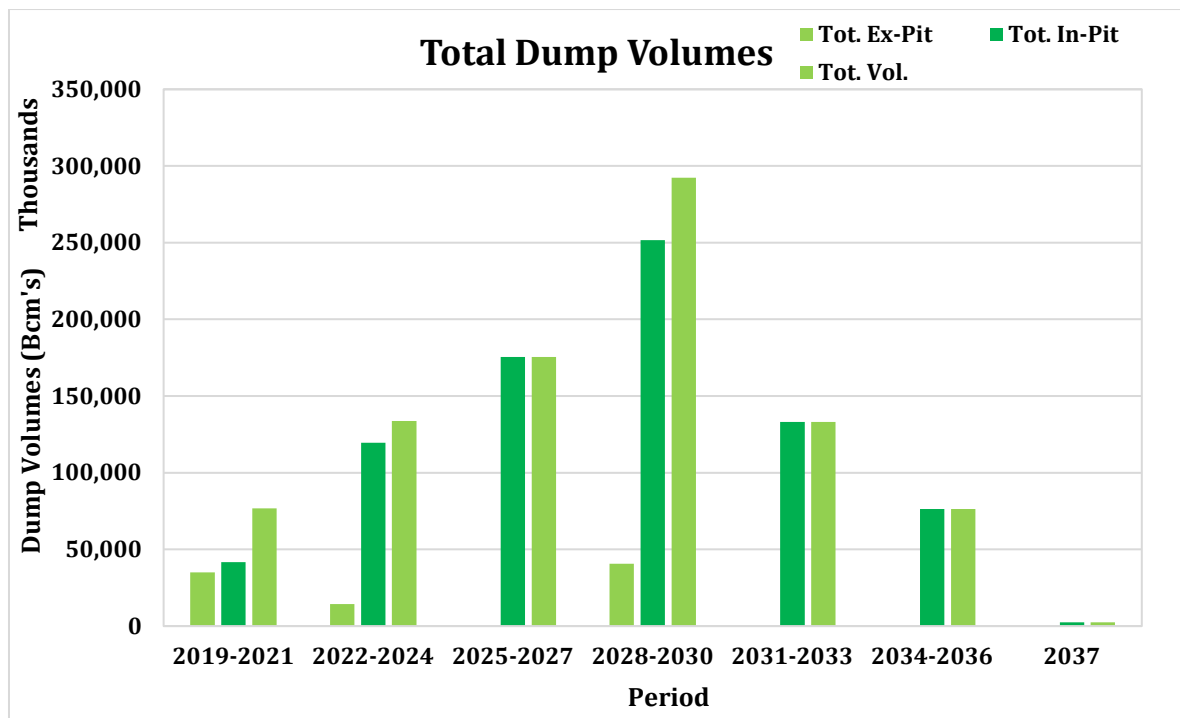


Figure 3-28 Waste material dump schedule – total volume

### 3.5.6 Water Management

A schematic of the proposed water management network for the Project is shown in Figure 3-29. The maximum total annual demand excluding water re-use is calculated at 804 Megalitres (ML) at 2030 and mining 10 Mtpa ROM. Dust suppression and coal washing form the major water demands. This water requirement will be supplied from harvesting on-lease stormwater runoff, mine affected water from pit dewatering activities and water reuse within the CHPP. These combined sources provide a 99% reliable supply. In times of extreme drought, dust suppression, product moisture correction and coal washing water use will be decreased and / or alternative water supply options explored to sustain operations. The updated mine water balance is discussed Chapter 9 – Surface Water.

The water within the mine site can be divided into four main classes as follows:

- Raw water – clean water runoff from catchments that are undisturbed or relatively undisturbed by mining activities;
- Sediment laden water – surface water runoff from disturbed catchments such as the active MIA and waste rock stockpiles, all of which could contain elevated levels of sediment;
- Mine affected water – water collected in open mine pits from groundwater ingress or surface water runoff, likely to contain elevated levels of salts and metals; and
- Contaminated water - surface water runoff and process water which could potentially contain hydrocarbons, salts or other chemical contaminants, possibly because of unintended spills.

The primary objective of site water management is to separate clean water and dirty water runoff for appropriate management, to maximise water harvesting for supply operations, to contain contaminated water for reuse and to prevent uncontrolled discharges.

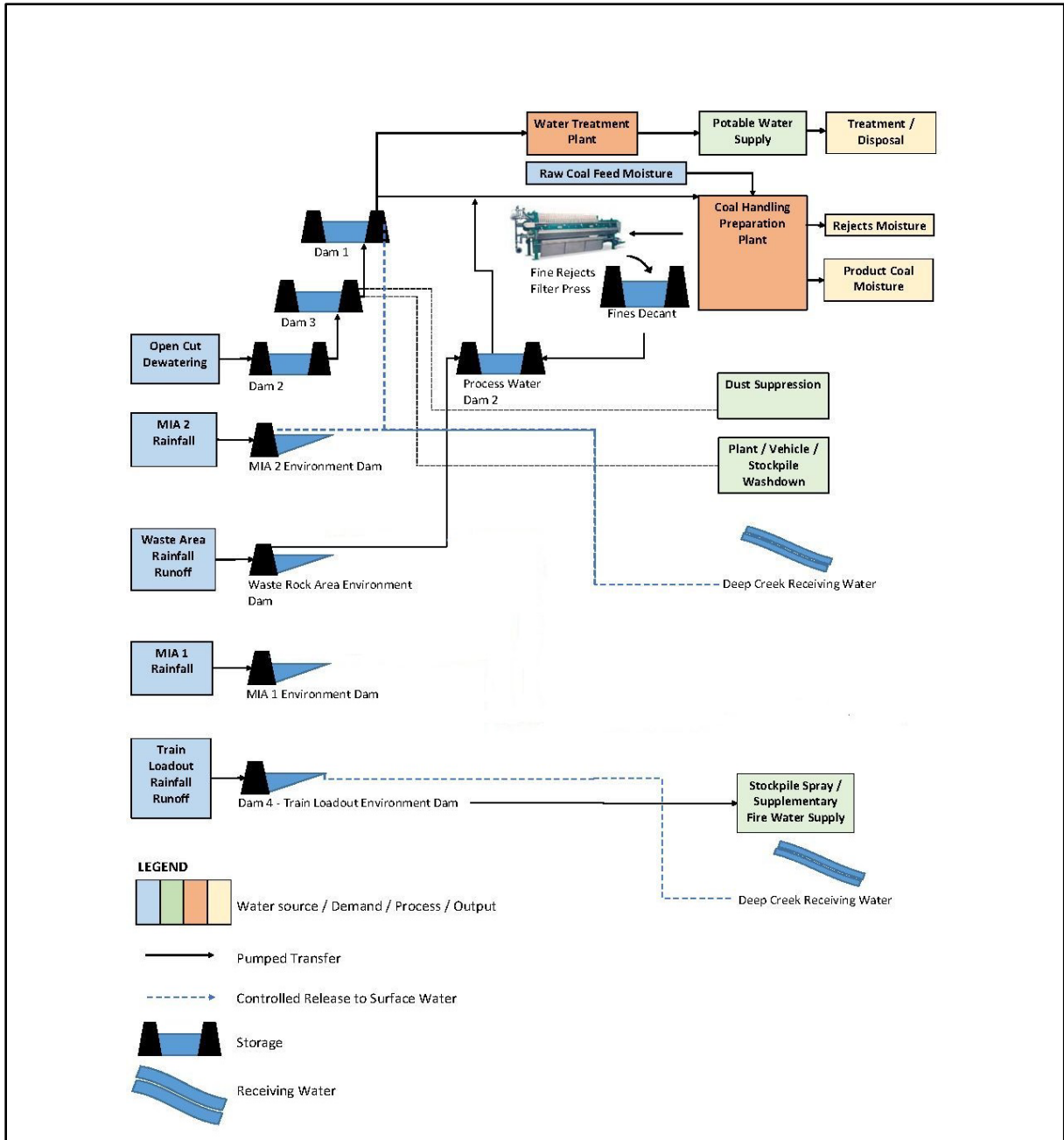


Figure 3-29 Water balance schematic

The proposed water management system for the Project principally comprises the following components:

- The collection of mine affected water in water storages for reuse;
- The collection of sediment laden runoff from the MIAs, TLF and waste rock stockpiles, for treatment and reuse and / or discharge;
- The transfer of water from the raw water dams, pit dewatering and environmental dams to the process water dam (PWD) at each MIA / CHPP where it is used for coal washing;
- The decant of effluent from coal washing activities and reuse of decant water within the CHPPs;
- The use of water by the workforce, industrial processes, dust suppression and for firefighting (if required); and
- The managed release of mine affected water to receiving waters, governed by flow conditions, and water quality objectives.

### 3.5.6.1 Project Water Demand

Project water usage including potable water, emergency use water (fire), raw water and mine water is outlined in Table 3-12. An updated detailed discussion and assessment of water usage including water balance is described in Chapter 9 – Surface Water. The water demand for rehabilitation and mine closure during 2036 - 2038 will likely be significantly lower than the demands during the operations of the mine. Water demands during rehabilitation stages is assumed to be 20 ML sourced from environmental dams and pit dewatering and will be finalised during detailed design.

**Table 3-12 Mine water demands (estimated)**

LOM Year	ROM (Mt)	Potable Demand (ML)	CHPP Demand (ML)	Dust Suppression Demand (ML)	Washdown Demand (ML)	Sewer (ML)	Total Water Demand (ML)
1	1	6.3	60	150	36	5.6	255
2	2	6.3	121	150	36	5.6	320
3	2	6.3	121	150	36	5.6	320
4	2	6.3	121	150	36	5.6	320
5	4	6.3	242	150	36	5.6	440
6	4	6.3	242	150	36	5.6	440
7	4	6.3	242	150	36	5.6	440
8	4	6.3	242	150	36	5.6	440
9	4	6.3	242	150	36	5.6	440
10	4	6.3	242	150	36	5.6	440
11	7	6.3	424	150	36	5.6	630
12	10	6.3	606	150	36	5.6	804
13	4	6.3	242	150	36	5.6	440
14	4	6.3	242	150	36	5.6	440
15	2	6.3	121	150	36	5.6	320
16	2	6.3	121	150	36	5.6	320
17	2	6.3	121	150	36	5.6	320
18	0.3	6.3	18	150	36	5.6	215

Dams 1, 2 and 3 are on the eastern side of Open Cut 2. Dam 1 will also capture water from Open Cut 1, which will be pumped via the conveyor culvert when operational. Dam 4 will capture run-off from the TLF area. Dam 3 and Dam 2 report to Dam 1; however, the transfer arrangement will facilitate the transfer of water between Dams 1, 2 and 3 as necessary. Dam 1 will be the main water source for potable, CHPP and washdown water.

A 700 ML dam (Dam 1) is proposed to provide a secure water supply for both construction and operational phases and involves impounding a tributary drainage feature of Deep Creek to provide a reliable water supply over the life of the mine. The construction design drawings for Dam 1 are presented in Appendix A16.

The Dam 1 will supply all water for the site for potable use (after first undergoing treatment), and raw water for plant washdown and makeup water for the CHPP. The makeup water demand is determined by the balance between incoming and outgoing coal and rejects moisture content, water required for coal washing, and decant water return from the CHPP decant ponds. The wet fines from coal washing will pass a filter press with an estimated 40 to 60% moisture recovery rate. The MIA environmental dam will provide dust suppression.

In general, reuse of water captured on site in environmental dams and mine dewatering to Dam 2 will take preference over raw water use. Suitable applications for reuse water include CHPP makeup water, dust suppression and stockpile sprays, and vehicle washdown. The water will be sourced from the dam location and / or transferred to the MIA process water dams (MIA Dams) for coal washing use within the CHPP. A simple water balance for the 5 Mtpa ROM scenario is shown in Figure 3-30.

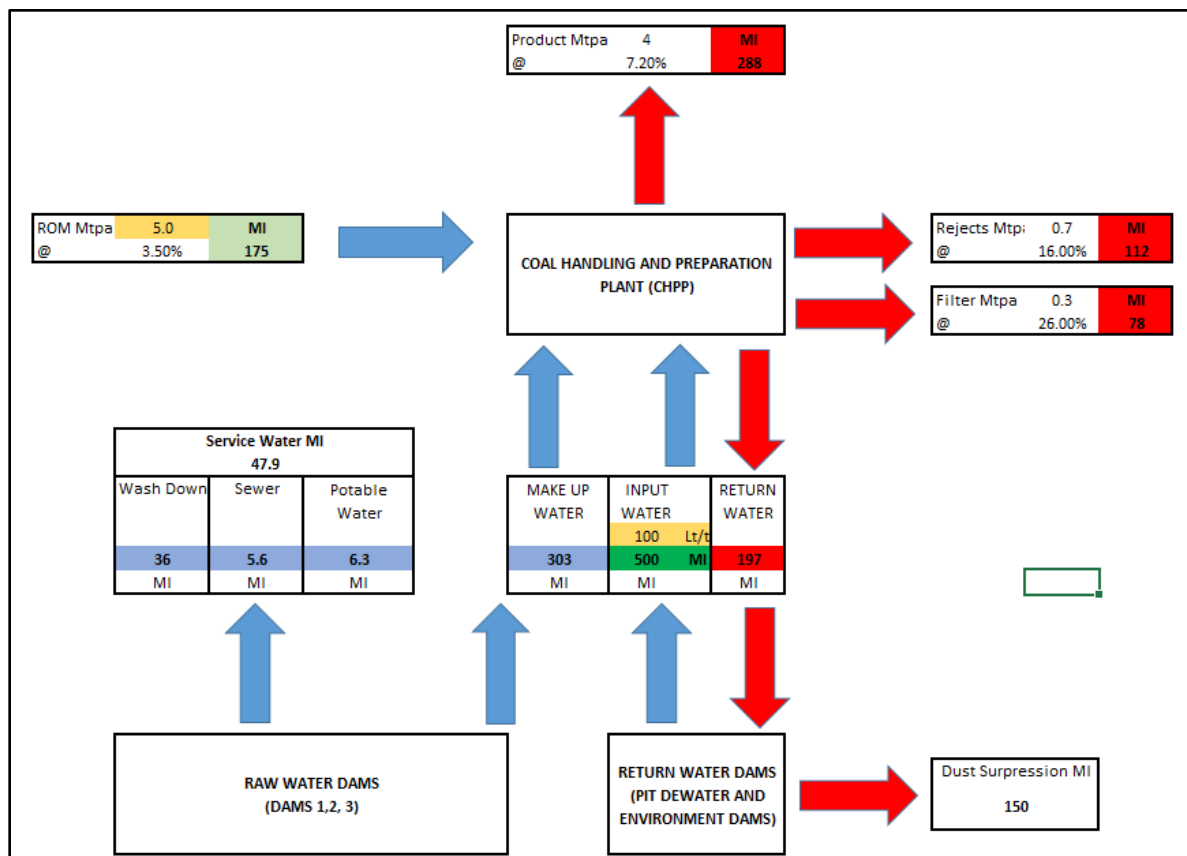


Figure 3-30 Water balance calculations

Environmental dams are proposed to capture rainfall runoff from the CHPPs, TLF and waste rock stockpile areas. The primary function of the environmental dams is to capture sediment laden runoff for sediment removal. Captured water in environmental dams will be prioritised for CHPP and MIA use (MIA and waste rock stockpile environmental dams) and for dust suppression, stockpile spray and supplementary fire supply (TLF environmental dam).

Oil / water separators are proposed for vehicle wash and workshop areas to treat hydrocarbon contaminated runoff prior to release or containment in environmental dams.

Fire water supply provisions are incorporated into Dam 1 storage capacity. A total of 5 ML has provisionally been included in Dam 1 for this water resources assessment. It is anticipated that these stores be replenished post use and that the total volume is available for firefighting activities during operations. Additional fire water supply will be provided at the TLF in closed storage tanks primarily designated for dust suppression supply.

### 3.5.6.2 Potable Water

A potable water demand of approximately 6.3 ML/annum is estimated for the mine at full operating capacity. All potable water will be procured, transported, treated monitored and stored in compliance with the Australian Drinking Water Guideline 2011 (NHMRC and NRMMC 2018). Potable water will be transported to site by water tankers initially during construction. A batch WTP will be commissioned and will involve treatment of groundwater bore or raw water supplies to drinking water standards. The capacity of the WTP will be 18 kilolitres per day (kl/d). The WTP would be modular in design and can be readily procured, installed and operated to comply with the Australian Drinking Water Guideline 2011 (NHMRC and NRMMC 2018). Additional unit/s can be added if required to meet any increases in demand. Sludge from the water treatment effluent stream will be disposed of in-pit or transported offsite to an authorised waste facility.

The management of the WTP will be undertaken by employees and contractors that are appropriately skilled and trained in the management and operation. Process controls will be established to ensure the effective and efficient management of the WTP and will include:

- Documentation of effective operational procedures, including identification of responsibilities and authorities;
- Establishment of a monitoring protocol for operational performance, including selection of operational parameters and criteria, and the routine review of data;
- Establishment of corrective actions to control excursions in operational parameters;
- Use and maintenance of suitable equipment; and
- Use of approved materials and chemicals in contact with drinking water.

Process control programs will be documented in the WTP operations manual, which will be readily accessible to all appropriate personnel. The operations manual will include descriptions of:

- Preventive measures and their purpose;
- Operational procedures for relevant activities;
- Operational monitoring protocols, including parameters and criteria;
- Schedules and timelines;
- Data and records management requirements;
- Corrective actions to be implemented;
- Maintenance procedures;
- Responsibilities and authorities; and
- Internal and external communication and reporting requirements.



As potable water will be used exclusively on site for mining related purposes there is no requirement for Central Queensland Coal to be registered as a Drinking Water Service Provider (DWSP) as regulated by the *Water Supply (Safety and Reliability) Act 2008* and the *Public Health Act 2005*. The *Water Supply (Safety and Reliability) Act 2008* at Schedule 3 states *inter alia*, that registration as a water service provider is not required where the service supplied by infrastructure is used solely for mining purposes; or, the service is used only by the owner of the infrastructure or the owner's guests or employees.

### 3.5.6.3 Clean Water Runoff Management

Clean water is defined as runoff from catchments undisturbed by mining and non-mining activities. The mine has been designed to avoid any diversions of defined watercourses of high environmental value, namely Deep Creek and Tooloombah Creek. However, low order tributary gullies that discharge into Deep Creek and Tooloombah Creek and that transect the ML are diverted around mine affected areas. These clean water diversions are aimed at maintaining the health of defined watercourses of higher environmental value and to reduce contamination of otherwise clean water runoff.

### 3.5.6.4 Contaminated Water Management

Several types of dams will be required to hold mine affected runoff, including:

- Environmental dams that capture rainfall runoff from the two CHPP / MIA areas, TLF and waste rock stockpile areas. The primary function of the environmental dams is to capture sediment laden runoff for sediment removal. A perforated riser pipe outlet is proposed to allow gravity draining of the sediment dam within 48 hours of filling. A gated outlet is proposed for potentially storing water for use (overburden and CHPP environmental dams) or for stockpile spray and supplementary fire supply (TLF environmental dam – Dam 4). Oil / water separators are proposed for vehicle wash and workshop areas to treat hydrocarbon contaminated runoff prior to release or containment in environmental dams;
- A PWD located at each MIA that supplies water to the CHPP. The PWD holds a 14-day CHPP demand volume to buffer against water supply maintenance and breakdown. The PWD is kept full from transfers from the pit dewatering (priority 1) and the raw water dam (Dam 1) (priority 2). The PWD does not discharge to the environment and has a design storage allowance to ensure overtopping does not occur;
- CHPP dewatering ponds that accept high moisture coal fines from coal washing and facilitate decant return to the PWD for reuse within the CHPP. The dewatered fines are then stored in exhausted mine pits; and
- Open cut pits that contain a sump (nominally 5 ML) from which groundwater inflow and rainfall runoff is stored. Water is transferred from the pit sump to an ex-pit dam at an indicative rate of 100 l/s.

### 3.5.6.5 Regulated Structures – Dams and Levees

All proposed storages and levees have undergone preliminary assessment under the Structures which are Dams or Levees Constructed as part of Environmentally Relevant Activities (ESR/2016/1934, Version 8.01, 2017) and the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933 Version 5.01, 2016) to determine the

minimum hydraulic performance requirements. This assessment has considered each of the following failure event scenarios:

- ‘Failure to contain – seepage’ – spills or releases to ground and/or groundwater via seepage from the floor and/or sides of the structure;
- ‘Failure to contain – overtopping’ – spills or releases from the structure that result from loss of containment due to overtopping of the structure; and
- ‘Dam break’ – collapse of the structure due to any possible cause.

A summary of the consequence assessment is shown in Table 3-13. Dam 1, Dam 2, Dam 3, Dam 4, MIA 1 and MIA 2 were classified under the “significant” consequence category for the “failure to contain-overtopping” and “dam break” scenarios. Levees were determined to be regulated structures and hence must have a crest elevation higher than the peak 0.1% AEP flood level.

The “failure to contain – seepage” scenario has a minimum classification of “significant” in the consequence manual. Leak detection and monitoring may be imposed through EA conditions for regulated dams containing contaminants, such as the MIA dams, Dam 4 at the train load-out, and Dam 2 receiving the pit dewatering. Design provisions for these dams include the use of, where practicable, low permeability clay as the dam foundation or liner to prevent the migration of contaminants.

**Table 3-13 Consequence assessment summary**

Storage	Scenario	Consequence Category	Overall Consequence Category	Comments
Dam 1	Failure to Contain	Low	Significant	Clean water (treated by prior environmental and holding dams) with negligible environmental harm expected from overtopping discharge when conducted in a controlled manner consistent with approval conditions.
	Dam Break	Significant		The 700 ML storage capacity is not considered a likely risk to populations and infrastructure downstream; however, it is a final receiving location and may be subject to cascading failure. This risk will be incorporated into the dam and spillway design.
Dam 2 – 600 ML	Failure to Contain	Significant	Significant	Possible harm to the receiving environment of moderate or significant values; however, the harm is unlikely to meet the thresholds for the “High” consequence category.
	Dam Break	Low		Possible harm to the receiving environment of moderate or significant values due to contaminant release. Volume reports via transfer channel to Dam 3.
Dam 3 – 150 ML	Failure to Contain	Significant	Significant	Possible harm to the receiving environment of moderate or significant values; however, the harm is unlikely to meet the thresholds for the “High” consequence category.
	Dam Break	Low		Possible harm to the receiving environment of moderate or significant values due to contaminant release. Volume is too small to be considered a risk to populations and infrastructure downstream. The MIA 1 dam has a small containment volume of ~30 ML and is unlikely to result in a downstream population at risk.

Storage	Scenario	Consequence Category	Overall Consequence Category	Comments
Dam 4 – 200 ML (Train Loadout)	Failure to Contain	Significant	Significant	Possible harm to the receiving environment of moderate or significant values; however, the harm is unlikely to meet the thresholds for the “High” consequence category.
	Dam Break	Significant		Possible harm to the receiving environment of moderate or significant values due to sediment entrainment on release. Volume is too small to be considered a risk to populations and infrastructure downstream. The Dam 4 has a small containment volume of ~200 ML and is unlikely to result in a downstream population at risk.
MIA 1 Dam (Process Water)	Failure to Contain	Significant	Significant	Possible harm to the receiving environment of moderate or significant values; however, the harm is unlikely to meet the thresholds for the “High” consequence category.
	Dam Break	Significant		Possible harm to the receiving environment of moderate or significant values due to contaminant release. Volume is too small to be considered a risk to populations and infrastructure downstream. The MIA 1 dam has a small containment volume of ~30 ML and is unlikely to result in a downstream population at risk.
MIA 2 Dam (Process Water)	Failure to Contain	Significant	Significant	Possible harm to the receiving environment of moderate or significant values; however, the harm is unlikely to meet the thresholds for the “High” consequence category.
	Dam Break	Significant		Possible harm to the receiving environment of moderate or significant values due to contaminant release. Volume is too small to be considered a risk to populations and infrastructure downstream. The MIA 2 dam has a small containment volume of ~30 ML and is unlikely to result in a downstream population at risk.
Environmental Dams	Failure to Contain	Low	Low	Sediment laden, but otherwise clean water with negligible environmental harm expected from overtopping discharge coinciding with extreme rainfall events and consistent with approval conditions.
	Dam Break	Low		Volume is too small to be considered a risk to populations and infrastructure downstream.
Levee	Dam Break	Regulated Structure	Regulated Structure	Levees are designed to prevent ingress of clean flood water into an operational area or containment system.

Only dams with an embankment height of greater than 10 m may possibly be categorised as “referrable”, thus requiring a Failure Impact Assessment (FIA). The FIA will be conducted in accordance with the Queensland Government Department of Energy and Water Supply (DEWS) - *Guidelines for Failure Impact Assessment of Water Dams*. Dam 1 could possibly fall within this category, pending the outcomes of further assessment and final detailed design. The dam FIA, if required, will be undertaken as outlined in the *Guidelines for Failure Impact Assessment of Water Dams* (DNRME 2018). The population at risk (PAR) determined by the FIA will inform the failure impact category that applies to the dam and subsequently the minimum design requirements outlined in applicable Australian National Committee on Large Dams guidelines.

The chief executive will then impose dam safety conditions, which are likely to include the following:

- The provision of design and construction reports;
- The preparation of an Emergency Response Plan as prescribed by the DEWS guideline for referable dams;
- The production of Operation and Maintenance Manual procedures in accordance with DNRME guidelines; and
- Development of standard operating procedures.

It is not anticipated that any of the dams conceptualised herein will create a PAR due to the sparse population density and small containment volume of the dams. Furthermore, except for environmental dams, no other storages have external contributing catchments, and therefore can only overtop if the pumps that feed water to the storages fail to shut off at full supply level, or in the unlikely case of extremely intense rain falling directly on to the storage. The spillways will therefore be designed to pass the maximum pump rate that supplies each storage to mitigate against dam break due to overtopping failures.

#### **3.5.6.6 Existing Water Users**

The Project is generally situated within the “Mamelon” cattle grazing property, which runs cattle and produces dryland cropping. A small section of the haul road is located within “Brussels” and the TLF within “Strathmuir”. The Mamelon property is owned by the Proponent and is currently being leased for cattle grazing and use. Supporting this land use is a series of farm dams and surface contour bunds that capture and store runoff generated by the local contributing catchments. Groundwater bores also lift water to dams and / or storage tanks in the surrounding region for domestic and stock water use (refer to Chapter 10 – Groundwater for further discussion).

There are several surface water entitlements in Tooloombah and Deep Creek for irrigation, stock and domestic supply. These entitlements are summarised in Table 3-14. The entitlements that may be impacted by the Project by being located adjacent to or downstream of operations include the following:

- 119/CP900367 - Irrigation entitlement located on parcel of land adjacent to the Mamelon property, separated by Deep Creek, and approximately 3 km downstream of mine infrastructure and environmental dam release point locations on Deep Creek;
- 1/RP616700 - Domestic / stock supply entitlement located on parcel of land adjacent to the Mamelon property and straddling Tooloombah Creek. The extraction point appears to supply a small off-stream storage on the western overbank of Tooloombah Creek, on the Bar-H property; and
- 45/MPH26062 - Irrigation entitlement on parcel of land directly bordering the Project to the north and extracting approximately 6 km downstream of the Bruce Highway on Tooloombah Creek.

**Table 3-14 Environmental values for waters associated with the Project**

Water Source	Location	Authorised Use	Entitlement Per Water Year	Maximum Extraction Rate	Water Name / Type
Tooloombah Creek	1/RP616700	Domestic Supply; Stock	18.0 ML	-	Tooloombah Creek / Watercourse (Surface Water)
Deep Creek	119/CP900367	Irrigation	20.0 Ha	-	Deep Creek / Watercourse (Surface Water)
Tooloombah Creek	45/MPH26062	Irrigation	8.0 Ha	-	Tooloombah Creek / Watercourse (Surface Water)

### 3.5.6.7 Storage Assessment

Based on the consequence assessment summarised in Table 3-13, the following Design Storage Allowance, Extreme Storm Storage and spillway capacities have been selected in accordance with the Department of Environment and Science (DES) consequence manual:

- Spillway capacity of 1% AEP with freeboard allowance for wave run-up from a 9.5% AEP wind;
- Design Storage Allowance for a 4.9% AEP wet season;
- Water balance modelling informed the 4.9% AEP wet season storage through simulation of 127 years of historic climate data and by adding a 50% contingency to the increase in storage volume from 1 November; and
- Extreme Storm Storage for a 9.5% AEP, 72 hr duration rainfall event. The corresponding 9.5% AEP, 72 hr design rainfall depth is 300 mm, per the BoM's Intensity Frequency Duration curves for the Project location.<sup>1</sup>

The MIA 1 and MIA 2 dams (PWDs) are designed as turkey's nest storages with no external contributing catchment. Contributing catchments to environmental dams are restricted to the area of disturbance generating dirty water runoff i.e. clean water runoff is kept separate and diverted around areas of disturbance. The required storage size for the dams was informed by simulating the mine water balance as discussed in Chapter 9 – Surface Water, Section 9.7.1 and / or by applying the following performance criteria:

- Dam 1, Dam 2 and Dam 3 combined – Provide 99% reliable water supply for the life of the Project;
- Environmental Dams – Sized to capture the 9.5% AEP year 24 hr duration storm event in accordance with The DES *Stormwater Guideline* (EHP 2014a);
- Pit dewatering to Dam 2 – Sized to have no non-compliant discharges for the maximum rainfall and assuming licenced discharges, dust suppression and washdown demands, and transfer to the MIA for use within the CHPP; and
- MIA 1 and MIA 2 Dams – Sized to have no non-compliant discharges for the maximum rainfall and assuming return of decant.

A summary of the storage sizing assessment is at Table 3-15.

<sup>1</sup> IFD curves sourced from: <http://www.bom.gov.au/hydro/has/cdirswebx/cdirswebx.shtm> for coordinates 21.69 m S and 149.66 m E

**Table 3-15 Storage sizing assessment summary**

ID	Storage	Design Capacity (ML)	Regulated Structure (Y/N)	Indicative Footprint (ha)	Design Storage Allowance	Indicative Footprint with DSA (ha)	Extreme Storm Storage (ESS)	Spillway Capacity
1	Dam 1	700	N	22.5	150 ML based on 4.9% AEP wet season volume increase plus 50%	14.6	41 ML based on a storage surface area of 13.5 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.
2	Dam 2	600	N	11.2	130 ML based on 4.9% AEP wet season volume increase plus 50%	14.2	40 ML based on a storage surface area of 11.2 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.
3	Dam 3	150	N	3.6	28 ML based on 4.9% AEP wet season volume increase plus 50%	4.1	9.5 ML based on a storage surface area of 3.6 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.
4	MIA 1 Process Water Dam	30	Y	1.6	17 ML based on 4.9% AEP wet season volume increase plus 50%	2	6 ML based on a storage surface area of 1.6 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.
5	MIA 2 Process Water Dam	30	Y	1.6	17 ML based on 4.9% AEP wet season volume increase plus 50%	2	6 ML based on a storage surface area of 1.6 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.
6	MIA 1 Environmental Dam	30	N	1.7*	N/A	N/A	N/A	1% AEP rainfall#
7	MIA 2 Environmental Dam	30	N	1.7*	N/A	N/A	N/A	1% AEP rainfall#
8	Dam 4 TLF	200	N	10.6*	70 ML based on 4.9% AEP wet season volume increase plus 50%	11.7	32 ML based on a storage surface area of 10.6 ha and 300 mm rainfall depth	0.2% AEP rainfall or pump supply rate, whichever is greater.

#1% AEP spillway capacity proposed for environmental dams that are not regulated structures

\*Dam areas calculated on an assumed average depth of 3m

### 3.5.7 Mine Infrastructure

#### 3.5.7.1 Mine Industrial Area

MIAs will be located adjacent to each of the CHPPs. The likely MIA arrangement for both CHPPs is shown at Figure 3-11. The key components of each MIA are:

- Administration offices and staff parking;
- Petroleum, oil and lubricant storage and handling facilities;
- Vehicle and equipment wash down facilities;
- Vehicle fuelling facilities;
- Workshops and stores facilities;
- Laydown and hardstand areas;
- Electrical power substations and associated facilities;
- Raw water supply for potable water production, firefighting, coal dust suppression and coal washing; and
- Internal road network including light-vehicle access roads, heavy-vehicle haul roads and a site access road.

Diversion structures will be formed at each of the MIAs to direct clean water around the area and direct potentially contaminated water to an environmental control pond. Areas storing fuels or oils and washdown areas will be appropriately designed and bunded with runoff from these areas directed to a sump to separate oils and water prior to releasing water to the environment control pond.

#### **Administration Facility**

The administration facility will provide office facilities for staff, a muster area for shift changes and locker room and change facilities for personnel. Access to the administration facility will be via two-way internal access roads. Key features of the administration facility are likely to include:

- Conformity with the building requirements in accordance with the Building Code of Australia and the Queensland Development Code;
- Air-conditioned office facilities, kitchen facilities, toilets, safety showers, meeting and training rooms and information technology rooms;
- Crib room with a covered area, sized to accommodate shift changes;
- Centrally located muster area;
- Car parking for light vehicles and bus drop off;
- First aid facility;
- Emergency equipment store and fire vehicle garage; and
- External lighting.

## Workshop and Stores

Workshop facilities will be centrally located at each of the MIAs for servicing heavy mining equipment and are proposed to include the following features:

- Maintenance bay for servicing mine site vehicles (including tyre change area and equipment store);
- Secure store;
- Electrical, tools, hydraulics machining and welding shops;
- Covered drum store and bunded lube area;
- Eyewash and shower facilities;
- Switchboard and compressor;
- Covered battery storage area; and
- Secure waste storage hardstand area.

A workshop will also be located at the TLF for the product coal haulage contractor.

## Fuel Facility

During peak production, it is estimated that approximately 163.58 ML of diesel fuel will be consumed. This consumption rate will decrease to approximately 0.73 ML as the open cut operations cease.

The fuel storage facility will be located at the MIA and will comprise several interconnected self-bunded bulk diesel storage tanks, with a single storage tank located at the TLF for refuelling the QR Diesel Locomotives. It is anticipated that approximately 770,000 L of diesel will be stored onsite at the two fuel storage areas. Diesel will be reticulated to heavy vehicle service bays, and heavy and light vehicle bowsers. Access to the fuel facility will be via the internal MIA access roads. The fuel facility will be designed and located at a safe operating distance from other MIA and surrounding facilities in accordance with Australian Standard AS1940 - The Storage and Handling of Flammable and Combustible Liquids.

There will be no in-field fuel storage. Fuel trucks will transfer fuel from the fuel storage tanks to mine vehicles.

## Petrol Oil Lubricant Storage and Handling Facilities

The petroleum, oil and lubricant will be located at the MIA. The petroleum, oil and lubricant facility is anticipated to store various quantities of transmission oil, hydraulic oil, diesel engine oil, final drive oil and waste oil. In addition, the facility will have a storage capacity for lubricants and coolants. The petroleum, oil and lubricant facility will also comprise:

- Self-bunded lube and oil storage tanks for several different types of oil and lubricants;
- Hardened on ground oil and lube tanker unloading area, allowing for oil transfer from the delivery vehicle to the storage tanks; and
- Some reticulation of oils and lubricants depending on the final configuration of the MIA facilities.



## Washdown Facilities

Heavy vehicle and light vehicle washdown facilities will be located at the MIA. The washdown facilities will comprise:

- Prewash bays to remove excessive amounts of large material;
- Washpad for washing with handheld high pressure water cannons;
- Grit traps and oil / water separators; and
- Reticulation of washdown water to an environmental water storage pond.

### 3.5.7.2 Additional Site Infrastructure

#### Power Supply

Power to the site will be supplied via a combination of a new 22kV power line supplying 63kVa and multiple 415V, three-phase diesel generators. Ergon will provide a connection to the existing 22 kV transmission line which provides power to the nearby township of Ogmore. The connection will terminate at the ML boundary (see Figure 3-11), where Central Queensland Coal will develop new transmission lines to the MIA on the eastern side of the Bruce Highway. The power supply will be used to supply power to the offices and administration areas. Ergon will be responsible for obtaining all approvals for the new connection.

The additional 415V, three-phase diesel generators will be installed initially at the MIA and the CHPP on the eastern side of the Bruce Highway to service those operations. The MIA will incorporate two 300kVA (or potentially two 350kVa) 415V diesel generator sets mounted in a fully bunded area adjacent to the MIA 415V Switchrooms. The normal mode of operation for the generators is synchronised and connected to the load through a bus tie. The generators will be sized to provide redundancy with each generator capable of carrying the total load.

The generators will include their own diesel day tanks capable of holding sufficient diesel for a minimum of seven days' operation on full load. The generators will be hired to minimise initial capital costs and the hire company will be responsible for all repairs and maintenance.

Each CHPP area will be serviced by a substation located at the CHPP. Conceptually the CHPP substation will have three 800kVA 415V diesel generator sets mounted in a fully bunded area adjacent to the CHPP 415V Switchroom. The normal mode of operation for the four generators is synchronised and connected to the load through bus ties with an interconnecting cable installed between the two substations. The generators will be sized to provide redundancy with three generators capable of carrying the total load. Like the generators used at the MIA, each have their own diesel tanks capable of holding sufficient diesel for a minimum of seven days' operation on full load.

The switchrooms house the motor control centres, programmable logic controls and instrumentation equipment, as well as the 415 V Distribution Board which supply light and power. The area lighting consists of hinged lighting towers fitted with 1,000 W floodlights.

In parallel to the development of the new 22 kV / 63 kVa connection, Central Queensland Coal are currently in discussion with Ergon regarding options to relocate a small section of the existing 22kV transmission line to support ongoing mining operations on the eastern side of the Bruce Highway. A key requirement of any relocation of the transmission line infrastructure will be no reduction to the current level of supply to the township of Ogmore.

There is also a regional 275 kV line which crosses the southwest EPC boundary. From discussions with Powerlink (275 kV), it is not feasible to connect to this power supply. Currently there is no transformer in the area to step down the high voltage for mine supply. Consequently, this option is not under consideration.

Central Queensland Coal notes Powerlink and Ergon have standard requirements for working around its infrastructure. This includes the requirement to ensure access is retained to the existing Ergon and Powerlink transmission line easements. Should the existing access arrangements need to be changed because of mining activities, Central Queensland Coal will work with Powerlink and Ergon to find alternative routes to the easements. Central Queensland Coal will also ensure all Blast Management Plans take into consideration the Powerlink and Ergon Transmission Lines. Should there be potential for impact to either transmission line infrastructure, Central Queensland Coal will work with Powerlink and Ergon to address any potential risks.

### **Onsite Road Infrastructure**

Access to the operational area of the Project will be via the Bruce Highway and the Mount Bison Road, which will have new turn out lanes constructed connecting to the entry points to the eastern and western operational areas. The turnout lanes will be designed to DTMR standards (see Chapter 6 – Traffic and Transport for further details).

Current designs indicate a requirement of approximately 15 km of roads for access around the MIA and CHPP. Roads will rely on existing farm access tracks wherever possible and, during their construction, clearance of any sensitive environmental features such as remnant vegetation will be avoided to the extent practicable.

### **Sewerage**

At the commencement of construction temporary shower and toilet facilities will be installed at the mine site. Shower and toilet facilities at each MIA will be pumped out at an appropriate schedule and taken by licenced contractors to an offsite licenced facility for treatment.

### **Telecommunications**

#### ***Local Area Network and Data Communications***

A site local area network (LAN) and temporary servers will be installed to service voice and data requirements during construction phase. A permanent computer and communications room will be constructed as part of the administration building at the MIA. Equipment associated with all site communications such as the satellite system, radio system and servers for voice and data transmission will be installed here. An optical fibre (OF) will run from the Marlborough exchange to the MIA and an OF backbone line will be installed between the administration building and all offices, switch rooms and buildings at the MIA, CHPP and TLF. The CHPP Supervisory Control and Data Acquisition (SCADA) control system will be interfaced by the OF backbone to provide a site wide control system with nodes at the control room, administration office and security office and gate, workshops and other authorised users as required. CCTV cameras at the security office and gate, the CHPP, TLF and ROM pad will be installed and connected to the LAN using the OF backbone cabling.

A computerised log on system, also connected to the LAN using the OF backbone, will be used by employees, contractors and visitors for recording personnel onsite. This system is used for contractor management, fatigue management and identification of onsite personnel during emergency evacuations.

### **Radio Communications**

A digital trunked radio communication system (based on TETRA technology) will be installed in stages commencing with communications for the construction phase. This initial installation will provide coverage over the entire tenement, and the highway road access for response to calls for assistance when travelling to and from site.

The initial installation will consist of a 26 m cyclonic concrete pole mast, located at the construction site, with easy access to the construction site LAN and mains power. An air conditioned relocatable building will house the electronic equipment with provision to install a microwave backbone radio LAN system at a later date when mining commences. This installation will be relocated to the MIA when construction is complete.

The second stage is an upgrade of the system to provide illumination of any working pit areas. A radio trailer with stabilised legs, a mast to ensure adequate coverage over the pit, and housing a TETRA base station will be positioned in the mining area to provide a full duplex microwave link backbone between the original site LAN at the MIA and the trailer. Power for the equipment will be provided by solar panels recharging a battery system. The system supports full duplex communications to provide full duplex private one on one and telephony calls and embraces IP technology and interfaces with the site LAN and fixed voice systems.

### **Fixed Voice Communications**

Fixed phones using IP telephony will be connected to the LAN for integration with the satellite and radio systems.

### **Lighting**

Artificial lighting will be designed, installed, operated and maintained in accordance with AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting, to minimise the amount of light spill. Controls stipulated in this standard include consideration of the location and orientation of lighting as well as the selection and maintenance of luminaries. Any further mitigation (for example shielding, further restricting the use of lighting) will be implemented on an as needed basis.

## **3.6 Workforce**

The Project is in its design stage, and while it is possible to predict the skills required in both construction and operation workforces, workforce requirements are indicative only. Workforce numbers have been developed to allow for the assessment of social impacts to take place at this early stage of the Project. Changes in workforce requirements are not likely to affect the overall conclusions of the assessment, and any changes in overall workforce numbers are expected to be minor.

### **3.6.1 Workforce Demand**

A construction workforce for the Project of approximately 275 people will be required for the initial construction period of 2019 – 2020. The workforce will be a combination of local workers and DiDo. The initial construction period is for the development of the infrastructure associated with Open Cut 2 and mining operations on the eastern side of the Bruce Highway. A second construction period in 2027 – 2029 will be required for the development of the infrastructure associated with Open Cut 1 and mining operations on the western side of the Bruce Highway. The maximum construction workforce for the Open Cut 1 development will be 175, occurring in 2028.

A proposed operational workforce of between 100 (2019) to 500 (2030) employees will be required during the mine operations. The Project's labour resources will be sourced from within the general local area (Marlborough, Ogmores, St Lawrence, Clairview, Yaamba and The Caves) as a commute workforce. A workforce of approximately 20 will be required during decommissioning.

The development of the Project is expected to operate with construction workers on a two shift, seven days rotating roster. Once operational, management will be on a five on and two off roster and the operational workforce will be structured based on production requirements and will eventually move to a two shift, seven-day rotating roster, when in full production.

Indicative workforce numbers for each phase of the Project are shown at Table 3-16.

**Table 3-16 Indicative workforce numbers**

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Construction	275	275	-	-	-	-	-	-	50	175
Operation	100	167	167	167	250	250	250	250	250	250
Total	375	442	167	167	250	250	250	250	300	425
Year	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Construction	30	-	-	-	-	-	-	-	-	-
Operation	350	500	250	250	167	167	167	167	-	-
Decommissioning	-	-	-	-	-	-	-	20	20	20
Total	380	500	250	250	167	167	167	187	20	20

Central Queensland Coal commits to providing the Queensland Police Service, prior to the commencement of construction activities, information about the expected maximum population of the workforce (fixed and mobile) at peak construction and operational periods.

### 3.6.2 Workforce Skills

The skills required for the Project will vary depending upon the stage of development. The construction workforce is likely to be mainly contractors and subcontractors appointed to undertake various components of the Project. As these contractors are not yet appointed, it is not possible to provide details on where the construction workforce may be sourced. As most workers involved in the construction phase will be employed by contractors and subcontractors, the recruitment, training and education of these workers will be the responsibility of these employers. Most contractors have training programs in place to address workforce management and recruitment of required skill sets.

Main construction skills required will be:

- Equipment operators and supervisors;
- Tradespeople (for example fabrication, boilermakers, carpenters, plumbers and electricians);
- Designers, surveyors and engineers; and
- Superintendents and managers.

Operation of the open cut mines will require workers in the following categories:

- Open cut mine operators including operators of truck and shovel fleet;
- Tradespeople including diesel fitters, electrical tradespeople and mechanical fitters;
- Technical services and support including:
  - Geological
  - Engineering
  - Health and safety
  - Environmental services
  - Laboratory and quality control
- Machinery operation and maintenance workers;
- Managers and production supervisors; and
- Administrative and support areas such as office staff, catering, cleaning and transportation.

### 3.6.3 Rosters

Site management and support staff will work on a five day on, two days off roster. The remaining workers will operate on various rosters yet to be finalised, to eventually cover the 24/7 operations of the mine.

### 3.6.4 Workforce Accommodation

Most of the workforce for the Project is anticipated to come from the local area, Marlborough, Ogmore, Clairview and St Lawrence region, as a local commute workforce. If these regional towns are not able to service the personnel required for the Project, the accommodation camp proposed for development at the Marlborough Caravan Park will be used for any non-local workers.

## 3.7 Geology and Resources

### 3.7.1 Regional Geology

The Styx Coal reserves lie in the Styx Basin, a small, Early Cretaceous, intracratonic sag basin that covers an area of approximately 300 km<sup>2</sup> onshore and 500 km<sup>2</sup> offshore (see Figure 3-31). The known coal bearing strata of the basin are referred to as the Styx Coal Measures and consist of quartzose, calcareous, lithic and pebbly sandstones, pebbly conglomerate, siltstone, carbonaceous shale and coal. The environment of deposition was freshwater, deltaic to paludal with occasional marine incursions (Taubert, 2004).

The Styx Coal Measures are preserved as basin infill in a half graben geometry which has an overall plunge to the north. Earlier attempts to understand coal-seam geometry are thought to have been incorrect, in assuming that the deposit was basically flat lying rather than incorporating the north and east dipping components.

The Styx Basin is relatively undeveloped, except for two small scale, government owned mines that were in operation from 1919 to 1963. The Ogmore and Bowman collieries, located close to the north and northeast of ML80187 respectively, produced small quantities of low quality coal for use in steam trains and other boiler requirements (see Chapter 18 - Cultural Heritage).

### 3.7.2 Local Stratigraphy

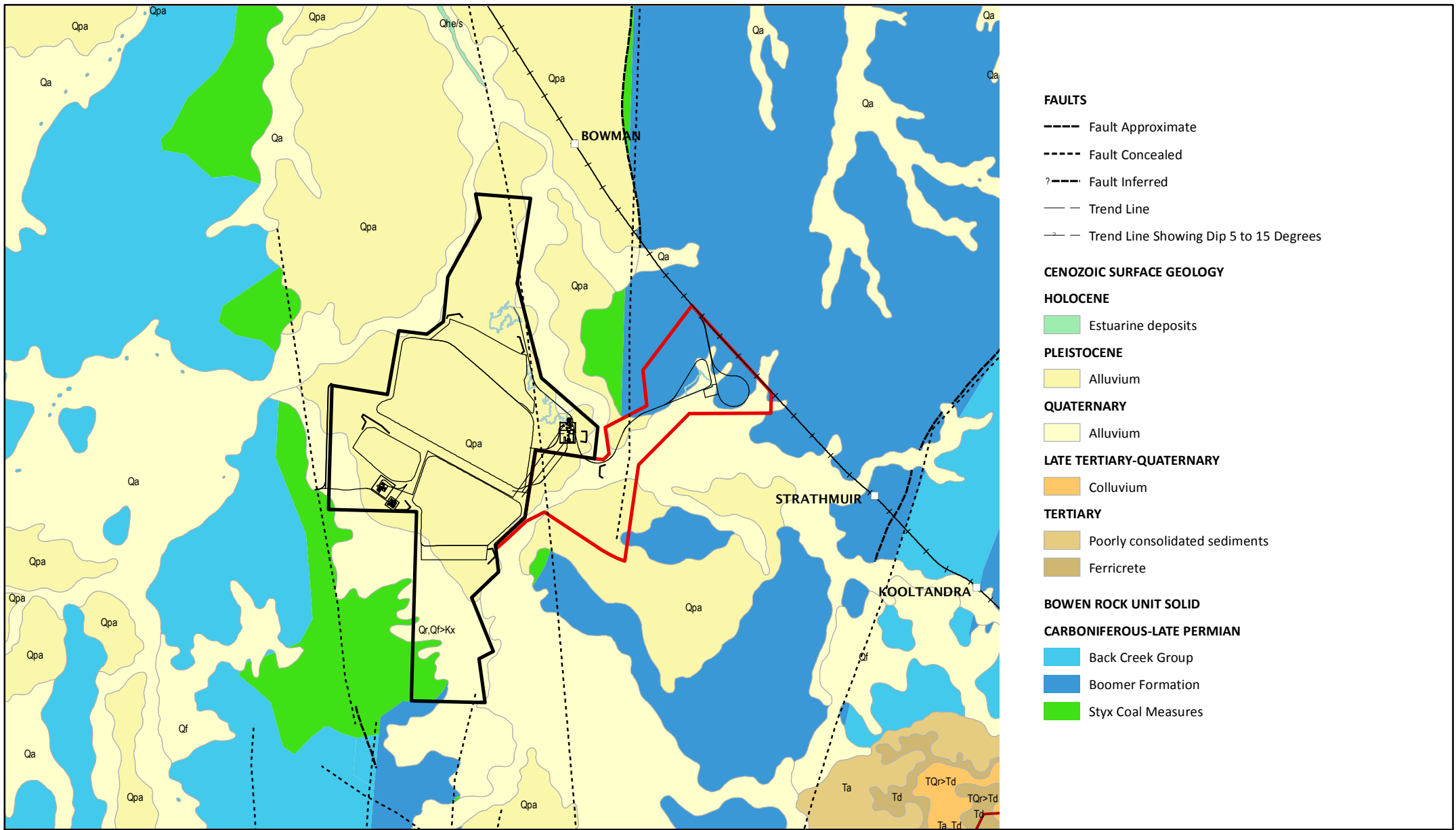
The stratigraphy of the Project area is shown at Figure 3-32 and summarised at Table 3-17. The coal seams are relatively shallow, and the average cumulative thickness of the full sequence of coal (Grey to V\_L2 seams) is approximately 6 m, contained within a sequence of approximately 120 m of coal bearing strata.

The coal seams dip generally to the east in the area west of the Bruce Highway, with the Violet seam, the lowest coal seam in the sequence sub-cropping in the western part of ML80187. The deposit structure is currently interpreted to be a syncline structure, the axis of which runs northwest / southeast through the mine area. This structural interpretation follows the deposit structure originally described by Morten (1955).

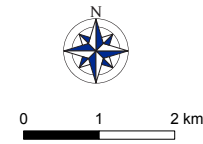
Currently no faults have been interpreted, and the apparent undulation seen in the floor contours of the coal seams is interpreted to be the result of variations in interburden thickness, known to be common in the Basin.

**Table 3-17 Stratigraphic units of the Project mine**

Period	Group	Sub-group/formation	Dominant lithology
Quaternary	Surficial	Quaternary Alluvial	Alluvium, coastal swamp deposits
Cainozoic	Surficial	Undifferentiated sediment	Sand, soil, alluvium, lateritic gravel
Lower Cretaceous	-	Styx Coal Measures	Quartz sandstone, conglomerate, siltstone, carbonaceous shale, coal
Upper Permian	Back Creek Group	Boomer Formation	Volcanolithic sandstone, claystone, siltstone, pebble conglomerate
Permian	Back Creek Group	Back Creek Group	Undifferentiated: fossiliferous volcanolithic sandstone, siltstone, limestone



**Figure 3-31**  
Regional geological map



- Legend**
- ML 80187
  - ML 700022
  - Mine infrastructure
  - North Coast Rail Line
  - Dam

Scale @ A4 1:100,000  
Date: 08/11/18  
Drawn: Gayle B.

DATA SOURCE  
QLD Open Source Data, 2018;  
Waratah Coal, 2018



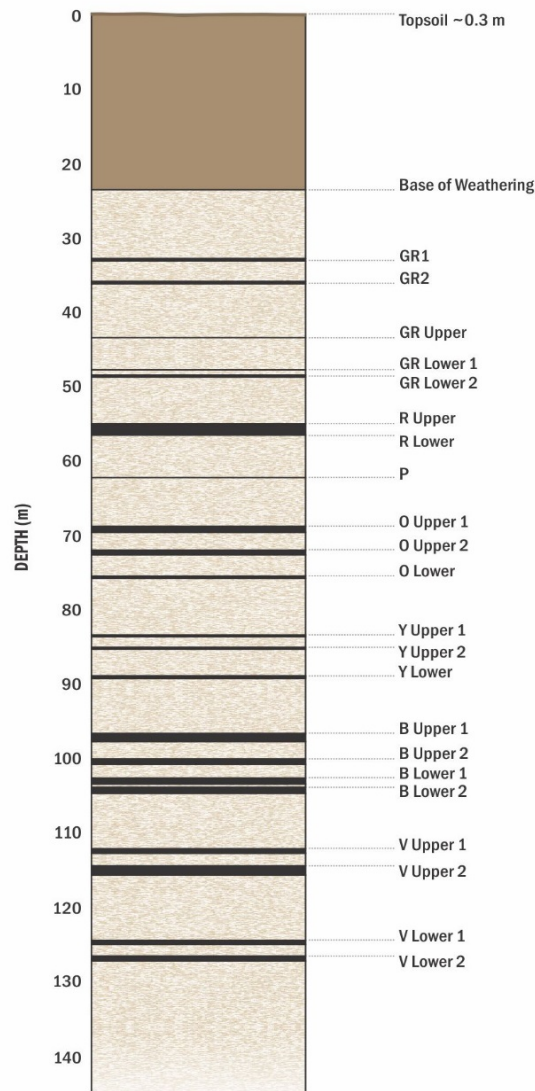


Figure 3-32 Schematic stratigraphic section

### 3.7.3 Coal Seams

The economic Cretaceous coal measures targeted for mining are the Styx Coal Measures, contained within the Styx Basin. The Styx basin is located on the central Queensland coast, north of Marlborough. It is a Lower Cretaceous sedimentary basin which unconformably overlies Permian sedimentary rocks of the Back Creek Group that have been compressed into a broad regional syncline, the Strathmuir Syncline. The basin extends beneath the sea bed into the Broad Sound near the Port of St Lawrence. Its portion on land is approximately 20 km wide (east-west) and 70 km long (north-south).

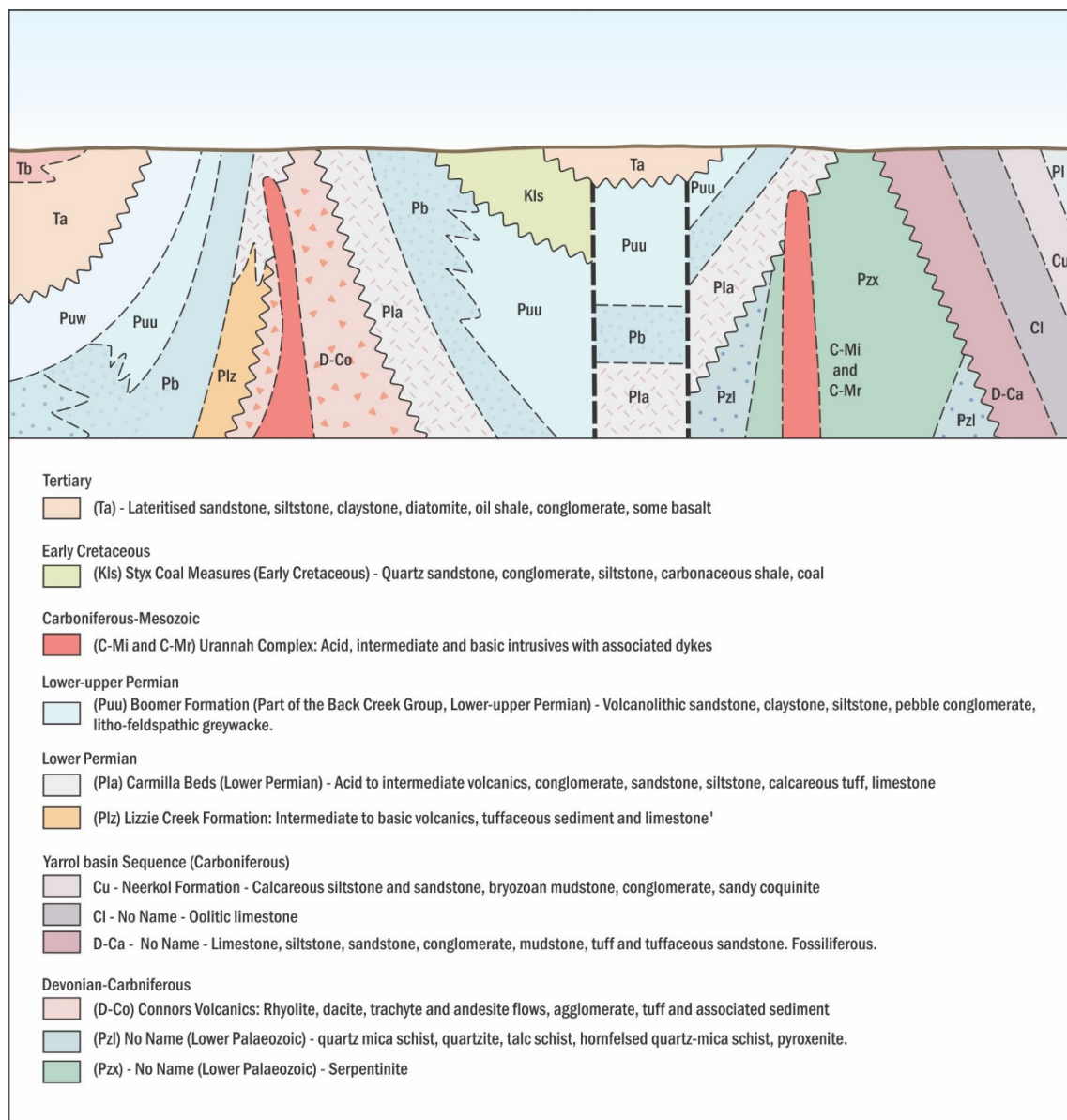
The majority of the Styx Coal Measures are concealed beneath Tertiary sediment. Queensland Geological Survey mapping shows the eastern margin of the Styx Basin extends to the eastern edge of the terrestrial Cainozoic sediments that conceal it. The Styx Coal Measures outcrop in the western margin of the Styx Basin as low forested hills. These outcrops form a series of detached hills, orientated north-south, that continue for about 60 kilometres northward to the coastline near the Port of St Lawrence. The outcrops generally form small hills and hillocks, but at their greatest height,



are 100 metres above the low-lying sediment flats to the east. The hills are probably the coal-barren basal section of the Styx Coal Measures sequence, which consists of thick beds of quartz-dominant sandstones.

The strata of the Styx Basin dip gently to the east, at around three degrees. Tertiary-aged, lateritised sedimentary rocks outcrop to the east of the southern part of the basin. Styx Basin sediments lap onto Permian strata in the west but appear to be faulted against them in the east. The southern part of the basin is bounded to the east by a post-depositional high-angle reverse fault. Adjacent to this fault, the Cretaceous sediments are folded and faulted.

The Styx Basin sediments were laid down on a coastal plain which developed on the Palaeozoic Strathmuir Syncline during the Early Cretaceous. The Styx Basin probably developed by subsidence of the Strathmuir Synclinalorium, an older feature containing Permian Bowen Basin strata. A schematic geological cross section (east-west) across the Styx Basin is shown in Figure 3-33 and the supporting description key is at Table 3-18.



**Figure 3-33 Schematic west to east geological cross section from Australia 1:250 000 Geological Series**

**Table 3-18 Geological cross section key**

Code	Name	Description
Ta	No Name (Tertiary)	Lateritised sandstone, siltstone, claystone, diatomite, oil shale, conglomerate, some basalt.
Kls	Styx Coal Measures (Early Cretaceous)	Quartz sandstone, conglomerate, siltstone, carbonaceous shale, coal.
Pb	Undifferentiated back Creek Group (Lower-upper Permian)	Undifferentiated: fossiliferous volcanolithic sandstone, siltstone, limestone, coquinite, minor crystal, lithic and vitric tuffs; sheared siltstone, phyllite.
Puu	Boomer Formation (Part of the Back Creek Group, Lower-upper Permian)	Volcanolithic sandstone, claystone, siltstone, pebble conglomerate, litho-feldspathic greywacke.
Pla	Carmilla Beds (Lower Permian)	Acid to intermediate volcanics, conglomerate, sandstone, siltstone, calcareous tuff, limestone.
Pzx	No Name (Lower Palaeozoic)	Serpentinite.
Pzl	No Name (Lower Palaeozoic)	Quartz mica schist, quartzite, talc schist, hornfelsed quartz-mica schist, pyroxenite.
D-Ca, Cl and Cu	Yarrol basin Sequence (Carboniferous)	
Cu	Neerkol Formation	Calcareous siltstone and sandstone, bryozoan mudstone, conglomerate, sandy coquinite.
Cl	No Name	Oolitic limestone.
D-Ca	No Name	Limestone, siltstone, sandstone, conglomerate, mudstone, tuff and tuffaceous sandstone. Fossiliferous.
D-Co	Devonian-Carboniferous 'Connors Volcanics'	Rhyolite, dacite, trachyte and andesite flows, agglomerate, tuff and associated sediment.
Plz	Lower Permian Lizzie Creek Formation	Intermediate to basic volcanics, tuffaceous sediment and limestone.
C-Mi and C-Mr	the Carboniferous-Mesozoic Urannah Complex	Acid, intermediate and basic intrusives with associated dykes.

### Cretaceous Coal Seam Characteristics – Styx Coal Measures

The coal seams that comprise the Styx Coal Measures are generally thin, commonly less than two metres in thickness. Seam splitting is common and seam thicknesses vary considerably. All seams are potentially economically exploitable, despite their relatively small thicknesses. Coal quality throughout the deposit is generally consistent, and all seams demonstrate coking properties.

The seams were divided into seam groups and named using a colour scheme. From the base of the Measures to the top, they are tagged as: Violet, Blue, Yellow, Orange, Pink, Red, Green and Grey.

The coal plies may coalesce to form substantially thick seams in parts of the deposit (e.g. Violet and Blue) but in other seams (Orange, Green, Grey) coalescence is not evident in the ML 80187 area. It is common for the coal plies to lense out over moderate distances. The Orange, Green and Grey Seams are characteristically coal ply groups that may coalesce elsewhere in the Styx Basin, but do not coalesce within the proposed mining area. The Red, Yellow and Pink Seams split into two plies in isolated areas. The Red Seam is the most consistent in thickness and quality throughout the ML 80187 area and occurs in the middle of the coal-bearing part of the stratigraphic sequence. The Red Seam commonly exceeds two metres in thickness.

All plies and coalesced seams demonstrate coal quality and seam thickness characteristics that are attractive mining targets. Coal quality analysis and reconciliation with geophysical data show that the majority of run-of-mine coal will require wash-plant treatment to remove partings. Sulphur content is low, even in the raw sample analysis. Pyrite has not been noted in any geological logging or results of quality analysis. Float-sink, drop-shatter, sizing and associated analyses indicate wash-

plant yields are likely to be around 80% of run-of-mine coal. Basic seam thickness information is provided in Table 3-19.

**Table 3-19 Cretaceous coal measures coal seam characteristics**

Seam	Ply	Seam thickness (m)		
		Min	Max	Average
Grey	GR1	0.11	1.09	0.42
	GR2	0.10	0.77	0.37
Green	GR Upper	0.10	0.85	0.34
	GR Lower1	0.10	0.79	0.37
	GR Lower2	0.10	0.29	0.19
Red	R Upper	0.10	2.24	0.81
	R Lower	0.10	1.32	0.71
Pink	P	0.10	0.25	0.16
Orange	O Upper1	0.10	0.60	0.33
	O Upper2	0.10	0.39	0.26
	O Lower	0.10	0.71	0.36
Yellow	Y Upper1	0.10	2.74	0.64
	Y Upper2	0.10	1.03	0.30
	Y Lower	0.10	0.78	0.37
Blue	B Upper1	0.10	1.76	0.56
	B Upper2	0.10	1.71	0.71
	B Lower1	0.10	2.23	0.53
	B Lower2	0.11	0.88	0.37
Violet	VI Upper1	0.10	1.35	0.36
	VI Upper2	0.10	0.30	0.18
	VI Lower1	0.10	1.19	0.43
	VI Lower2	0.10	0.74	0.36

### 3.7.4 Coal Seam Structure

The Styx deposit is contained within the Styx Sedimentary Basin, an early Cretaceous basin that formed because of subsidence of the already existing Strathmuir Syncline. Regionally, the strata dip to the east and east-northeast at approximately three degrees, with local variations. In the Styx deposit area, a regular dip of three degrees to the east also exists. The Styx Basin is thought to extend north from dry land, continuing undersea in the Broad Sound area, in conjunction with the undersea extension of the Strathmuir Syncline.

The most relevant and local regional geological structure is the axis of the Strathmuir Syncline, which appears to have caused formation of the Styx Basin. Regional faults associated with the Strathmuir Syncline have confined the extents of sediment accumulation in the eastern part of the basin. Numerous folds and faults are mapped to the south of the Styx Basin, in the Permian formations, parallel with the axis of the Strathmuir Syncline, but their effect does not extend into the Styx Basin, as these structures formed prior to its formation.

Geological modelling has not identified evidence of displacement of seams in the deposit area by folding or faulting. Faulting that is known to occur within the Styx Coal Measures on the eastern side of the basin, noted from surveys of the early 20th century mining shafts, does not appear to have affected the western or central parts of the basin. Variations in seam structure contours produced from modelling of the Styx deposit are considered to be the result of variations in interburden thickness, known to be common in the Basin. Although slickensiding and other geotechnical defects have been noted in some Styx deposit core logs, displacement by folding or faulting has not been detected or interpreted during seam correlation exercises, geological modelling, geotechnical

analysis, downhole sonic scanner analysis or drill core analysis. Some fracturing of rock is expected to be encountered during mining, but no structural displacement of seams.

### 3.7.5 Coal Quality

#### 3.7.5.1 Raw Coal Quality

All coal quality data has been modelled on an air-dried basis (adb). There is a total of 67 cored holes used to build the quality model.

The results show the raw ash for all plies sampled ranges from 7 % to 39.6 % and averages at 20.1 %, adb. Inherent moisture for all plies ranged from 1.6 % to 5.0 % with an average of 3.2 %, adb. Calorific values for all plies ranged from 17 Mj/kg to 31 Mj/kg and averages at 26.7 Mj/kg, adb, and the vitrinite reflectance averages at 0.85 (%mmr or Romax) over all coal plies.

The Red and Yellow Seams have the most consistently low ash values and high calorific value with the average raw ash percentage for the Red Seam of 14.5 %, adb, and an average CV of 28.5 Mj/kg, adb. The Yellow Seam has an average raw ash value of 15.5 %, adb and an average CV value of 28.0 Mj/kg, adb. The Blue and Violet Seams have the most variable qualities across the different plies across the deposit. The Blue Seam has an average raw ash percentage of 22.5 %, adb and an average CV value of 25.2 Mj/ kg, adb. The Violet Seam has an average raw ash of 22.6 %, adb and an average CV value of 25.6 Mj/kg, adb.

The raw coal quality results (adb), of each group of seams are displayed in Table 3-20.

**Table 3-20 Summary of coal resources – raw quality data (adb)**

Category / seam	Coal Mass (Mt)	Ave Thickness (m)	Raw Coal Quality (adb)								Comments
			RD	PRD	IM%	Ash%	Vol%	FC%	CV MJ/Kg	TS%	
Indicated	34.3	0.86%	1.43	1.40	3.5	16.8	30.7	52.1	27.8	0.53	Weighted Av Indicated
Grey	3.4	0.54	1.46	1.43	3.7	20.4	30.1	49.7	27.0	0.45	
Green	4.5	0.45	1.43	1.40	3.9	16.7	31.3	52.1	27.8	0.50	
Red	9.2	1.25	1.42	1.39	3.8	16.8	31.3	53.1	28.2	0.59	
Orange	2.5	0.58	1.44	1.40	2.9	20.0	28.1	49.1	25.8	0.54	
Yellow	3.4	0.98	1.50	1.46	3.3	23.1	30.9	48.5	26.1	0.61	
Blue	11.3	0.83	1.40	1.38	3.4	13.3	30.7	53.6	28.6	0.50	
Violet	-	-	-	-	-	-	-	-	-	-	
V_L2	-	-	-	-	-	-	-	-	-	-	
Inferred	169.1	0.59	1.47	1.44	3.1	20.75	29.04	51.15	26.47	0.53	Weighted Av Inferred
Grey	3.0	0.46	1.44	1.42	3.9	17.6	30.4	50.3	27.9	0.46	
Green	7.7	0.35	1.46	1.43	3.3	19.8	30.8	52.2	27.5	0.50	
Red	25.3	0.73	1.41	1.38	3.4	15.7	31.0	52.9	27.9	0.57	
Orange	9.0	0.42	1.50	1.46	3.6	26.7	26.1	43.7	26.4	0.48	
Yellow	29.5	0.54	1.44	1.41	3.0	16.4	29.6	52.4	27.0	0.58	
Blue	59.0	0.60	1.50	1.46	3.0	23.0	28.3	50.0	25.1	0.48	

Violet	34.2	0.63	1.50	1.46	3.1	22.5	28.6	52.5	26.9	0.56	
V_L2	1.4	0.36	1.65	1.60	2.9	39.6	29.3	52.4	27.6	0.68	
Grand Total	203.4	0.63	1.46%	1.43	3.2	20.1	29.3	51.3	26.7	0.53	Weighted Av Total

### 3.7.5.2 Product Coal Quality

Initial float sink analysis (F1.50 fraction) of the coal plies included in the Resource Estimate, gives an average theoretical yield of approximately 83.1 %, average washed ash of approximately 6.1 % and calorific value of approximately 31.6 Mj/kg. CSN values average approximately 5.3, ranging from 3.4 to 6.1. These initial results are very encouraging to potentially produce a soft coking coal or a high quality thermal coal from the Project area.

### 3.7.6 Estimated Coal Resource

The assessment of coal resource at the Styx resource area was conducted by a qualified and experienced geologist. The assessment of the coal resource identified a total of 203.4 million tonnes (Mt) of coal resource (see Table 3-21). This is based on a nominal 100 m depth cut-off for open cut extraction. Note: Open Cut 2 and Open Cut 4 are now combined into one mine.

**Table 3-21 Estimated coal resource to depth of 100 m – Central Queensland mine area**

Method	Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Subtotal (Mt)
Open Cut 1	0	15.0	65.0	80.0
Open Cut 2	0	19.3	93.0	112.3
Open Cut 4	0		11.1	11.1
<b>Total</b>	<b>0</b>	<b>34.3</b>	<b>169.1</b>	<b>203.4</b>

### 3.7.7 Exploration History

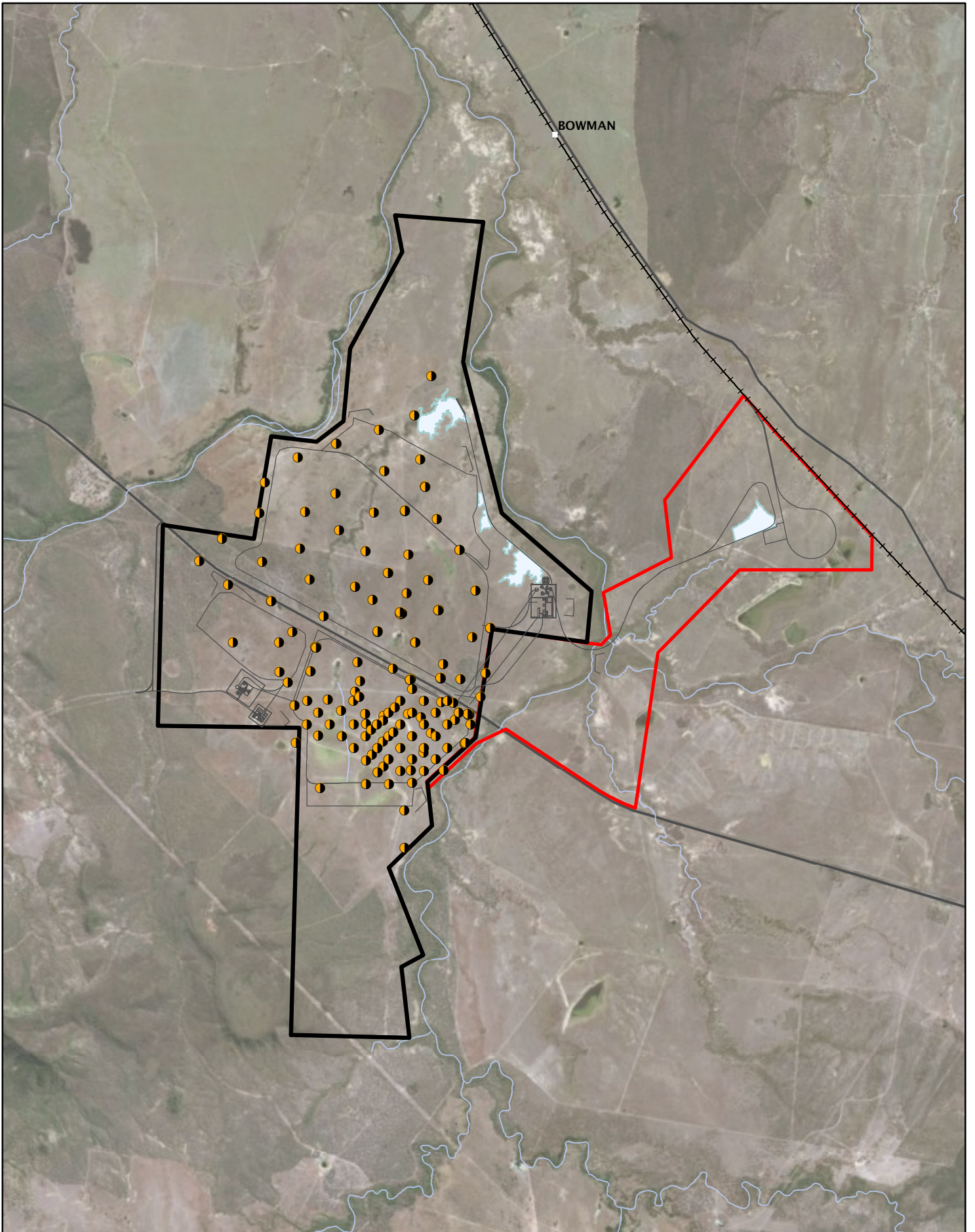
Central Queensland Coal and Fairway have undertaken an extensive exploration drilling program in EPC1029 from late 2010, focusing on the Mamelon Property area in 2011 and 2014, and extending the exploration area to the north of the Mamelon Property in 2012. A total of 137 holes have been drilled including 68 chip holes and 69 fully cored HQ sized holes. All holes were geophysically logged and surveyed in line with industry standards.

In addition to the exploration drilling, six large diameter cores have been completed on two sites for coal washability and handleability tests. Drill hole spacing varies across the deposit, but generally ranges between 100 m and 1,000 m. All coal core has been sampled and analysed for proximate analysis, specific energy, total sulphur and relative density. Several holes have had further ash analysis and analysis for ash fusion temperatures. Float sink coal quality analysis has also been undertaken on all coal samples at three densities, F1.40, F1.50 and F1.60 on recent drilling (post 2010) and at F1.50 on drilling pre-2010. Crucible Swelling Number (CSN) analysis was also performed on each density cut point to further investigate the coking properties of the coal found in the Project area.

Historical data from the Geological Survey of Queensland, 1955 (27 drill holes), Earth Resources Australia, 1981 (seven drill holes) and New Hope Collieries, 1994 (nine drill holes) are available for the Project area. Data from these drill programs were included in initial modelling to aid the understanding of the deposit and plan exploration drilling.

Central Queensland Coal have created a geological and raw coal quality model for the Project area using the MapInfo 'Discover' and Ventyx 'Minescape' software packages. Exploration drill hole data, raw coal quality and washed coal quality data were correlated and audited by Central Queensland Coal and Xenith. The model was finalised in February 2015.

A total of 137 drill holes have been used to develop the structural model (Central Queensland Coal and Fairway drill holes). The holes are a mixture of cored holes and chip holes, all with geophysical logs. A total of 69 drill holes have coal quality data available and were used as Australasian Joint Ore Reserves Committee Points of Observation where seams were cored and had suitable raw coal quality and geophysical data. The location of the drill holes used in the geological model are shown at Figure 3-34.



**Figure 3-34**  
Location of exploration drillholes



0 0.5 1 km

**Legend**

- Exploration drillholes
- ML 80187
- ML 700022
- Mine infrastructure
- Main Road
- North Coast Rail Line
- Watercourse
- Dam

Scale @ A4 1:60,000  
Date: 19/10/18  
Drawn: Gayle B.

DATA SOURCE  
Waratah Coal, 2018  
QLD Open Source Data, 2018



### 3.8 Relationship to Other Projects

The Project is interrelated with other external infrastructure projects which are not encompassed in this EIS assessment or approval process. The potentially interrelated projects below may be undertaken as part of supporting and servicing the Project following further design and consultation with stakeholders. Should these projects be required they will be subject to separate assessment and approvals undertaken by the respective service providers. They are provided here for the sake of completeness and are:

- Accommodation camp upgrade at the Marlborough Caravan Park; and
- Alternative access road to Mount Bison Road.

Any related developments will be constructed and owned by third party service providers who will obtain any necessary approvals (local, state or federal government approvals) to construct or maintain the infrastructure.

### 3.9 Mine Decommissioning and Rehabilitation

Rehabilitation is defined as the process of making a former mine site safe, stable, and self-sustaining (EHP 2014b). This section describes the options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the Project. Without effective rehabilitation, mining has the potential to permanently reduce the capacity of land and ecosystems to provide economic and ecological services and be unsafe for future use. The incorporation of rehabilitation and decommissioning considerations within the Project description demonstrates Central Queensland Coal's commitment to integrating these stages of the Project into its environmental management system.

The Project is expected to commence final decommissioning at year 18 and be completed at year 20, or following depletion of the target coal resource. Progressive rehabilitation is proposed to be carried out as operations progress (opposed to a large operation once mining is complete). Thus, staged treatments will be applied as soon as areas become available for such. Rehabilitation of the MIAs; however, will take place once mining is completed and plant and structures decommissioned.

The review and audit of rehabilitation work undertaken during operations will be required as part of the Project's EA. More specifically, the Plan of Operations or Progressive Rehabilitation and Closure Plan (PRCP), will set out the proposed program of actions to comply with the EA conditions including a program to rehabilitate any disturbed land. The Plan of Operation or PRCP will provide for compliance measures obliged by applicable legislation. The rehabilitation and decommissioning approaches, including figures showing the modelled final landforms, are described in detail in Chapter 11 – Rehabilitation and Decommissioning.

The Plan of Operations or PRCP will be submitted to DES prior to any disturbance occurring onsite and will be reviewed by an independent suitably qualified auditor. Approval by DES to renew the Plan of Operation will take place on a five-year basis at most but more likely annually. DES may suspend or cancel the EA in the event of inadequacy or non-compliance of operations in meeting the Plan of Operations or PRCP. In addition to this, the EA will require Central Queensland Coal to provide financial assurance to DES prior to any activities taking place onsite to cover any costs or expenses incurred in the highly unlikely event that the conditions of the EA are not met. This includes, for example, conditions relating to rehabilitation.



This section specifically identifies the following key aspects relating to the rehabilitation of the Project:

- The control and management of mine waste;
- Proposed rehabilitation methods;
- The management of topsoil resources for use in rehabilitation of the site;
- Description of the planned progressive rehabilitation and revegetation of areas across the mine site;
- The integration with on-going and future rehabilitation activities across the wider mining area; and
- Rehabilitation monitoring and maintenance requirements which may apply.

The level of detail provided here is commensurate to the level of risk associated with each key closure issue and the time to closure. It sets out acceptable and realistic criteria for rehabilitation and closure that would allow the Project to meet the principles of Ecologically Sustainable Development without any unacceptable liability to the State.

Decommissioning and rehabilitation are discussed in detail in Chapter 11 - Rehabilitation and Decommissioning.

### 3.10 ToR Cross-reference Table

**Table 3-22 ToR cross-reference**

Terms of Reference	Section of the EIS
<b>7. Project description and alternatives</b>	
Describe all aspects of the project that are covered by the EIS's assessment. If there are any aspects of the project that would be assessed separately, describe what they are, and how they would be assessed and approved.	Chapter 1 - Introduction
The project description should include all on and off lease activities relevant to the project including construction, operation and decommissioning activities. If the delivery of the project is to be staged, the nature and timing of the stages should be fully described.	Sections 3.4, 3.5 and 3.8
<b>7.1 Proposed development</b>	
Describe and illustrate the following specific information about the proposed project, including but not limited to:	
<ul style="list-style-type: none"> <li>▪ project's title;</li> </ul>	Chapter 3 – Description of the Project
<ul style="list-style-type: none"> <li>▪ project objectives;</li> </ul>	Chapter 1 - Introduction
<ul style="list-style-type: none"> <li>▪ expected capital expenditure;</li> </ul>	Chapter 2 – Project Need and Alternatives
<ul style="list-style-type: none"> <li>▪ rationale for the project;</li> </ul>	Chapter 2 – Project Need and Alternatives
<ul style="list-style-type: none"> <li>▪ project description, including the nature and scale of all project components and activities;</li> </ul>	Section 3.5
<ul style="list-style-type: none"> <li>▪ whether it is a greenfield or brownfield site;</li> </ul>	Section 3.2
<ul style="list-style-type: none"> <li>▪ regional and local context of the project's footprint with maps at suitable scales;</li> </ul>	Section 3.3
<ul style="list-style-type: none"> <li>▪ proposed timing of the development, including construction staging and likely schedule of works;</li> </ul>	Sections 3.5

Terms of Reference	Section of the EIS
<ul style="list-style-type: none"> <li>▪ relationship to other major projects or developments of which the proponent should reasonably be aware;</li> </ul>	Section 3.8
<ul style="list-style-type: none"> <li>▪ the workforce numbers for all project phases;</li> </ul>	Section 3.6
<ul style="list-style-type: none"> <li>▪ where personnel would be accommodated and the likely recruitment and rostering arrangements to be adopted; and</li> </ul>	Section 3.6
<ul style="list-style-type: none"> <li>▪ proposed travel arrangements of the workforce to and from work, including use of a FIFO workforce.</li> </ul>	Section 3.6.1
<b>7.2 Site description</b>	
Provide real property descriptions of the project land and adjacent properties, any easements, any existing underlying resource tenures, and identification number of any resource activity lease for the project land that is subject to application.	Section 3.3.3.1
Describe and illustrate with scaled maps the key infrastructure in and around the site, including state-controlled and local roads, rail lines and loading yards, airfields, ports or jetties, electricity transmission infrastructure, pipelines, and any other infrastructure in the region relevant to the project.	Section 3.3.3
Describe and illustrate the topography of the project site and surrounding area, and highlight any significant features shown on the maps.	Chapter 5 - Land
Map the location and boundaries of the project's footprint including all infrastructure elements and development necessary for the project.	Figure 3-8 and Figure 3-9
Show all key aspects including excavations, stockpiles, areas of fill, services infrastructure, plant locations, water or tailings storages, buildings, bridges and culvert, haul and access roads, causeways, stockpile areas, barge loading facilities and any areas of bed levelling.	Figure 3-8 and Figure 3-9
Include discussion of any environmental design features of these facilities including bunding of storage facilities.	Section 3.5.7
Describe and map in plan and cross-sections the geology and terrestrial and/or coastal landforms of the project area.	Sections 3.7, and Figure 3-4 and Figure 3-33
Indicate the boundaries of water catchments that are significant for the drainage of the site.	Chapter 9 – Surface Water
Show geological structures, such as aquifers, faults and economic resources that could have an influence on, or be influenced by, the project's activities.	Section 3.7
Describe and illustrate the precise location of the proposed project in relation to any designated and protected areas and waterbodies. This is to include the location of any proposed buffers surrounding the working areas; and lands identified for conservation, either through retention in their current natural state or to be rehabilitated.	Figure 3-4
Describe, map and illustrate soil types and profiles of the project area at a scale relevant to the site. Identify soils that would require particular management due to wetness, erosivity, depth, acidity, salinity or other feature, including acid sulfate soils. Complete an assessment of the potential for acid sulfate soils, risks associated with disturbance and proposed management and mitigation measures consistent with relevant government guidelines, policies and best practice management.	Chapter 5 - Land
<b>7.3 Proposed construction and operations</b>	
Describe the following information about the proposal, and provide maps and concept/layout plans:	See below
<ul style="list-style-type: none"> <li>▪ existing land uses and any previous land use that might have affected or contaminated the land;</li> </ul>	Chapter 5 – Land
<ul style="list-style-type: none"> <li>▪ existing buildings, infrastructure and easements on the potentially affected land;</li> </ul>	Section 3.3.4 and Chapter 18 – Cultural Heritage
<ul style="list-style-type: none"> <li>▪ all pre-construction activities (including vegetation clearing, site access, interference with watercourses, wetlands and floodplain areas);</li> </ul>	Section 3.5
<ul style="list-style-type: none"> <li>▪ the proposed construction methods, associated equipment and technique;</li> </ul>	Section 3.5
<ul style="list-style-type: none"> <li>▪ road and rail infrastructure, and stock routes, including new constructions, closures and/or realignments;</li> </ul>	Section 3.5 and Chapter 6 – Traffic and Transport

Terms of Reference	Section of the EIS
<ul style="list-style-type: none"> <li>▪ location, design and capacity of all other required infrastructure, including water supply and storage, sewerage, electricity from the grid, generators and fuels (whether gas, liquid and/or solid), and telecommunications;</li> </ul>	Section 3.4 and 3.5
<ul style="list-style-type: none"> <li>▪ changes to watercourses and overland flow on or off the site, including stream diversions and flood levees;</li> </ul>	Chapter 9 – Surface Water
<ul style="list-style-type: none"> <li>▪ any infrastructure alternatives, justified in terms of ecologically sustainable development (including energy and water conservation);</li> </ul>	Chapter 2 – Project Need and Alternatives
<ul style="list-style-type: none"> <li>▪ hours of construction and operation;</li> </ul>	Sections 3.5.5 and Chapter 13 - Noise
<ul style="list-style-type: none"> <li>▪ the proposed extractive and processing methods, associated equipment and techniques;</li> </ul>	Section 3.5.5
<ul style="list-style-type: none"> <li>▪ the sequencing and staging of activities;</li> </ul>	Section 3.5.2
<ul style="list-style-type: none"> <li>▪ the proposed methods and facilities to be used for the storage, processing, transfer, and loading of product;</li> </ul>	Section 3.5.2, 3.5.3, and 3.5.7
<ul style="list-style-type: none"> <li>▪ the capacity of high-impact plant and equipment, their chemical and physical processes, and chemicals or hazardous materials to be used;</li> </ul>	Section 3.5.5 and Chapter 21 – Hazard and Risk
<ul style="list-style-type: none"> <li>▪ any activity that would otherwise be a prescribed environmentally relevant activity if it were not undertaken on a mining or petroleum lease; and</li> </ul>	Chapter 1 - Introduction
<ul style="list-style-type: none"> <li>▪ any new borrow pits, stream bed excavations, or expanded quarry and screening operations that may be required to service construction or operation of the project.</li> </ul>	Section 3.5.4.1
<b>7.4 Feasible alternatives</b>	
Present feasible alternatives of the project's configuration (including conceptual, technological and locality alternatives to the project and individual elements) that may improve environmental outcomes.	Chapter 2 – Project Need and Alternatives
Summarise the comparative environmental, social and economic impacts of each alternative, with particular regard to the principles of ecologically sustainable development.	Chapter 2 – Project Need and Alternatives
Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action while rejecting others.	Chapter 2 – Project Need and Alternatives
Discuss the consequences of not proceeding with the project.	Chapter 2 – Project Need and Alternatives