Central Queensland Coal Project

Chapter 1 – Introduction and Project Description

Central Queensland Coal

CQC SEIS, Version 3

October 2020

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Terms and Abbreviations

µS/cm	Micro siemens per centimetre
adb	Air-dried basis
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALC	Agricultural Land Class
AS	Australian Standard
CAPEX	Capital Expenditure
CCTV	Closed-circuit Television
CHPP	Coal Handling and Preparation Plant
CQC	Central Queensland Coal Pty Ltd
CSN	Crucible Swelling Number
DAWE	Commonwealth Department of Water, Agriculture and the Environment
DBCT	Dalrymple Bay Coal Terminal
DES	Department of Environment and Science
Disturbance Area or Disturbance Footprint	The area within, and roads adjacent to, the Mining Lease Applications that will be disturbed to enable construction and operation of the mine – covers an area of 1,372.5 ha (taken as the earthworks footprint plus a 10 m buffer to allow for vegetation clearing)
DNRME	Department of Natural Resources, Mines and Energy
DotEE	Department of the Environment and Energy
DTMR	Department of Transport and Main Roads
EA	Environmental Authority
EC	Electrical Conductivity
EHP	Former Department of Environment and Heritage Protection
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EP Act	Queensland *Environmental Protection Act 1994*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPC	Exploration Permit for Coal
EPM	Exploration Permit for Minerals
ERP	Emergency Response Plan

ESA	Environmentally Sensitive Areas
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
Fairway Coal	Fairway Coal Proprietary Limited
FBA	Fitzroy Basin Association
FHA	Fish Habitat Area
FIA	Failure Impact Assessment
FIFO	Fly-in Fly-out
GBRMP	Great Barrier Reef Marine Park
GWh	Gigawatt hour
ha	Hectare
HGTC	High Grade Thermal Coal
HQ	63.5mm inside diameter core hole
IAS	Initial Advice Statement
IP	Internet Protocol
JORC	Joint Ore Reserves Committee
Kl/d	Kilolitres per day
km	Kilometres
km^2	Square kilometres
kph	Kilometres per hour
kV	Kilovolt
kVA	Kilovolt Amperes
L	Litres
LAN	Local Area Network
LGA	Local Government Area
LiDAR	Light Detection and Ranging
LOS	Level of Service
LSC	Livingstone Shire Council
m	Metres
m3/s	Cubic Metres per Second

Mbcm	Million bank cubic metres
MDL	Mineral Development Licence
mg/L	Milligram per litre
MHWS	Mean High Water Spring
MIA	Mine Infrastructure Area
Mj/kg	Megajoules (million joules) per Kilogram
ML	Mining Lease Application
ML	Megalitre
ML/a	Megalitres per annum
ML/d	Megalitres per day
Mlcm	Million loose cubic metres
mm	Millimetre
mmr	Mean Maximum Reflectance
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
Mt	Million Tonnes
Mtpa	Million Tonnes per Annum
Mw	Megawatt
MWMP	Mineral Waste Management Plan
OF	Optical fibre
PAR	Population at Risk
PoO	Points of Observation
PRCP	Progressive Rehabilitation and Closure Plan
Project Area	Generally refers to Mining Lease Application 80187 and 700022 and the surrounding local areas
Project Site	Everything within the boundaries of Mining Lease Applications 80187 and 700022 – covers an area of 2,661 ha
QR	Queensland Rail
RE	Remnant Regional Ecosystem
RIA	Road Impact Assessment
RIM	Rail Infrastructure Manager
RL	Reduced Level

ROM	Run of Mine
RP1	Release Point for dam 1
RRC	Rockhampton Regional Council
RSO	Rolling stock Operator
SCADA	Supervisory Control and Data Acquisition
SCL	Strategic Cropping Land
SEIS	Supplementary Environmental Impact Statement
SSCC	semi-soft coking coal
SSE	Site Senior Executive
SSTV	Site Specific Trigger Value
TEC	Threatened Ecological Community
TETRA	Terrestrial Trunked Radio
The Project	the Central Queensland Coal Project
TLF	Train Loadout Facility
ToR	Terms of Reference
V	Volts
W	Watts
WTP	Water Treatment Plant

1 Introduction and Project Description

This chapter explains the function of the Environmental Impact Assessment (EIS) and Supplementary Impact Assessment (SEIS) processes, and provides a description of the construction, operation and decommissioning activities that make up the Central Queensland Coal Project (the Project).

This SEIS is referred to throughout as Version 3 of the SEIS, or SEIS v3.

1.1 Terms of Reference Addressed in this Chapter

Table 1-1 summarises the requirements for the Introduction and Project Description from the ToR for the Project, and where in this chapter they are addressed.

Table 1-1: ToR cross-reference

Terms of Reference	Section of the EIS
5. Introduction	
Clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. Include an overview of the structure of the document.	Section 1.4; Section 1.4.3.2
5.1 Project proponent	
Provide information about the proponent(s) and their business, including: • the proponent's full name, street and postal address, and Australian Business Number, including details of any joint venture partners; • the nature and extent of the proponent's business activities; • proponent's environmental record, including a list of any breach of relevant environmental laws during the previous 10 years; and • the proponent's environmental, health, safety and community policies.	Section 1.3
5.2 The Environment impact statement process	
Outline the steps of the environmental impact statement process, note which steps have been completed, and provide an estimated completion date for each remaining step. Highlight the steps in which the public will have the opportunity for input. The information in this section is required to ensure readers are informed of the process and are aware of their opportunities for input and participation.	Section 1.4
Inform the reader how and when properly made public submissions on the EIS can be made, and outline how the submissions are taken into account in the decision-making process.	Refer to Section 1.6 and 1.7 of EIS
5.3 Project approvals process	
Describe the approvals that are required to enable the project to be constructed and operated, and note the legislation under which the approvals are assessed and issued. Explain how the EIS fits into the assessment and approval processes for the environmental authority, leases, licences and permits required by the proponent before construction and operations can start.	Section 1.4 and Chapter 2
Describe the approvals process under the EPBC Act if this project is to be assessed under the bilateral agreement between the Queensland and the Australian Governments.	See Chapter 2
6. Consultation process	

Terms of Reference	Section of the EIS
Provide information on the development and implementation of a consultation plan for the people and organisations identified as affected or interested persons, or stakeholders for the project.	Sections 1.5; Chapter 19B; Appendix 14a
Describe issues of potential concern to any and all stakeholders at various stages of the project from project planning to commencement, project operations and decommissioning.	Chapter 19B; Appendix 14a; Appendix 14b
The description should at least include the following matters: • the objectives of the consultation process • timing of consultation • the number and interests of the people and organisations involved in the consultation (particularly the affected and interested persons defined in sections 38 and 41 of the EP Act) • methods of consultation and communication • reporting and feedback methods of the consultation process • an assessment explaining how the consultation objectives have been met and • an analysis of the issues raised and their completed or planned resolution, including any alterations to the proposed project as a result of the received feedback.	Sections 1.5; Chapter 19B; Appendix 14a; Appendix 14b
7. Project description and alternatives	
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.	Section 1.9
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.	Section 1.9
7.1 Proposed development	
Describe and illustrate the following specific information about the proposed project, including but not limited to:	
project's title	Section 1.2
project objectives	Section 1.2
expected capital expenditure	Section 1.6.3
rationale for the project	Section 1.6
project description, including the nature and scale of all project components and activities	Section 1.9
whether it is a greenfield or brownfield site	Section 1.2
regional and local context of the project's footprint with maps at suitable scales	Section 1.8.1
proposed timing of the development, including construction staging and likely schedule of works	Section 1.9.15
relationship to other major projects or developments of which the proponent should reasonably be aware	Section 1.10
the workforce numbers for all project phases	Section 1.7.1
where personnel would be accommodated and the likely recruitment and rostering arrangements to be adopted	Section 1.7.2; Section1.7.3; Section 1.7.4; Chapter 19B

Terms of Reference	Section of the EIS
proposed travel arrangements of the workforce to and from work, including use of a FIFO workforce	Section 1.7.4; Chapter 19B
7.2 Site description	
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 1.8.2
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 1.8.1.2
Describe and illustrate the topography of the project site and surrounding area, and highlight any significant features shown on the maps.	Section 1.8.4.1
Map the location and boundaries of the project's footprint including all infrastructure elements and development necessary for the project.	Section 1.9.1 Figure 1-18
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.	Section 1.9
Include discussion of any environmental design features of these facilities including bunding of storage facilities.	Section 1.9
Describe and map in plan and cross-sections the geology and terrestrial and/or coastal landforms of the project area.	Section 1.8.4.2; Chapter 5
Indicate the boundaries of water catchments that are significant for the drainage of the site.	Section 1.8.4.5; 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 1.8.4.2; Chapter 5
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.	Section 1.8.4
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.	Section 1.8.4.4; Chapter 5 - Land
7.3 Proposed construction and operations	
Describe the following information about the proposal, and provide maps and concept/layout plans:	See below
• existing land uses and any previous land use that might have affected or contaminated the land;	Section 1.8.1.3; Section 1.8.3
• existing buildings, infrastructure and easements on the potentially affected land;	Section 1.8.3.1
• all pre-construction activities (including vegetation clearing, site access, interference with watercourses, wetlands and floodplain areas);	Section 1.9.16
• the proposed construction methods, associated equipment and technique;	Section 1.9.17

Terms of Reference	Section of the EIS
• road and rail infrastructure, and stock routes, including new constructions, closures and/or realignments;	Section 1.9.7; Section 1.9.9; Chapter 6
• 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;	Section 1.9
• changes to watercourses and overland flow on or off the site, including stream diversions and flood levees;	Section 1.9.5
• any infrastructure alternatives, justified in terms of ecologically sustainable development (including energy and water conservation);	Section 1.11
• hours of construction and operation;	Section 1.7.3
• the proposed extractive and processing methods, associated equipment and techniques;	Section 1.9.3
• the sequencing and staging of activities;	Section 1.9.15.2
• the proposed methods and facilities to be used for the storage, processing, transfer, and loading of product;	Section 1.9
• the capacity of high-impact plant and equipment, their chemical and physical processes, and chemicals or hazardous materials to be used;	Section1.9.10.3; Section 1.9.17.8; Section 1.9.18.2; Chapter 21 – Hazard and Risk
• any activity that would otherwise be a prescribed environmentally relevant activity if it were not undertaken on a mining or petroleum lease; and	See Chapter 2
• 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.	Section 1.9.17.8;
7.4 Feasible alternatives	
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.	Section 1.11; Appendix 2 – Project Alternatives Considered
Summarise the comparative environmental, social and economic impacts of each alternative, with particular regard to the principles of ecologically sustainable development.	Section 1.11; Appendix 2 – Project Alternatives Considered
Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action while rejecting others.	Section 1.11; Appendix 2 – Project Alternatives Considered
Discuss the consequences of not proceeding with the project.	Section 1.11

1.2 Project Overview

Central Queensland Coal Pty Ltd (CQC) is proposing to develop the Central Queensland Coal Project (the Project). The Project is a greenfield site and will comprise the following as major components:

- 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.

The Project will be located within Mining Lease Application (ML) 80187 and ML 700022.

Development of the Project will commence in 2021 with initial early construction works and extend operationally for approximately 19 years (2039) until the depletion of the current reserve, with rehabilitation and mine closure activities completed by 2044.

The Project will involve mining a maximum combined tonnage of 10 million tonnes per annum (Mtpa) of semi-soft coking coal (SSCC) and high grade thermal coal (HGTC) across two open cut operations. The run-of-mine (ROM) coal will ramp up to approximately 2 Mtpa during Stage 1 (2021 - 2024), where coal will be crushed, screened and washed to SSCC grade with an estimated 80% yield. Stage 2 of the Project (2025 - 2039) will include further processing of up to an additional 8 Mtpa ROM coal within another coal handling and preparation plant (CHPP) to SSCC, and a HGTC plant with an expected 100% yield.

The open cut mines will be developed progressively with Open Cut 2 commencing from Year 1 of the Project (2021) and Open Cut 1 commencing in Year 10 of operations (2030). At full production, two CHPPs, one servicing each open cut mine, will be in operation. Rehabilitation will be ongoing from Year 3, however rehabilitation to final landform and mine closure activities will occur between 2038 and 2044.

The Project will be located within ML 80187 and ML 700022 which are adjacent to Mineral Development Licence (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 Environmental Authority (EA).

The Project is located in the Styx Basin, approximately 130 kilometres (km) northwest of Rockhampton in Central Queensland (Figure 1-1). Access to the Project will be via the Bruce Highway. The Project will employ a peak workforce of approximately 222 people during construction and between 100 (2021) and 500 (2032) during operation, with the workforce reducing to approximately 20 during decommissioning. CQC will manage the Project construction and ongoing operations with the assistance of contractors.

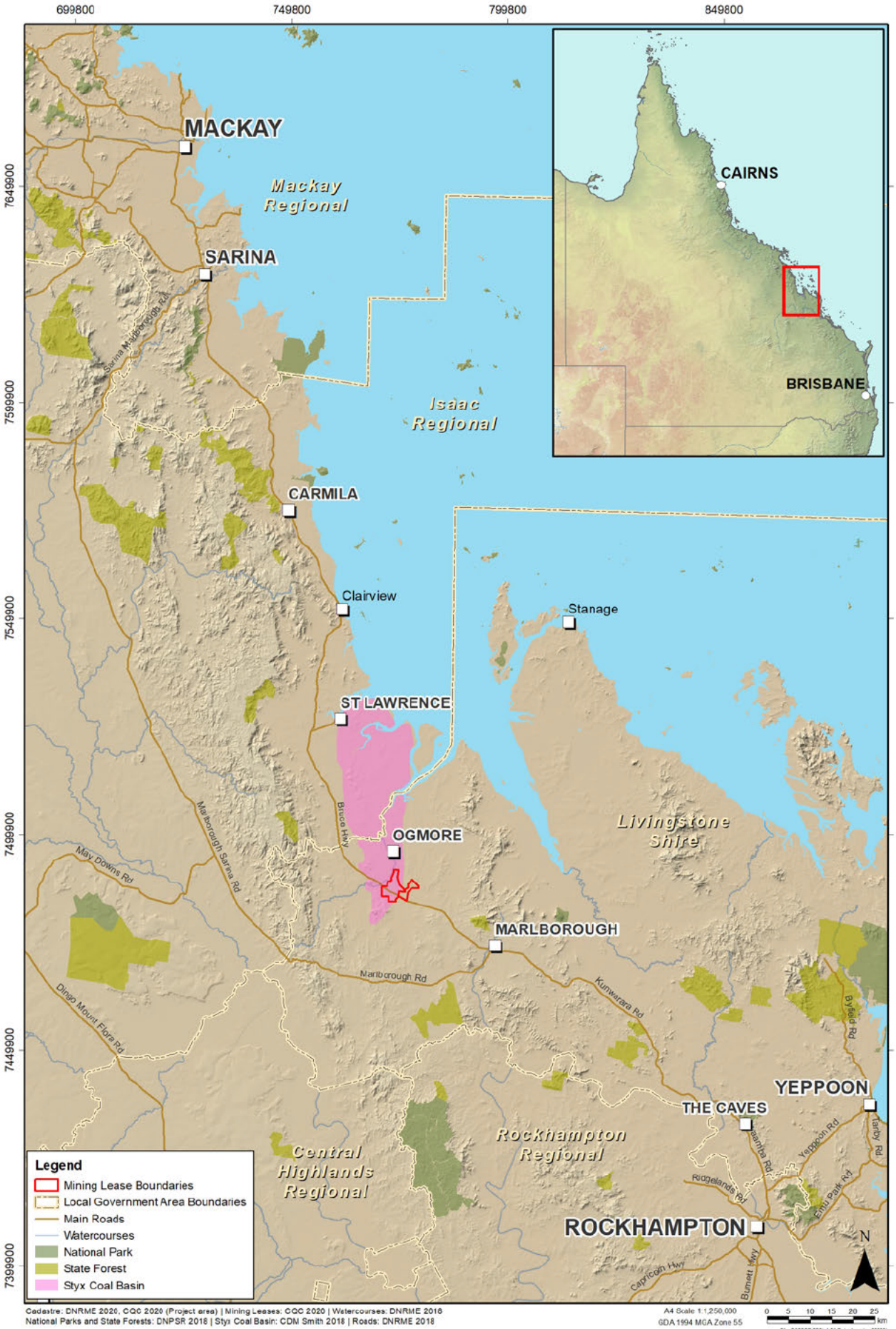


Figure 1-1: Project regional location

1.3 Project Proponents

The Proponents for the project are CQC and Fairway Coal Proprietary Limited (Fairway Coal) (the joint Proponents). As CQC is the senior proponent, only CQC is referred to as the proponent throughout this Supplementary Environmental Impact Statement (SEIS).

1.3.1 Proponent Details

The full details for each proponent are:

Central Queensland Coal Proprietary Limited
ABN: 55 155 767 516
Street Address: Level 17 240 Queen Street, Brisbane, Qld, 4000, Australia
Postal Address: PO Box 1538, Brisbane QLD 4001

Fairway Coal Proprietary Limited
ABN: 68 127 220 642
Street Address: Level 17 240 Queen Street, Brisbane, Qld, 4000, Australia
Postal Address: PO Box 1538, Brisbane QLD 4001

CQC and Fairway Coal jointly own MDL 468 which will form the Project.

1.3.2 Nature and extent of the Proponents' business activities

CQC and Fairway Coal are privately owned Australian Coal Exploration and Coal development companies, holding coal tenures within the Styx Coal Basin. Fairway Coal is a subsidiary of Mineralogy Pty Ltd and both companies are related companies, having common shareholder ownership and control.

In addition to the Styx Basin, Fairway Coal holds extensive mining concessions within the mineral basins of Bowen and Surat.

CQC was established in 2017 with the specific purpose of delivering the CQC project within the Styx Basin.

CQC is the owner of ML80187 and ML700022 and Fairway Coal is the Authorised Holder of MDL 468, which together form the Project.

1.3.3 Proponent Environmental Record

There are no past or present, proceedings under any Commonwealth or State law relating to the protection of the environment, or the conservation and sustainable use of natural resources, against either proponent.

Both Fairway Coal and CQC are registered as suitable operators with the DES (#701901 and #686364, respectively), meaning each company is registered as being suitable to carry out industrial activities requiring an EA.

Both proponents are committed to the economic development of regional growth in Queensland through the growth of mineral wealth while operating with an excellent environmental record in the area.

1.3.4 Environmental, Health, Safety and Community Policies

CQC has established Health and Safety, and Environmental Management policies. The approach to CQCs Environmental Management System (EMS) has been developed to be consistent with the internationally recognised EMS standard ISO 14001.

1.4 Environmental Assessment Process

An Environmental Impact Statement (EIS), and two SEIS versions have preceded this version of the SEIS (i.e. SEIS Version 3, or v3). This section outlines the steps of the environmental impact assessment process to the time of writing this SEIS.

The EIS process and the EA and ML approval processes are presented in Figure 1-2, with each step of the EIS process described in more detail below.

As can be seen from Figure 1-2, the opportunity for public input to the EIS process has already occurred, however any individuals who made a submission during the EIS process are able to later object to the approval of an EA for a mining project in the Land Court, if they wish.

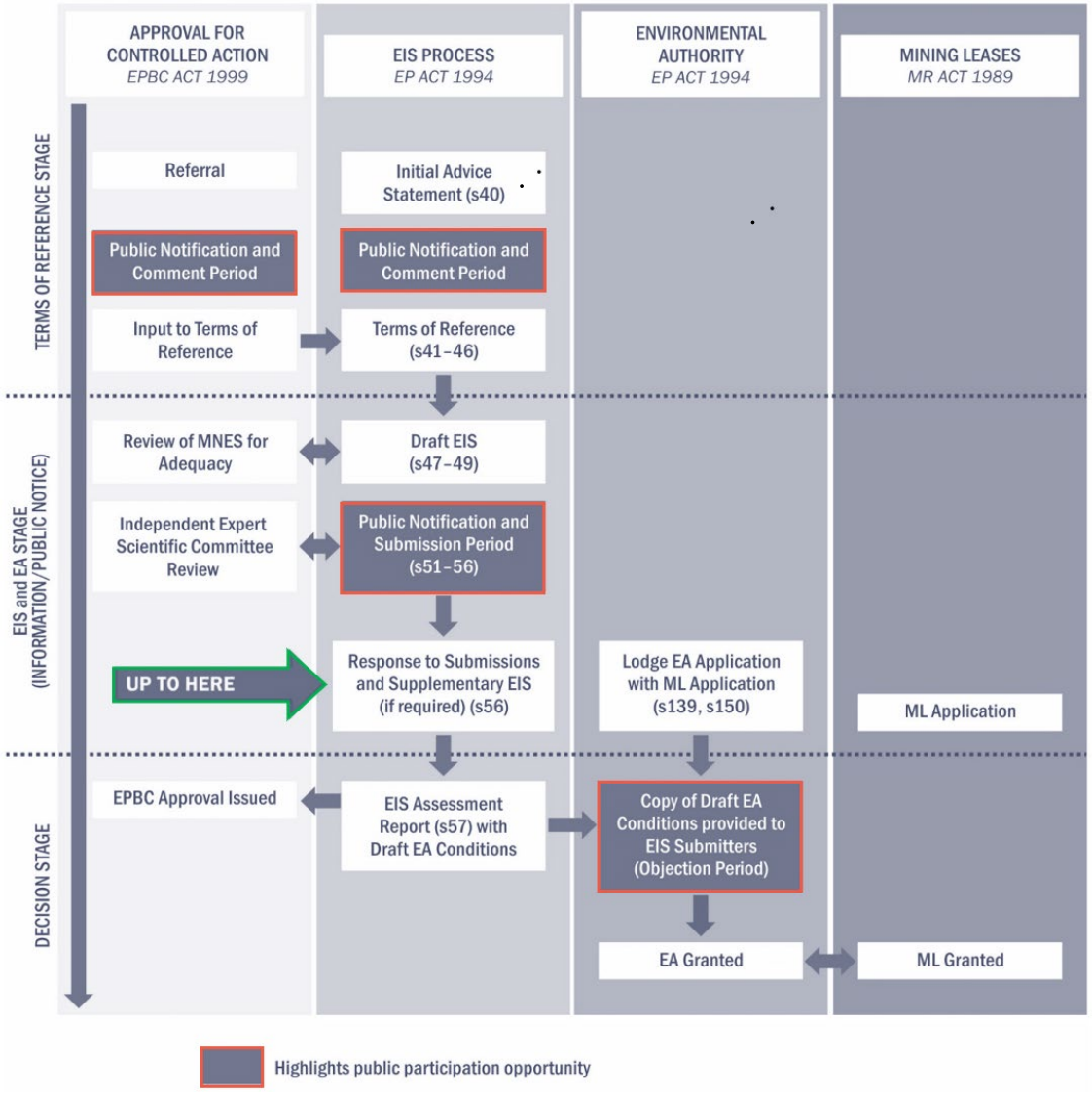


Figure 1-2: EIS, EA and ML approvals process summary

1.4.1 Initial Advice Statement, Application to prepare EIS, Referral and ToR

1.4.1.1 Application to the Queensland Government to prepare an EIS

On 16 December 2016, Fairway Coal submitted to the DES an application, and supporting Initial Advice Statement (IAS), to undertake a voluntary EIS under the Queensland *Environmental Protection Act 1994* (EP Act). The application was approved by DES on 27 January 2017 under section 72 of the EP Act.

1.4.1.2 Referral to the Commonwealth Government

The Project was identified as having the potential to impact on Matters of National Environmental Significance (MNES) and was referred to the former Commonwealth Department of the Environment and Energy (DotEE) – now the Department of Agriculture, Water and the Environment (DAWE). On 3 February 2017, a delegate of the Commonwealth Minister for the Environment decided that the proposed action was a controlled action (EPBC ref 2016/7851) and, as such, required assessment and approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The controlling provisions are:

- World Heritage properties (sections 12 & 15A)
- National Heritage places (sections 15B & 15C)
- Listed threatened species and communities (sections 18 & 18A)
- Listed migratory species (sections 20 & 20A)
- Great Barrier Reef Marine Park (GBRMP) (sections 24B & 24C) and
- a water resource, in relation to coal seam gas development and large coal mining development (section 24D & 24E).

1.4.1.3 Bilateral Agreement

The project is being assessed under the bilateral agreement between the Commonwealth and the State of Queensland (section 45 of the EPBC Act) using the EIS prepared under the EP Act. This bilateral agreement allows the Commonwealth Minister for the Environment to rely on specified environmental impact assessment processes of the State of Queensland in assessing actions under the EPBC Act. The bilateral process runs parallel with the EIS process with input from the Commonwealth Department in the Terms of Reference (ToR), government consultation and review and assessment of the EIS. DAWE will issue a separate approval for the Project which outlines the required conditions to mitigate any impacts to MNES.

1.4.1.4 Terms of Reference

The ToR for the Project (EHP 2017) sets out the scope and required content that the EIS must include. The draft ToR were prepared under the EP Act and placed on public exhibition together with the IAS. The final ToR was issued by DES on 4 August 2017.

1.4.2 Preparation, lodgement and public review of the EIS

The EIS for the Project was prepared to address the ToR and inform the Queensland and Commonwealth Government's approval decision. The EIS provided an assessment of the potential risks of the Project during both construction and operation, including an assessment of the proposed mitigation, management and monitoring measures.

The EIS was lodged in November 2017 and is available from the following link.

https://cqcoal.com.au/publications-approvals/

1.4.2.1 Public review of the EIS

The EIS was made available for public comment and review from 6 November 2017 through to 18 December 2017.

A total of 34 interested parties including independent organisations, State and Commonwealth advisory agencies and government departments made submissions to the EIS.

The issues raised in these submissions form the basis of the previous versions (Version 1 and 2) of the SEIS.

1.4.3 SEIS Process

1.4.3.1 SEIS v1 and SEIS v2

A SEIS (May 2018 – hereafter referred to as SEIS Version 1 or SEIS v1) was prepared to address the submissions received during the EIS public review period. As mentioned above, 34 submissions were received, however seven submitters did not require any additional points of clarification.

Further comments, separate to the original comments on the EIS, were then received in response to submissions arising from departmental reviews of the SEIS v1 for adequacy. These were addressed in in a December 2018 version (hereafter referred to as SEIS Version 2 or SEIS v2). The comments and associated responses associated with these two 2018 versions of the SEIS are provided at Table 1-2 of Appendix 13. Response to additional comments by the Independent Expert Scientific Committee arising out of the first SEIS adequacy review are presented at Table 1-3 of Appendix 13.

A summary of the issues raised during these stages of the Project is provided in Section 1.8.3.2 of Chapter 1 – Introduction of the December 2018 SEIS (SEIS Version 2).

1.4.3.2 SEIS v3

On 14 June 2019, via DES, CQC received submissions from five Queensland Government agencies, and the Commonwealth Department of Environment and Energy regarding the SEIS v2. Many of the comments from the agencies concluded that version two of the SEIS did not adequately address their original submissions and/or the ToR of the EIS, and that further assessment was required to be undertaken by 18 June, 2020.

As a result, on June 14, 2019, DES wrote to CQC to inform them that, in order for the EIS to proceed under section 56A(2) (with section 56A(4)) of the EP Act, they were providing CQC with an opportunity to:

a. amend the statement of response to the submissions which were provided under section 56(2)(b) and
b. make additional amendments to the submitted amended EIS provided under section 56(2)(d) (along with an amendment notice under section 66 of the EP Act).

Accordingly, this version of the SEIS (i.e. Version 3, or v3, October 2020) has been prepared. This SEIS addresses the comments arising from the adequacy review of the SEIS v2. Substantial work has been undertaken to provide comprehensive assessment and responses to these comments.

A description of the additional work undertaken, and responses to each of the submission comments on the SEIS v2, is provided in Chapter 3 of Volume 2 of this SEIS.

As part of the SEIS v3 process, refinement of Project design has sought to further avoid and minimise impacts on environmental values. Since the finalisation of SEIS v2, several additional changes have been made to the Project layout, operations and equipment to avoid and mitigate impacts on environmental values. The Project layout changes are shown in Figure 1-3) and include:

- excising 349 ha from the southern extent of ML 80187 to reduce the overall size of the Project Site
- revising the mine site water management system to increase storage capacity and hence minimise the potential for controlled and uncontrolled releases while increasing the site water security for operations:
  - as part of the above, consolidating the water storages and increasing the size of Dam 1 within areas of non-remnant vegetation and
  - as part of the above, commitment to source all water required for the Project from on site capture and reuse (i.e. no water abstraction proposed)
- complete removal of Dam 2 to avoid impacts on least concern RE 11.3.27 (freshwater wetlands) and of concern RE 11.4.2
- recovery of 1% AEP flood storage area in previous area of Dam 2
- movement of MIA 2 and CHPP 2 to adjacent to Dam 1, avoiding need for separate environmental dam and removal of that dam from the floodplain
- relocating Environmental Dam 2D from within an area of concern RE 11.3.4 into non-remnant areas adjacent to the Haul Road
- relocating the haul road which has removed it from the 1% AEP area on the west side of the Deep Creek crossing, and since it coincided with the Dam 2 wall, also avoid impacts to RE 11.3.35 and RE 11.3.27, which are Least Concern, and RE 11.4.2, which is Of Concern. The new location avoids impacts to remnant REs
- retracting the Open Cut 2 pit northern end wall by 40 m to the south to increase the buffer between the mine and endangered RE 11.3.11
- redesigning, reconfiguring or removing the Waste Rock Stockpiles in order to minimise the area of disturbance, best facilitate later reworking to achieve reduced landform slopes post-mining and locating them out of the flood zone to the greatest extent possible
- commitment to not undertake construction activities at night to avoid night time noise disturbance to the nearest sensitive receptors and
- as part of above, a commitment to replace three haul truck models previously proposed, with a quieter fleet.

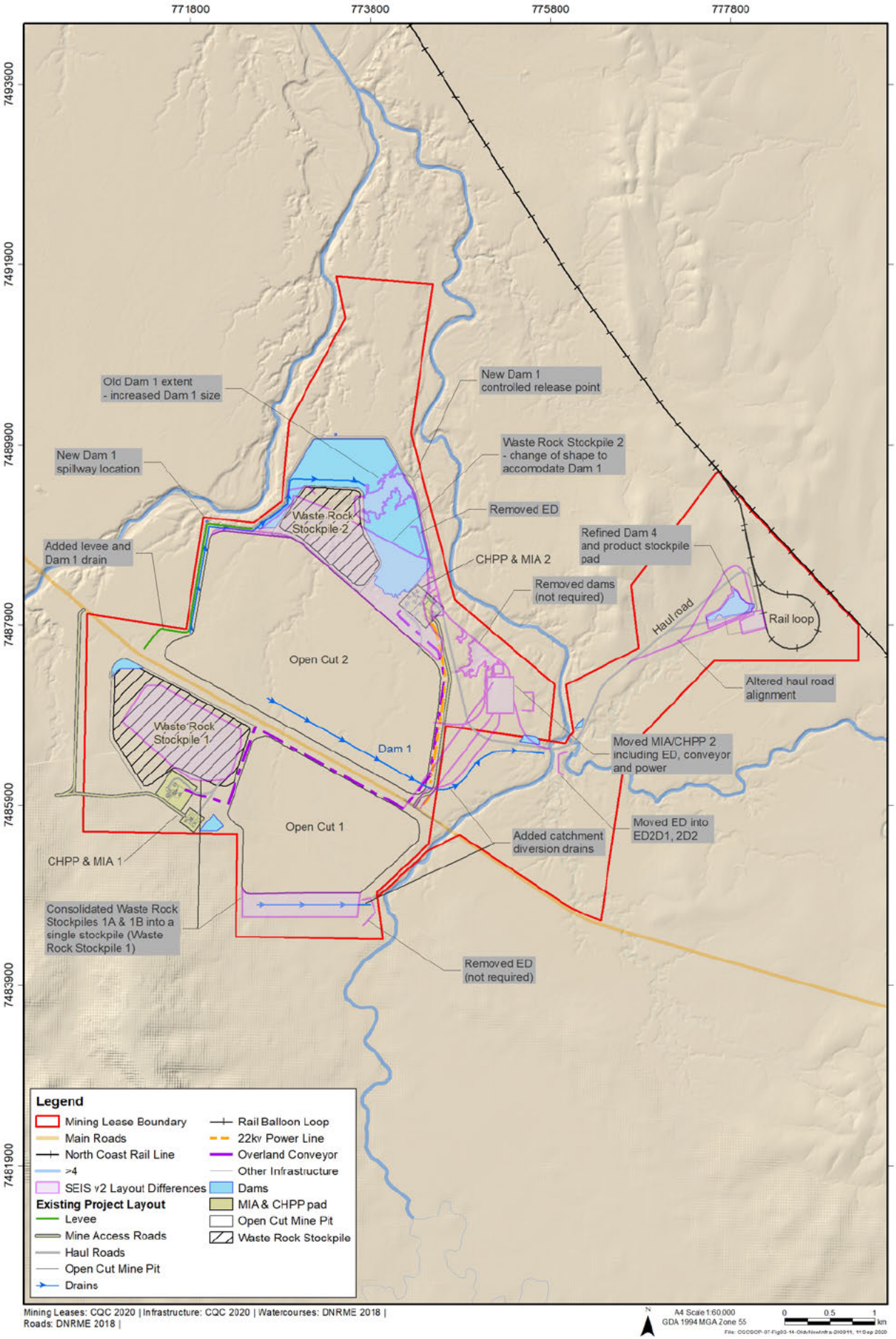


Figure 1-3: Project layout changes between SEIS v2 and SEIS v3

This SEIS has sought to follow the layout of previous versions to assist the readers in undertaking their adequacy review. However, as mentioned above, a large body of work has been undertaken to inform this SEIS and as such, there have been substantial changes to the document in many chapters. Therefore to assist the reader, an overview of the work undertaken is provided in Chapter 3 of Volume 2, along with responses to each of the agency comments that address each issue in summary form, and direct the reader to where in the SEIS the full body of work to address each agency comment can be found.

The SEIS v3 is organised as into three volumes as follows:

- Volume 1 – Executive Summary
- Volume 2 - SEIS chapters and
- Volume 3 - SEIS appendices.

A summary of the contents of each volume is shown in Table 1-2 to Table 1-4.

Table 1-2: SEIS v3 Volume 1 - Project overview contents

Chapter	Chapter Title	Chapter	Chapter Title
i.	Executive Summary	iii.	Glossary
ii.	Table of Contents		

Table 1-3: SEIS v3 Volume 2 – Chapter contents

Chapter	Chapter Title	Chapter	Chapter Title
1.	Introduction and Project Description	14.	Terrestrial Ecology
2.	Legislation and Approvals	15.	Aquatic and Marine Ecology
3.	Response to Agency Comments and SEIS Changes	16.	Matters of National Environmental Significance
4.	Climate and Climate Change	17.	Biosecurity
5.	Land	18.	Cultural Heritage
6.	Traffic and Transport	19.	Social and Economic
7.	Waste Management		19A CQC Economic
8.	Waste Rock and Rejects		19B CQC Social
9.	Surface Water	20.	Health and Safety
10.	Groundwater	21.	Hazard and Risk
11.	Rehabilitation and Decommissioning	22.	Key Commitments
12.	Air Quality and Greenhouse Gas	23.	Draft EA Conditions
13.	Noise and Vibration	24.	References

Table 1-4: SEIS v3 Volume 3 – Appendices contents

No.	Appendix Title	No.	Appendix Title
1.	Central Queensland Coal Final Terms of Reference	9f	2016 and 2020 Database Searches
2.	Project Alternatives Considered	9g	Composite Fauna Species List (2011 to 2019).
3.	Land, Soil and Geochemistry	9h	Migratory Shorebird Counts in Broad Sound.
3a	Land Suitability Assessment	10.	Aquatic Ecology, Marine Ecology and Groundwater Dependent Ecosystems
3b	Geochemical Assessment	10a	Aquatic Ecology, Groundwater Dependent Ecosystems, Marine Ecology and the Great Barrier Reef
3c	Land Stability Assessment	10b	2011 Baseline Monitoring Program
4.	Road and Traffic Studies	10c	Stygofauna Assessment
4a.	Road Impact Assessment	10d	Groundwater Dependent Ecosystem Assessment
4b.	Geotechnical Assessment	10e	Groundwater Dependent Ecosystem Management and Monitoring Program
4c	Draft Road-Use Management Plan	10f.	Receiving Environment Monitoring Program
5.	Surface Water	10g	2018 Waterway Barrier Works Map Amendment Request
5a	Surface Water Quality Technical Report	10h	Preliminary Isotope Study Results
5b	Flood Study and Site Water Balance	10i	Estuarine Benthic Study
5c	Draft Mine Site Water Management Plan	11.	Offsets
5d	Fluvial Geomorphology Assessment	11a	Biodiversity Offset Strategy
5e	Preliminary Dams Consequence Category Assessment	11b	Draft Offset Delivery Plan
6.	Groundwater	11c	Draft Mamelon Offset Area Management Plan
6a.	Groundwater Model Report Summary	11d	Draft [redacted] Offset Area Management Plan
6b	Numerical Groundwater Model and Groundwater Assessment Report	12.	Environmental Management Plan
6c	Groundwater Quality Data Summary	13.	EIS and SEIS v1 Submissions Register
6d	Surface Water/Groundwater Interactions Report	14.	Socio-Economic
6e	Groundwater Model Peer Review	14a	Economic Model Outputs
6f	Transient Electromagnetic Survey	14b	Stakeholder Engagement Report
6g	Core Permeability Tests	14c	Social Impact Assessment
6h	Cross Sections of Regolith	15.	Erosion and Sediment Controls
7.	Air Quality and Greenhouse Gas	15a	Draft Erosion and Sediment Control Plan
8.	Noise and Vibration	15b	Styx Catchment Sediment Budget
9.	Terrestrial Ecology	16.	Construction Design Drawings
9a	2011-2012 Terrestrial Fauna Reports	16a	Mine Access Road Civil Drawings
9b	2011 Flora and Vegetation Assessment	16b	Mine Dam 1 Civil Drawings
9c	Threatened Fauna Investigation – Deep Creek	16c	Mine Haul Road Civil Drawings
9d	MNES and MSES Supplementary Impact Assessments	16d	MIA, CHPP and Dam 1 Access Road Civil Drawings
9e	Significant Species Management Plan		

1.5 Consultation Process

1.5.1 Objectives

The objectives of the consultation program for the CQQ Project EIS were to:

- initiate and maintain open and honest communication on all aspects of the project and the EIS with interested and affected stakeholders
- engage in a consultation process that provides genuine, active, two-way exchange and feedback
- provide a range of communication methods to engage and inform stakeholders about the project, and to identify stakeholder issues of concern about the Project
- consider and address stakeholder issues of concern via the technical studies conducted for the EIS
- record and address stakeholder issues of concern through the EIS process and establishment of a grievance / feedback mechanism and
- provide ongoing feedback to stakeholders on their issues of concern and advise them how comments have been used to inform the Project.

1.5.2 Methods and Timing of Consultation

Stakeholders with an interest in the Project include local community residents, landholders and neighbours, Traditional Owners, local councils and state government departments as well as residents and businesses in the broader regional area.

Stakeholders have been engaged and consulted through a variety of methods, including face to face meetings and briefings, interviews, open community meetings and opportunities for formal comment on the ToR and EIS.

Stakeholder and community engagement for the project has occurred at various intensities since 2012, when discussions with landholders and neighbours commenced. Consultation feeding into the SIA commenced with the EIS ToR consultations which occurred in early 2017, and was followed by specific consultation for the EIS, the SEIS's and for the revised SIA a part of this SEIS v3. Figure 1-4 shows an overview of the consultation program since project inception.

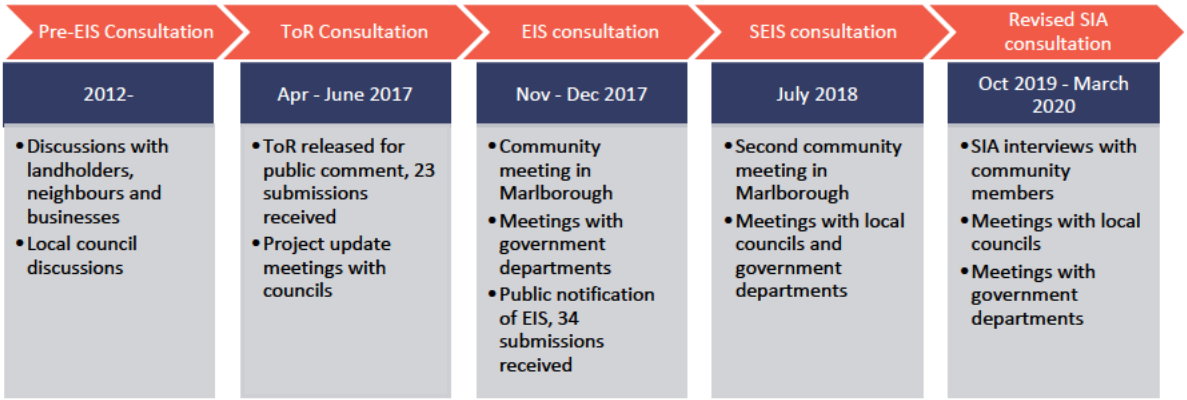


Figure 1-4: Overview of the consultation program

A full description of the consultation activity for each stage of the program shown in Figure 1-4 above, is given in the Stakeholder Consultation Report contained at Appendix 14a. It provides an account of the consultation undertaken for the project prior to the EIS commencing, as well as that undertaken during the EIS and subsequent versions of the SEIS. It also provides an outline of the Proponent's approach to ongoing community engagement for the life of the project.

1.6 Project Rationale and Benefits

The Project will produce both coking (SSCC) and thermal HGTC coal for export. Thermal and coking coals are in demand globally to generate electricity and steel, respectively. Coal pricing forecasts and future demand for SSCC and HGTC is discussed in Chapter 19A – Economics.

Queensland has a number of policies, strategies and plans to capitalise upon this and promote and support the growth of the resources sector, which the Project will contribute to. The Project will also contribute key social and economic benefits to the locality, region and state including flow on business, employment skills and training programs, and royalties and taxes. The benefits of the Project are described further below.

1.6.1 Policy Framework for Coal in Queensland

The Queensland Government has undertaken strategic planning activities to support the growth and development in areas of mining communities and coal export facilities. The Project is in line with the objectives of these strategic planning activities. These legislative and non-statutory frameworks include:

- Building our Regions
- Queensland Ports Strategy and
- Central Queensland Regional Plan 2013.

The Central Queensland Regional Plan 2013 recognises that the prominent industries in the region are agriculture and resources (primarily thermal coal) (DSDIP 2013). In 2011/12, around 75 million tonnes of coal was produced in the region accounting for 40 per cent of Queensland's total coal production (DSDIP 2013). The region is naturally endowed with extensive coal and mineral resources that are projected to continue to be in high demand by rapidly growing countries such as China and India over the medium-term (DSDIP 2013).

The Central Queensland Sustainability Strategy 2030 has been developed as an initiative of the Fitzroy Basin Association (FBA), to provide a blueprint to better manage and protect Central Queensland's assets. The CQSS2030 has been developed collaboratively by FBA with regional stakeholders and is written for members of the community, natural resource managers and the institutions that influence resource management in Central Queensland.

In 2014 the Queensland Government established the ResourcesQ 30-year vision and action plan to deliver the objectives of the Queensland Plan pertaining to the resources sector. The intention is that by 2044, Queensland will be recognised as a preferred resource destination, with an enviable investment track record and competitive operating environment. A number of initiatives are being implemented by the Queensland Government to deliver the ResourcesQ vision, including:

- the CoalPlan 2030 and
- the Coal Infrastructure Program of Actions.

Since 2008, the Coal Infrastructure Program of Actions has committed more than $19.3 billion to coal related infrastructure, including transport systems, water and energy supplies, skills and social infrastructure. It is anticipated that the Project will also contribute to a variety of plans outlined in the Coal Infrastructure Program of Actions including, but not limited to, skills development and contribution to social infrastructure (see Chapter 19B – Social Impacts for further details).

1.6.2 Social and Economic Benefits

The Project is predicted to provide a significant contribution to economic benefits, including employment and a boost to the townships of Ogmore, Marlborough and St Lawrence, as described in detail within Chapter 19A –Economics.

The Project is anticipated to result in a range of positive impacts including:

- Economic stimulus to the regional, state and national economies during the construction and operational phases of the project, especially for suppliers in the Central Queensland region.
- Export revenues from coal produced across the life of the mine is estimated to be in the order of $7.78 billion to $8.2 billion (AUD), which, assuming royalty rates remain unchanged, would yield royalties of approximately $703.3 million to $766.0 million (AUD) over the life of the mine.
- Increased employment opportunities within Central Queensland which would help to reverse the trend of increasing unemployment within the region.

1.6.2.1 Economic Stimulus and Flow-on Benefits

A significant proportion of Project investment will flow directly into the regional economy from the goods and services required during the construction and operation phases. During the construction stage the predominant economic advantage comes from capital expenditure (CAPEX) on goods and services. This will continue during operations but at a reduced demand. Goods and services expected to be sourced locally and from the region include:

- consumables (food, beverages etc.) for the workforce
- fuel supply and transport
- housing
- light engineering and engineering support services
- professional and technical services
- road transport services for consumables, equipment and supplies
- tools, plant and equipment
- training and personnel management services and
- vehicle hire or purchasing.

Ongoing supply lines during the operational phase of the Project are likely to be from regional centres such as Rockhampton and Mackay. As such the flow-on effects are expected to benefit these centres through the provision of goods and services. Indirect businesses and infrastructure development are also expected to benefit from the additional personnel in the region. Beyond local and regional suppliers, the Project will also require support from the broader Queensland supply and services base for technical and specialist skills or equipment to deliver and sustain operations.

1.6.2.2 Royalties and Taxes

The Project will provide significant positive contributions to the Queensland economy, with the projected total value of exports expected to be in the order of $7.8 billion (AUD) to $8.2 billion (AUD) and the resulting Queensland Government royalties generated being between $703.3 million (AUD) and $766.0 million (AUD).

The assessment is discussed in further detail in Chapter 19A – Economics.

1.6.2.3 Employment, Skills and Training

Throughout the three phases of the Project (construction, operation and decommissioning) the Project will provide potential employment opportunities in Ogmore, Marlborough and St Lawrence, in addition to the broader regional area.

The direct employment opportunities created by the project include:

- relatively short-term construction workforce opportunities with a peak of 222 workers in phase one and 150 workers in phase two
- ongoing employment opportunities of approximately 100 workers during production, increasing to 167 workers at year 4 and
- a peak of 500 operational employment opportunities while both open cut one and open cut two operate in year 12. This would last approximately one year.

In the context of the local study area, where the labour force comprised 367 persons in 2016, this is a significant and positive impact. Given the reasonably small labour force in the local area the labour force is likely to also be drawn from the regional area and to some extent from the rest of Queensland, as discussed in Section 1.7.2.

Operational employment impacts will vary throughout the operational life of the mine in response to changes in production. The Project will ensure employees are appropriately trained in their relevant industry skills and provide training programs to further develop industry skills.

As outlined above, a significant proportion of total employment effects will be in flow on or indirect employment, which will ease some pressure in the local community resulting from recent down-sizing of workforces and add to the over 50,400 employed throughout the Australian coal industry as at November 2019 (ABS 2019).

1.6.3 Capital Expenditure

Capital expenditures for the construction of project are reported in Chapter 19A. Capital expenditures for the project are anticipated to total $262.3 million (AUD), comprising approximately:

- $114.1 million of project expenditures within Central Queensland
- $54.9 million of project expenditures within the rest of Queensland
- $46.1 million of project expenditures interstate and
- $47.3 million of project expenditures overseas.

1.7 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.

1.7.1 Workforce Demand

A construction workforce for the Project of approximately 222 people will be required for the initial construction period of 2021 – 2022 (years 1 and 2). 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 2029 – 2031 (years 9-11) 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 150, occurring in 2030.

A proposed operational workforce of between 100 (2021) to 500 (2032) employees will be required during the mine operations.

From then the workforce will decrease as operations will be winding down, and final rehabilitation and decommissioning commences. A workforce of approximately 20 will be required during decommissioning.

Figure 1-5 shows the indicative workforce demand over the life of the project.

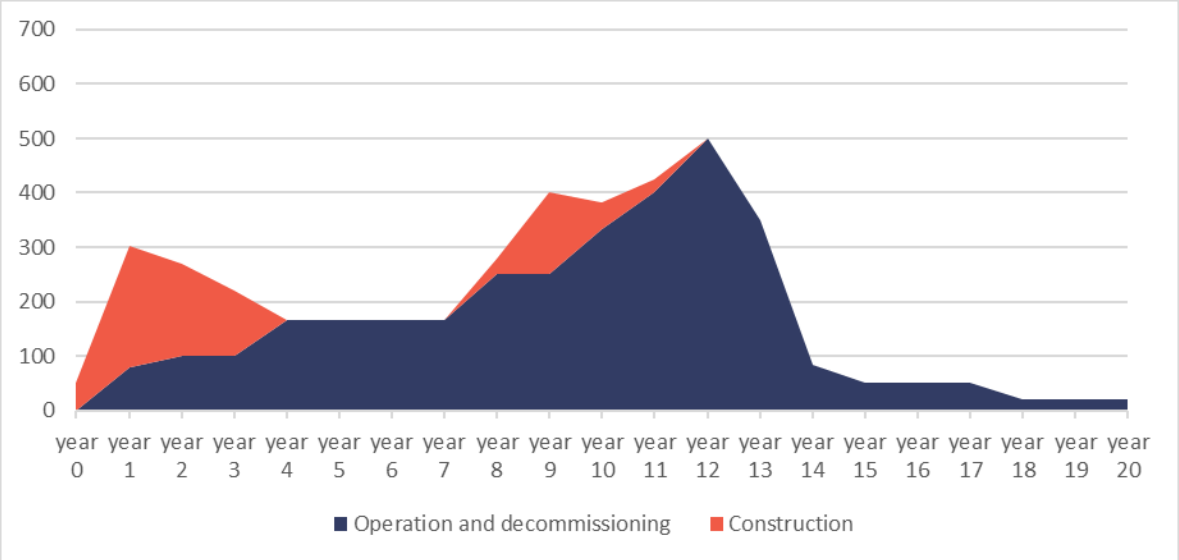


Figure 1-5: Indicative workforce requirements over the life of the Project

CQC 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.

1.7.2 Workforce Recruitment

Two workforce sourcing scenarios have been developed for each of the construction and operations workforces to inform the impact assessment of related social impacts.

For construction, the first scenario considers a predominantly regionally based workforce, consisting of existing residents and those who relocate to reside in the region, a smaller workforce commuting from the rest of the state, and an even smaller cohort recruited from existing residents in the local study area. The second scenario assumes a smaller, but still significant proportion recruited from the regional area, approximately the same proportion from the state, and a very small proportion from the local study area.

For the operational workforce, the first scenario assumes a predominantly local workforce scenario, where half of the workforce is sourced from the local study area, 45% from the region, and the remainder from the rest of Queensland. The second scenario considers a predominantly regional workforce scenario, where 20% is sourced from the local study area, 75% from the regional study area, and the remainder from the state of Queensland. For operations, both of these scenarios share assumptions of an equal split between recruitment of existing and in-migrating residents for each area (except the state), and that the family and dwelling arrangements are similar to averages for the regional study area.

The assumptions underpinning these scenarios have been developed taking into account existing demographic and employment data for the local and regional study areas and experience from comparable mining projects and are described in detail in Chapter 19B - Social.

1.7.2.1.1 Construction employment

Under the *predominantly regional* scenario, 133 existing regional area residents would be employed at peak of the first construction stage, and 55 would have migrated into the regional area to work on the project. This would see 144 people move into the regional study area, of which 33 are children. Under this scenario 17 persons would be commuting from the rest of Queensland to work on the project, and 17 would be drawn from the existing workforce in the local study area.

During the second construction phase, at which the western infrastructure is constructed, a peak of 90 existing regional area residents would be employed, 38 would relocate to reside in the regional area and 11 local residents would be employed. Applying the same household size assumptions, this would equate to an additional 98 residents in the regional study area. At this stage, eleven workers would be commuting from the rest of the state.

The *predominantly state* scenario would see 47.5% of the construction workforce sourced from outside the regional study area, 25% from existing regional residents, 25% from in-migrating regional residents, and 2.5% from the local study area. This would lead to the first construction stage sourcing 105 workers from outside the regional study area, 55 would migrate in and 55 would be existing residents in the regional study area. Six local residents would be employed. This would equate to a regional in-migration of 144 persons, of which 33 are children.

At the peak of the second construction phase this scenario would involve a workforce of 71 Queensland residents commuting to work on the project, 37 migrating to the region, 38 already living in the region, and 4 local residents. The regional population growth induced by this scenario would equate to 98 persons, of which 23 are children.

1.7.2.1.2 Operational employment

The *predominantly local* scenario would see 50 local residents employed initially, increasing to 84 in year 4 and to 250 in year 12. Under this scenario half of these would be drawn from existing residents, and half would be migrating into the local study area. This would equate to an additional 65 local residents at year 1, increasing to 109 at year 4 and 325 at year 12, of which 15, 25 and 75 respectively are children. Population growth in the regional study area is likely to be up to 293 persons, of which 68 children at year 12.

The *predominantly regional* scenario would see fewer local residents employed; starting at 20 of which half are existing and half in-migrating and growing to a total of 100 at peak production in year 12. This would lead to an in-migration to the local area of 130 persons at year 12, of which 30 are children. At a regional level, the in-migration associated with this scenario would be 98 new regional residents initially, growing to 163 and then to 488 at peak production, of which 23, 38 and 113 respectively, are children.

1.7.3 Rosters and hours of construction and operation

The development of the Project is expected to operate with construction workers on a single shift, seven days rotating roster. Once operational, workforce will generally be on a five on and two off roster, however the roster will be developed as part of a 'life style package' to encourage residents to live locally with employment opportunities.

Construction hours will commence at 7.00 am and cease at 5.00 pm (i.e. there will be no night-time construction activities).

Operational hours will be 6.00 am to 6.00 pm for day shift Monday to Friday, and 6.00pm to 6am for night shift Monday to Friday (i.e. Friday night shift finishes at 6.00 am Saturday morning). There will be no work on weekends.

1.7.4 Workforce Travel and Accommodation

The CQC project will seek to recruit both its construction and operational workforces in accordance with the principles set out in the Queensland Governments' *Social Impact Assessment Guideline*, seeking first to recruit workers who reside in or are willing to relocate to the local area, followed by regional and state residents. CQC anticipates all or nearly all of the construction and operational workforces can be recruited from the local and regional study areas, including some workers who may relocate. Workforce sourcing scenarios are discussed in Section 1.7.2.

Workers who reside within one hour's drive of the mine are likely to make their own way to work at the beginning of each shift or commute using a project bus service. For workers who live further afield but in the region, CQC is considering a bus operation from strategically located places, depending on the source of the workforce. It is considered likely that a bus operation would be operating between Rockhampton and the mine and consideration given to extending the service to Yeppoon, as well as from the communities to the north of the mine, including Clairview and St Lawrence.

The EIS proposed a worker accommodation facility near the mine site. This is no longer being considered. The Marlborough Caravan Park is currently working with Livingstone Shire Council (LSC) to add further accommodation facilities to the park and the Project intends to utilise this facility as its primary accommodation facility for any workers that are not commuting daily. Should

this facility intermittently not meet demand other commercial accommodation in the local study area will be considered for overflow accommodation. It is envisaged that only a small number of short-term roles will be using these during operation. CQC may also acquire or rent a small number of houses near the mine to provide housing for senior managers.

1.8 Site Description

1.8.1 State, Regional and Local Context

1.8.1.1 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^2) onshore and 500 km^2 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 1-1.

1.8.1.2 Regional Context

The Project is located between the cities of Rockhampton and Mackay and lies within the LSC Local Government Area (LGA) (Figure 1-1). The major centres of LSC include the coastal towns of Yeppoon and Emu Park, with the smaller villages of Byfield, Farnborough, Cawarral, Keppel Sands, The Caves, Marlborough, Ogmore, Styx and Stanage Bay. See Figure 1-6.

The key infrastructure in and around the site, including state-controlled and local roads, rail lines, airfields, boat ramps, electricity transmission infrastructure and pipelines are shown on Figure 1-7.

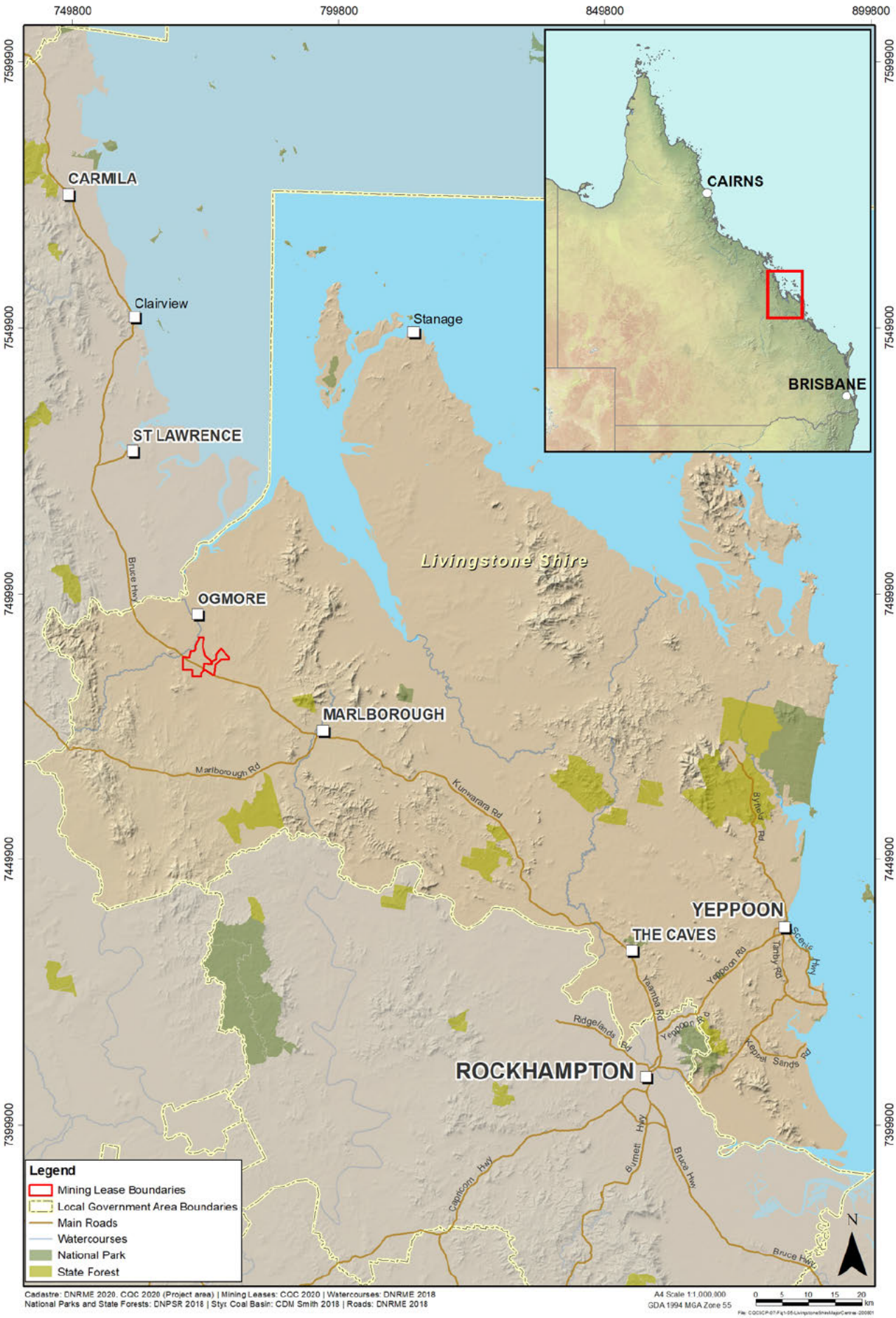


Figure 1-6: Project context – Livingstone Shire Council

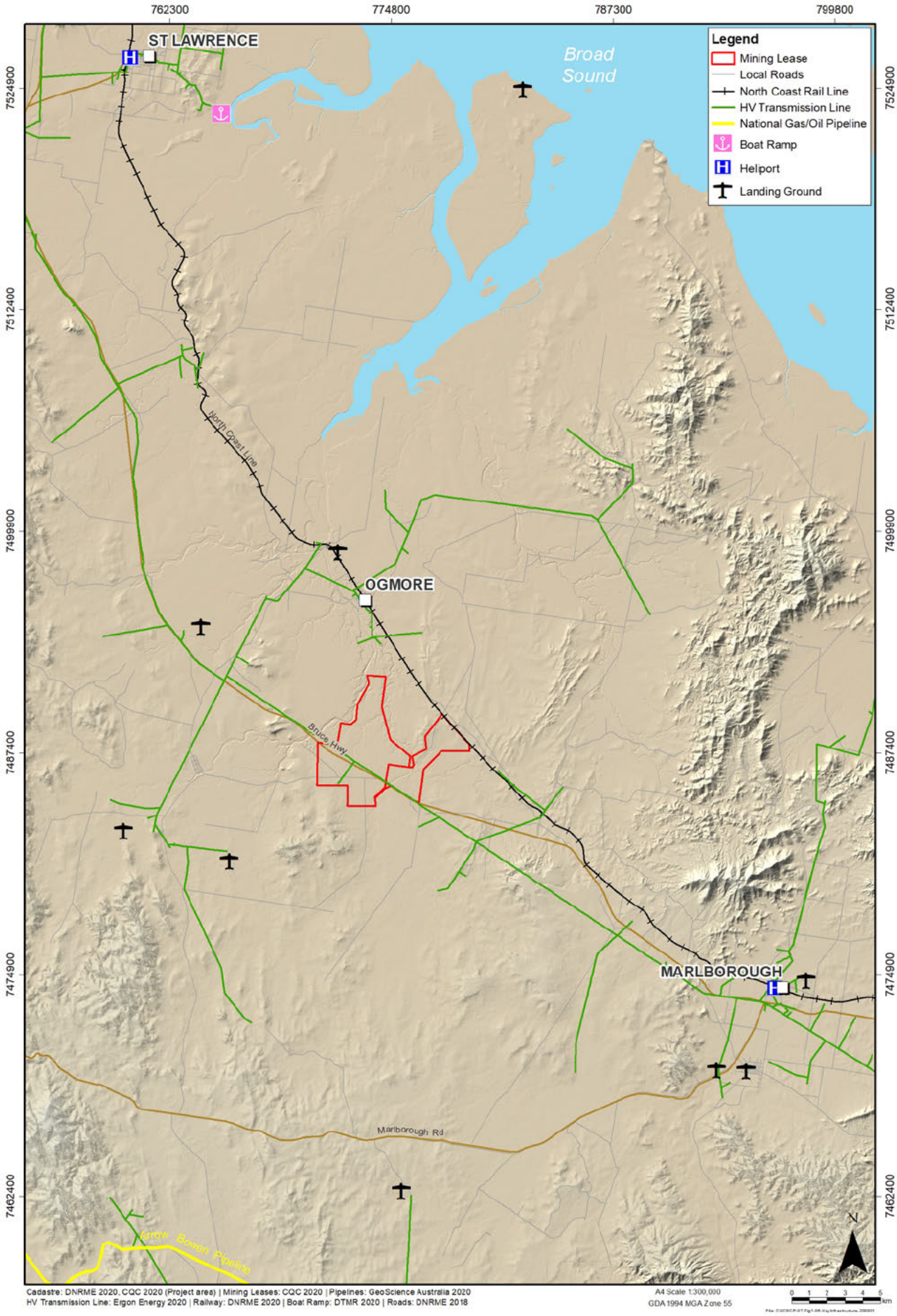


Figure 1-7: Key infrastructure in the Project region

1.8.1.3 Local Context

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 (Figure 1-6).

The Bruce Highway passes through the centre of the Project and the North Coast Rail Line, which will be utilised to transport coal to the Dalrymple Bay Coal Terminal (DBCT) at the Port of Hay Point (just north of Mackay), passes to the east of the Project.

The Project is wholly contained within the Styx River Basin, which discharges to the GBRMP, a World Heritage Area. The Project is bordered by two watercourses as defined under the Queensland *Water Act 2000*, 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 local area has a history of mining coal, minerals and semi-precious gems. Coal was historically mined in the Styx River catchment from around 1919 to the 1963 at the Styx No.1 & No.2, Styx No.3 and Bowman Coal Mine in the Styx River/Tooloombah Creek lower catchment and Deep Creek sub-catchment (see Chapter 18 – Cultural Heritage). Local tributaries including Cedar Creek, north of the Ogmore, and Fault Gully near Bowman, were also historically undermined.

A number of open cut mines still operate in the local area today. To the south of the Project lies the Kunwarara Magnesite mine, which works one of the world's largest supplies of the mineral. Chrysoprase has been mined since 1959 at the Gumigil Mine (also known as the Marlborough Chrysoprase Mine) - this deposit of chrysoprase is the largest in Australia and generally considered to be the highest quality.

1.8.2 Land Tenure

There are three types of resource tenures (Exploration Permit for Coal [EPC], Mineral Development License [MDL], and Mining Lease/Mining Lease Application [ML]), and several properties underlying the Project.

1.8.2.1 Real Property Descriptions

The Project is generally located on 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 Mamelon property is currently owned by QNI Metals Pty Ltd, which is a related company to both CQC and Fairway Coal, having common shareholder ownership and control. The east-west oriented, Mount Bison Road Gumboil reserve also traverses the mine area. CQC is working with the Department of Natural Resources, Mines and Energy (DNRME), 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. Impacts as a result of the road realignment are included as part of this SEIS.

Additional road reserves are located to the west of the Bruce Highway (Mount Bison Road and unnamed road reserves located within the Mamelon property) which will be impacted by Project activities. Prior to the commencement of the Project in these areas, CQC 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 and part of Lot 87 on SP164785 (Brussels), and Lot 107 on SP316283 (Strathmuir), all of which are freehold tenures. The TLF is to be located entirely Lot 107 on SP316283 (Strathmuir).

Land tenure details for properties within or intersected by the Project area are included in Table 1-5 and the cadastral boundaries are shown in Figure 1-8.

Table 1-5: Real property descriptions within or intersected by the Project

Property description	Property name	Tenure	Current use	Proposed use
Lot 10 on MC493	Mamelon	Freehold	Grazing	Mining
Lot 11 on MC23				
Lot 9 on MC496				
Lot 107 on SP316283	Strathmuir	Freehold	Grazing	Transport Corridor
Lot 107 on SP316283				TLF
Lot 85 on SP164785	Brussels	Freehold	Grazing	Transport Corridor
Lot 87 on SP164785				
AAP16117	n/a (easement)	Lands Lease	Grazing	Mining
Lot 1 on RL3001	n/a (easement)	Lands Lease	Grazing	Transport Corridor

1.8.2.2 Resource Tenure

The resource tenure types which cover the Project include EPC 1029, MDL 468, ML 80187 and ML 700022. All are owned by CQC or Fairway Coal.

EPC 1029 was granted on 20 April 2006, expiring 19 April 2021. Currently there remains 68 sub blocks with a combined area of 197 km² owned by Fairway Coal (100%). EPC 1029 carries with it EA EPSX00763213, allowing for coal exploration activities. A renewal application for EPC 1029 was submitted to the DNRME and renewed on the 22/11/2016.

MDL 468 was granted on 22 January 2014, the expiry date being 31 January 2024. MDL 468 covers an area of 125.35 km² owned by CQC (99%) and Fairway Coal (1%). The EA covering activities on MDL 468 is EPSX00879613, allowing for exploration and development activities.

ML 80187 was lodged with DNRME on 15 June 2012. ML 80187 covers an area of 1,915 ha with a surface area of 1,887 ha. The difference between the 'area' and the 'surface area' is that the 'area' takes into account the Bruce Highway, which runs through the ML, while the 'surface area' refers only to the land that is usable within the ML, and so excludes the Bruce Highway. The area (i.e. 1,915 ha) is used as the basis of calculations throughout this SEIS.

ML 700022 was lodged with DNRME on 23 May 2017. ML 700022 covers an area of 746.30 ha. Both ML's are owned by CQC (99%) and Fairway Coal (1%). The boundaries for EPC 1029, MDL 468, ML 80187 and ML 700022 are shown at Figure 1-9.

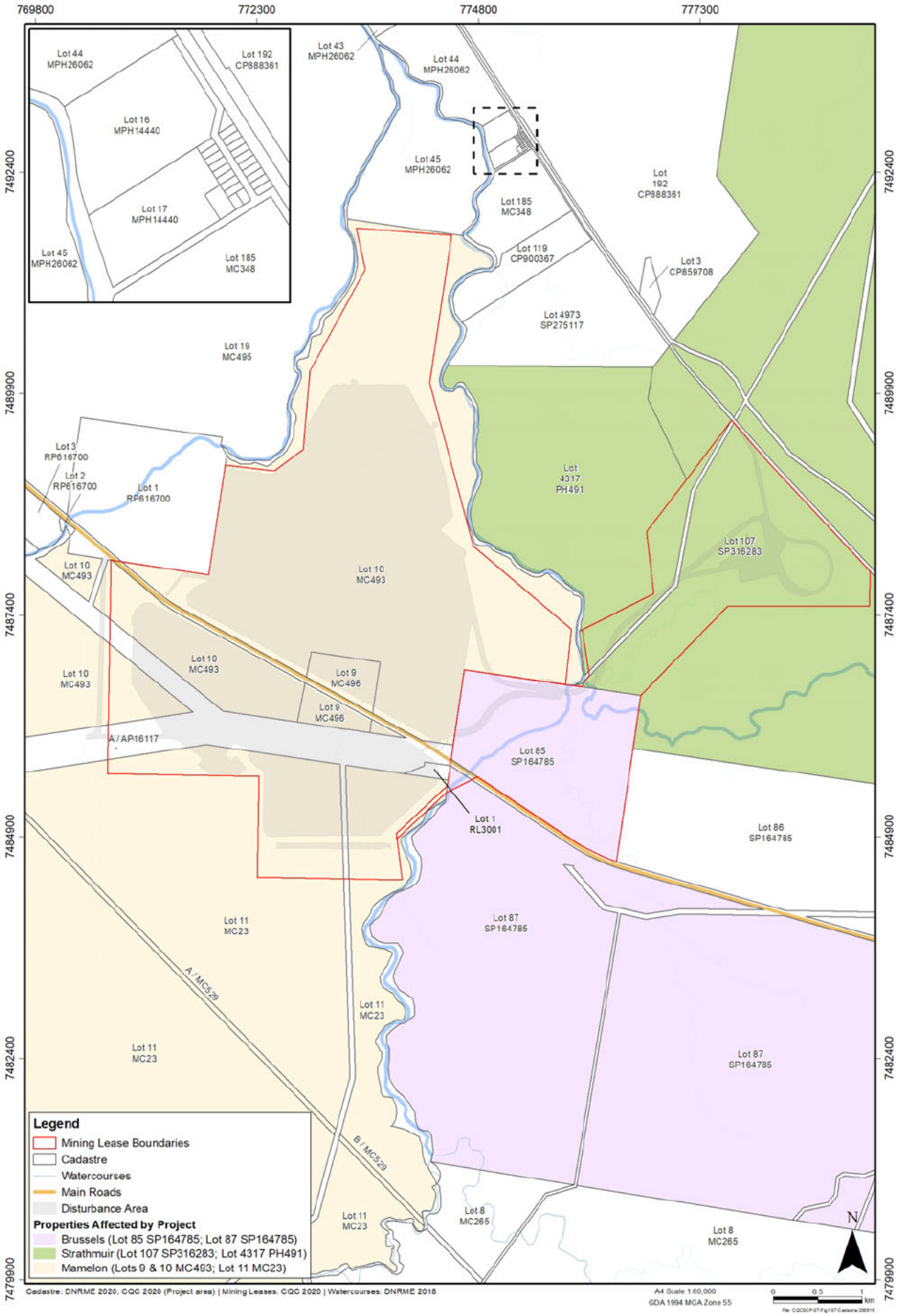


Figure 1-8: Real properties intersecting the Mining Leases

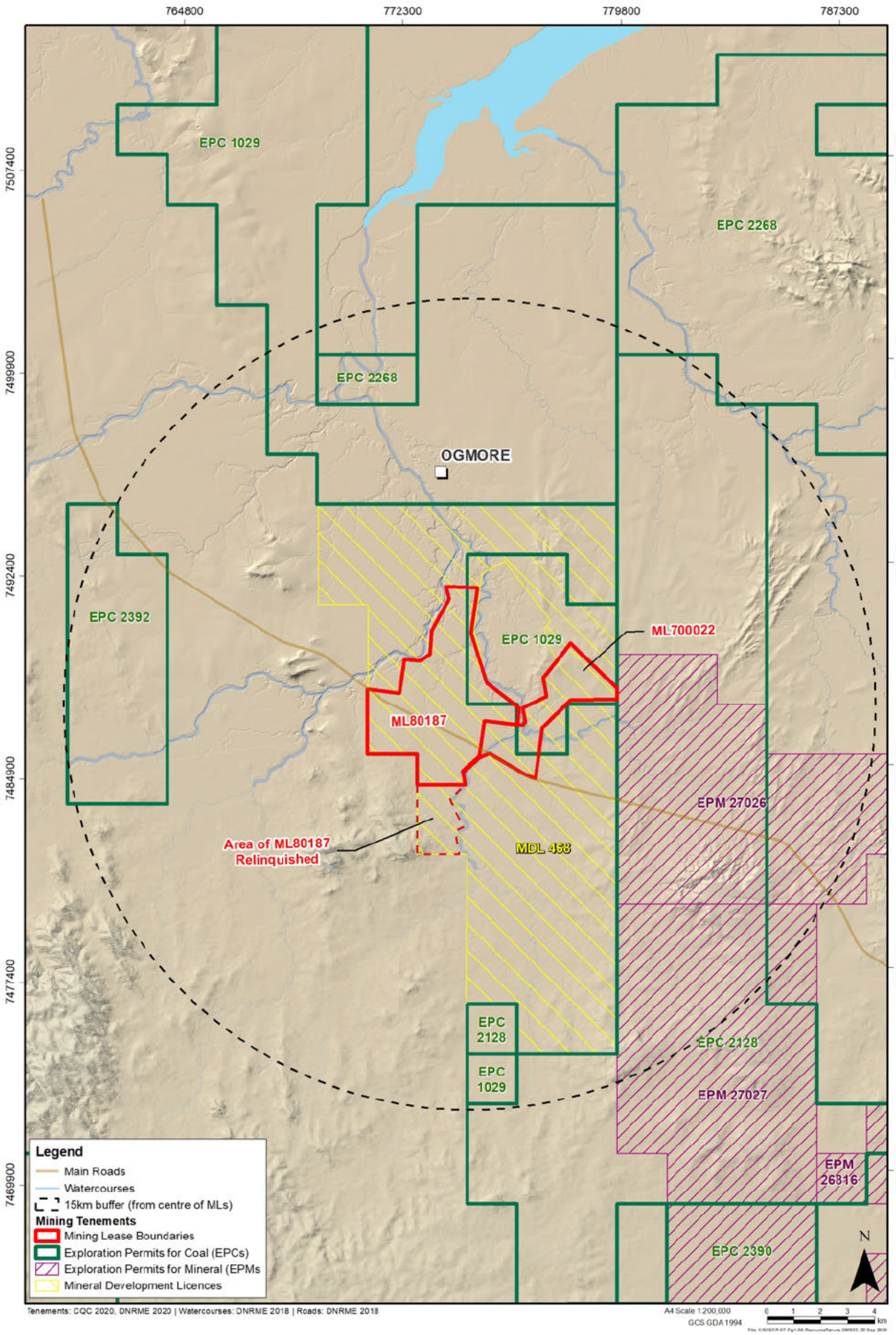


Figure 1-9: Mining Tenure within 15 km of the Project Boundaries

Since the previous SEIS (v2), CQC has partially abandoned the southern portion of ML80187 (south of the proposed southern catchment diversion drain), as no mining activities are proposed in this location. This abandonment was completed on 15 June 2020, and is shown in Figure 1-9.

A number of other EPCs, EPMs and MLs owned by other entities exist within the vicinity of the Project (but outside the boundaries of the Project Area). These are also shown on Figure 1-9.

Table 1-6: Tenements within the general Project Area

Tenement	Tenure Holder	Granted	Expires
Mining Leases			
EPC 1029	Fairway Coal Pty Ltd	20/04/2006	19/04/2021
EPC 2268	Fairway Coal Pty Ltd	27/06/2011	26/06/2024
EPC 2128	Scorpion Energy Pty Ltd	05/02/2013	04/02/2021
EPC 2390	Civil and Mining Resources Pty Ltd	04/03/2015	03/03/2025
EPC 2392	Civil and Mining Resources Pty Ltd	22/04/2015	21/04/2025
EPM 27026	Mineralogy Pty Ltd	21/05/2019	20/05/2024
EPM 27027	Mineralogy Pty Ltd	21/05/2019	20/05/2024
EPM 26885	Capricornia Vti Pty Ltd	25/10/2018	24/10/2023
EPM 26816	Super Cruser Pty Ltd	19/03/2019	18/03/2024
MDL 468	Fairway Coal Pty Ltd	22/01/2014	31/01/2024
ML 80187	Central Queensland Coal Pty Ltd	15/06/2012	Awaiting grant
ML 700022	Central Queensland Coal Pty Ltd	23/05/2017	Awaiting grant

1.8.2.3 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) (Figure 1-10). 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.

EPC 1029 and MDL 468 were granted over Native Title extinguished land only. The CQC applications for ML 80187 and ML 700022 are both over 100% Exclusive Land where Native Title is not applicable.

Any existing road reserves closed to allow future mining may be subject to Native Title review.

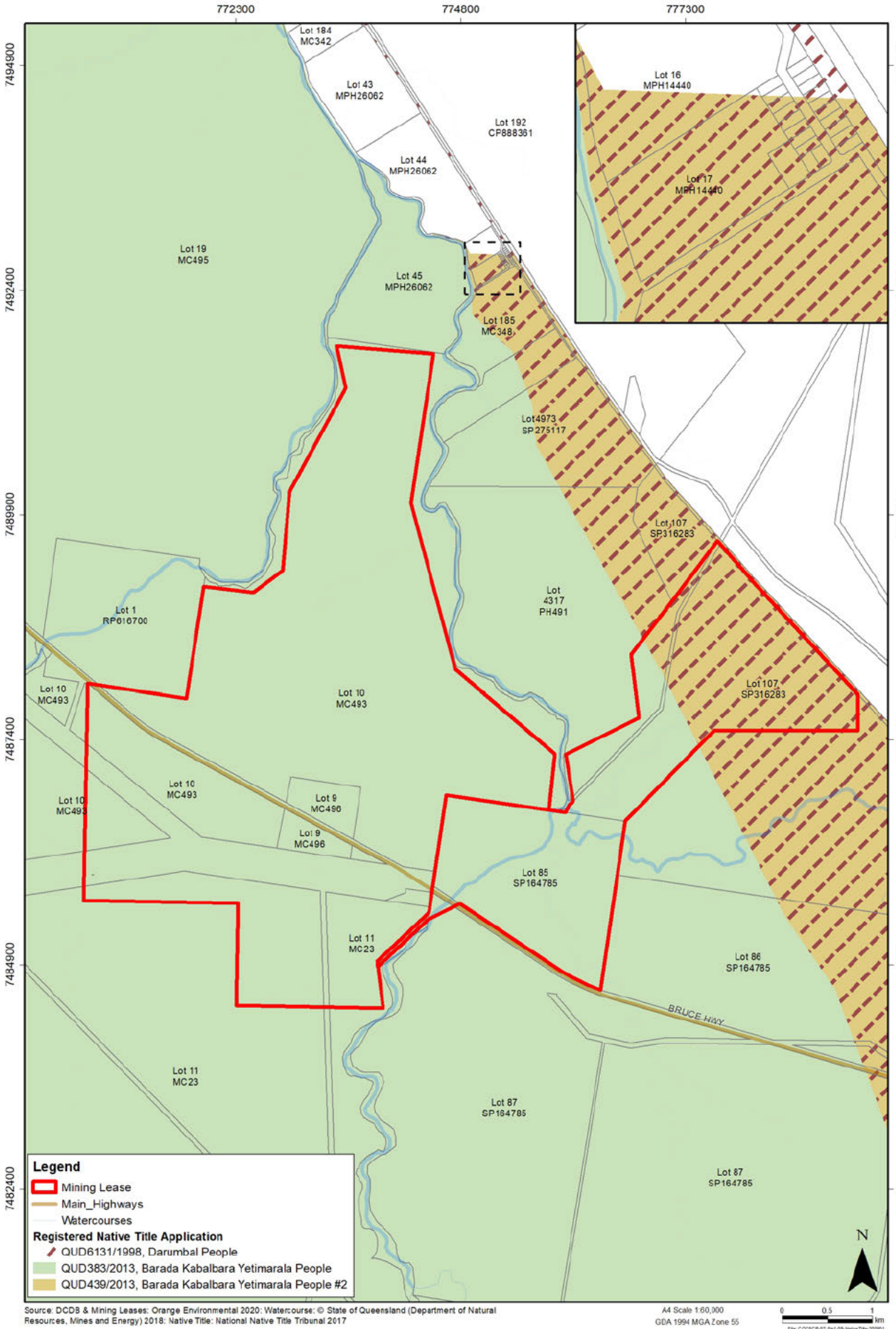


Figure 1-10: Native Title Tenure

1.8.3 Existing and Previous Land Use

Cattle grazing is the principal agricultural industry in the Project area (See Figure 1-11). Based on historical studies carried out as part of the EIS (see Chapter 18 - Cultural Heritage) the first pastoral runs within the Project area were issued licenses in the early 1860s. Since then, cattle grazing has continued across the broader Project area.

Cattle grazing, for both fattening and breeding of stock, has relied on stock dams, fencing and associated access tracks constructed within the Project area.

The Mamelon property is generally considered suitable for beef cattle grazing on pastures. Whilst some areas within Mamelon and the adjoining Brussels and Strathmuir properties are theoretically suitable for cropping, this type of agriculture enterprise has not occurred at these properties.

As mentioned above, the local area has a history of mining coal, minerals and semi-precious gems. Coal was historically mined in the Styx River catchment from the late 1800s to the 1960s at the Styx No.1 and No.2, Styx No.3 and Bowman Coal Mine in the Styx River/Tooloombah Creek lower catchment and Deep Creek sub-catchment. Local tributaries including Cedar Creek, north of Ogmore, and Fault Gully near Bowman, were also historically undermined. The effects of the historical mining in the local area have been addressed in the groundwater modelling (see Chapter 10 - Groundwater).

1.8.3.1 Existing Buildings and Infrastructure to be disturbed by the Project

There is a farm residence complex (see Chapter 18 – Cultural Heritage), including an unused tennis court, shed, uninhabited house (currently used as the site office), stockyards and two windmills.

There are no easements, other than AAP16117, and Lot 1 on RL3001 (both small easements located within the Mt Bison Road Reserve) within the Project footprint.

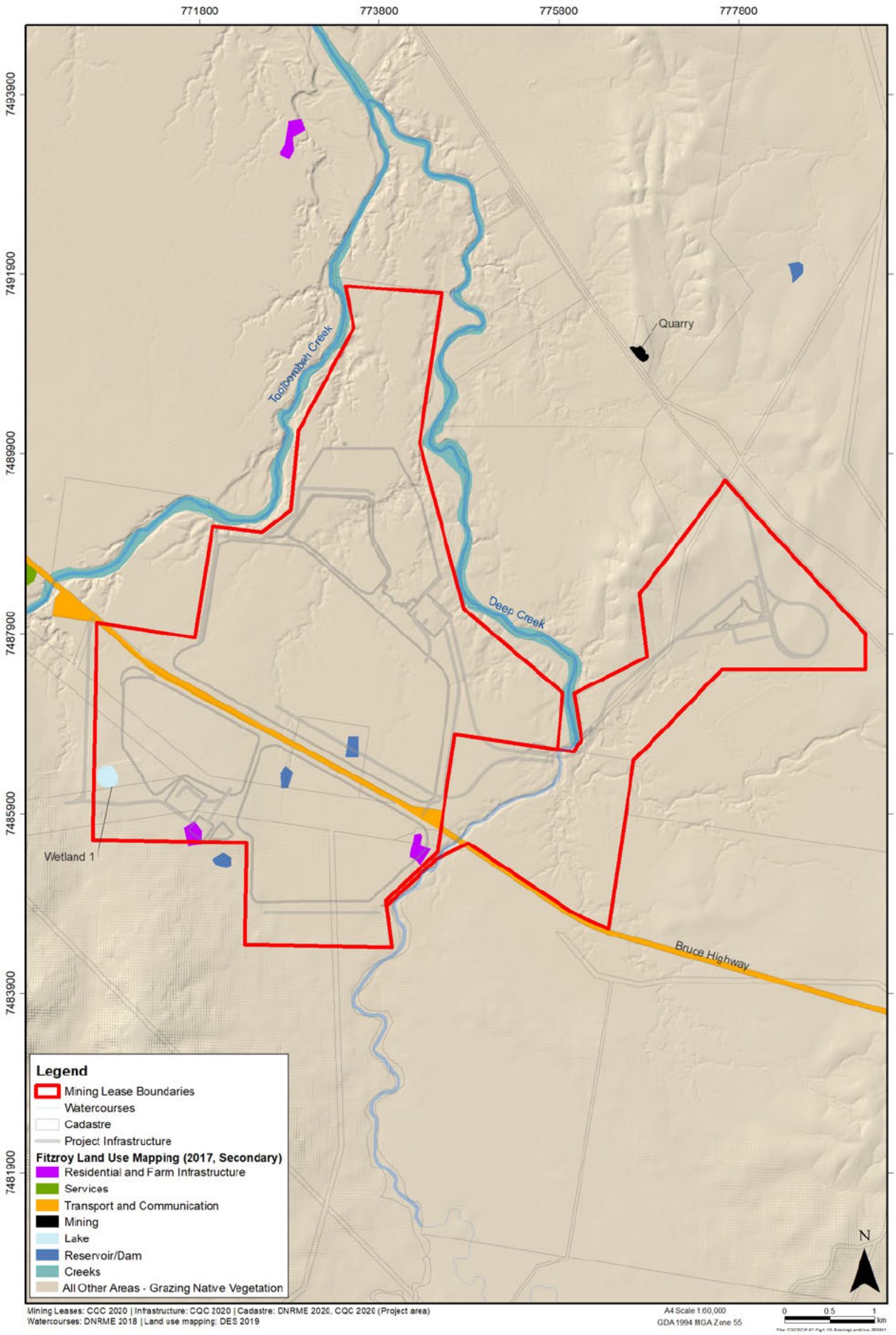


Figure 1-11: Mapped land use in the Project area (from Fitzroy NRM Region land use 2017)

1.8.4 Natural Features

1.8.4.1 Topography

Elevations across the Styx catchment range from 0 to 540 m above sea level. The area predominantly comprises flat or undulating lands, draining via several smaller creeks and tributaries to the Styx River and estuary, and into the Coral Sea (see Figure 1-12). The land within the Project area can be described as gently undulating (see Plate 1-1). Elevations within the MLs range from 4.5m to 155m AHD, within the disturbance footprint the range is between 11.4 m and 43.8 m AHD.

Further information regarding topography is given in Chapter 5 – Land.

Looking south across Open Cut 1

Looking east across Open Cut 2

The TLF

Looking south over Open Cut 2

Plate 1-1: Examples of topography of the Project Area

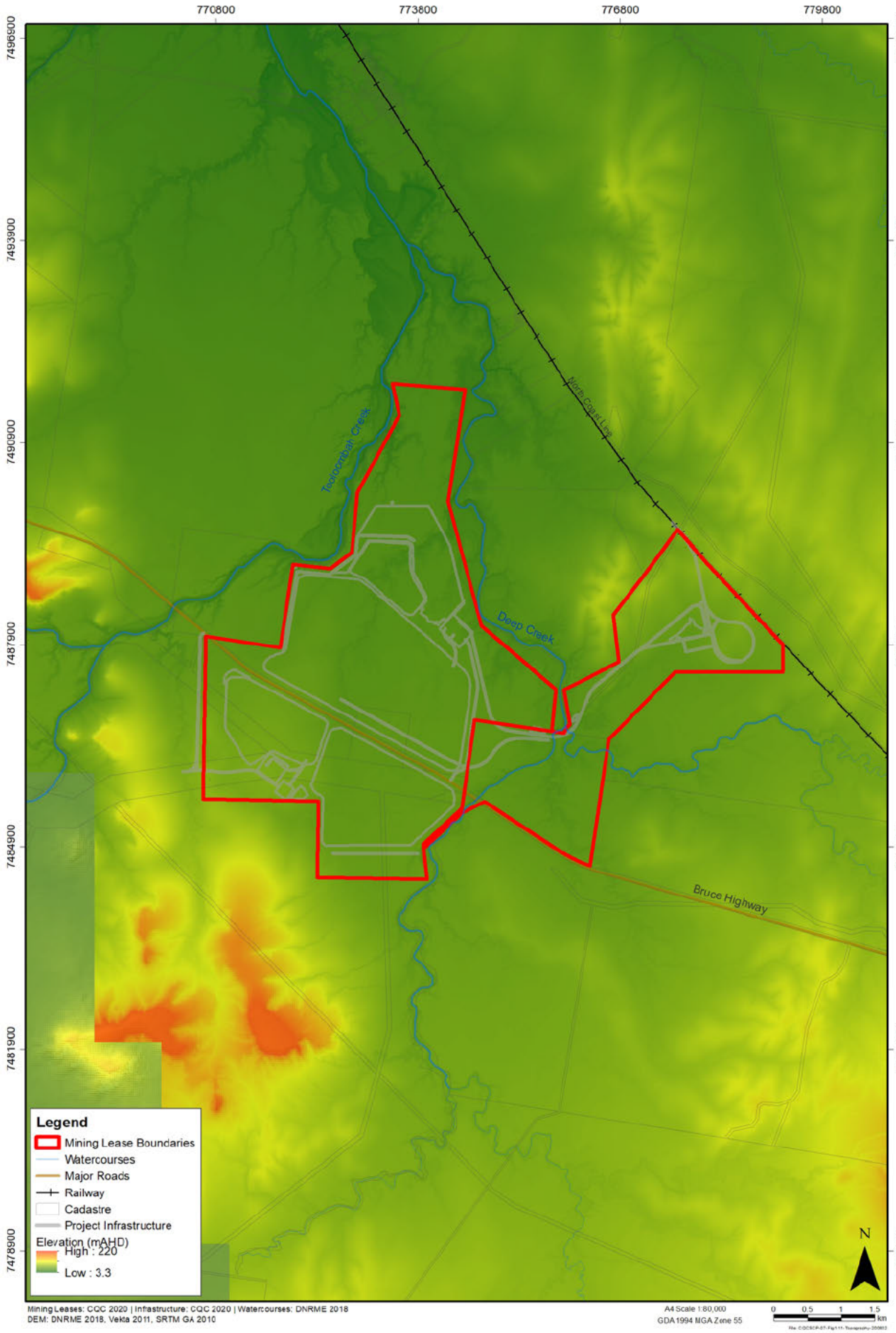


Figure 1-12: Project Area topography

1.8.4.2 Geology

The CQC Project is located within the Early (or Lower) Cretaceous aged Styx Basin, which is superimposed on the Permo-Triassic aged Bowen Basin. Along the Permo-Triassic aged Sydney and Gunnedah Basins and overlying Jurassic-Cretaceous Surat Basin in eastern Australia, the basins have been associated with coal exploration and mining for over a century, and with hydrocarbon exploration and production, particularly in the Bowen Basin and overlying Surat Basin succession in Queensland, for several decades (Othman 2003).

The Styx Basin is a small, Early Cretaceous aged, intracratonic sag basin that covers an area of approximately 300 km^2 onshore and 500 km^2 offshore. Its portion on land is approximately 20 km wide (east-west) and 50 km long (north-south). The Styx Basin probably developed by subsidence of the Strathmuir Synclinorium, an older feature containing Permian Bowen Basin strata. Styx Basin sediments lap onto Permian strata in the west but are faulted against them in the east. The known coal bearing strata of the Styx Basin are referred to as the Styx Coal Measures. The Styx Coal Measures are preserved as basin infill in a half graben geometry which has an overall plunge to the north.

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 majority of the Styx Coal Measures are concealed beneath Quaternary and Tertiary sediment. Queensland Geological Survey mapping shows the eastern margin of the Styx Basin extends to the eastern edge of the terrestrial Cenozoic 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 km 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 and are faulted against them in the east. The southern part of the basin is bounded to the east by the post-depositional high-angle reverse fault. Adjacent to this fault, the Cretaceous sediments are folded and faulted.

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 regional geology of the Styx Basin is shown in Figure 1-13 and described in Table 1-7. A full description of the geology of the Project Area is given in Chapter 5 – Land.

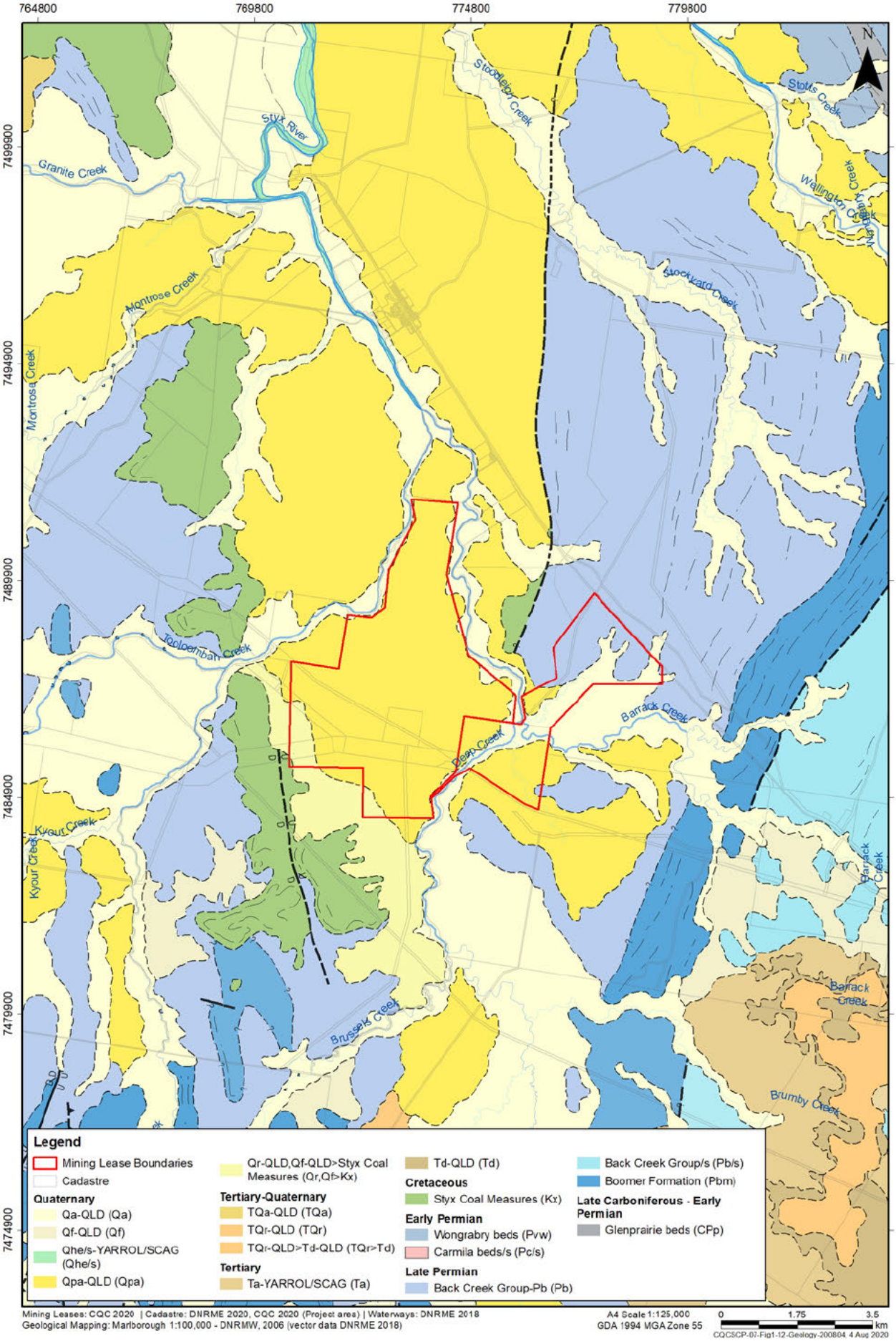


Figure 1-13: Regional geology

Table 1-7: Geological units underlying and overlaying the Styx Basin

Period	Group	Sub-group/formation	Dominant lithology
Quaternary	Surficial	Quaternary Alluvial	Alluvium, coastal swamp deposits
Cenozoic	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

1.8.4.3 Regional faults

Regional faults are mapped at the interface of the Styx Basin and Permian Measures of the Bowen Basin, and most notably the Gogango Overfolded Zone to the east/ north-east of the CQC Project toward the Marlborough Block. Some regional faulting is also mapped in the areas to the south-west of the Project associated with the inlier of Connors Volcanics.

Of most relevance for the purposes of this SEIS is the fault / interface to the east of the Project in which sediments of Styx Coal Measures are faulted against the Permian Boomer Formation. This mapped fault's throw is estimated to be greater than the thickness of the Styx Coal Measures (e.g. in order of hundreds of metres) and has been accounted for in the revised groundwater modelling undertaken to support this version (v3) of the SEIS.

Recent drilling near the banks of Deep Creek demonstrated that this unnamed, north-south trending, inferred fault line coincides in part with the Deep Creek channel. Permian sedimentary rocks of the Back Creek Group were intersected in shallow drill holes located on the eastern side of Deep Creek, while Styx Coal Measures were intersected a short distance away in shallow drill holes near the western bank.

From the nearby historic Bowman underground coal mine, a description of the coal seams' structure includes details of multiple faults and substantial folds in the coal measures proximal to this fault, that decrease in magnitude with distance west from the regional fault (Shepherd 1949).

1.8.4.4 Soils

Soil investigations and mapping has refined the existing land unit mapping into five soil mapping units, shown in Figure 1-14, summarised as follows:

- *Unit 1 - Infertile soils formed on deep weathered sedimentary and metamorphic rocks on hillslopes & rises*

  Red and Brown Gravelly Earths (Kandosols) - Sandy Loam Topsoil over Clay Loam Subsoil, comprising 37 ha of the disturbance area (3.1%).

- *Unit 2 - River flats and terraces*

  Alluvial Soils Non-gravelly (Tenosols, Rudosols, Vertosols) - Sandy Loam to Clay textures, comprising 0.8 ha of the disturbance area (0.1%).

- *Unit 3 - River flats and channels*

  Alluvial Soils Gravelly Shallow (Tenosols, Rudosols) - Sand, Gravel Loam, comprising 20 ha of the disturbance area (1.1%).

- *Unit 4 - Alluvial plain soils*

  Brown and Grey Sodic Vertosols - Non-gravelly Medium Clay over Medium Heavy Clay, comprising 61 ha of the disturbance area (4.1%).

- *Unit 5 - Alluvial terrace soils*

  Vertic Hypernatic Grey and Brown Sodosols - Gravelly Clay-loamy Clayey, comprising 1254 ha of the disturbance area (91%).

The Project site covers part of the alluvial plain between Tooloombah and Deep Creeks, comprising a mixture of materials delivered by both systems, and defining the majority of soils to be cleared as the Sodosols on alluvial terraces (91%), followed by alluvial plain Vertosols (4.1%) and lesser amounts of river flats and channels, terraces and infertile soils on hillslopes and rises. Agricultural land classification and Strategic Cropping Land (SCL) validation indicated that no areas considered SCL exist within the Project disturbance area, following revisions to the mapping from the field investigation. Areas of ALC Class A / B land in the Project Area were revised from 140 ha to 28 ha in 1:25,000 scale site mapping in the survey (Figure 1-14).

The geology and risk mapping in the area of the Project does not support the presence of acid sulfate soils within the surface disturbance footprint, the open cut pits or the maximum extent of predicted groundwater drawdown.

The soils of the area are described in full in Chapter 5 – Land.

1.8.4.5 Catchments and Key Waterways

The Project is located within the North East Coast Drainage Division, within the Styx River basin (Queensland river basin 127), a small basin of around 3,000 km^2 discharging into the Coral Sea (refer Figure 1-15). Landuse in the basin is predominantly 'Production from relatively natural environments' (91%) – predominantly grazing - followed by 'Conservation and natural environments' (8%) and 'Intensive uses' (1%) which comprise transport and communication, residential and farm infrastructure, services and mining. The remainder is predominantly water (saline coastal wetland areas, rivers and dams), with minor areas of dryland and irrigated agriculture (0.5%). The Styx basin has been extensively cleared for grazing.

The Styx subbasin comprises several coastal catchments, grouped into three overarching areas, with the Project located within the Southern Styx Freshwaters under the EPP (Water and Wetland Biodiversity), and is within the Tooloombah and Deep Creek sub-catchment areas. These Creeks bound the Project, with Tooloombah Creek passing along the western boundary of ML80187, and Deep Creek along the east (refer Figure 1-15). Both join at the confluence approximately 2.3 km downstream from the Project, and drain into the Styx River and then into the Styx River and Broadsound Estuaries. The Broad Sound Declared Fish Habitat Area (FHA-047) and a General Use Zone of the GBRMP are located within the Styx River approximately 10 km downstream of the Project lease boundary.

The normal tidal limit (mean high water spring, [MHWS]) within the Styx River is located approximately 3.7 km downstream from the Project, with the peak tidal limit (defined by the limit of the highest astronomical tide) extending upstream to the confluence of Deep and Tooloombah Creeks, approximately 2.3 km downstream from the Project.

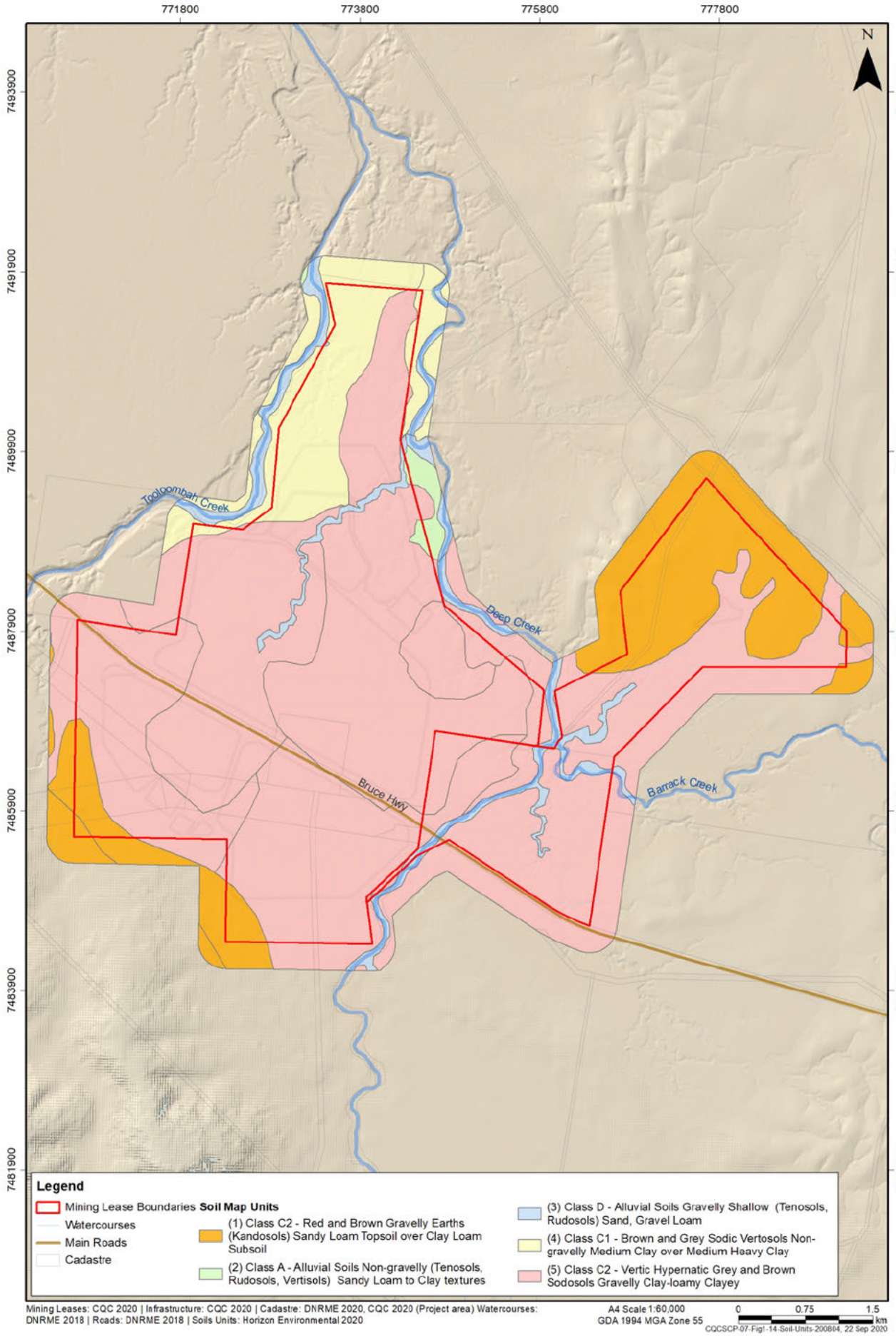


Figure 1-14: Project landscape and soil units

Figure 1-15: Styx River Catchment - major watercourses draining the study area

1.8.4.6 Flood Hydrology

A flood assessment was undertaken for the Project, showing that flood events are largely confined to the Deep and Tooloombah Creek main channels, with minor breakouts from Deep Creek in the 1% Annual Exceedance Probability (AEP) event upstream of the Bruce Highway that contributes flow to the local drainage paths through the proposed mine area.

Further information on flooding is provided in Chapter 9 - Surface Water and Appendix A5b.

1.8.4.7 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are declared by the Queensland Minister for Environment under section 51B of the EP Act.

ESA mapping identified a Category B ESA within the ML (Figure 1-16). This Category B ESA is associated with remnant vegetation listed as Endangered under the VM Act. A number of Category A, B and C ESAs are located within the wider locality (within 25 km of the Project area), including various protected areas and nature refuges (Table 1-8). Tooloombah Creek Conservation Park (Category A) is located less than 1 km west of the ML boundary. The Great Barrier Reef World Heritage Area and Marine Park boundaries and Broad Sound Fish Habitat Area overlap (all Category B) and are located just under 10 km north of the Project. Waters associated with the Styx River are also designated as a 'coastal management district' which is also a Category C ESA.

Table 1-8: Environmentally Sensitive Areas within 25 km of the Project area

Environmentally Sensitive Area	Category	Approximate distance from Project Site (km)
Tooloombah Creek Conservation Park	Category A	0.70
Great Barrier Reef World Heritage Area	Category B	9.70
Bukkula Conservation Park	Category A	14.50
Marlborough State Forest	Category C	14.20
Eugene State Forest	Category C	21.50
Mt Buffalo State Forest	Category C	21.80
Develin Nature Refuge	Category C	22.40
Burwood Nature Refuge	Category C	19.20
Great Barrier Reef Marine Park – general use area	Category B	9.70
Fish Habitat Area – Broad Sound	Category B	9.80
Endangered remnant vegetation	Category B	0.08
Marine Plants	Category B	4.00
Coastal Management District	Category C	3.80

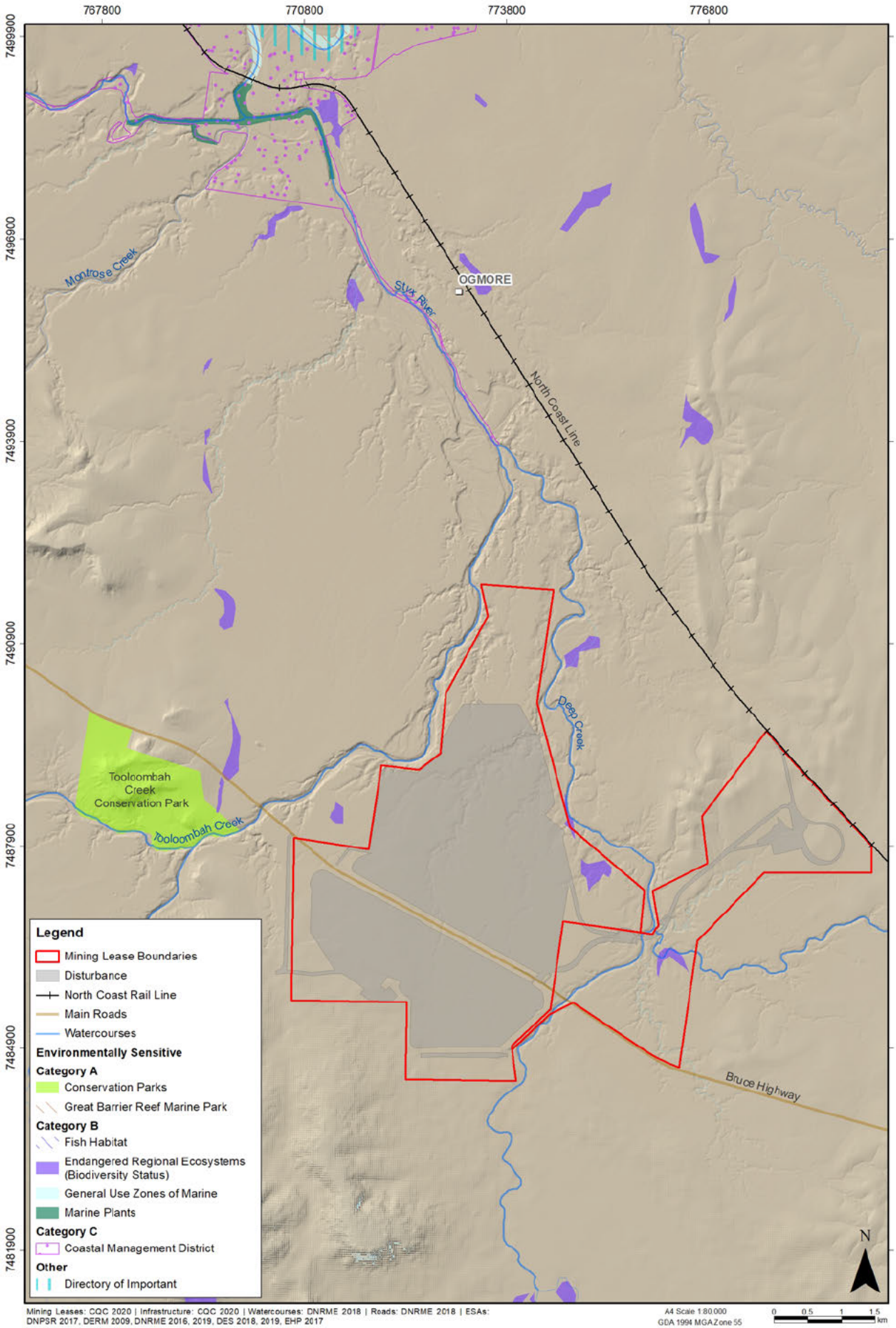


Figure 1-16: Environmentally Sensitive Areas in the vicinity of the Project

1.8.5 Coal Resources

1.8.5.1 Styx Basin

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 structure - the Strathmuir Synclinorium which is an elongated north-trending structure occupied by the Carmila Beds and Back Creek Group (Malone, 1964). 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 50 km long (north-south).

The majority of the Styx Coal Measures are concealed beneath Quaternary and Tertiary sediment. Queensland Geological Survey mapping shows the eastern margin of the Styx Basin extends to the eastern edge of the terrestrial Cenozoic 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 km 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 and are faulted against them in the east. The southern part of the basin is bounded to the east by the post-depositional high-angle reverse fault. Adjacent to this fault, the Cretaceous sediments are folded and faulted.

The Styx Basin probably developed during the Early Cretaceous by subsidence of the Strathmuir Synclinorium, a Palaeozoic feature containing Permian Bowen Basin strata. A schematic geological cross section (east-west) across the Styx Basin is shown in Figure 1-17 and the supporting description key is shown in Table 1-9.

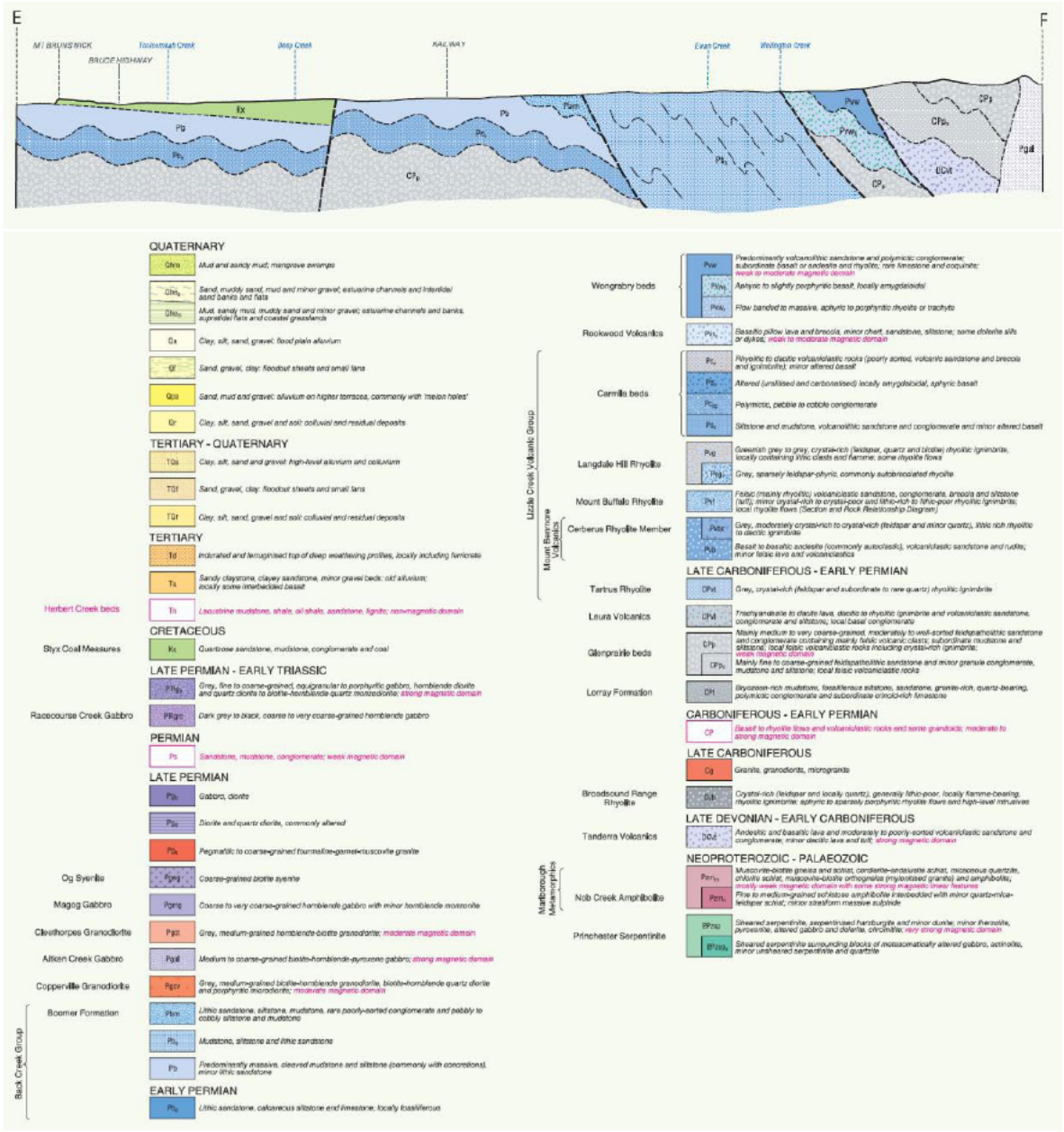


Figure 1-17: Schematic west to east geological cross section from Marlborough Sheet 8852 1:100 000 (After DNRM 2006)

Table 1-9: Geological cross section key

Code	Name	Description
Kx	Styx Coal Measures (Early Cretaceous)	Quartz sandstone, conglomerate, siltstone, carbonaceous shale, coal.
Pb	Undifferentiated Back Creek Group (Late Permian)	Undifferentiated: Predominantly massive, cleaved mudstone and siltstone (commonly with concretions), minor lithic sandstone
Pbs	Undifferentiated Back Creek Group (Late Permian)	Mudstone, siltstone and lithic sandstone

Code	Name	Description
Pbm	Boomer Formation (Part of the Back Creek Group, Lower-upper Permian)	Volcanolithic sandstone, claystone, siltstone, pebble conglomerate, litho-feldspathic greywacke.
PCs	Carmilla Beds (Lower Permian)	Acid to intermediate volcanics, conglomerate, sandstone, siltstone, calcareous tuff, limestone.
Pvw	Wongrabry Beds (Early Permian)	Predominantly volcanolithic sandstone and polymictic conglomerate.
Pvwb	Wongrabry Beds (Early Permian)	Aphyric to slightly porphyritic basalt, locally amygdaloidal.
CPp	Glenprairie Beds (Late Carboniferous – Early Permian)	Mainly medium to very coarse-grained, moderately to well-sorted feldspatholitic sandstone and conglomerate containing mainly felsic volcanic clast.
CPpx	Glenprairie Beds (Late Carboniferous – Early Permian)	Mainly fine to coarse-grained feldspatholithic sandstone and minor granule conglomerate, mudstone and siltstone; local felsic volcanoclastic rocks.
DCvt	Tanderra Volcanics (Late Devonian)	Andesitic and basaltic lava and moderately to poorly-sorted volcaniclastic sandstone and conglomerate; minor dacitic lava and tuff.

1.8.5.2 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 1-10.

Table 1-10: Cretaceous coal measures coal seam characteristics

Seam	Ply	Seam thickness (m)			
		Min	Max	Average	Combined Seam Thickness Indicative Average
Grey	GR1	0.11	1.09	0.42	0.79
	GR2	0.10	0.77	0.37	
Green	GR Upper	0.10	0.85	0.34	0.90
	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	1.52
	R Lower	0.10	1.32	0.71	
Pink	P	0.10	0.25	0.16	0.16
Orange	O Upper1	0.10	0.60	0.33	0.95
	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	1.31
	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	2.17
	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	1.33
	VI Upper2	0.10	0.30	0.18	
	VI Lower1	0.10	1.19	0.43	
	VI Lower2	0.10	0.74	0.36	

1.8.5.3 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 Synclinorium. 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 Synclinorium.

The most relevant and local regional geological structure is the axis of the Strathmuir Synclinorium, which appears to have caused formation of the Styx Basin. Regional faults associated with the Strathmuir Synclinorium 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 Synclinorium, 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 structural features have been noted in some Styx deposit core logs, displacement by folding or faulting has not been detected during seam correlation exercises, geological modelling, geotechnical analysis, downhole sonic scanner analysis or drill core analysis. One geological model (Xenith 2017) included a fault in its modelling to accommodate an interpreted discontinuity in a modelled coal seam, but subsequent modelling concluded that the apparent discontinuity was the result of the lenticular nature of the Styx Basin seams. Some fracturing of rock is expected to be encountered during mining, but no structural displacement of seams.

Of most relevance for the purposes of this SEIS is the fault / interface to the east of the CQC Project in which sediments of Styx Coal Measures are faulted against the Permian Boomer Formation. This mapped fault throw is estimated to be greater than the thickness of the Styx Coal Measures (e.g. in order of hundreds of metres) and has been accounted for in the revised groundwater modelling described in Chapter 10 – Groundwater.

1.8.5.4 Coal Quality

1.8.5.4.1 Raw Coal Quality

All coal quality data has been modelled on an air-dried basis (adb). There is a total of 71 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 (CV) 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 1-11.

Table 1-11: Summary of coal resources – raw quality data (adb)

Category / seam	Coal Mass (Mt)	Ave Thickness (m)	Raw Coal Quality (adb) RD	PRD	IM%	Ash%	Vol%	FC%	CV MJ/Kg	TS%	Comments
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**

1.8.5.4.2 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.

1.8.5.5 Estimated Coal Resource

JORC Coal Resources for the Project have been conducted by Xenith Consulting in November 2011, September 2012, and the most updated version in July 2017 which was estimated according to the JORC Code (2012), Xenith (2017). Data from 154 exploration drill holes, including 71 Points of Observation (PoO), have been used in the estimation.

The Project area is estimated to contain a total Coal Resource of 206 Million tonnes. The Coal Resource is comprised of 38 Million tonnes in the Indicated Resource category (18% of total), and 169 Million tonnes in the Inferred category (82% of total). Table 1-12 displays a summary of the Resource Estimated by Xenith (2017).

Table 1-12: Estimated coal resource – Central Queensland Coal Project

Seam	Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Subtotal (Mt)
Grey	0	3.1	3	6.1
Green	0	4.5	10	14.5
Red	0	9.4	25	34.4
Orange	0	3	8	11
Yellow	0	3.6	25	28.6
Blue	0	14	62	76
Violet	0	-	36	36
Total	0	38	169	206

1.8.6 Exploration History

Coal was first discovered in the Styx River area in 1887, and prospecting followed initially for the next 2-3 years. One of the earliest Styx River Coalfield maps was prepared by the Geological Survey of Queensland (W.H. Rands 1892). Development of the Styx River Coalfield began in 1918 at the Styx No.1 State Coal Mine at Bowman, followed shortly thereafter to the south by the Styx No.2 State Coal Mine. In 1924, The Styx No. 3 State Coal Mine began production and was closed in 1964 after 1.5 Million of tons of coal were produced (Malone 1965).

Given the long history of coal exploration and mining in the Styx River Coalfield, and more broadly the Bowen Basin in Qld, the geology of CQC Project area and surrounds has been mapped by a number of sources and different scales: 1:2,000,000 Scale - Queensland Geology (DNRM 2012); 1:250,000 Scale - Geological Series Saint Lawrence Sheet SF/55-12 (Malone, 1964) and 1:100,000 Scale – Geological Series Marlborough Sheet 8852 (DNRM 2006).

CQC 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 227 holes have been drilled including 82 chip holes, 16 fully cored HQ sized holes, 117 partially cored holes, and 12 large diameter- 4 inch holes. All holes were geophysically logged and surveyed in line with industry standards.

In addition to the exploration drilling, 12 large diameter cores have been completed on four 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.

CQC 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 CQC and Xenith. The model was finalised in February 2015, and updated in July 2017, however further work was carried out on coal quality in August 2017 for design of the CHPP. The deposit was modelled again in 2018 to include the very thin seams that were previously excluded from modelling.

A total of 154 drill holes have been used to develop the structural model (CQC and Fairway drill holes). The holes are a mixture of cored holes and chip holes, all with geophysical logs. A total of 71 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 in Figure 1-18.

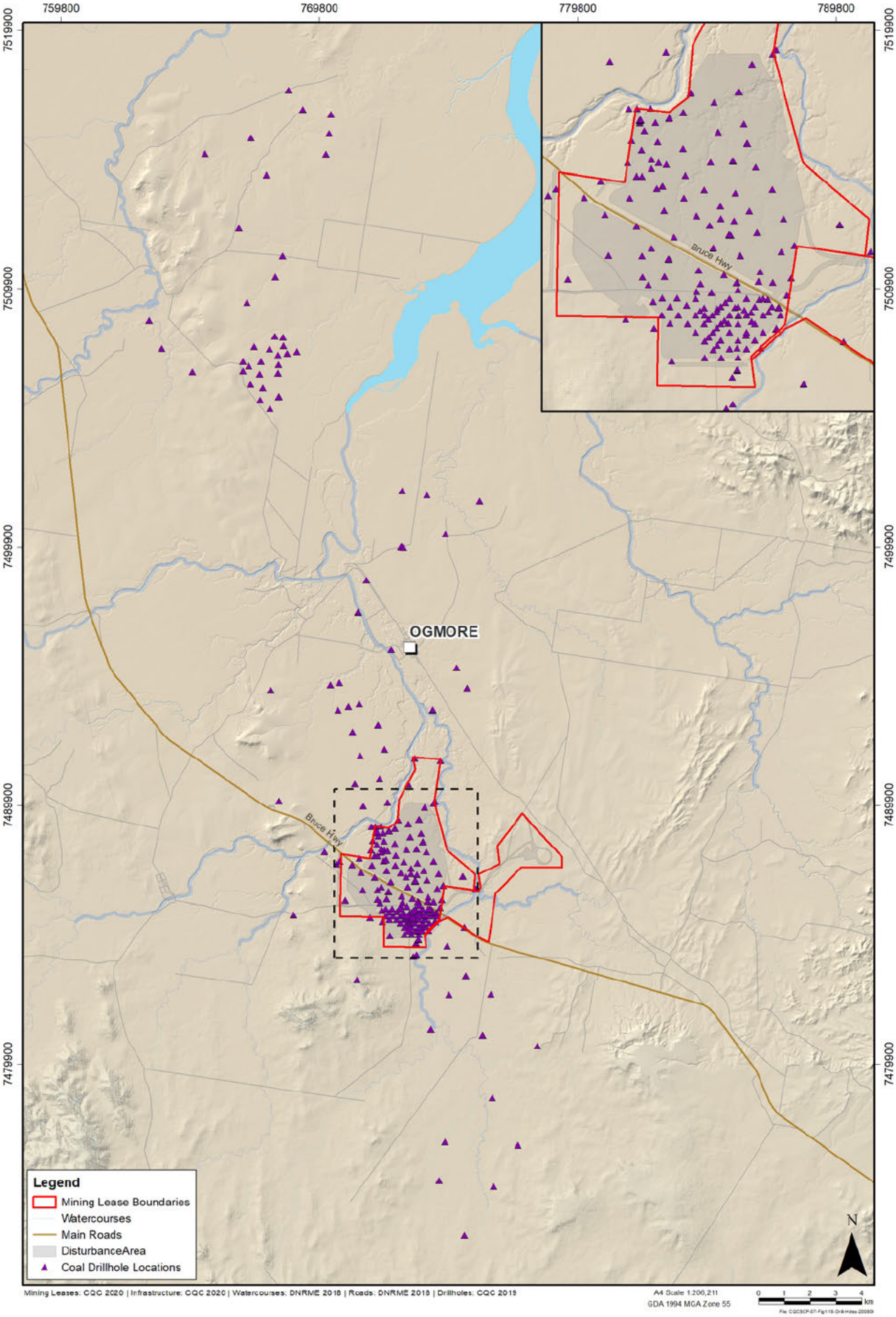


Figure 1-18: Location of exploration drillholes

1.9 Project Description

1.9.1 Overview

The Project includes:

- two open cut operations, associated mining activities and mining infrastructure
  - Open cut 2, commencing first, in 2021 and
  - Open Cut 1, commencing second, in 2030
- a 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.

The infrastructure will be located over the two Mining Lease Applications - ML 80187 and ML 700022. Collectively, the two MLs are cover an area of 2,661 ha and are referred to as the Project Site.

The extraction and processing of coal is contained within ML 80187 including the Open Cut mines, Waste Rock Stockpiles, Dam 1, the MIAs and CHPPs. ML 80187 is 1915 ha. The Project will occupy an area of 1285 ha within this ML.

ML 700022 contains the TLF, the majority of the haul road, several of the sediment dams and part of a catchment diversion drain. ML 700022 is 745 ha, of which 75 ha will be occupied by the Project infrastructure.

Within the ML's the area that will be disturbed to enable construction and operation of the mine (i.e. the open cut mines, waste rock stockpiles, CHPP's, MIAs, roads, dams, and all other associated infrastructure) is 1,361 ha. Outside of the ML an additional 11.5 ha will be disturbed to facilitate the western mine access and relocate the entry to Mount Bison Road, and another 0.9 ha to facilitate the eastern mine access road. Collectively these areas are referred to as the Disturbance Area and sum to 1,372.5 ha. These disturbance areas are inclusive of a 10 metre buffer around all infrastructure components. The Project layout is shown in Figure 1-19.

The configuration of the MLs has provided for buffer to separate the Project's activities from retained ecological features including Deep and Tooloombah Creeks and associated riparian vegetation.

Development of the Project will commence in 2021 with initial early construction works and extend operationally for approximately 19 years (2039) until the depletion of the current reserve, with rehabilitation and mine closure activities completed by 2044. The mine schedule is discussed in Section 1.9.15.

The Project will involve mining a maximum combined tonnage of 10 Mtpa of SSCC and HGTC across two open cut operations for a period of one year. The open cut mines will be developed progressively with Open Cut 2 commencing from Year 1 of the Project (2021) and Open Cut 1 commencing in Year 10 of operations (2030). At full production, two CHPPs, one servicing each open cut mine, will be in operation (mine sequencing is discussed in Section 1.9.15.2). Rehabilitation will be ongoing from Year 3, however rehabilitation to final landform and mine closure activities will occur between 2038 and 2044 (rehabilitation activities are discussed in Section 1.9.18.3, and more thoroughly in Chapter 11).

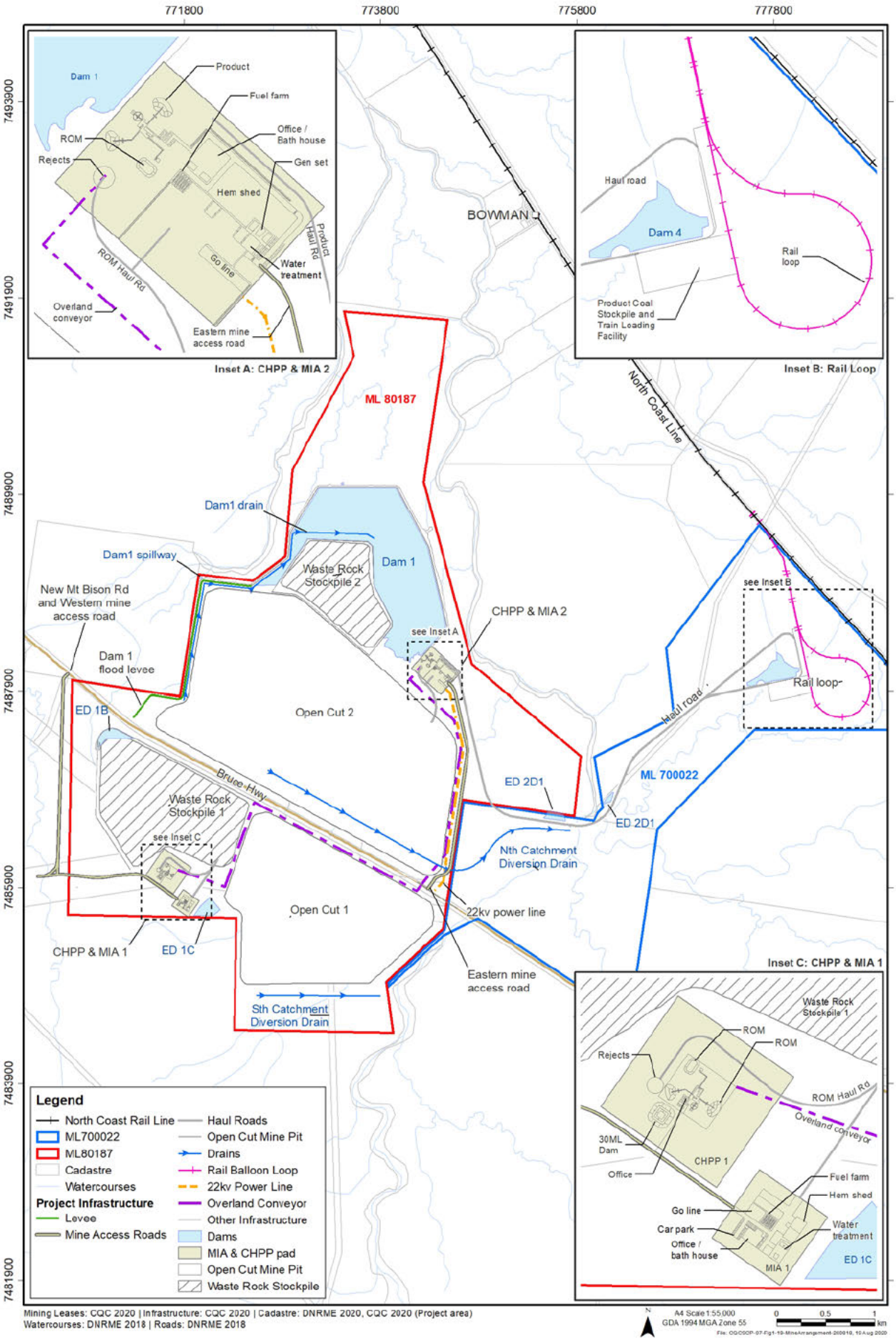


Figure 1-19: Project layout

The two open cut operations will be mined using a truck and shovel methodology. The method of mining is discussed below in Section 1.9.18.1. The ROM (i.e. the raw material from the open cut mines that reports to the CHPP for processing into product coal) coal will ramp up to approximately 2 Mtpa during Stage 1 (2021 – 2024). The ROM coal will be crushed, screened and washed to SSCC grade with an estimate 80% yield. Stage 2 of the Project (2025 - 2039) 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. The mine schedule is discussed in 1.9.15.

From 2030 onwards a conveyor will 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 Project will utilise the North Coast Rail Line to transport coal to the 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.

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. The transportation of coal from the product stockpiles to the TLF will be via the transport corridor using trucks.

The Project will employ a peak workforce of approximately 222 people during construction and between 100 (2021) and 500 (2032) during operation, with the workforce reducing to approximately 20 during decommissioning. CQC Coal will manage the Project construction and ongoing operations with the assistance of contractors.

1.9.1.1 Project Changes since SEIS v2

As part of SEIS v3, a review of the Project layout was undertaken with the objective of refining the Project layout wherever possible to avoid and minimise impacts on environmental values. As such, since the finalisation of SEIS v2, several changes have been made to the Project layout. These changes are described in Section 3.3 of Chapter 3 – Project Changes and Responses to Regulator Comments. The descriptions of the Project elements that follow presents the updated Project layout.

Table 1-13 shows each of the major Project components and their disturbance areas. Each of these is described below and the construction and operation of these elements is described below in Sections 1.9.17 and 1.9.18, respectively.

Table 1-13: Project components and disturbance areas

Project Component	Approximate area (ha)
Mining and Infrastructure Area	**1287.2**
Open Cut 1	255.7
Open Cut 2	531.6
Waste Rock Stockpile 1	152.6
Waste Rock Stockpile 2	76
Environmental Dams	6.6
Dam 1, Dam access road and Embankment / Levee	157.8
MIA & CHPP 1 and 2	39.5
Catchment Diversion Drains	18.6

Project Component	Approximate area (ha)
Mine access and internal roads – Open Cut 1	6.9
Mine access and internal roads – Open Cut 2	9.2
Power supply	4.2
Conveyor	10.6
Ancillary areas within mining and infrastructure area	17.9
Haul Road to TLF and Environmental Dams, Dam 4 and TLF	**55.1**
Rail loop and spur line	**17.9**
Total within Mining Lease	**1360.2**
New Mt Bison Road and Western Mine Access (outside of Mining Leases)	**11.5**
Eastern Mine Access Road	**0.9**
Total inside and outside of Mining Lease	**1372.6***

* Value is the allowance for clearing of new Mt Bison Road alignment and intersection outside of the mining lease, and small areas associated with the new Bruce Highway intersection.
Note that the areas above are inclusive of a 10 m buffer around each project component.

1.9.2 Open Cut Mines

1.9.2.1 Open Cut 2

The disturbance area of Open Cut 2 is 531.6 ha. Open Cut 2 will begin in 2021 and cease in 2034. Mining of Open Cut 2 will commence in the northern end of the pit and progress in a south-easterly direction operating outside a 500 m buffer between the Project and the Bruce Highway. Once the area outside of the buffer is mined out (by 2031) mining operations will progress to the western point of the pit and repeat the mining process in a south easterly direction. 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 closer 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.

The mining method for both Open Cuts is discussed below in Section 1.9.18.1 – Mining Method.

1.9.2.2 Open Cut 1

Open Cut 1 will be 255.7 ha in size. Open Cut 1 will commence operations in the southern end and progress in a north-westerly direction. Mining of Open Cut 1 will commence in 2030 and cease in 2038. The method of mining will be the same as for Open Cut 2, and is discussed in below in Section 1.9.18.1 – Mining Method.

1.9.3 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 ROM coal feed from the two open cut pits supplying the CHPPs. Materials handling capacity has been set at a maximum of 4 Mtpa of ROM coal for each CHPP to process the SSCC (note thermal coal bypasses this system). A figure showing the coal handling system from mine to port is shown in Figure 1-20.

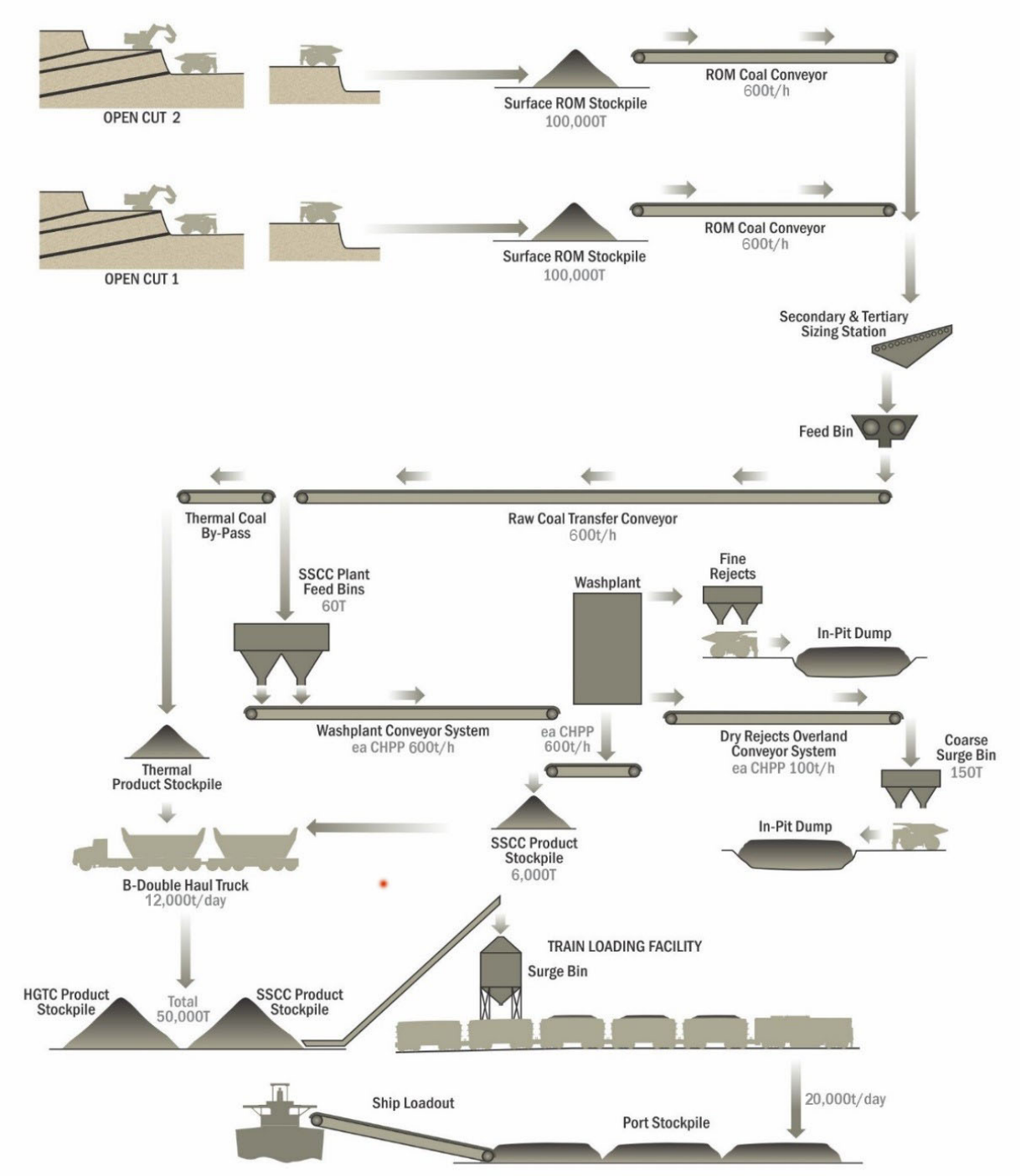


Figure 1-20: Coal handling system

1.9.3.1 ROM Coal System

The ROM coal system consists of two coal stockpile areas and dump stations (comprising dump hopper, product conveyor, crushers and surge bin).

1.9.3.1.1 Raw Coal Handling

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.

1.9.3.1.2 Raw Coal Conveyor Configuration

ROM coal conveyors sized at 600 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.

1.9.3.2 Product Coal System

1.9.3.2.1 CHPPs (CHPP 1 and CHPP 2) and product coal stockpiles

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 to produce SSCC (HGTC bypasses the wash plant as shown in Figure 1-20). 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.

Initially, a single conveyor sized at 600 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 (2 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, which is later transported via haul trucks and disposed of amongst the significantly more substantial 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.

1.9.3.2.2 Product Coal Handling

Both CHPPs will initially have a single product coal conveyor sized at 600 t/hour discharging washed coal to a product coal stockpile sized at 6,000 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 50,000 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.

1.9.4 Waste Rock and Rejects Management

1.9.4.1 Waste Rock and Rejects

Overburden and coarse and fine rejects disposal will be conducted in accordance with the Project's Mineral Waste Management Plan (MWMP), a draft of which is included in the draft EMP in Appendix A12. Over the life of the mine, the total volume of excavated waste rock from open cut activities (i.e. overburden, interburden) is expected to be approximately 740 million bank cubic metres (Mbcm), with coarse and fine rejects totalling approximately 9.3 million cubic metres.

The waste generation rates and dump schedule are detailed in Section 1.9.15.2.

Waste rock comprises overburden and interburden material extracted as part of mining operations. Overburden is rock that sits above the uppermost target coal seam and is required to be removed to access the coal. Interburden is the rock material between the targeted coal seams. Waste rock generally consists of large sized, blocky material. These materials will initially be disposed of within the Waste Rock Stockpiles (see Section 1.9.4.2 below). Later, as sufficient working areas have been developed within the open cut, waste rock will be emplaced into the completed mining areas and used to facilitate progressive rehabilitation. Any surplus waste rock materials will continue to be temporarily emplaced within the waste rock stockpiles and be available at closure to assist in filling the mining area to ensure no final void remains in the landscape. Approximately 140 Mbcm of the waste rock materials stored within the waste rock stockpiles during operations will ultimately be used for the final backfilling of the mining area to ensure that no final voids remain at closure.

Rejects are the processing waste which includes rock and a very small amount of low-grade coal particulates that naturally occur within the deposit and are extracted as part of the ROM coal. Rejects are removed during the crushing, screening and washing of the coal at the CHPP. The outputs from the CHPP are product coal, coarse rejects (particles sized between 1 mm and 120 mm) and fine rejects (particles less than 1 mm in size). All rejects will be dewatered before leaving the CHPP by filter press to achieve a more stable dry paste for disposal.

Rejects will be blended with the overburden/interburden waste rock for co-disposal. In the early years this will be within the ex-pit Waste Rock Stockpiles (see Section 1.9.4.2 below) encapsulated below the final landform surface. Following this, once the in-pit backfill areas become operational it will be interred within the pit backfill areas.

The waste materials will be hauled as back loads to Waste Rock Stockpiles or pits using coal haulage trucks after they deliver ROM coal to the ROM stockpile.

The waste materials as a whole (including waste rock and fine / coarse rejects) are expected to have low acid production potential, high potential to be sodic and moderate saline drainage potential (see Chapter 8 - Waste Rock and Rejects). Management measures have been determined in response to these potential impacts and best reflect the requirements for land management throughout the construction, operation and rehabilitation phases of the Project. These are contained in the draft MWMP in the draft EMP in Appendix A12 – and described in Chapter 8 - Waste Rock and Rejects and Chapter 11 – Rehabilitation and Decommissioning. The management of waste rock materials will be integrated with the overall mine planning, particularly rehabilitation works, which will be described within a Progressive Rehabilitation and Closure Plan (PRCP).

1.9.4.2 Waste Rock Stockpiles

One waste rock stockpile will be developed for each Open Cut mine during the initial years of operations as the box cuts are developed. These waste rock stockpiles will store waste rock materials which will ultimately be utilised to infill the mining areas at closure to ensure no final voids remain in the landscape. Waste Rock Stockpile 2 will service Open Cut 2. The ex-pit dumping for Open Cut 2 will commence in 2021 and continue until 2029 and will initially be developed up to a maximum landform height of RL 135 m, reformed to a final landform height of approximately RL 100 m at mine closure.

Waste Rock Stockpile 1 will service Open Cut 1. The ex-pit dumping for Open Cut 1 will commence in 2031 and will initially be to an indicative maximum height of up to RL 125 m. This will be

reformed to a maximum final landform height of RL 100 m upon the completion of mining operations.

The conceptual mine plan design has located the waste rock stockpile areas with consideration of sensitive site receptors, surface and groundwater drainage impacts, proximity to the CHPPs and health and safety risks. These factors will continue to be considered during detailed design of the waste rock stockpiles.

As such, the detailed design and management of waste rock materials generated by the Project will account for:

- climate, topography and location of sensitive receptors within the Project area i.e. Tooloombah Creek and Deep Creek
- the geochemical characteristics of the waste rock and its variations across the mine
- expected water balance and water quality controls within the waste rock stockpiles
- measures that provide for safe operations
- compliance requirements of the Project's EA and minimum performance standards for the mining industry
- costs (in terms of net present value) and
- facilitating progressive rehabilitation (including temporary rehabilitation where final rehabilitation is not able to be achieved) whilst also optimising for mine closure outcomes.

Rehabilitation of the waste rock stockpiles will continue through the life of the mine (refer below to Section 1.9.19 and to Chapter 11 – Rehabilitation and Decommissioning for discussion about the rehabilitation approach for the Project).

The proposed mining and associated disturbance areas are generally constrained by mining lease boundaries and environmental considerations, such as the two neighbouring local drainages: Deep Creek and Tooloombah Creek. The layout of Project entails temporary rehabilitation of the waste rock stockpiles to manage water runoff and erosion of these landforms during the ongoing mining operations. Final shaping and rehabilitation of the waste rock stockpiles according to the final landform design will be undertaken following the recovery and use of stored materials to fill the completed mining areas at closure to ensure no final void remains in the landscape.

1.9.5 Water Management System

1.9.5.1 Overview

An updated Draft Site Water Management Plan for the Project has been prepared, detailed in Appendix A5c - Draft Water Management Plan, with the technical supporting assessment detailed in the Flood Study and Water Balance in Appendix A5b. The water management system aims to manage water quality and quantity so as to:

- minimise the risk of uncontrolled discharges from the mine water management system
- ensure the site has sufficient water available for operation in dry times and
- ensure no adverse impact on receiving water quality.

The proposed water management strategy for the Project is based on targeted management of water from different sources based on anticipated water quality. The categories of water and specific objectives for each type are summarised in Table 1-14.

Table 1-14: Summary of water management system

Water Type		Management Objectives
Clean water	Surface runoff from undisturbed catchment areas	• Separate from the mine affected and sediment water systems as much as practicable and allow it to pass uninterrupted through the catchment
Mine affected water	Seepage, groundwater and surface runoff inflows to the open cut mining areas which could potentially have elevated salinity	• Contain within the site water management system. • Ensure any controlled releases do not result in environmental harm. • Minimise uncontrolled discharges in wet periods to protect downstream water quality and ensure adequate water supplies are maintained for site demand during dry periods.
Sediment laden water	Surface runoff from overburden emplacement areas and other non-mining disturbed areas which is likely to have high concentrations of suspended sediment	• Contain within the site water management system and recycle to meet site water demands. • Treated to remove sediments to a level suitable for release.
Contaminated water	Water from workshop or fuel storage areas that may have elevated oil, grease and other contaminants	• Ensure full separation from other water sources and manage under the specifications of AS1940 - Storage and Handling of Flammable and Combustible Liquids.

1.9.5.2 Water Supply and Demand

Water supply for the Project will be sourced from Dam 1, which sources water from natural catchment runoff, groundwater and rainfall from pit dewatering, and water captured in other site storages, including sediment dams.

Although the EIS and SEIS v1 and v2 previously reported water permits will be sought to take water from Tooloombah Creek during construction, this will not be necessary. Since the release of the EIS, further water demand assessment has been undertaken and the water storage network within the Project has been revised. This assessment has confirmed that there will be adequate water availability through the proposed Dam 1 (see Section 9.6.3 of Chapter 9 – Surface Water). Minor amounts of water will be sourced for potable supply and on-site farm dams used for dust suppression as needed prior to completion of site water storages to supply water for construction use.

Geochemical characterisation presented in the Geochemical Assessment of Waste Rock and Coal Reject in Appendix A3b concluded that the overwhelming majority of the waste rock and potential coal reject materials have a very low risk of acid generation, and runoff from waste rock and coal rejects would be alkaline and have a low level of salinity. Dissolved metal/metalloid concentrations are expected to be low and unlikely to pose a significant risk to the quality of surface and groundwater resources in site storages. As such, water is anticipated to be of good quality for reuse on the site.

Fine rejects from the fines coal circuit will be dewatered at the CHPP using belt press filters, with the extracted water recycled back into the CHPP water circuit at an effective decant return rate of about 82%. This significantly reduces the net CHPP makeup water from a gross requirement of approximately 208 L/ROM tonne to approximately 81 L/ROM tonne. During years 11 and 12,

approximately 1Mt and 4Mt of the Run of Mine (ROM) coal will be bypassed, respectively. This bypassed coal will not require washing at the CHPP.

Water for haul road dust suppression and service water (for vehicle washdown, fire water demand and ROM pad dust suppression) will be sourced from Dam 1. Daily haul road dust suppression watering rates were estimated based on haul road surface area and daily rainfall and evaporation rates. Service water demand is estimated at 50 ML/a across all mine stages.

Potable water will be sourced from groundwater or raw water supplies (Dam 1) and treated in an on-site batch Water Treatment Plant (WTP) to drinking water standards. An annual demand of 6.3 ML/a has been assumed.

Annual water demand estimates are provided in Table 1-15, based on the five stages used in the water balance modelling (note potable water is excluded as it may not be sourced from the mine water management system).

Table 1-15: Average annual water balance

Component	Process	Average Annual Volume (ML/a)				
		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Inflows	Catchment runoff & direct rainfall	1,510	1,623	2,147	2,539	2,680
	Groundwater inflows	310	274	46	0	0
	External supply (demand shortfall)	29	26	88	91	32
	Total inflows	***1,849***	***1,923***	***2,281***	***2,630***	***2,712***
Outflows	Evaporation	746	871	912	965	1,252
	Dust suppression	436	438	596	596	596
	CHPP makeup demand	178	324	324	323	168
	Service water demand	50	50	50	50	50
	Spillway overflows: mine water dams	5	7	2	98	83
	Spillway overflows: sediment dams	3	5	60	57	58
	Controlled releases	295	226	285	383	407
	Total outflows	1,713	1,921	2,229	2,472	2,614
	Change in volume	***136***	***2***	***52***	***158***	***98***

The water demand for rehabilitation and mine closure during Years 19 to 24 will likely be significantly lower than the demands during the operations of the mine, assumed to be 20 ML and sourced from environmental dams. This will be finalised during detailed design.

Groundwater inflows have been sourced from the groundwater modelling assessment (Appendix A6b) as shown in Figure 1-21. The total gross inflows into Open Cut 1 and Open Cut 2 peak at 1.1 ML/a in Year 4, showing the total gross inflow (total flowing into the pit), and net inflow (total flow less face evaporation and similar losses).

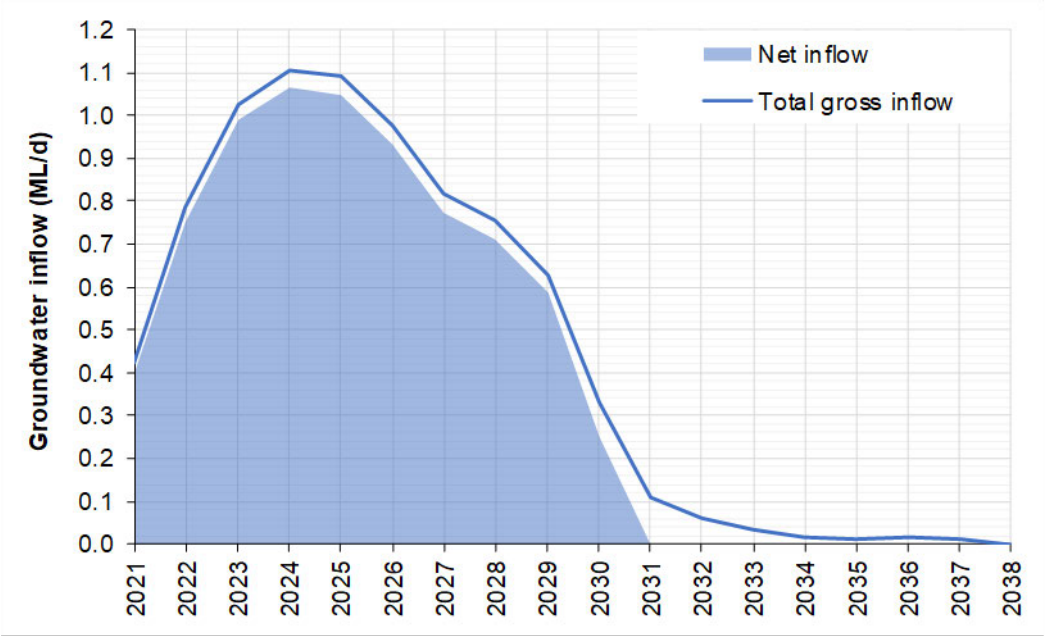


Figure 1-21: Estimated groundwater inflows (WRM 2020)

1.9.5.3 Water management infrastructure

1.9.5.3.1 Overview

The site water management system involves the following key infrastructure, summarised in Table 1-16. The water management system is shown schematically in Figure 1-22 and in the site layout in Figure 1-19, with the potential release points shown in Figure 1-23:

- A large (2,783 ML) mine water dam (Dam 1) which is the main storage for runoff from active mining areas and groundwater inflows to the open cut pits. Dam 1 will also collect undisturbed catchment runoff in the early stages of the Project to provide water supply for mining operations.
- A controlled release system from Dam 1 to Deep Creek. The controlled release system will enable site water volumes to be managed during wet periods when significant inflows to the site water management system are expected. Releases will only occur during flow events in Deep Creek.
- Two clean water diversion drains
  - the Northern Catchment Diversion Drain, located north of the Bruce Highway, to divert clean catchment runoff around Open Cut 2 to Deep Creek, operating from the start of mining up to Year 12 when it will be largely mined out (and the remainder rehabilitated) and
  - the Southern Catchment Diversion Drain, located south of the Bruce Highway, to divert clean catchment runoff around Open Cut 1 to Deep Creek, operating from Year 10 until the end of mining.

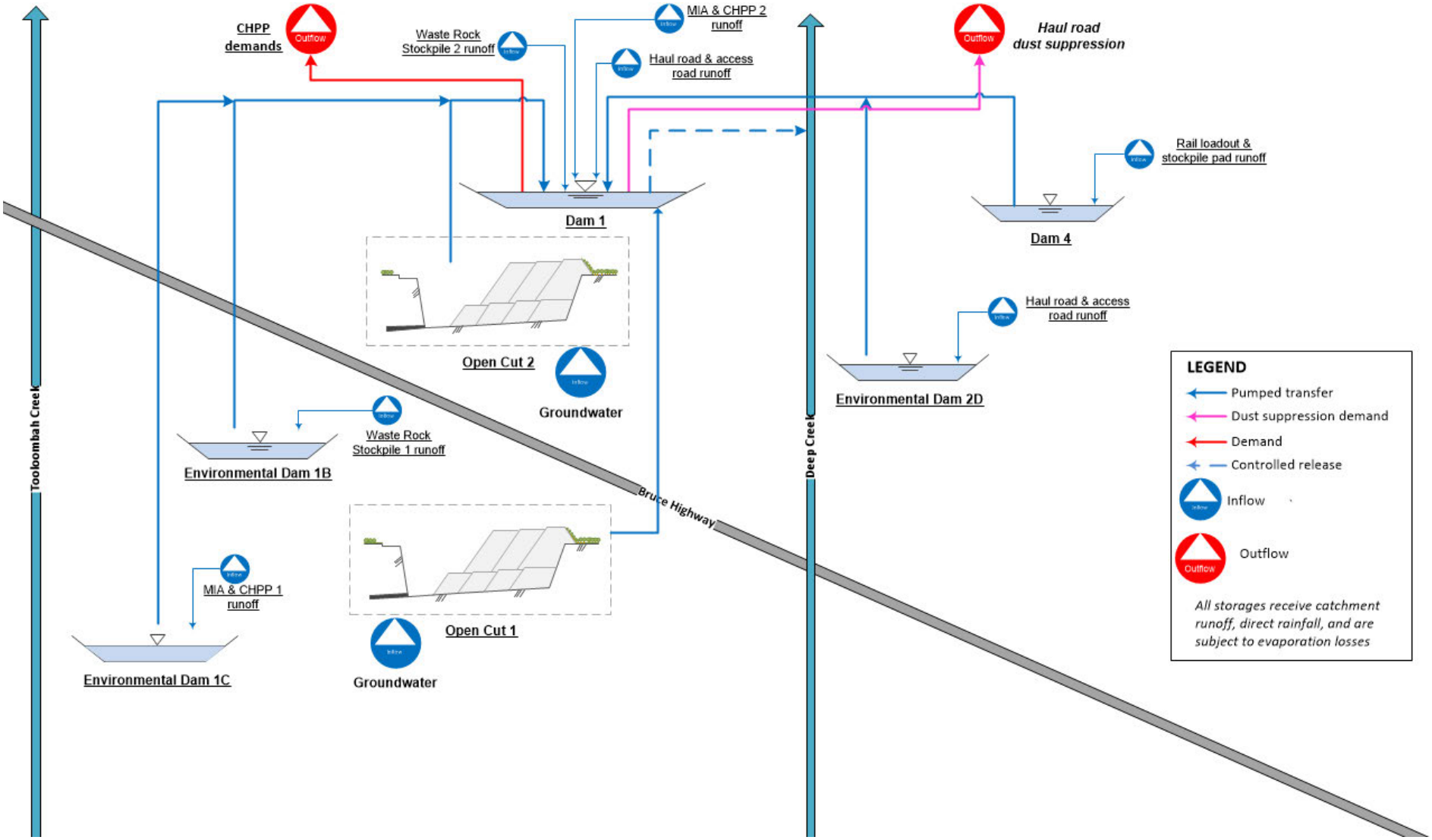


Figure 1-22: Proposed water management system configuration

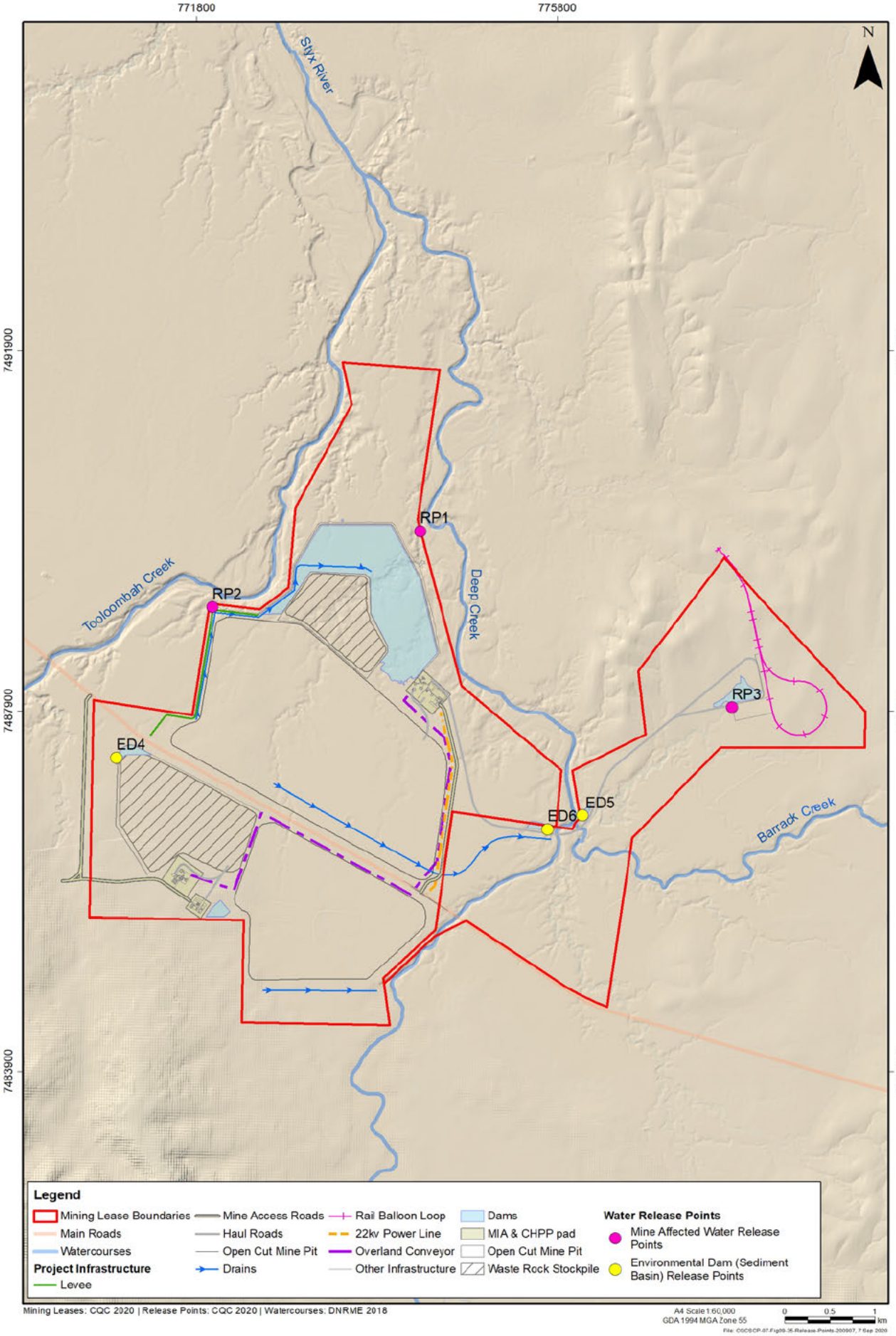


Figure 1-23: Site water release points

Table 1-16: Proposed infrastructure details

Infrastructure	Details	Management / Operating Rules
Open Cuts		
Open Cut 1 and 2	Open cut mining operations, capturing groundwater inflow / dewatering water and rainfall, requiring draining for mining	Dewaters to Dam 1, allowing for a nominal 50ML sump volume within each pit.
Dams and Levees		
Dam 1	Mine affected water dam Full Supply Storage: 2.783 ML Operating Storage: 1,800 ML Area: 128 ha Wall height: generally <10m, require detailed design to determine in all areas	Operated as the primary mine affected water storage for the Project, and receives all mine affected water on the site, and additional water from sediment dams and clean upslope water. It captures runoff directly from Waste Rock Stockpile 2, MIA and CHPP 2, part of the haul road and northern access road, and upslope clean water, and sources water from the other dams. Water is supplied from Dam 1 to meet CHPP demands, haul road dust suppression, vehicle washdown and fire water Controlled releases are required to Deep Creek, from a controlled release structure in the north-east of Dam 1. Where capacity is exceeded, Dam 1 would overflow to Tooloombah Creek.
Environmental Dam 1B	Sediment dam Full Supply Storage: 23.7 ML Operating Storage: 0 (operated empty) Area: ~2.9 ha	Captures water from Waste Rock Stockpile 1 and dewaters to Dam 1 to maintain empty. If exceeded, would overflow to Tooloombah Creek, after settling within the dam.
Environmental Dam 1C	Mine affected water dam Full Supply Storage: 44.1 ML Operating Storage: 0 (operated empty) Area: ~2.7 ha	Captures water from MIA / CHPP 1, and dewaters to Dam 1 to maintain empty. Constructed with additional storage capacity to contain flows, but if exceeded would overflow to Dam 1, after settling within the dam.
Environmental Dam 2D1/2	Sediment dams Full Supply Storage: 26.9 ML Operating Storage: 0 (operated empty) Area: ~1.4 ha + ~0.5 ha	Captures runoff from part of the haul road, and dewaters to Dam 1 to maintain empty. If capacity is exceeded, would overflow to Deep Creek, after settling within the dam.

Infrastructure	Details	Management / Operating Rules
Dam 4	Mine affected water dam Full Supply Storage: 95.8 ML Operating Storage: 0 (operated empty) Area: ~6.8 ha	Captures water from the train loadout facility, rail loop and part of the haul road and dewaters to Dam 1 to maintain empty. The product coal stockpile means this dam may be considered mine affected water. The dam could overflow to a tributary to Deep Creek, but will be managed to prioritise transfer of this water to Dam 1 as required to avoid overflows.
Levee	Flood protection, contaminated water containment Length: 2.3 km extending from Dam 1 wall Crest Elevation: above 0.1% AEP level	The levee is proposed to extend from the western end of the Dam 1 wall. Combined with the Dam 1 wall, elevated MIA / CHPP 2 platform and access road, this provides flood protection from the Bruce Highway on the west around to the highway on the east, for the Project elements on the north side of the highway.
Diversions		
Northern Catchment Diversion Drain	Located on the northern side of the Bruce Highway Length: 3.5 km	Temporary drain which will be in place for approximately the first half of the Project life before being mined through
Southern Catchment Diversion Drain	Located south of Open Cut 1 Length: 1.3 km	Constructed in the latter half of the Project life to divert catchment runoff away from the open cut pit to Deep Creek
Other		
Fuels, oils Chemical storage	Chemical, fuel and temporary liquid waste storage facilities will be constructed and bunded in accordance with the relevant specifications of *AS1940 - Storage and Handling of Flammable and Combustible Liquids* (AS1940). Fuel storage areas associated with Project operations will be inspected regularly, with repair and maintenance work completed as required. Bunds filled with stormwater will be drained or pumped out by a licensed contractor as soon as practicable to maintain the bund volume. Runoff from the vehicle wash down and workshop areas will be treated by an oil and grease separator prior to collection in the mine water management system for re-use. Waste oil, grease, etc. will be stored in contained areas prior to removal off-site.	

- Sediment dams to collect and treat runoff from the overburden emplacements and haul roads
  - Environmental Dam 1B, collecting runoff from Waste Rock Stockpile 1, located south of the Bruce Highway and
  - Environmental Dam 2D (2D1 and 2D2), collecting runoff from the haul road to the TLF, with any overflows (after settling) to Deep Creek.
- Dam 4, an environmental dam to collect and contain runoff from the haul road, rail loop and train loadout facility, including product coal stockpile, draining to a tributary to Deep Creek.
- Environmental Dam 1C, to contain runoff from Mine Infrastructure Area (MIA) and CHPP 1 south of the Bruce Highway, draining to Dam 1 (though designed with sufficient emergency storage to avoid overflow).
- Pumps and pipelines and ancillary equipment to transfer water around the site.

Dams will be maintained empty and pumped to Dam 1 for on-site reuse and to minimise overflows from the site. Details of the dams are provided in Table 1-16.

1.9.5.3.2 Controlled Release Structure

The configuration of the outlet will be determined during detailed design; however, it is likely to comprise a number of discharge pipes through the dam wall (nominally 4 x 900mm dia.), with remote controlled valves to enable optimum discharge timing. The outlet will be designed with scour protection and energy dissipation to ensure safe and stable releases.

1.9.5.3.3 Dam 1 Spillway

The Dam 1 spillway has been located on the western side of Dam 1, with overflows occurring over the levee wall by way of a constructed and stabilised spillway into Tooloombah Creek adjacent to the site. Detailed design for this system is yet to be finalised, and another location for the spillway has also been investigated, located on the western end of the northern Dam 1 wall, discharging to Tooloombah Creek slightly downstream from the site. This is shown in Figure 1-24. For the purposes of this SEIS, the westernmost location is the relevant location.

In accordance with the results of the regulated structures assessment (Section 1.9.5.6), Dam 1 will require a spillway to have capacity to pass the 0.1% AEP event.

1.9.5.3.4 Environmental Dams

Environmental dams are sized based on the 9.5% AEP, 24-hour rainfall event. Water captured in the environmental dams will be preferentially used in the mine operations, at the MIA, CHPP and for dust suppression. Otherwise, these dams will be operated empty, dewatered to Dam 1.

Environmental Dams 1B, 2D1/2 and Dam 4 will have a low flow perforated riser-pipe decant outlet to discharge treated water to the receiving environment as controlled discharges when the dam cannot be transferred instead to Dam 1. Dam 4 will be via an authorised release point, and the others will be managed as part of the site Erosion and Sediment Control Plan (ESCP).

Environmental Dam 1C is not designed to drain off-site, incorporating a design storage allowance and minimal catchment to ensure overtopping does not occur.

Spillways for Environmental Dams will be designed to have capacity to pass the 0.1% AEP event.

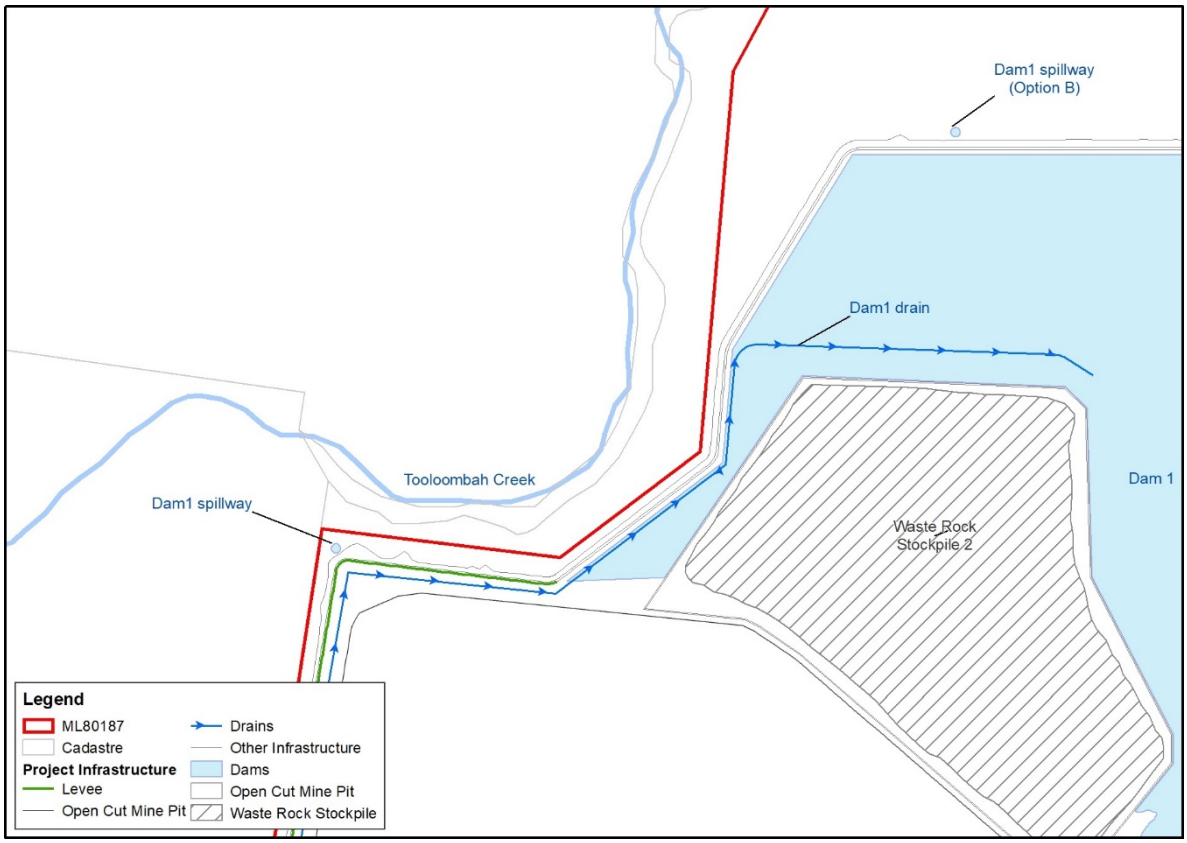


Figure 1-24: Dam 1 spillway location

1.9.5.3.5 Clean Water Diversions

Diversion drains and bunds are proposed to divert clean water runoff around the mine affected areas, including the open pits and waste areas. This clean water is diverted away from mine-affected or sediment affected water which is captured in environmental dams.

Two catchment diversion drains are proposed – one on the north of the Bruce Highway to divert upslope catchment waters away from Open Cut 2 and the Dam 1 catchment, reducing water inventory and therefore discharge risk. The other is located on the southern side of the Bruce Highway to likewise divert upslope waters around Open Cut 1, to be constructed in Year 10 (the northern drain is fully mined out by Year 13/14).

1.9.5.3.6 Levee

A levee wall has been incorporated into the site design for the Project north of the Bruce Highway, extending from the western end of Dam 1 another 2.3 km south and west to near the Bruce Highway, providing flood protection and containment of potentially contaminated waters on-site. The levee structure is part of the Dam 1 wall, and due to other constructions on the site, the flood protection effectively extends around MIA / CHPP 2 and along the entrance road to near the Bruce Highway on the eastern side of the Project.

1.9.5.3.7 Site Stormwater Drainage

The major elements of the site water management system have been described above. For the minor components and in-site drainage elements, a concept site stormwater plan was prepared for the previous SEIS v2 in keeping with the DES *Stormwater Guideline* (EHP 2014). The current updated

mine layout has adopted the same approach, with design details for elements of the system shown in the construction plans in Appendix 16 of this SEIS v3. However, the detail that was included in the SEIS v2 has not been replicated herein.

The site stormwater system will be updated as detailed design progresses post approval, and general details of the plan are as follows:

- Open Cut pits will utilise bund and diversion drain systems along the edge of the pit to divert local stormwater away from the pit, sized to divert the 0.1% AEP event. These will move with the pits as they change as necessary.
- Site drains for waste rock stockpiles, MIA, CHPP and the like will incorporate a 9.5% AEP design capacity, with runoff directed into environmental dams. Local clean water diversion drains will be constructed to a similar standard where required.
- Table drains will be constructed along haul roads and conveyed longitudinally towards culvert structures by way of sediment structures (such as Environmental Dams 2D1 and 2D2). In areas of steeper grade, sediment transport can be effectively managed using check-dam structures within the drain. Where haul roads cross drainage gullies or the Deep Creek watercourse, an appropriately sized culvert will be provided, allowing for fish passage where relevant.
- Crossings are conceptualised as box culvert crossings with capacity to pass a minimum 9.5% AEP design discharge. Discharges above the design event will pass over the box culvert as a floodway-type arrangement, efficiently passing flows over the road while minimising impacts on local flood depths and velocities, as well as impacts associated with rising headwaters upstream of the culvert crossing.

1.9.5.3.8 Wastewater

Sewage wastewater will be generated on the site from personnel attending the site. As proposed in the SEIS v2, this will be collected in on-site storages (septic tanks or similar) and trucked off-site for treatment and disposal. No on-site wastewater treatment and irrigation scheme is proposed.

Minor amounts of waste oils or other chemicals will be generated on the site. This will be contained and removed off-site for recycling, treatment and/or disposal at appropriately licensed premises. Oily or fuel contaminated water from bunded areas (fuel farms, vehicle washdown, etc.) will be treated through triple interceptor type arrangements, with the treated water directed to the site water management system, and the collected contaminants likewise removed off-site for recycling, treatment and/or disposal at appropriately licensed premises.

1.9.5.4 System Operation

The water management system has been modelled by WRM Water and Environment, with the operating rules described in the draft Water Management Plan in Appendix A5c, and the modelling provided in the Flood Study and Site Water Balance Technical Report in Appendix A5b. The key elements of the system are detailed in Table 1-16.

In summary, the water management system is designed to operate as follows:

- Dam 1 is operated as the primary water storage on the site, with all mine affected water including pit dewatering collected in Dam 1, or pumped from other storages. Other sediment basins are also dewatered to Dam 1 as needed.
- Dam 1 supplies all site water needs, with potable water potentially sourced from Dam 1 or groundwater supplies.

- Controlled releases from Dam 1 to Deep Creek are proposed during wet conditions to prevent excessive accumulation of water within the site storages and minimise the risk of uncontrolled discharges.
- Spillways are provided on all dams, and overflows may occur from Dam 1, from Dam 4 and from the other sediment basins, although generally the smaller dams are operated empty by dewatering back to Dam 1. Environmental Dam 1C is designed with significant overflow protection storage, and drains to Dam 1.
- A pump and pipe system connects all of the water dams to enable movement of water where it is needed on the site. In general, mine affected water will be prioritised for reuse over cleaner water sources.
- Two diversion drains are proposed to be implemented to divert clean upslope catchment runoff around the mine site.
- Oil / water separators are proposed for vehicle wash and workshop areas to treat hydrocarbon contaminated runoff prior to release or containment in environmental dams.

1.9.5.5 Controlled Release Rules

In order to minimise the risk of uncontrolled releases from overtopping storages during wet climatic conditions, controlled release from Dam 1 to Deep Creek release point (RP1) will be required. Receiving water flow rates will be measured at the Deep Creek gauging station, and releases made according to the receiving water flows and release characteristics as shown in Table 1-17.

Table 1-17: Proposed controlled release rules

Deep Creek Flow Condition	Receiving Water Flow Criteria for Discharge (m^3/s)	Maximum Release Rate (m^3/s)	Release limit	
			EC (µs/cm)	Sulphate (SO_4^{2-}) (mg/L)
Low Flow	0.1	0.018	1,000	38
Medium Flow	4	0.142	2,000	80
High Flow	50	1.09	3,000	120
Very High Flow	100	2.02	4,000	160
Flood Flow	250	3.07	8,000	330

1.9.5.6 Release Criteria and Site-Specific Trigger Values

The Surface Water Quality Technical Report in Appendix A5a provided an assessment of the existing baseline water quality, including generating statistics summarising relative parameter concentrations at the different sites and systems in the Project area. The assessment also provided release criteria for parameters in addition to those described in Section ?, and developed SSTVs for receiving waters to trigger action or further investigation.

Proposed release criteria are provided in Table 1-18 and Table 1-19, with SSTVs for receiving waters summarised in Table 1-20.

Table 1-18. Proposed water release criteria

Parameter	Trigger Level
Flow (ML/d)	As per the controlled release rules in Table 1-17
EC (µS/cm)	
Sulphate (mg/L)	
pH (pH units)	6.5 – 9.0[1]
Turbidity	50[2]

Table notes:

1 From DES (2013) Model Water Conditions for Coal Mines in the Fitzroy Basin

2 Based on achievable release limits from sediment basins for suspended solids (Appendix 2, Table A Construction phase – stormwater management design objectives, Queensland State Planning Policy July 2017) and adopted SSTV for turbidity in receiving waters (from the EPP (Water) DGV)

Table 1-19: Release contaminant trigger investigation levels

Parameter	Trigger Level (mg/L)	
	Deep Creek	Tooloombah Creek
Aluminium (dissolved)	0.24	0.055
Arsenic (dissolved)	0.013	0.002
Boron (dissolved)	0.37	
Cadmium (dissolved)	0.0002	
Chromium (dissolved)	0.001	
Cobalt (dissolved)	0.090	
Copper (dissolved)	0.003	0.002
Iron (dissolved)	0.3	
Lead (dissolved)	0.004	
Manganese (dissolved)	1.9	
Mercury (dissolved)	0.0002	
Molybdenum (dissolved)	0.034	
Nickel (dissolved)	0.011	
Selenium (dissolved)	0.010	
Silver (dissolved)	0.001	
Uranium (dissolved)	0.001	
Vanadium (dissolved)	0.010	
Zinc (dissolved)	0.008	
Ammonia – as N	0.900	
Nitrate – as N	1.100	
Petroleum Hydrocarbons (C6-C9)	0.020	
Petroleum Hydrocarbons (C10-C36)	0.100	
Fluoride (total)	2.0	

Table notes:

List of parameters from the DES (2013) Model Water Conditions for Coal Mines in the Fitzroy Basin

Table 1-20. Summary of adopted receiving water SSTVs

Parameter	Deep Creek	Tooloombah Creek	Deep and Tooloombah Creek Confluence (St1)	Styx River at Ogmore Bridge (St2)
pH	6.5 - 8.3			
Dissolved Oxygen (%Sat)	65 – 110			
EC (µS/cm)	740	1,640	-	-
Sulfate (mg/L)	25	54	-	-
Total Suspended Solids (mg/L)	26	11	15	30
Turbidity (NTU)	50			
Ammonia – as N (mg/L)	0.088	0.055	0.060	0.130
Oxidised Nitrogen – as N (mg/L)	0.023	0.014	0.020	0.028
Total Nitrogen – as N (mg/L)	2.48	0.69	0.60	0.74
Filterable Reactive Phosphorous – as P (mg/L)	<0.010			
Total Phosphorous – as P (mg/L)	0.484	0.065	0.090	0.180
Dissolved metals and metalloids	Compare against SSTVs in the Surface Water Quality Technical Report (Appendix A5a)			

1.9.5.7 Regulated Structures Assessment

All proposed storages and levees have undergone a preliminarily consequence category assessment against the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (ESR/2016/1933 Version 5.01) (DES 2016) to determine the minimum hydraulic performance requirements. The assessment is summarised in Section 9.4.7 of Chapter 9 – Surface Water and is provided in full in the Preliminary Dams Consequence Category Assessment in Appendix A5e.

The assessment 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.
- 'Dam break' – collapse of the structure due to any possible cause.

Dam 1 was classified under the 'High' consequence category for the dam break scenario and 'Significant for the failure to contain scenario, and so is classified as 'High' and is a regulated structure. Environmental Dams 1B and 1C, Dam 4 and the levee were classified under the 'Significant' consequence category for the 'failure to contain' 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 TLF, and Dam 1 receiving the pit dewatering.

Only dams with an embankment height of greater than 10 m may be categorised as 'referrable', thus requiring a Failure Impact Assessment (FIA). 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. See Section 9.4.7 of Chapter 9 – Surface Water and the Preliminary Dams Consequence Category Assessment in Appendix A5e for further details.

1.9.6 Mine Industrial Area

MIAs will be located adjacent to each of the CHPPs. The likely MIA arrangement for both CHPPs is shown at Figure 1-19. The key components of each MIA are:

- administration offices and staff parking
- safety office including first aid and emergency response
- technical services
- petroleum, oil and lubricant storage and handling facilities
- vehicle and equipment wash down facilities
- vehicle fuelling facilities
- workshops and stores facilities including procurement
- 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.

Minor bunding/diversion drains will be formed at each of the MIAs to direct clean water around the area and direct potentially contaminated water to an environmental dam. Potentially contaminated areas such as those storing fuels or oils and washdown areas will be appropriately designed and bunded with runoff directed to a sump to separate oil and water prior to releasing water to the environmental dam.

1.9.6.1 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.

1.9.6.2 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, including procurement
- 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.

1.9.6.3 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 above rail operator's 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.

1.9.6.4 Petroleum, Oil and Lubricant Storage and Handling Facilities

The petroleum, oil and lubricant facility is proposed to store various quantities of transmission oil, hydraulic oil, diesel engine oil, final drive oil, lubricants, coolants and waste oil, and will be located at the MIA. The petroleum, oil and lubricant facility will also comprise:

- self-bunded lube and oil storage tanks
- 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.

1.9.6.5 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.

1.9.7 Roads

Traffic to and from site during operations and construction will include workforce traffic, and heavy vehicles delivering materials and equipment to site. Peak traffic volumes are likely to occur during year two of the project at the peak of the first construction phase, at year 10, when the second construction phase co-occurs with operation of the eastern infrastructure, year 12 at the peak of the operational phase, and at year 20 during decommissioning and rehabilitation.

Workforce traffic forecasts suggest total vehicle movements per day generated by the workforce to be 542 in year 2, 402 in year 10, 876 in year 12 and 32 in year 20. All heavy traffic will access the project via the Bruce Highway. Coal haulage to the TLF will occur within site perimeters, and there may be very limited use of local roads, primarily for workforce commuting and incidental project related traffic.

All materials, plant and equipment are intended to be delivered to the Project via road-based transport. It is expected that construction traffic will primarily involve a mix of rigid trucks, articulated vehicles (i.e. semi-trailers) and B-Doubles. Some oversize loads are also expected, particularly during the CHPP, dump station, stacker / reclaimer and heavy mining equipment construction and installation phase. These loads will be hauled from either the Port of Brisbane, Mackay, or Gladstone. Annual heavy vehicle movements during construction are anticipated to be 552 during year 2, and 355 in year 10. The annual movements for the operational period in year 12 are anticipated to be 6,602.

No adverse impacts are expected to the existing rail network. CQC will continue to work with Aurizon and QR to ensure appropriate management regimes are established prior to the commencement of operations.

No impacts are expected in respect of the DBCT operations as the tonnages proposed by the Project are within the existing approvals for the port. No impacts are expected at regional airports as the Project will not be using a FIFO workforce.

1.9.7.1.1 Mine access points on the Bruce Highway

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 was approximately 28.3 km north of Marlborough (see Figure 1-25). 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.

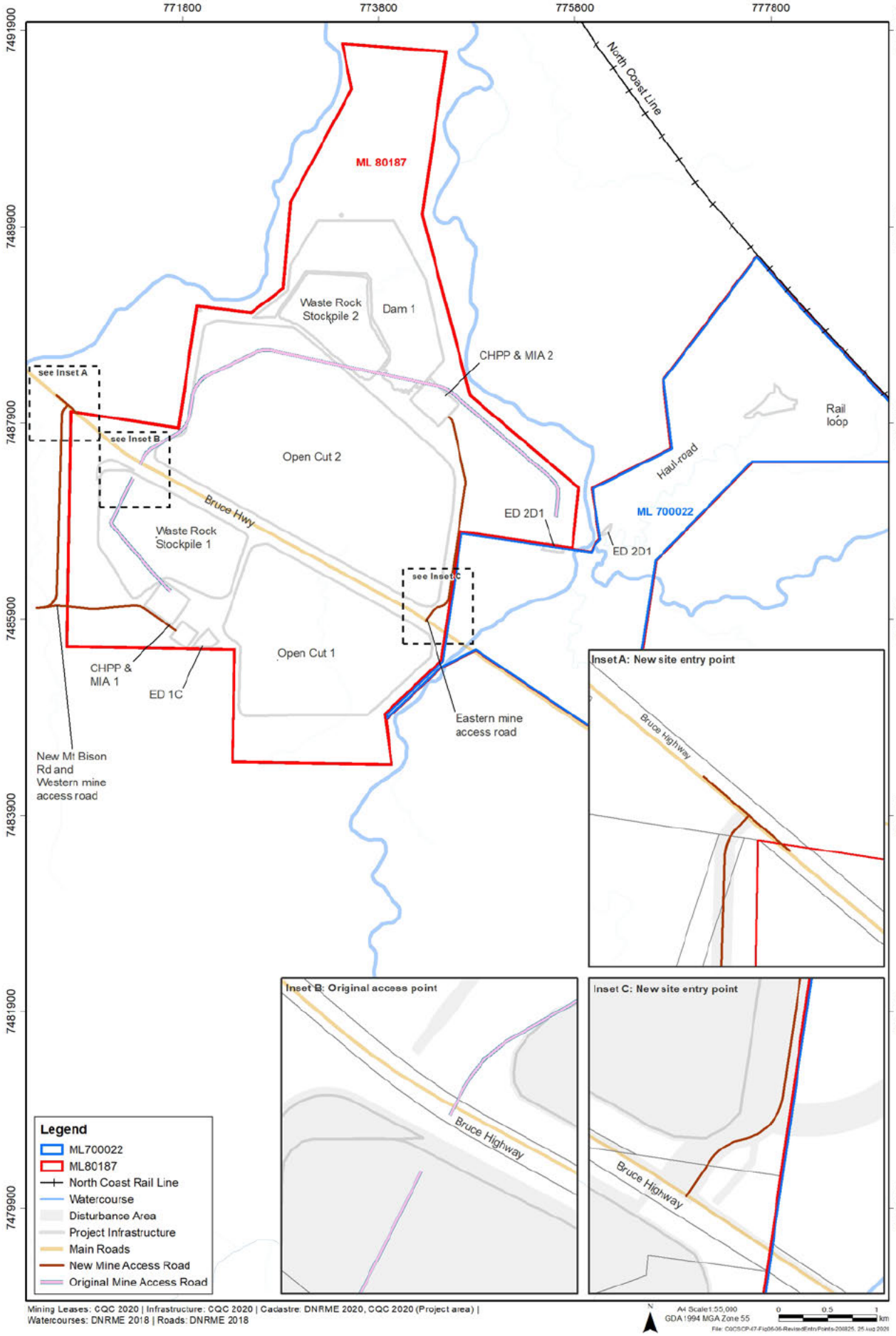


Figure 1-25: SEIS v2 and SEIS v3 mine entry points

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 110 kilometres per hour (kph) and design speed of 120 kph. The design allows for a 235 m right hand turning lane and a 216 m left hand turning lane with full painted chevron median warning features.

Figure 1-26 shows the general arrangement of the new entry point. Construction design drawings are provided in Appendix 16.

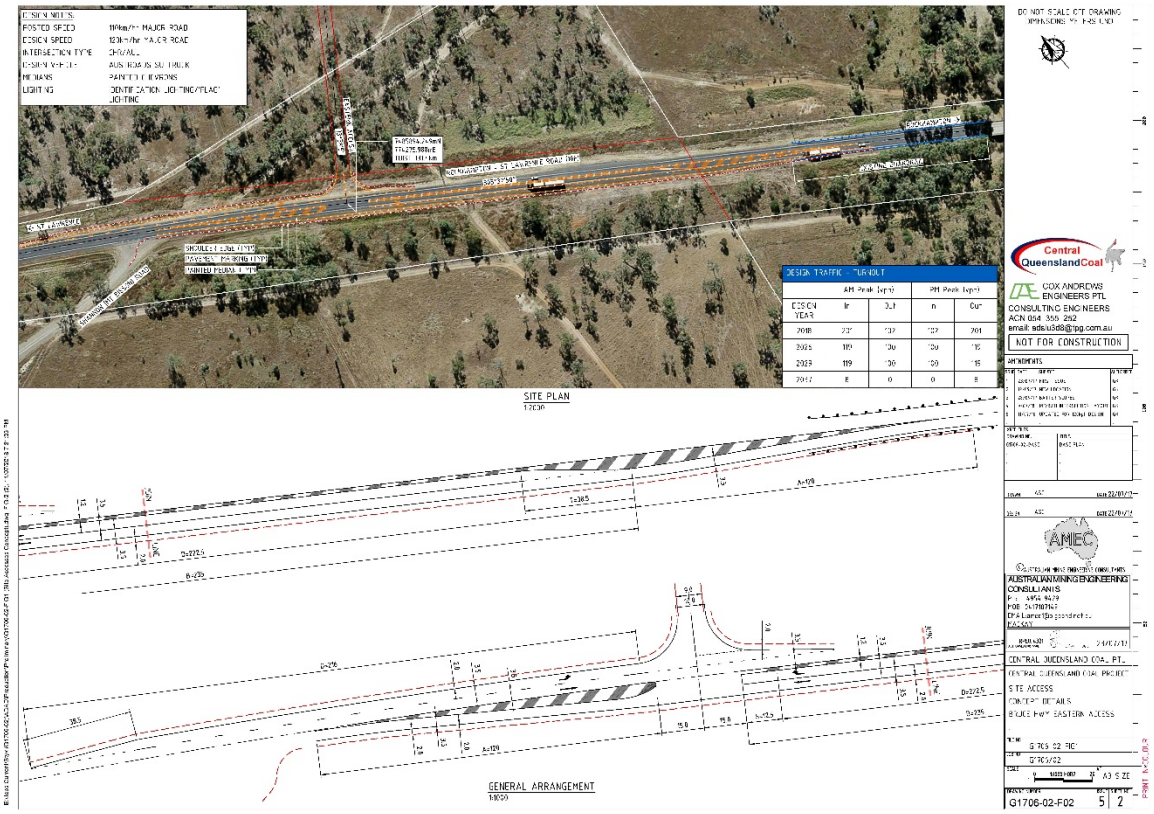


Figure 1-26: Site access concept details Bruce Highway eastern access

New Mt Bison Road and Western Mine Access (outside of Mining Leases)

The western access from the CQC mine site to the Bruce Highway will not be required until approximately 2030. The entry point is indicatively located at 7488079.9N 770623.9E, which is approximately 29 km north of Marlborough. This location may change due operational requirements or because of future discussions with DTMR and the LSC and is therefore considered as indicative.

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 110 kph and design speed of 112 kph.

A road safety audit and impact assessment will be undertaken as part of finalising the detailed design and approvals stage for the western mine site access with the Bruce Highway.

An indicative general arrangement of the entry point is at Figure 1-27. Construction design drawings are provided in Appendix 16.

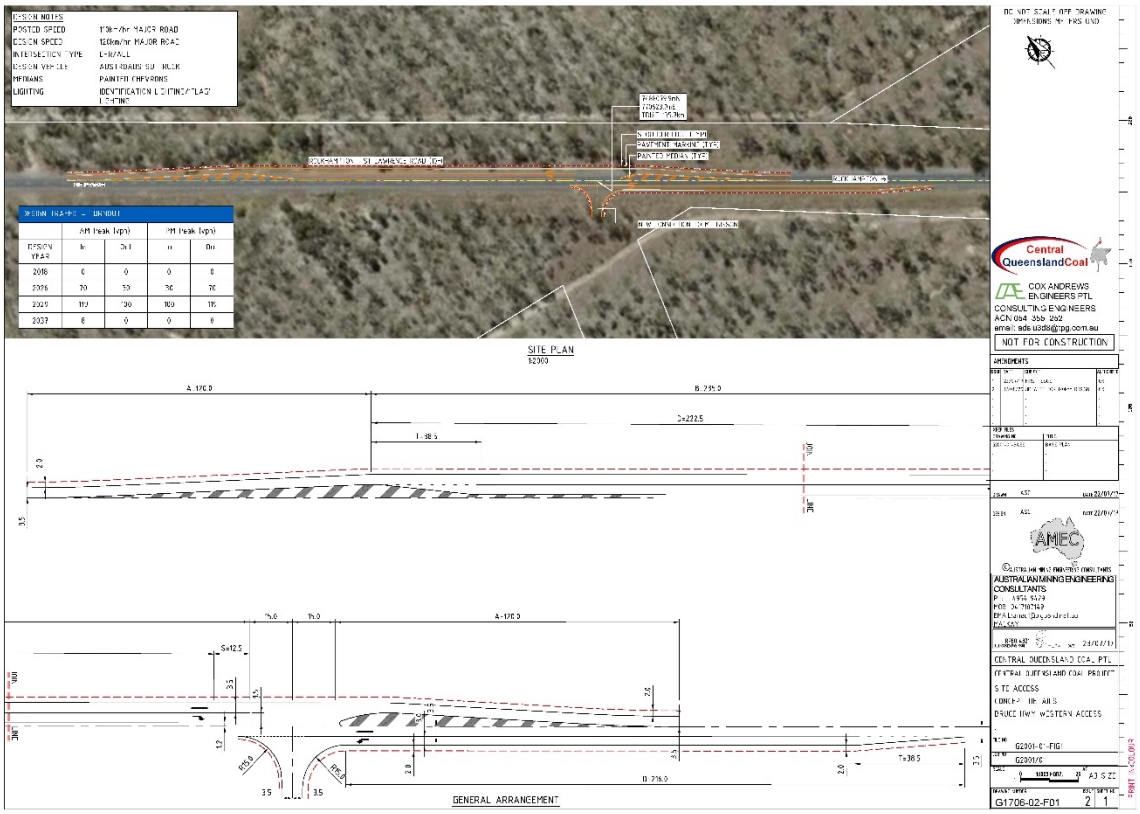


Figure 1-27: Indicative site access concept details Bruce Highway western access

1.9.7.1.2 On-site road infrastructure

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, but some will need to be constructed in year 1 to facilitate essential site access.

Current designs indicate a requirement of approximately 15 km of roads for access around the MIA and CHPP. Road design has been optimised throughout the EIS process to avoid disturbance to environmental values as much as possible. For example, the original access road to the CHPP and MIA 2 proposed in the EIS would have disturbed 0.2 ha of Brigalow TEC. This access road is no longer required due to the new entry point to the infrastructure on the eastern side of the Bruce Highway, as such, the area of Brigalow TEC will no longer be disturbed.

The basic design criteria adopted for the haul road and light vehicle road design process are presented in Table 1-21. Road design and construction will include suitable culverts and overflow structures to allow the free flow of water during the wet season.

Table 1-21: Indicative haul road and light vehicle road design criteria

Design Element	Criteria
Typical Cross Section	
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 for haul road; 4 m for light vehicle road
Traffic lane crossfall	3%
Shoulder width	2 m
Shoulder crossfall	4%
Cut batter slope	2H:1V
Fill batter slope	4H:1V
Horizontal Alignment	
Design vehicle	Truck
Design speed	90 km/h
Minimum curve radius	250 m
Vertical Alignment	
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

Haul Roads

Haul Roads will be constructed between the active pit areas and the associated CHPPs. Product coal will be transported by conveyor from CHPP 1 servicing Open Cut 1 west of the highway, to the product stockpiles at CHPP 2 servicing Open Cut 2 east of the highway (refer Section 1.9.8). The Product Coal from both CHPPs will then be transported by truck from the product stockpiles at CHPP 2 along the haul road to the TLF (see Figure 1-19). This haul road will be approximately 7.03 km long, and 25 m wide, which includes the return haul road loop.

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.

Indicative haul road cross sections are shown at Figure 1-28 (at cut and fill) and Figure 1-29 (at grade).

Light vehicle road cross sections at Figure 1-30 (at cut and fill) and Figure 1-31: (at grade).

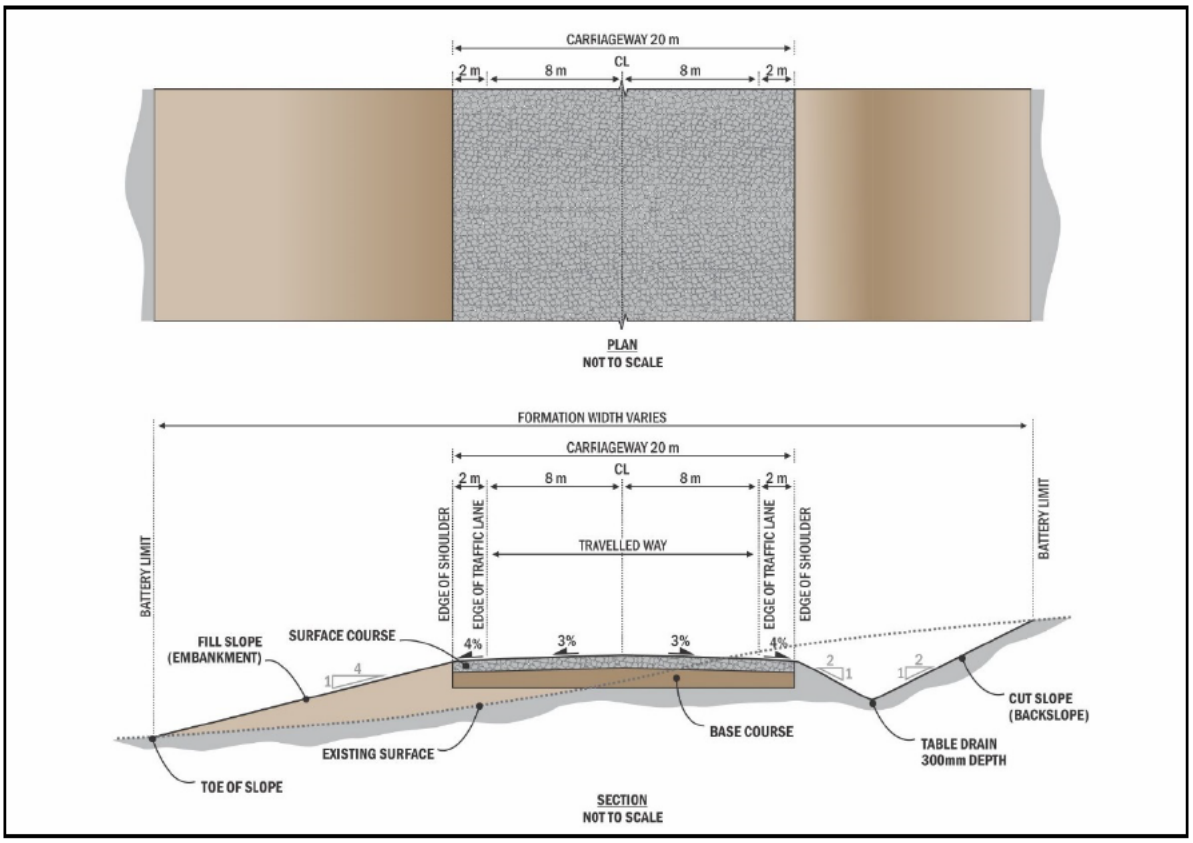


Figure 1-28: Typical haul road layout at cut and fill

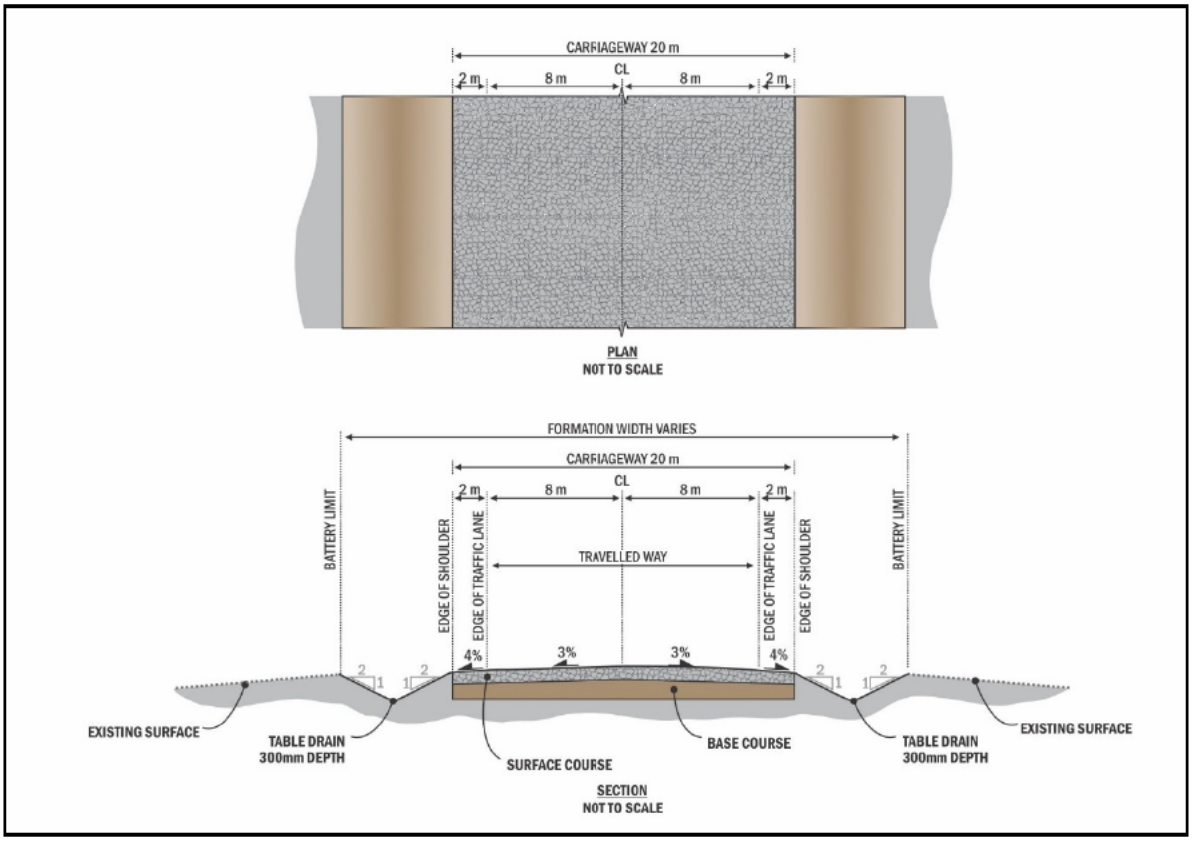


Figure 1-29: Typical haul road layout at grade

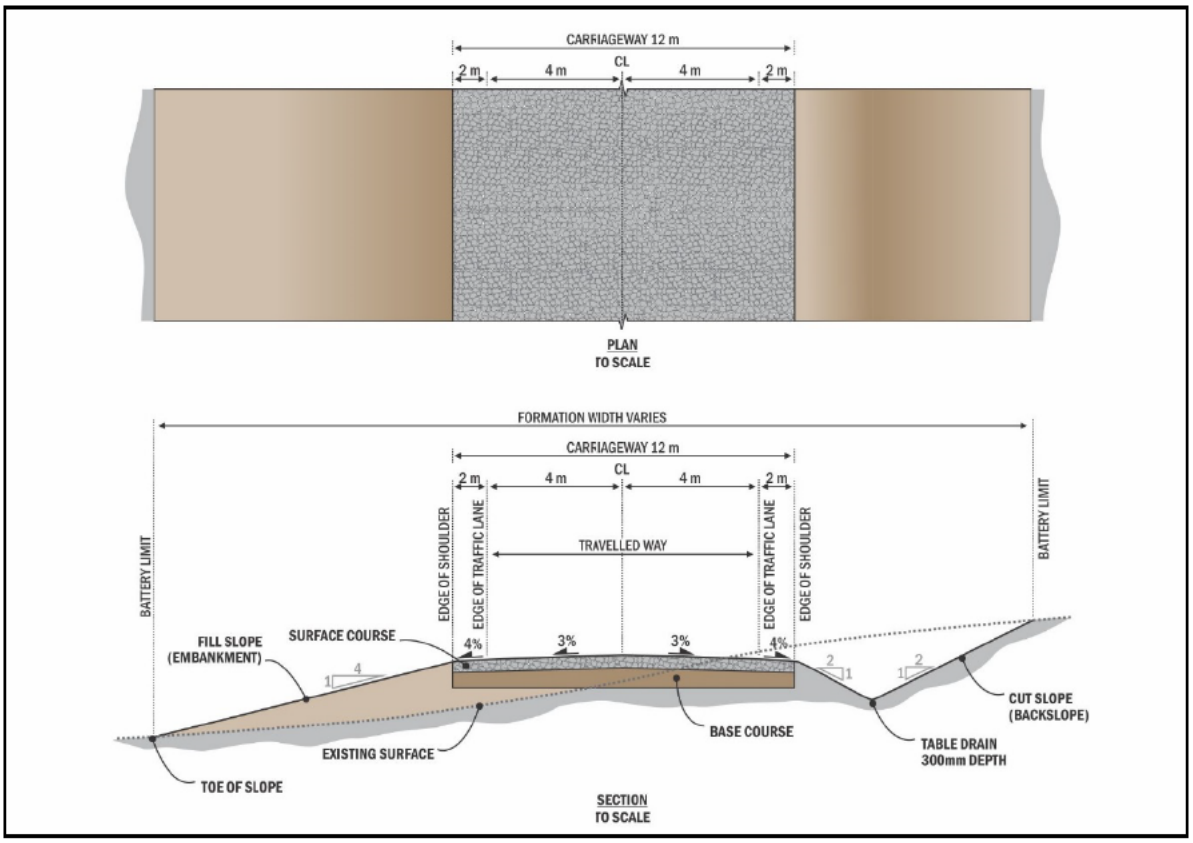


Figure 1-30: Typical light vehicle road layout at cut and fill

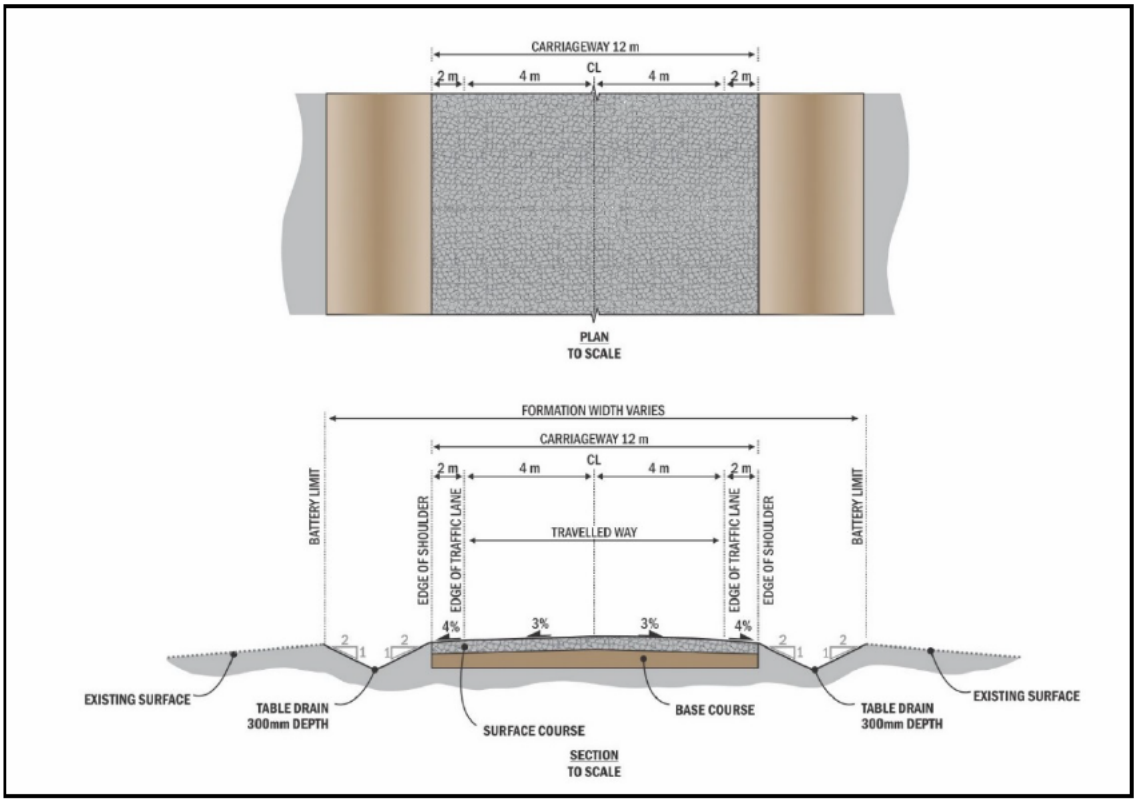


Figure 1-31: Typical light vehicle road layout at grade

1.9.8 Product stockpiles and conveyor from Open Cut 1 to the product coal stockpile East

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.

As the conveyor will not be required until 2030, the design of the culvert and conveyor arrangement has not been finalised. The indicative conveyor culvert general arrangement is, however, shown in Figure 1-32. 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.

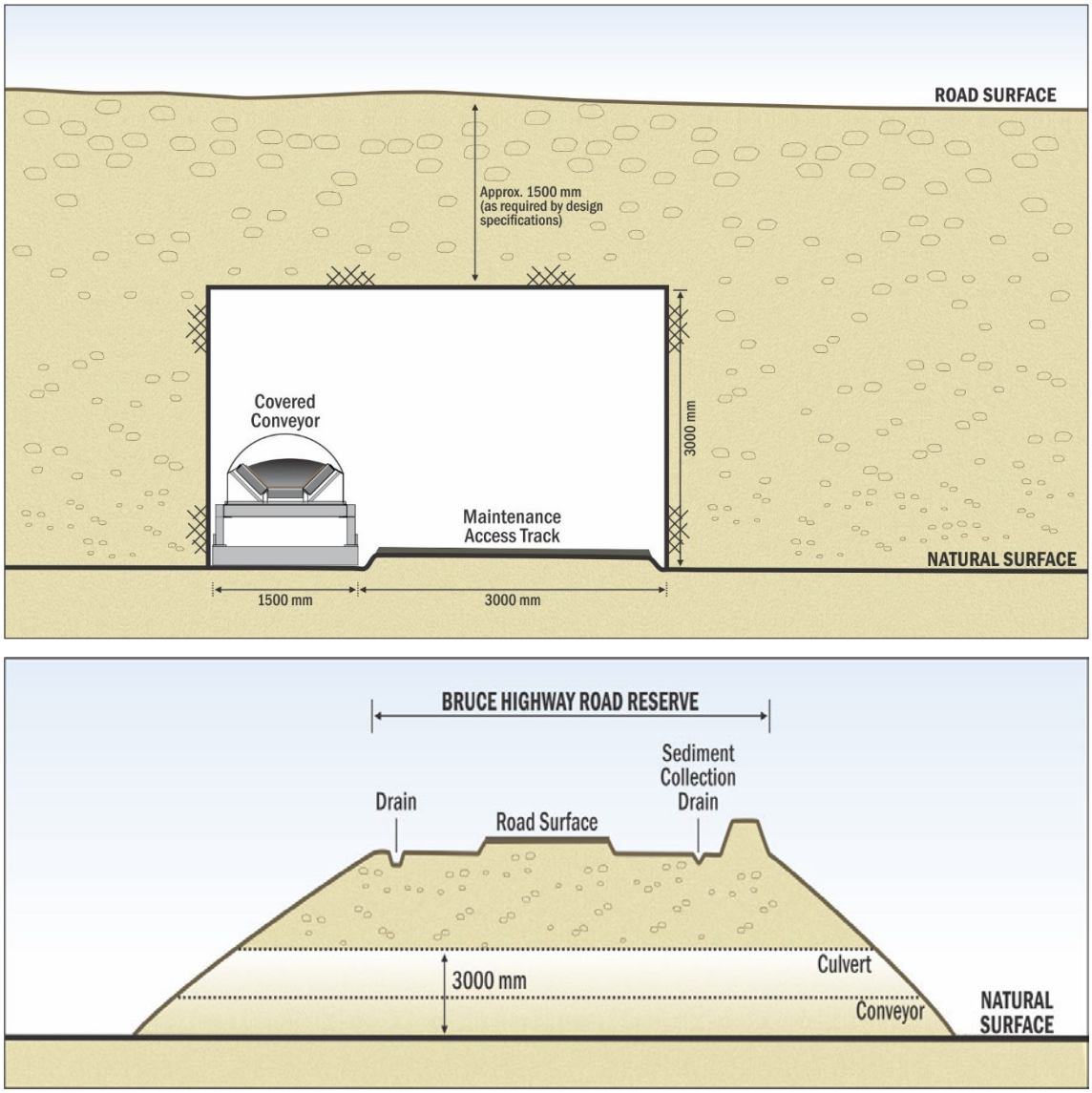


Figure 1-32: New conveyor arrangement under the Bruce Highway (from 2028 onwards)

1.9.9 Train Loadout Facility and Transportation of Product coal

The TLF will be constructed to facilitate the transfer of coal to the DBCT via the Queensland Rail (QR) North Coast Line and then a short section of the Aurizon Goonyella rail corridor.

Product coal will be loaded on to trucks at the product coal stockpiles and transported along the haul road to the TLF.

The TLF will comprise a product coal stockpile, train loading infrastructure, veneering station, rail loop and rail spur. The loop and spur are approximately 4.4 km in length,

Product coal will be loaded from the TLF product coal stockpile onto a single reclaim tunnel conveyor via bulldozer and coal valve operation discharging coal. 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 plan and longitudinal section is shown in Figure 1-33 and the general layout of the TLF is at Figure 1-34. The full TLF construction design drawings are provided in Appendix A16.

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.

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.

It is envisaged trains will be two diesel engine trains (double headers), initially hauling 66 coal wagons with a load limit of 20 tonne per axle, to be expanded to longer trains as permitted by QR. Initial train length is likely to be increased from the current length limit of 700m to approximately 1,000 metres and then to a 'Goonyella length' train of 2082m. At project output of 2Mtpa ROM on average eight trains per week (1,000m) will be required, although it is likely that these will occur mostly during a few days' cycle, followed by several days of no train movements to suit the allocation of ships at the port load-out. Trains will operate during day time and night. A production output of 4Mtpa will require between 15 and 16 1,000m long trains per week, however, for the 10Mtpa output which has a 5% confidence level of occurring in year 12, 21 'Goonyella length' trains will be required each week.

Table 1-22: Estimated train lengths and movements at various production levels

Production rate (ROM)	Train length		
	700m	1,000m	2,082m
2 Mtpa	12	7-8	4
4 Mtpa	24	15-16	8
10 Mtpa[1]	-	-	21

[1] Note that this would only occur for one year.

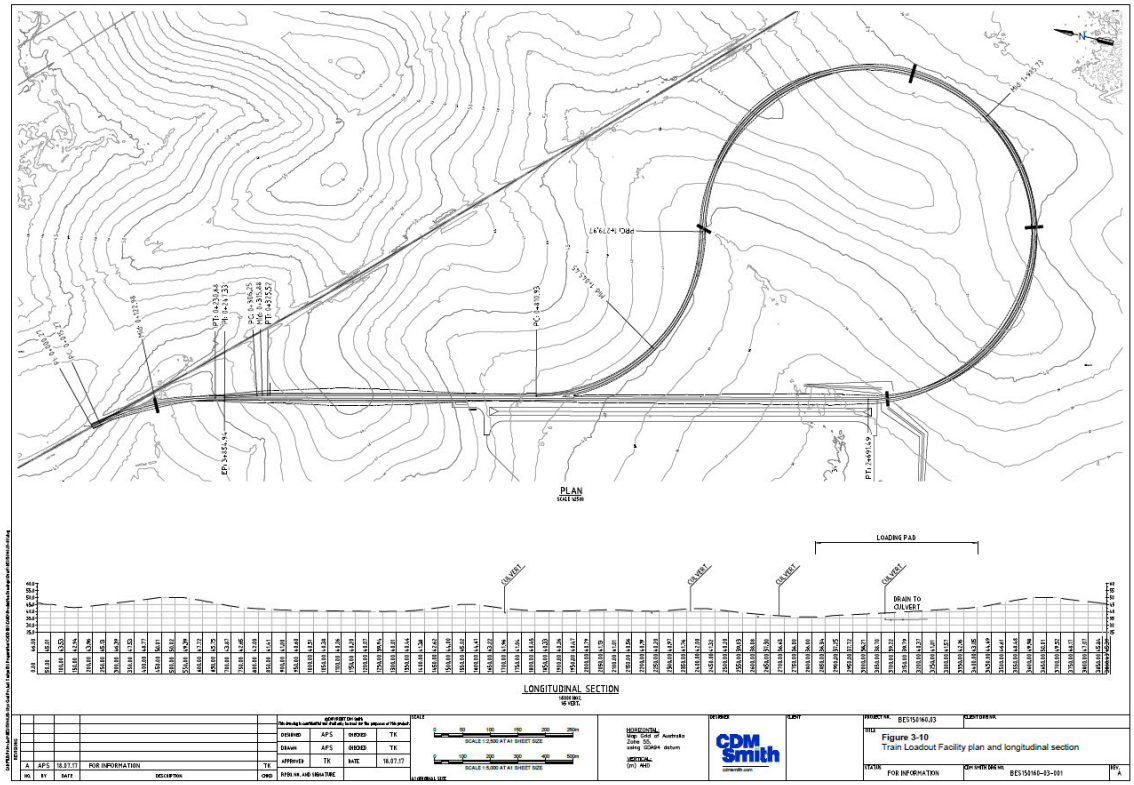


Figure 1-33: Train Loadout Facility plan and longitudinal section

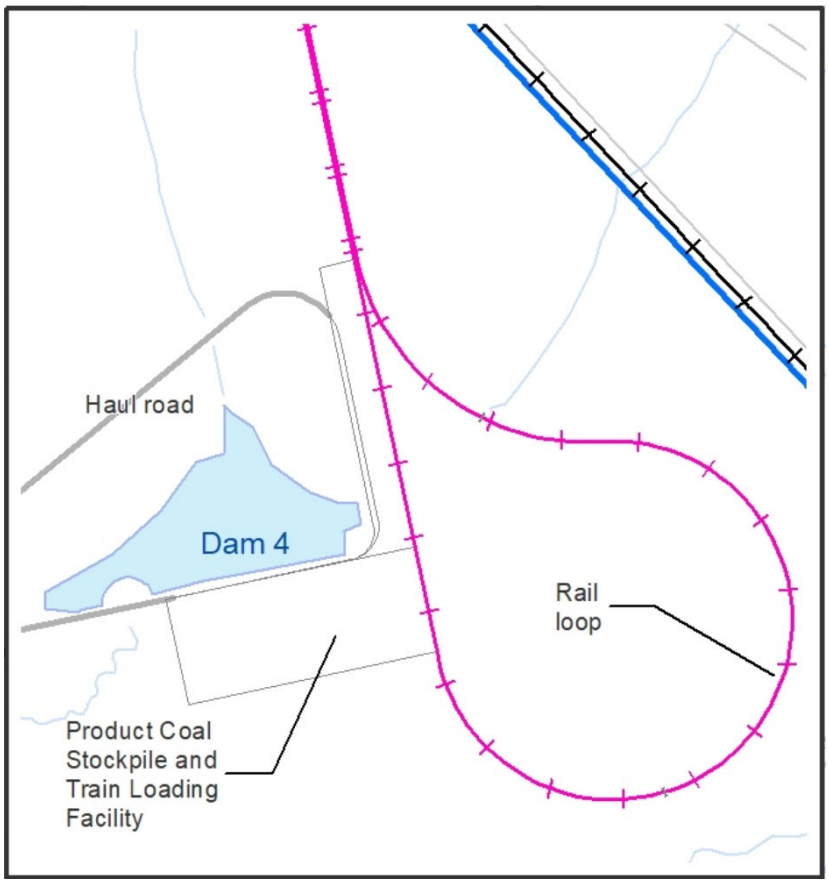


Figure 1-34: TLF General Layout

1.9.10 Ancillary Areas

1.9.10.1 Waste management facilities

Waste will be generated throughout the construction, operation and decommissioning phases of the Project. There will be no onsite disposal of waste.

For general and recyclable waste, it is estimated that a total volume of 151 tonnes per annum of solid waste will require offsite disposal and 127 tonnes per annum of solid waste can be recycled during the construction period. Annually during the operational period 383 tonnes of solid waste will require disposal and 317 tonnes of solid waste can be recycled. This will be removed from site by a licensed contractor and CQC will work with the contractor to adopt sustainable reuse and the reprocessing of marketed recyclable wastes. The closest local municipal landfill is located at Rockhampton. The RRC has confirmed the current annual and long-term capacities of the landfill can receive general waste for the duration of operations.

Regulated wastes produced include sewage sludge, oils and chemical waste which will also be stored in designated areas and segregated in clearly labelled containers. Regulated wastes will be removed by the licensed contractor and oils recycled using the Gladstone lube oil recycling plant.

1.9.10.2 Sewerage

At the commencement of construction temporary shower and toilet facilities will be installed at the mine site with waste taken off-site for disposal at licenced sites. During operations, all sewage and septic waste will be removed by licenced contractors to suitable licenced facilities (in the Rockhampton region) for treatment. Consequently, there is no requirement to irrigate effluent water and CQC will not be seeking approval for an irrigation area as part of the EIS process.

1.9.10.3 Hazard goods storage facilities

All hazardous goods will be stored in a signed area on concrete bunded pads in accordance with AS 1940. The concrete pad will have a sump with an oily water separator. Areas where hazardous goods are stored will be monitored frequently to ensure spillages and incidents are accurately observed, cleaned up and recorded. Storage areas will be roofed to prevent flooding of the bunded areas to ensure land and / or surface and groundwater contamination, does not occur.

All containers which hold dangerous or hazardous goods will be appropriately labelled and SDS' made available for all substances in accordance with the National Guidelines for Occupational Health and Safety Competency. In addition, all safety processes and storage and handling procedures will be compliant with AS/NZS1940-2004: The Storage and Handling of Flammable and Combustible Liquids.

The hazardous substances that are anticipated to be handled, stored and used during the various phases of the Project are discussed in Chapter 21 – Hazard and Risk.

1.9.11 Telecommunications

1.9.11.1 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 the 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.

1.9.11.2 Radio Communications

A digital trunked radio communication system (based on Terrestrial Trunked Radio [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, with a small back-up generator. 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.

1.9.11.3 Fixed Voice Communications

Fixed phones using Internet Protocol (IP) telephony will be connected to the LAN for integration with the satellite and radio system.

1.9.12 Lighting

Artificial lighting will be designed, installed, operated and maintained in accordance with AS 4282 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.

1.9.13 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. Fencing will be installed where required and will be designed to be fauna friendly in sensitive areas (see Chapter 14 – Terrestrial Ecology).

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 Safety and Health Management System. The site security system will be routinely reviewed to ensure procedures remain current and continue to achieve security objectives.

1.9.14 Power distribution lines and substation

Power to the site will be supplied via a combination of a new 22 kilovolt (kV) power line supplying 63 kilovolt amperes (kVA) 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 1-19) where CQC 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, CQC 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, 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.

CQC 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, CQC will work with Powerlink and Ergon to find alternative routes to the easements. CQC 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, CQC will work with Powerlink and Ergon to address any potential risks.

1.9.15 Project Program

1.9.15.1 Construction

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 2021 and will continue into 2022. Open Cut 1 construction will commence development at approximately 2029 and will continue into 2031.

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 SEIS, Year one is now set as 2021. This schedule incorporates the receipt of the ML and EA for the Project and an expedited construction period commencing in the second half of 2021.

The timing for the Project development is shown at Figure 1-35.

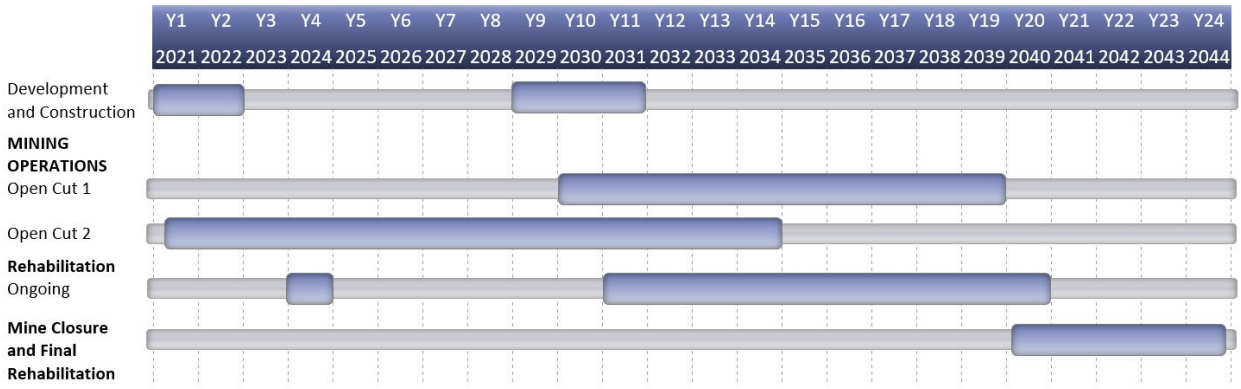


Figure 1-35: Indicative Project development schedule

1.9.15.2 Operations Sequencing

The mining schedule is based on the development of two open cut operations producing up to 10 Mtpa of ROM coal. 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 2021 and 2039, which comprises 19 years of mining (2021 – 2039) and six years (2039 – 2044) to

finalise the rehabilitation program (2039 involves minimal mining and mostly rehabilitation and closure works).

Mine sequencing within Open Cut 1 and Open Cut 2 has changed from the sequencing described in the EIS and SEIS v1. Mining of Open Cut 2 will commence at the western edge of the pit with mining operations then progressing towards the east. Mining of Open Cut 1 will commence in the southern end of the pit and progress generally in a northerly direction.

Open Cut 2 will commence development in 2021 and is anticipated to operate until 2034. Open Cut 1 is anticipated to commence development in 2029 and continue operations until 2039.

Mining operations will be up to seven days a week and 24 hours per day.

The proposed open cut mine layouts and updated sequencing of each open cut are shown in Figure 1-36, with the mined coal and waste volumes by year shown in Table 1-23. The dump schedule for both open cuts is detailed in Chapter 8 – Waste Rock and Rejects.

Whilst the initial mining approach is based around truck and shovel operations, CQC 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 2021. First shipment of product coal is scheduled in the Q1 2022. 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. Rehabilitation works will be undertaken throughout the mine life and for approximately 6 years after mine closure (to year 24, 2044) commencing with the trial rehabilitation area in years 3 and 4.

The mine layout and rehabilitation schedule for years 4, 6, 12 18 and for the final (fully rehabilitated) landform is shown in Figure 1-37 to Figure 1-41.

Table 1-23: Mining and waste volume schedule

Project Period	ROM (Mt)	SSCC		HGTC		Total Product Coal (Mt)	Waste Volume (Mbcm)	Reject Volume (Mlcm)
		Yield (%)	Product Coal (Mt)	Yield (%)	Product Coal (Mt)			
Year 1	1.0	78%	0.8	-		0.8	17.8	0.16
Year 2	2.0	78%	1.6	-		1.6	22.0	0.32
Year 3	2.0	79%	1.6	-		1.6	21.6	0.30
Year 4	2.0	78%	1.6	-		1.6	23.2	0.31
Year 5	4.0	77%	3.1	-		3.1	45.2	0.65
Year 6	4.0	77%	3.1	-		3.1	40.9	0.65
Year 7	4.0	77%	3.1	-		3.1	49.1	0.65
Year 8	4.0	77%	3.1	-		3.1	51.2	0.66
Year 9	4.0	78%	3.1	-		3.1	51.1	0.62
Year 10	4.0	79%	3.2	-		3.2	54.3	0.59
Year 11	7.0	79%	4.7	100.0%	1.0	5.7	86.6	0.92
Year 12	10.0	76%	4.6	100.0%	4.0	8.6	108.5	1.01

Project Period	ROM (Mt)	SSCC		HGTC		Total Product Coal (Mt)	Waste Volume (Mbcm)	Reject Volume (Mlcm)
		Yield (%)	Product Coal (Mt)	Yield (%)	Product Coal (Mt)			
Year 13	4.0	79%	3.2	-		3.2	48.6	0.59
Year 14	4.0	79%	3.1	-		3.1	42.8	0.62
Year 15	2.0	77%	1.5	-		1.5	13.5	0.33
Year 16	2.0	77%	1.5	-		1.5	24.5	0.32
Year 17	2.0	78%	1.6	-		1.6	19.1	0.31
Year 18	2.0	79%	1.6	-		1.6	21.7	0.31
Year 19	0.1	76%	0.1	-		0.1	0.8	0.02
Total	64		46		5	51	742	9.3

Table notes:

* Mbcm = Million bank cubic metres, the volume as excavated; Mlcm = Million loose cubic metres, material that has been disturbed and has swelled as a result, with a swell factor of approximately 20%

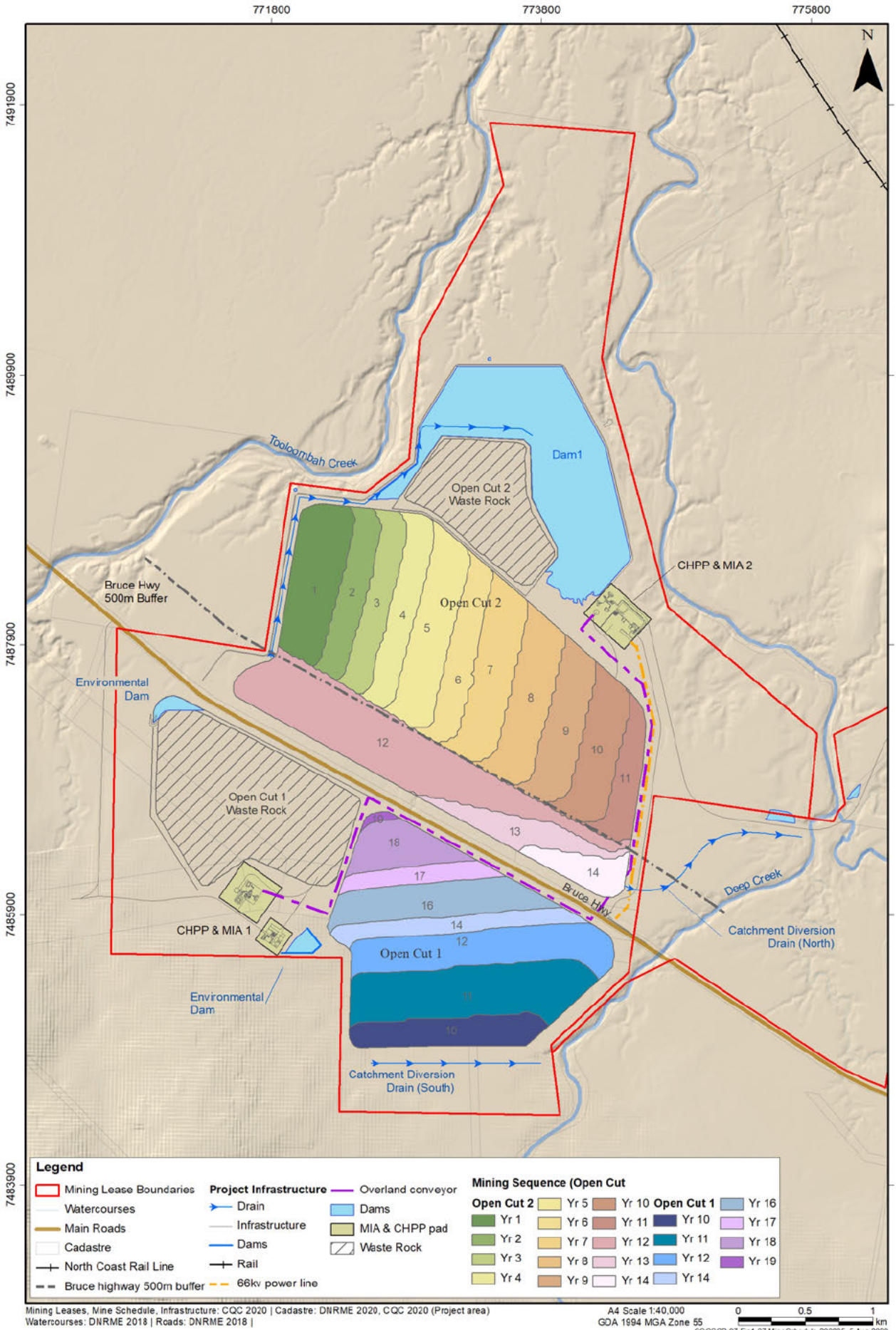


Figure 1-36: Mining Schedule

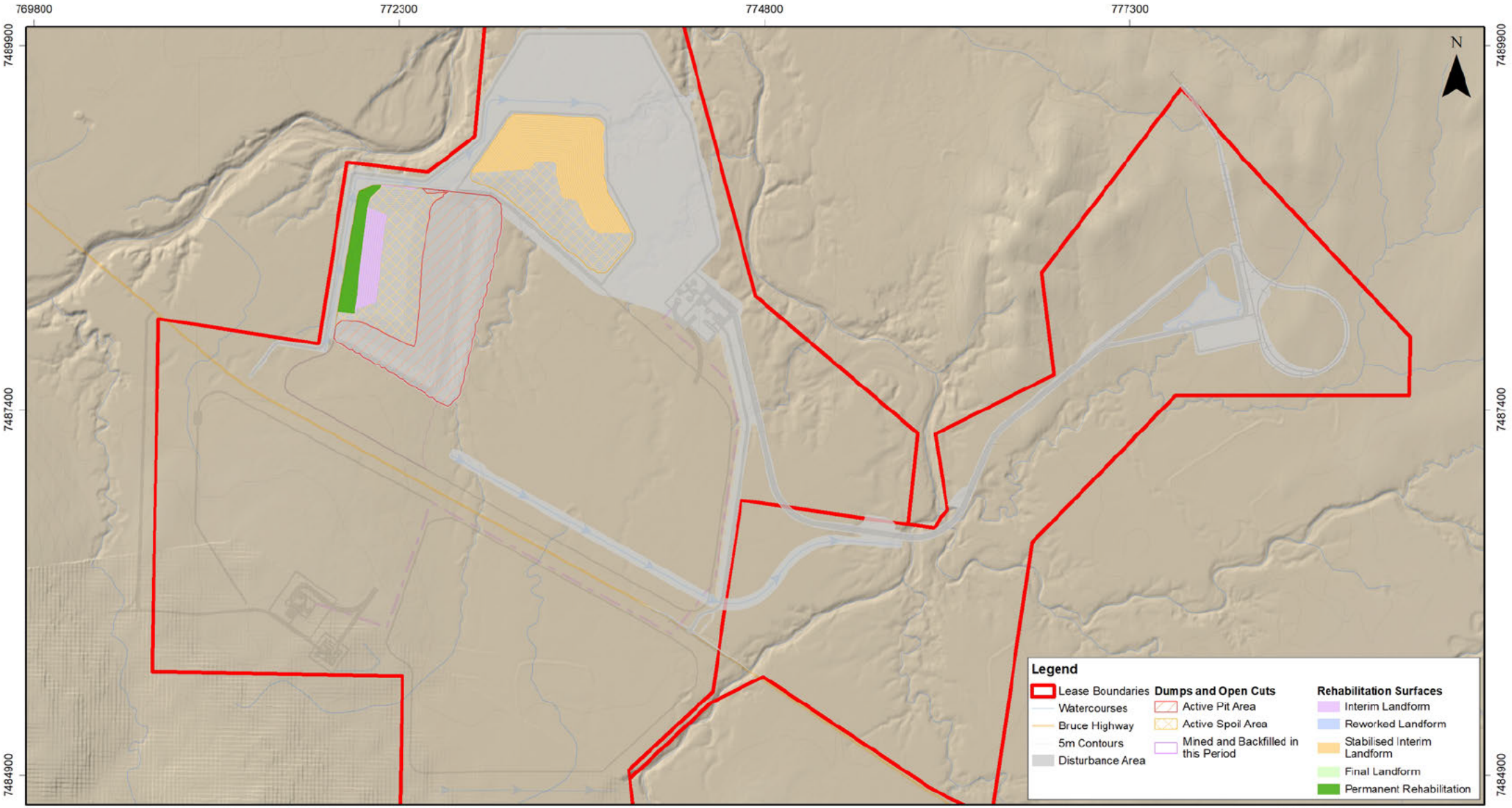


Figure 1-37: Progressive rehabilitation Project Year 4 (2024)

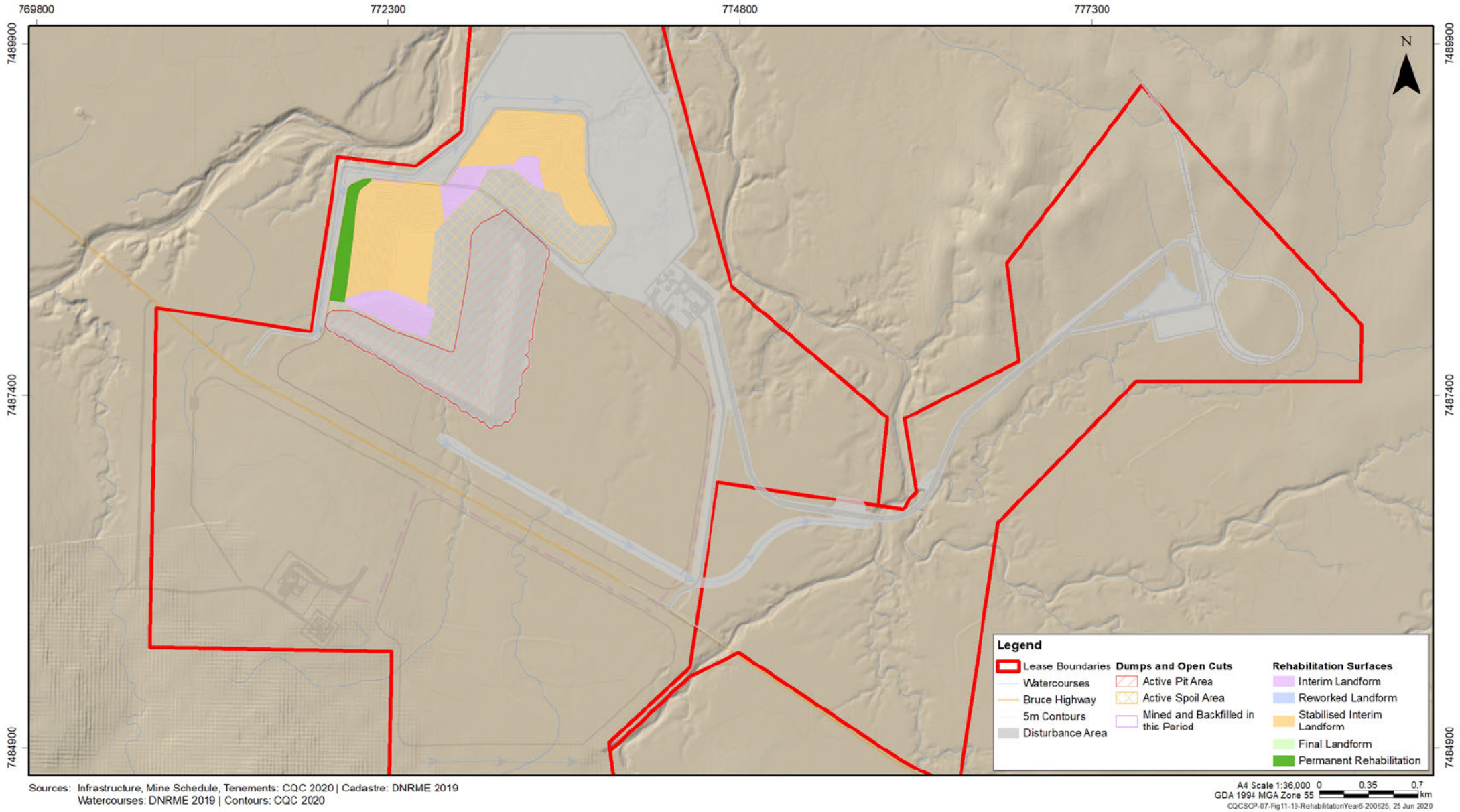


Figure 1-38: Progressive rehabilitation Project Year 6 (2026)

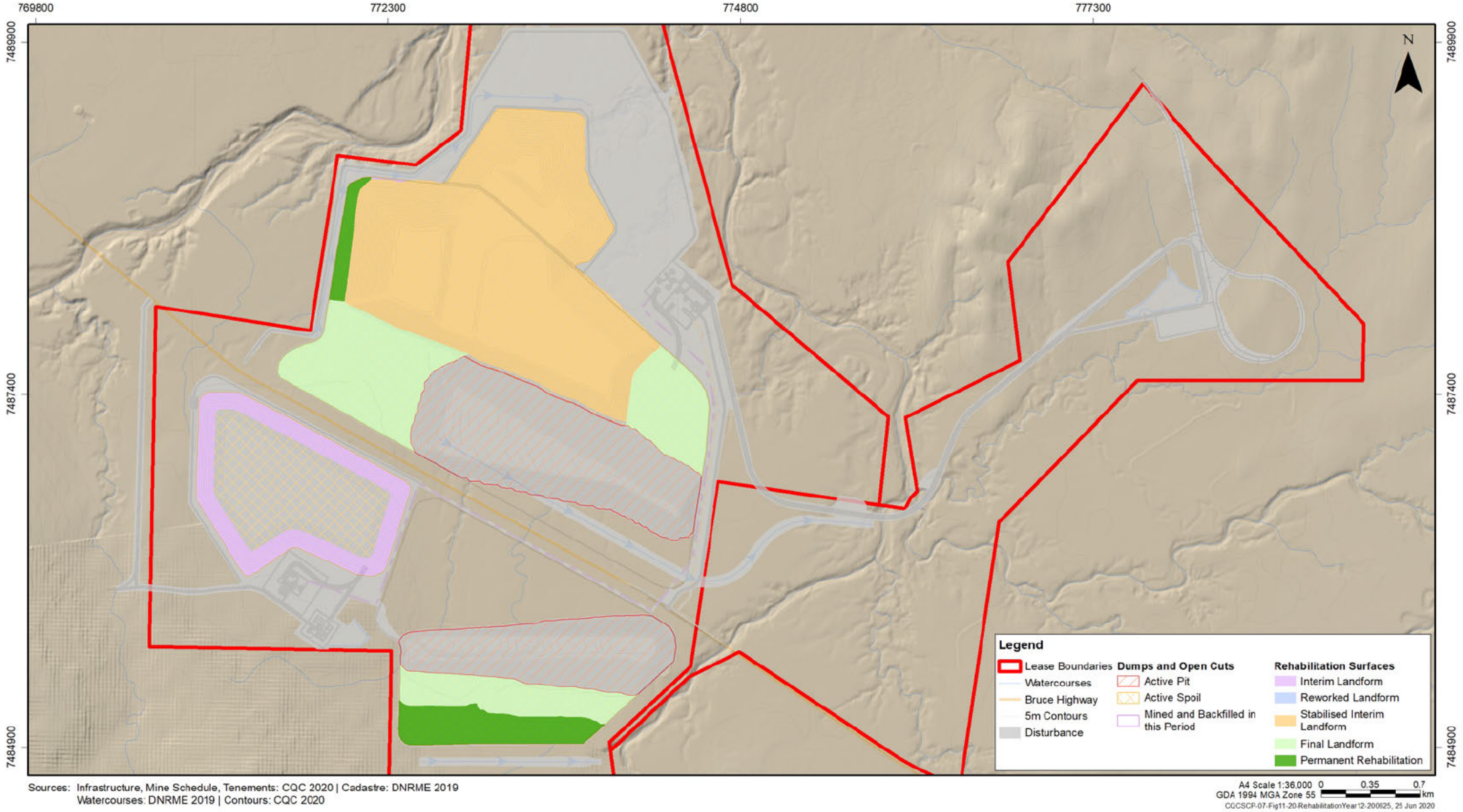
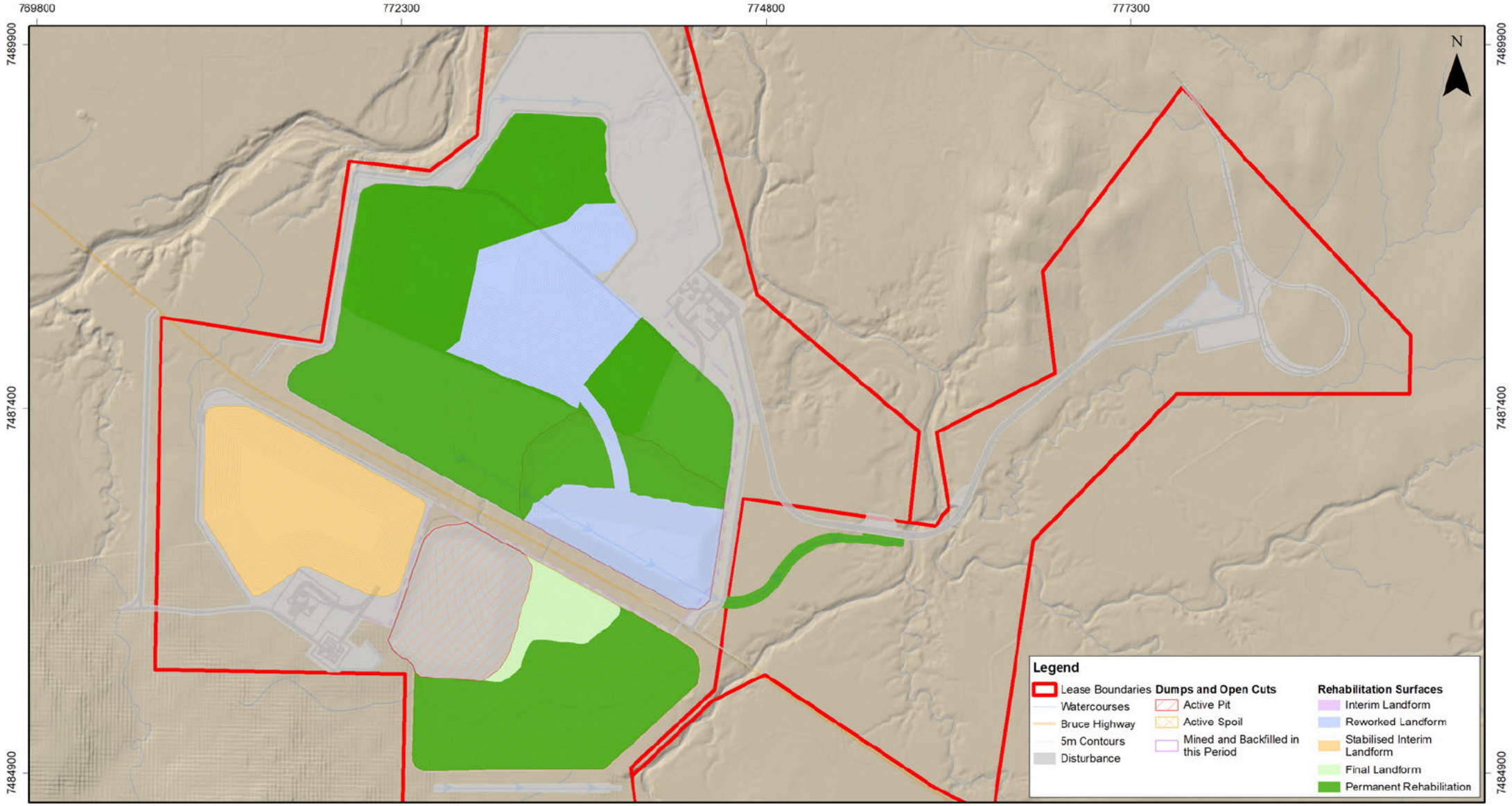


Figure 1-39: Progressive rehabilitation Project Year 12 (2032)



Sources: Infrastructure, Mine Schedule, Tenements: CQC 2020 | Cadastre: DNRME 2019
Watercourses: DNRME 2019 | Contours: CQC 2020

Figure 1-40: Progressive rehabilitation Project Year 18 (2038)

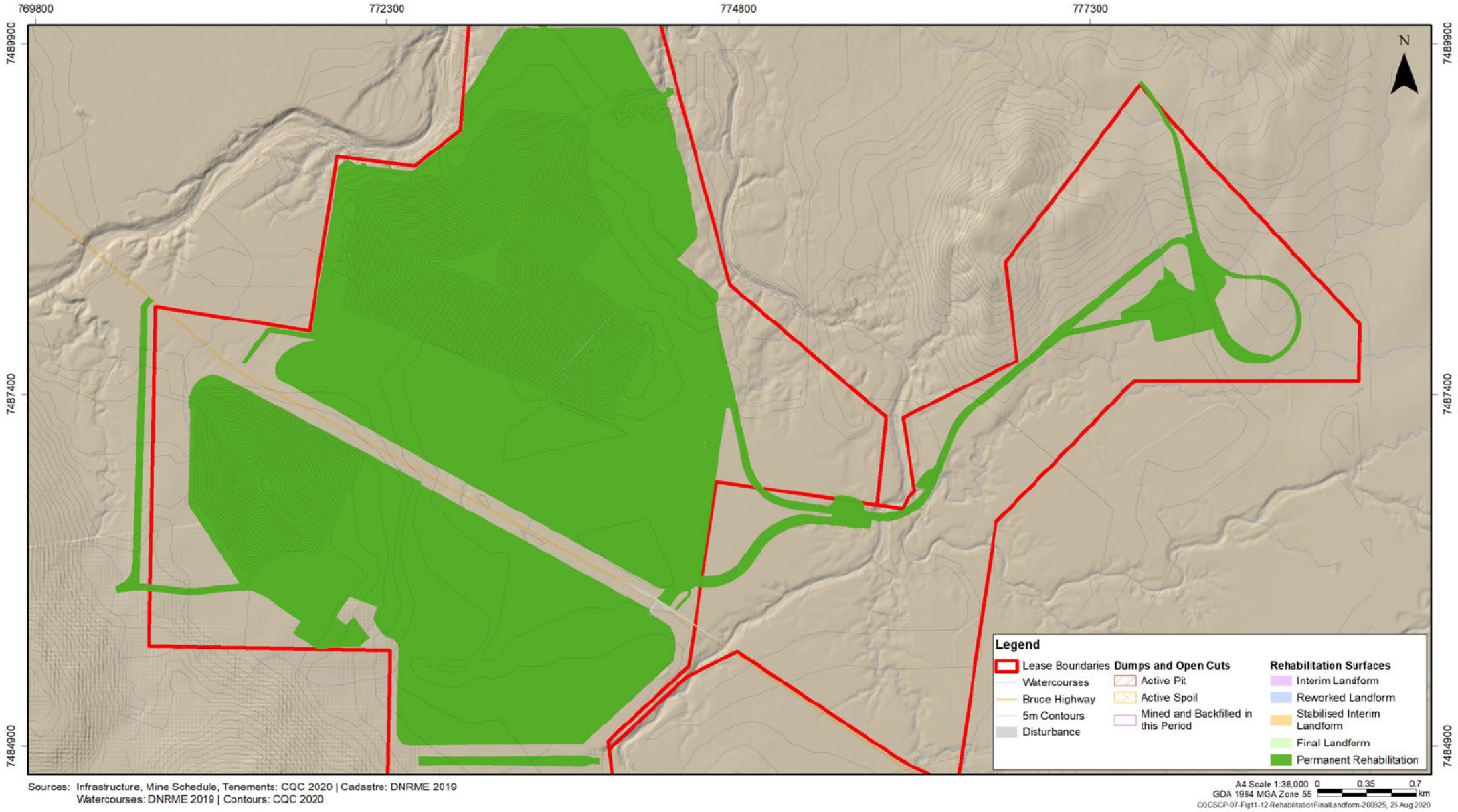


Figure 1-41: Progressive rehabilitation (final landform at 2044)

1.9.15.3 Rehabilitation

Progressive rehabilitation is proposed to be carried out as operations progress rather than taking place as a large operation once mining is complete, which assists with the rate of rehabilitation. This will involve early rehabilitation (from year 3, 2023) to provide trials of the proposed rehabilitations methods for the final landforms, stabilised landforms such as waste stockpile areas that are inactive until reshaping works in the last quarter of the mine life. Large scale rehabilitation will continue from 2031, based on these earlier rehabilitation works and trials, and will continue up until final closure (2044). Final rehabilitation of the MIAs, haul road and TLF will take place once mining operations and associated rehabilitation activities are completed and plant and structures have been decommissioned.

1.9.16 Site Preparation Activities

The initial site clearance works will occur in 2021 and will be focused on the infrastructure required to support Open Cut 2, including 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 2029 continuing into 2031 (see schedule at Figure 1-35).

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 (ESCs)
- 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 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.

1.9.16.1 Vegetation clearing and soil stockpiling

The initial site clearance works will occur in 2021 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 2029 continuing into 2031 (see schedule at Figure 1-35).

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. Work areas will be cleared and grubbed with vegetation mulched for reuse on site as part of rehabilitation works, topsoil stockpile protection and similar works. 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 separately stockpiled in a manner in line with industry best practice to prevent the deterioration of soil quality (refer to Chapter 5 – Land and Chapter 11 – Rehabilitation and Decommissioning). 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 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.

1.9.16.2 Establishment of Power Distribution Network

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.

1.9.16.3 Access and Security

Site access and security during site preparation activities will be as described in Section 1.9.13.

1.9.16.4 Environmental Protection Measures

The environmental management measures contained within the Environmental Management Plan (see Appendix 12) will be put in place during any site preparation activities. These will include such measures as flagging of sensitive vegetation outside of clearance areas to prevent accidental damage; provision of temporary washdown facilities (in place until the washdown facilities to be located at the MIA can be established) and ESC measures.

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.

1.9.16.5 Construction Management Office Area

The construction management office area will be located near 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 (water will be trucked to the site until a WTP is installed) and
- temporary wastewater storage, until permanent facilities are installed (effluent will be trucked from site by a licensed contractor to a licensed offsite waste disposal facility).

1.9.17 Construction

The main infrastructure to be constructed for the Project are:

- two open cut pits (Open Cut 1 and Open Cut 2)
- two waste rock stockpiles (1 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, an overhead TLF, rail loop and rail spur.

1.9.17.1 Civil Works, Dams, Roads and TLF

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 2029. 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.

1.9.17.2 Drainage and Conveyor Culvert

Installation of permanent drainage will be undertaken to accommodate drainage requirements for both the construction and operational phase where possible. This includes a number of Environmental Dams, such as dams ED 2D1, ED 2D2 and Dam 4 which capture the stormwater from the haul road and TLF. Where permanent drainage for the operational phase cannot be installed, temporary drainage for the construction period will be designed to the relevant standards.

1.9.17.3 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.

1.9.17.4 Two open cut pits (Open Cut 1 and Open Cut 2)

The initial box cut will be developed utilising a ramp formed in the low wall of each of the two pits using typical civil earthworks methods. The open cuts are then progressively developed as described in Section 1.9.18 – Operations.

Infrastructure construction to commence in conjunction with mining the Box Cut for Open Cut 2. All work areas (including footprints of the advancing mining operations and waste rock stockpiles) will be cleared and grubbed with vegetation mulched for reuse on site as part of rehabilitation works, topsoil stockpile protection and similar activities. Topsoil (and other suitable soil materials) will be stripped and separately stockpiled for future use on mine rehabilitation. Primary sediment controls such as dams and drainage diversions will also be constructed in this phase.

1.9.17.5 Two waste rock stockpiles (1 and 2)

Waste rock stockpiles are developed progressively as described in Section 1.9.4.

1.9.17.6 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.

1.9.17.7 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 WTP. All potable water will be procured, transported, treated, monitored and stored in compliance with the Australian Drinking Water Guideline 2011 (NHMRC and NRMMC 2011).

1.9.17.8 Construction Materials, Plant and Equipment

Quarry materials for the construction of the access road and haul road base material will be sourced from existing commercial quarries or from competent materials located within the MLs for use as road base, select fill, rail ballast, rock protection, sealing aggregates and other construction materials. Once access to site is established, materials will be sourced from a combination of on-lease deposits where possible and licensed offsite quarries.

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

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. Neither is it anticipated that any State-owned quarry material administered under the *Forestry Act 1959* will be required by the Project. However, should this be the case that CQC will negotiate suitable arrangements with the Department of Agriculture and Fisheries and other affected parties before any work commences. Any approvals that are required pursuant to the requirements of the *Forestry Act 1959* would be sought outside of this EIS process.

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 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 in 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 1-24. Construction equipment will, where practicable, be serviced and maintained at the site workshop.

Table 1-24: Indicative construction equipment

Equipment	Quantity
CAT 631G Scraper	2
785D Haul Truck (Hitachi EH3500 AC3 as alternative)	4
789D Haul Truck (Hitachi EH3500 AC3 as alternative)	4
793D Haul Truck (Hitachi EH4000 AC3 as alternative)	5
RH170 Excavator	1
Liebherr 996 Excavator	1
EX1200 Excavator	1
D9 Dozer	1
D10 Dozer	1
D11 Dozer	1
HD605 Water Cart	1
16 Grader	1
992 Front End Loader	1
960 Front End Loader	1
980 Front End Loader	1
Volvo Semi-Tippers	8
Service Truck	1
Pump Truck	1
Fuel Truck	1
Franna Crane	1
Generator (1MW)	1
UDR800 Drill	1

1.9.17.9 Construction Site Management and Security

1.9.17.9.1 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 CQC and will be present on the site during the construction phase.

1.9.17.9.2 Emergency Response

An Emergency Response Plan (ERP) will be implemented at the site as part of the overall Safety and Health Management System 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.

1.9.17.9.3 Access and Security

Site access and security during construction will be as described in Section 1.9.13.

1.9.18 Operations

1.9.18.1 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 top and subsoil stockpiles or placed directly to form 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 1-19) for the initial strips and then in-pit for the remaining strips.

The coal bearing strata are known as the Styx Coal Measures and consist 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.

Hard rock material will be preferentially placed on the outer slopes of waste rock stockpiles to provide stabilisation where final landforms are unable to initially be formed, before final landforming and rehabilitation takes place.

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 2 will be undertaken from 2021 to 2023, with minor infill anticipated in 2026 – 2029, to an indicative maximum height of 105 m (RL 135 m). The ex-pit dumping for Open Cut 1 occurs in 2030 to 2032, and in 2035, to an indicative maximum height of approximately 90 m (Reduced Level (RL) 125 m).

Raw coal from the open cut operations will be transferred by truck to one of two 100,000 t capacity ROM pads (refer to Section 1.9.3). Overburden and Interburden waste rock will be transported to the Waste Rock Stockpiles (refer to Section 1.9.4).

1.9.18.1.1 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 Friday 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 will average approximately 18,400 tonnes per year.

Following discussions with DTMR since the release of the EIS and SEIS v1, CQC agreed to avoid undertaking blasting activities that will require any closure of the Bruce Highway. As such, CQC is not proposing any Project related activity that will require the closure of the Bruce Highway. CQC 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. No mining is proposed within 500m of the Bruce Highway until year 12 (2032).

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.

1.9.18.2 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 1-25 will be required to support open cut mining throughout the duration of the Project.

Table 1-25: Mining equipment schedule

Equipment	Quantity	
	Year 3 (Stage 1)	Year 12 (Stage 2)
CAT 631G Scraper	1	1
785D Haul Truck (Hitachi EH3500 AC3 as alternative)		
789D Haul Truck (Hitachi EH3500 AC3 as alternative)	4	8
793D Haul Truck (Hitachi EH4000 AC3 as alternative)	8	36
RH170 Excavator	1	2
Liebherr 996 Excavator	2	9
SKS 270mm Drill	1	4
MD5150C Track Drill	1	3
D9 Dozer	1	4
D10 Dozer	2	5
D11 Dozer	2	4
HD605 Water Cart	2	4
16M Grader	2	2
24H Grader	1	2
B-Double Coal Haulage Units	2	8
992 Front End Loader	3	6
Service Truck	1	2
Pump Truck	1	2
Fuel Truck	1	3
Franna Crane	1	2
Service vehicles	10	19
Generator (520kVA)	3	3
Generator (300kVA)	3	3

1.9.18.3 Coal Handling

The coal handling system during operations consists of a ROM coal system, a product coal system and a rejects waste system, as described above in Section 1.9.3.

1.9.18.4 Waste Rock and Reject Disposal

The method of disposal of waste rock and rejects during operations is described above in Section 1.9.4.

1.9.18.5 Water Management

The mine Water Management System is described above in Section 1.9.5.

1.9.19 Rehabilitation and Decommissioning

1.9.19.1 Overview

The Project is proposed to operate for 18 years (and a small portion in year 19), and is expected to commence final decommissioning in year 19 (2039) and be completed at year 24 (2044). Progressive rehabilitation is proposed to be carried out as operations progress, opposed to a large operation once mining is complete, to minimise the amount of land disturbed at any one time. Thus, staged treatments will be applied as soon as areas become available.

As part of this SEIS v3, additional detailed mine scheduling, rehabilitation planning and final landform assessment and design work has been undertaken, in particular development of final landforms to support a post mining low intensity cattle grazing landuse. Previously, final elevated landforms were located within the floodplain in both the north and south final landform areas, however with the re-design, the southern final elevated landform was moved out of the floodplain and the northern area adjusted to minimise floodplain coverage, improving post closure landform stability and reducing flood impacts.

The decommissioning and rehabilitation objectives, indicators and completion criteria have been updated to better support the proposed post mining low intensity grazing landuse. This has been based on the revised landform design, updated rehabilitation scheduling and works on geochemistry, soils, and the updated rehabilitation strategy. Flood modelling was revised for the Project, and an assessment of post mining flood impacts undertaken (see Chapter 9 – Surface Water), with the post closure drainage over the site specified, subject to detailed design. Post closure, it is proposed to remove all catchment diversion drains and dams, fill all voids, flatten slopes to a maximum 7 degree overall grade and rehabilitate and stabilise all previously disturbed areas to achieve a post mining land use that is stable, vegetated and self-sustaining and supports the intended final land use. Rehabilitation works on drainage lines and creeks will maintain fish passage opportunities.

Rehabilitation will occur progressively throughout the life of the Project, including the development of trial rehabilitation areas early in the mine life to ensure long term rehabilitation activities will be successful. This will occur from year 3 (2023), when approximately 8.5 ha of final landform which will involve confirmation of the proposed soil treatment and rehabilitation methods over flat and sloped terrain. These methods will be refined so that bulk rehabilitation works utilise tried and proved methods for the site.

The final landform stability assessment conducted as part of this new body of work has identified the detailed assessment and design work to be undertaken prior to mining commencing which CQC has committed to, including development of a geo-environmental block model and detailed landform haulage schedule. It provides a detailed assessment and pathway for forward works to ensure that final landforms are low maintenance and geotechnically stable commensurate with the agreed final land use. Overall, the work undertaken to support the rehabilitation strategy indicates that there should be no impediment to achieving a final landform that is safe, stable, and non-polluting.

It should be noted that a PRCP was not required as part of the Project ToR, however, in light of the recent commencement of the new financial provisions and rehabilitation requirements, this SEIS (v3) includes information which is typically required for inclusion within a PRCP. The rehabilitation strategy will be finalised and a final PRCP completed and approved through the PRCP process prior to the commencement of mining operations. Specific rehabilitation and decommissioning measures to avoid or minimise any impacts will be identified and the PRCP will be reviewed and updated during the mining life. This will ensure closure matters are appropriately addressed prior to the commencement of mine closure activities, and that all stages of mining are undertaken with the end in mind. The PRCP will include annual rehabilitation schedules and detailed rehabilitation design drawings. As the PRCP is updated, drawings showing rehabilitation progress, landform and proposed design contours, planned future rehabilitation schedules and operational budgets for rehabilitation activities will be included. Design drawings and contours will be developed using LiDAR data that has been captured for the site.

Finally, the EA will require CQC to provide financial assurance 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.

Decommissioning and rehabilitation are discussed in detail in Chapter 11 - Rehabilitation and Decommissioning, and the objectives and framework are summarised below.

1.9.19.2 Rehabilitation and Decommissioning Objectives and Framework

The Project will be decommissioned following the depletion of the target coal resource and final rehabilitation activities have been completed. The primary aim of rehabilitation will be to establish a landform with no final voids that is suitable for use for low intensity grazing land uses.

To achieve the final landform objective of having a free draining landform with no final voids, rehabilitation activities during the initial years of mining operations will target the temporary stabilisation of the two main waste rock emplacement areas which are proposed to be developed to manage waste rock initially extracted from the open cut mining areas. Temporary rehabilitation of these waste rock emplacement areas will be required as a priority to stabilise the outer slopes and to manage erosion risk throughout the life of mining operations. These stored waste rock materials will (in part) be utilised to fill the final void areas at the completion of mining operations. At this time, the remaining materials within the emplacement areas will be reshaped and rehabilitated according to the final landform design. A landform haulage schedule will be developed prior to mining, and waste rock inventory during extraction, to plan, track and achieve optimum placement to assist in later reforming and void filling activities.

Mining operations will advance and pits backfilled as mining progresses, and the remaining elevated landform and part of the backfilled pits requiring later reshaping will not achieve final landforms until later in the mine life (i.e. after final reshaping works). Other than the trial rehabilitation area located on the western side of Open Cut 2 from year 3, large scale final landforms are scheduled to be available for rehabilitation from approximately year 11 (year 2031) of the Project. At this time, progressive rehabilitation will continue following the completed mining operations, using the experience learned from the initial trial rehabilitation works. Progressive rehabilitation is proposed to be carried out as operations progress rather than taking place as a large operation once mining is complete. Rehabilitation of the MIA, haul road and TLF will take place once mining operations and associated rehabilitation activities are completed and plant and structures have been decommissioned.

The main features of the progressive rehabilitation process are:

- constructing stable landforms for all disturbed areas
- topsoil spreading across available reshaped areas which meet the final landform design
- contour ripping immediately after topsoil placement to control erosion
- revegetation with an appropriate seed mix prior to the wet season and
- management of rainfall and runoff from the rehabilitated landform in sediment dams.

The proposed mine life is 24 years including the final rehabilitation and mine closure period. Progressive rehabilitation will occur in accordance with the PRCP to be prepared for the Project. The PRCP will identify areas to be rehabilitated and provide specific rehabilitation details for each domain and desired post-rehabilitation land use.

The above Rehabilitation Framework will be further developed and will continue to evolve over time to reflect changing regulatory requirements, community values, and lessons learned onsite or at other mines.

Chapter 11 – Rehabilitation and Decommissioning provides the full detail of the Progressive Rehabilitation Program which will be further developed in the PRCP.

1.10 Relationship to Other Projects

The Project maximises the use of existing transport infrastructure, using the Bruce Highway for road based transportation of workforce and equipment, the North Coast Rail Line to transport coal to port, and the DBCT to export coal to customers.

1.10.1 Coal Transport to Port

The transportation of coal via rail from the Project to the nominated port site is to be carried out by a credible accredited third party operator for both below and above rail operations. As such the carrying out of coal transport activities will be conducted under licenses and permit approvals previously gained by accredited third party above rail operators (RSO - rolling stock operator) for the train haulage operations, and by an accredited third party below rail operator for the rail infrastructure manager (RIM) responsibilities for the constructed rail siding and balloon loop.

1.10.2 Port Operations

Handling of the Project Coal once it reaches the Port will be the responsibility of the Dalrymple Bay Coal Terminal Pty Ltd.

1.10.3 Accommodation

The EIS proposed a worker accommodation facility near the mine site. This is no longer being considered. The Marlborough Caravan Park is currently working with LSC to add further accommodation facilities to the park and the Project intends to utilise this facility as its primary accommodation facility for any workers that are not commuting daily. Should this facility intermittently not meet demand other commercial accommodation in the local study area will be considered for overflow accommodation. It is envisaged that only a small number of short term roles will be using these during operation. CQC may also acquire or rent a small number of houses near the mine to provide housing for senior managers.

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.

1.10.4 Realignment of the existing Mount Bison Road entrance

A realignment of Mount Bison Road and a corresponding new intersection with the Bruce Highway will be required to facilitate entry to Open Cut 1 on western side of the Bruce Highway. Mount Bison Road is located directly south of Tooloombah Creek and south of the proposed Project access.

This realignment and new intersection are intended to provide public access to existing agricultural uses on the western side of the Bruce Highway and will significantly improve road safety over the existing intersection. It will also provide access to MIA1 and associated mine infrastructure. This road

realignment has received the general support of the local community during consultation sessions conducted for the Project.

As construction of the infrastructure on the western side of the Bruce Highway will not commence until 2030 based on current planning, the design of the intersection has not been finalised. The entry point is indicatively located at 7488079.9N 770623.9E, which is approximately 29 km north of Marlborough. This location may change slightly due operational requirements, or because of future discussions with the DTMR and the LSC and is therefore considered as indicative.

Approval of the intersection design and for construction will be required from the Fitzroy District DTMR Office and a Traffic Management Plan to undertake works in and near the Bruce Highway will be required prior to the commencement of construction. The Traffic Management Plan will be prepared in accordance with the requirements of the DTMR Guide to Traffic Impact Assessment.

Even though these subsequent secondary approvals will be required to construct the new entrance to the road, the impact assessment within this SEIS v2 has considered potential impacts as a result of the mine entrance, and the Project disturbance footprint of 1,372.5 ha includes 11.5 ha for the western mine access and relocation of the entry to Mount Bison Road (see section 1.9.1), and another 0.9 ha to facilitate the eastern mine access road.

1.11 Project Alternatives

During the initial Project design process, a number of alternative scenarios were considered to evaluate the relative social, economic and environmental advantages and disadvantages of different Project alternatives. Results from this analysis were used to select the final Project scope in the context of fixed locations for the coal resource and ML areas. This process ensures the Project design has been underpinned by relevant environmental, social and economic drivers.

The analysis included consideration of a range of environmental factors such as:

- the location and stripping ratio of the coal resource
- protected or declared environmental areas
- mapped areas of biodiversity significance
- the presence of MNES and MSES including, but not limited to, remnant vegetation, wetlands and fauna habitat
- the location of surface water features and
- maximising the use of existing infrastructure such as power supply, telecommunications infrastructure and transportation options, including proximity of mine site to existing ports.

Throughout the EIS/SEIS process, as potential impacts have been revealed through the impact assessment process, the Project layout has continued to be refined to avoid and minimise these impacts as much as possible.

Alternative scenarios considered were those that are practicable, feasible and available to Central Queensland Coal. These included locality, technological and conceptual alternatives. The scenarios assessed as part of the EIS included the following alternative actions:

- no development scenario
- locality alternatives:
  - mine

  - coal transport to port and
  - port selection
- mine layout changes made during EIS and SEIS, minimising project impacts (the full description of project changes made during SEIS v3 are given in Chapter 3 – Project Changes and Responses to Regulator Comments):
  - MIA and CHPPs
  - open cut layouts
  - waste rock stockpiles
  - transport corridor and haul road locations
  - water storage infrastructure including dams, catchment diversions and levees
  - new catchment diversion drains and levees
  - overland conveyors
  - overhead power line connections and
  - mine access road
- transport alternatives:
  - port selection and
  - coal transport to port
- technological alternatives:
  - mining methods
  - rejects and tailings management and
  - train wagon loading options
- conceptual alternatives:
  - open cut configurations
  - water supply
  - energy supply and
  - alternative accommodation during the construction and operational phases.

The assessment of alternatives is contained in full in Appendix 2 – Project Alternatives Considered.