Central Queensland Coal Project

Appendix 12 - Draft Environmental Management Plan

Central Queensland Coal

CQC Draft EMP

October 2020

Key Contacts

Position	Contact Details
General Manager/Site Senior Executive (GM/SSE)	TBA Central Queensland Coal
Health, Safety and Environment Manager (HSE Manager)	TBA Central Queensland Coal
Monitoring Manager	TBA Central Queensland Coal
Site Construction Manager	TBA Central Queensland Coal
Site Environmental Manager	TBA Central Queensland Coal
Notification of non-compliance with conditions of approval or licensing	Qld Department of Environment and Science Responsible Officer: TBA Contact details TBA
Pollution Incidents	Significant pollution events Qld Department of Environment and Science 1300 130 372, option 2
Notification of weeds, pests or disease outbreak on-site	Biosecurity Queensland 13 25 23
Report minor pollution events Report environmental nuisance matters	Livingstone Shire Council 25 Normanby Street, Yeppoon Telephone: (07) 4913 5000 or 1300 790 919
Reporting injured, sick or orphaned wildlife RSPCA Qld	RSPCA Qld 1300 ANIMAL (1300 264 625)

Contents

Figures

Terms and Abbreviations

Abbreviation	Definition
AS/NZS	Australian and New Zealand Standards
ASSMP	Generic Acid Sulfate Soil Management Plan
CHMP	Cultural Heritage Management Plan
Central Queensland Coal	Central Queensland Coal Proprietary Limited
Council	Livingstone Shire Council
DES	Department of Environment and Science
EA	Environmental Authority
EMP	Environmental Management Plan
EPC	Exploration Permit for Coal
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
Fairway Coal	Fairway Coal Proprietary Limited
GDEMMP	Groundwater Dependent Ecosystem Management and Monitoring Plan
GM	General Manager
GMMP	Groundwater Management and Monitoring Plan
HSE	Health, Safety and Environment
km	Kilometres
LUMP	Land Use Management Plan
MDL	Mineral Development Licence
ML	Mining Lease
MWMP	Mineral Waste Management Plan
PDCA	Plan-Do-Check-Act
PRCP	Progressive Rehab and Closure Plan
REMP	Receiving Environment Monitoring Program
SEIS	Supplementary Environmental Impact Statement
SIMP	Social Impact Management Plan
SSE	Site Senior Executive
SSMP	Significant Species Management Plan
TARP	Trigger, Action and Response Plans
The Project	The Central Queensland Coal Project
TLF	Train Loadout Facility
WMP	Water Management Plan

1 Introduction

1.1 Purpose and Scope

Central Queensland Coal Proprietary Limited (Central Queensland Coal) and Fairway Coal Proprietary Limited (Fairway Coal) (the joint Proponents), propose to develop the Central Queensland Coal Project (the Project). As Central Queensland Coal is the senior proponent, Central Queensland Coal is referred to throughout this draft Environmental Management Plan (EMP).

This document represents the site specific EMP document for the construction and operation of the Project and has been developed to manage potential environmental impacts and to assist Central Queensland Coal to comply with relevant environmental approvals and permit conditions. It has been prepared in general accordance with the Commonwealth Environmental Management Plan Guidelines (Commonwealth of Australia 2014).

1.2 Environmental Authority Conditions

Draft Environmental Authority (EA) conditions proposed by Central Queensland Coal are included in the SEIS v3 Chapter 23 – Draft EA Conditions. On approval of the Project, this draft EMP will be updated to reflect approval requirements and implemented on the Project Site.

1.3 Other Management Plans

This draft EMP has been primarily prepared to address environmental matters, including social and cultural heritage. Additional management measures related to health and safety are not included as part of this EMP. These other matters are dealt with in the following plans:

- Emergency Response Plan (ERP)
- Safety and Health Management System
- Principle Hazard Management Plan and
- Integrated Risk Management System.

The 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.

The ERP will meet the requirements of the *Coal Mining Safety and Health Act 1999* and regulation and the relevant risk management standards. The Integrated Risk Management System will be developed in accordance with the relevant standards, including AS/NZS ISO 31000:2009 and the Principle Hazard Management Plan must meet the requirements of RS2 – Control of Risk Management Practices.

1.4 Objectives and Targets

Objectives and Performance outcomes have been specified in the Project SEIS v3 in each of the chapters, with specific Objectives and Targets relevant to each discipline including in the management plans in Appendix C to this EMP.

1.5 EMP Framework

This EMP is intended to detail the site-specific requirements to meet the company wide objectives, including site context, mitigation measures and monitoring requirements. It has been organised as follows:

- EMP Background and Policy: Sections 1 to 4 - including this section (introduction), project description, environmental policy and social and environmental context
- EMP Implementation: Section 5 and Appendix B - the over-arching management regime and supporting documents for implementing and managing the EMP
- Environmental Management Sub-plans: Section 6 and Appendix C - specific sub-plans for managing environmental impacts; Appendix D - a monitoring and review register; Appendix E - contingencies for non-routine events and
- Environmental Forms (Incident / Complaint / Improvement): Appendix F.

This EMP is modelled on the AS/NZS ISO 14001 Plan-Do-Check-Act (PDCA) continual improvement model, as outlined in Figure 1.

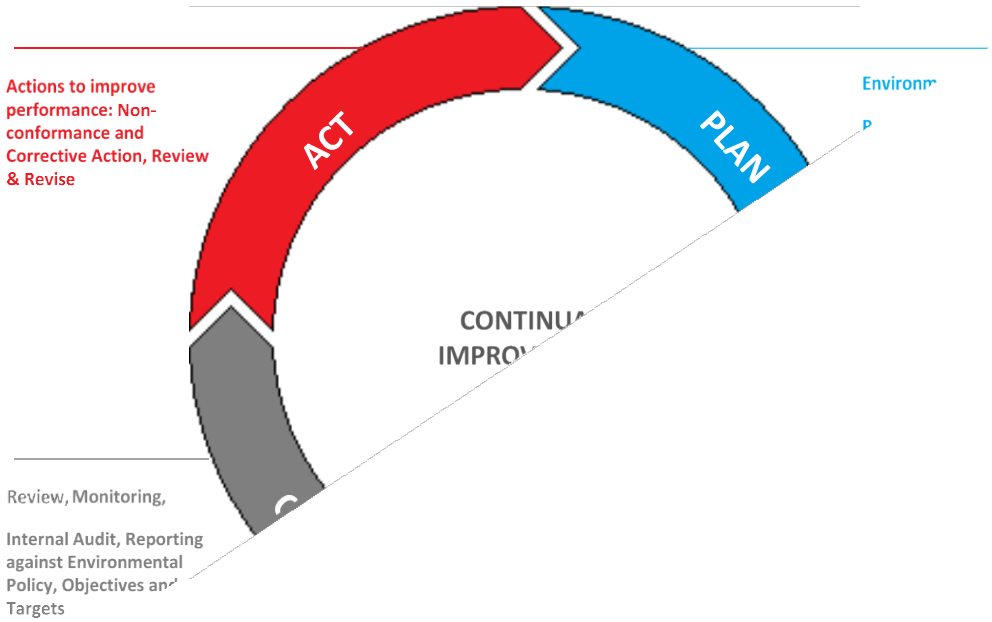

Figure 1: EMS continual improvement model

1.6 Links to Other Management Plans

Central Queensland Coal are required to develop and implement a suite of management plans to address State and Commonwealth approval conditions and consolidate the commitments made as part of the SEIS as described in more detail in Section 6. The intent is for the EMP to provide the overarching environmental management system and incorporate or link to these other management plans where relevant. This is undertaken within the site-specific management plans in Appendix C to this EMP.

2 Project Description

The Project is located in the Styx Basin, approximately 130 kilometres (km) northwest of Rockhampton in Central Queensland. Access to the Project will be via the Bruce Highway.

The Project will be within two separate mining leases (ML), 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. The Project will comprise the following major components:

- two open cut mining pits, 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.

Further detail of the Project, including location and layout, are provided in Chapter 1 – Introduction and Project Description. Following Project approval, this section will be updated to provide a concise summary of the key Project elements from the SEIS.

3 Environmental Policy

Environmental Policy

CENTRAL QUEENSLAND COAL ENVIRONMENTAL POLICY

Central Queensland Coal (CQC) recognises its responsibilities to ensure that its activities are planned and managed to minimise impact to the Environment. This Policy content and how it will be implemented will be conveyed to all members of staff, employees, subcontractors and visitors.

CQC Commitment is:

- To plan and conduct mining and materials extraction in a manner that will minimise the footprint of its activities and reduce, so far as is practicable, any disturbance to flora and fauna or impact to the environment;
- To ensure that plant is appropriately maintained and that hazards resulting from spills or emissions are eliminated or effectively controlled; and
- To work within the parameters of environmental license conditions and approvals framework.

CQC will achieve this through:

- Developing and maintaining an effective Environmental Management Plan;
- Scheduled inspection and monitoring of all equipment and workplace activities to identify any potential for impact to the environment and to address the findings in a timely manner;
- Collection, storage and control of waste materials and spent consumables and having arrangements for appropriate and responsible disposal;
- Minimising the volume of any hazardous substances required to be held at site and implementing effective controls for storage and use;
- Provision of training and instruction for its employees and contractors;
- Immediately report and remediate any damage, spills or loss of containment;
- The application of Hot Work Permits and provision of adequate resources to eliminate or reduce the risk of fire;
- Maintaining an audit program for both internal and external audits to assist with the measurement and monitoring of its performance; and
- Comply with client, community and license requirements for monitoring, sampling and reporting.

Nui Harris

Central Queensland Coal Chief Executive Officer

4 Social and Environmental Context

The SEIS v3 provides a detailed overview and assessment of the existing environmental and social aspects, potential impacts and mitigation measures. A summary of the key environmental and social aspects of the Project, along with the environmental receptors and values to be protected, will be provided in this section following Project approval. It will be updated as required to ensure it remains up to date throughout the life of the Project, including following mine-closure – both during and after rehabilitation works are completed.

5 EMP Implementation

5.1 Environmental Risk Management Framework

This document adopts a risk management approach to planning and undertaking activities managed under the EMP. A risk assessment has been conducted specific to the development and design of the Project to define site and phase specific risks and develop appropriate mitigation and management measures. This is shown in each relevant chapter of the SEIS v3.

Following approval, the risk assessments will be incorporated into an overall Project risk register, after the approach outlined in Chapter 21 - Hazard and Risk. This will be reviewed and updated annually at a minimum or as required to ensure it remains up to date, and all environmental risks are appropriately managed.

5.2 Relevant Legislation and Approvals

The primary piece of environmental legislation in Queensland is the *Environmental Protection Act 1994* (Qld). In particular, section 319 of the Act states that a person has a duty to avoid causing environmental harm, described as their 'general environmental duty'.

Section 320 of the Act describes a person's duty to notify environmental harm. An employer has a duty to notify the administering authority directly (Council or the Department of Environment and Science - DES) if serious or material environmental harm is caused or threatened. If another person becomes aware of the event, they have a duty to notify their employer, of if they are not available, undertake the notification themselves.

In addition to the 'general environmental duty' and 'duty to notify', a number of other regulatory instruments are relevant to this EMP. These are described in Chapter 2 – Legislation and Approvals. Following approval, a register will be developed (the Legislation and Approvals register), to summarise the key pieces of legislation, their relation to the Project, and the approvals gained and required to be gained for the Project (where relevant).

Appendix B1 of this EMP contains a template for the Legislation and Approvals Register.

5.3 Roles and Responsibilities

A detailed description of the key roles and responsibilities, including communication channels and strategies, will be developed prior to works commencing on-site, with key contacts included in this EMP. As a general guide, the below key roles are anticipated for the Project:

General Manager (GM) / Site Senior Executive (SSE):

- ultimately responsible and accountable for the effectiveness of the EMP
- establish the overall direction of the Project from an environmental perspective, and lead the development of the Environmental Policy
- provide sufficient resources to support the objectives of the EMP, including ongoing review and continual improvement
- ensure the policy, objectives and targets, and ongoing review against targets is incorporated into top level management review, and the strategic direction of the organisation

- ensure relevant approvals and licenses are in place to undertake the works and
- implement non-conformance processes (notification to DES), and act as the Project contact for DES and Council.

Site Construction Manager:

- responsible for site management during the construction phase
- supported by a senior site representative from the principal construction contractor and
- 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.

Health, Safety and Environment Manager (HSE Manager) and Community Manager:

- support the GM in developing and maintaining the effectiveness of the EMP
- responsible for ensuring the EMP is implemented on-site
- ensure EMP remains up to date and is revised as required
- implement non-conformance processes (incident reporting, control, implementation), and support the GM as the Project contact
- conduct review and audits of the EMP and its effectiveness
- develop training materials and conduct training
- ensure records are collected and maintained and
- report performance to the GM, including non-conformances, issues and improvement recommendations.

Monitoring Manager:

- reports to the HSE Manager and GM
- responsible for undertaken and directing the monitoring programs
- responsible for data collection and storage and
- develops training materials related to monitoring programs, in liaison with the HSE Manager.

Site Environmental Manager:

- reports to the GM and HSE Manager and is responsible for day to day compliance with the EMP
- implement required training, monitoring, inspection and review
- ensure that personnel and sub-contractors are appropriately inducted and are aware of requirements of the EMP
- implement non-conformance processes (incident and complaint management, corrective actions, notification to HSE Manager and GM) – provide agency (e.g. Council/DES) notification on behalf of the HSE Manager/ GM if required
- acts as the site contact for DES and Council officers and
- relay information to site personnel.

All Staff and sub-contractors:

- be aware of the EMP and supporting systems and procedures, and understand the requirements relevant to their role

- adhere to relevant aspects of the EMP, procedures communicated during inductions, and to directions given by the Site Environmental Manager and HSE Manager
- have a general duty to not cause environmental harm (as do all persons in Queensland) and
- notify their supervisor / employer of any environmental (and other) incidents, near misses and hazards immediately. Supervisors/employers to ensure the Site Environmental Manager is notified as soon as possible.

5.4 Training and Awareness

Central Queensland Coal will ensure that all employees are appropriately trained and qualified to carry out their duties. Site inductions will be carried out for all personnel, including staff and contractors, prior to starting work on the site to address the aspects of this EMP relevant for each role. Inductions will be recorded in the Site Environmental Manager's logbook.

Training will comprise the following elements:

- personnel assigned roles within the EMP will ensure they are appropriately qualified and experienced
- site induction will be carried out for all new employees and those who have not received such training to ensure they are aware of and understand their role in adhering to all specific aspects of the EMP and
- regular short meetings (i.e. toolbox talks) will be held on-site between the Site Environmental Manager and site staff. These meetings will outline any changes to the site or environmental controls required and ensure that personnel are fully aware of their environmental commitments.

More generally, when any person starts work or enters a new position, their training needs are to be assessed and a date for training established.

5.5 Communication

5.5.1 External Communications

Relations between Central Queensland Coal and the public are important for maintaining a good working relationship within the community. Central Queensland Coal is committed to being a part of the community as a whole, seeking advice and views as appropriate.

Key points of contact within the organisation for external communication (public, statutory agencies, etc.) will be identified as part of the Roles and Responsibilities in Section 5.3 and will include a Community Liaison Officer. Key contacts will be provided within the EMP as an easy one-page lookup sheet.

The following website will remain the main entry point on the internet for dissemination and communication with the wider public:

https://cqcoal.com.au/

Refer also to Section 5.7 for details of responding to non-compliance events.

5.5.2 Corporate Management

Central Queensland Coal will incorporate review of progress against the EMP Objectives and Targets into regular management level meetings, communications and discussions and will implement the management review process. In particular, management will review audit reports, non-compliance and project timetables as appropriate.

5.5.3 Internal

At a site level, the results of internal audits, monitoring reports and any non-compliance will be directed to the Site Environmental Manager / HSE Manager as they become available. The Site Environmental Manager / HSE Manager should be advised of any monitoring results or other activity that do not comply with any part of the EMP as soon as practicable but within at least 24hrs of the event or receipt of results.

Results from these audits and reviews should be provided to the GM in summary form.

5.5.4 Complaints Management

All complaints and issues raised by community members or stakeholders are managed in accordance with the Social Impact Management Plan (SIMP). A 1800-number and project email address is to be maintained for Project information, feedback and complaints. A *complaints policy and process* will be published on the Project website. Ongoing engagement with affected communities, potential to monitor impacts as they arise and swift and fair responses to potential complaints will be essential to reduce the severity of any amenity impacts.

The SIMP contains a communications protocol for liaison between the Project, police and relevant local stakeholders regarding workforce behaviour during construction and operations.

Any complaints are recorded on the incident form (Appendix F1) or similar and stored within the incident register for a period of not less than 5 years and will include the following details:

- name, address and contact number of complainant (or “not identified" if they do not wish this to be recorded)
- time and date of complaint, and form of complaint (e.g. phone, in person, email)
- reasons for the complaint
- investigations undertaken in response and conclusions formed
- actions taken to resolve complaint
- any abatement measures implemented to mitigate the cause of the complaint and
- name and contact details of the person responsible for resolving the complaint.

5.6 Supplier and Contractor Management

Sub-contractors are responsible for adhering to the EMP and to directions given by Central Queensland Coal regarding environmental management.

Sub-contractors are required to confirm they have policies and procedures in place to allow them to conform to the relevant aspects of the EMP prior to beginning work on site which may affect the achievement of the Objectives and Targets (e.g. environmental harm or nuisance). Alternatively, the subcontractor may select to comply fully with the EMP.

The Site Environmental Manager must induct each sub-contractor prior to beginning works on the site. Sub-contractors must undertake a re-induction if they have not been on the Project site within 12 months or more.

Each sub-contractor is to have a nominated contact point to the Site Environmental Manager.

5.7 Non-compliance and Corrective Action

Non-compliance with any aspect of this EMP, any project consent conditions and/or monitoring limits will require corrective action and reporting. The type and scale of corrective action and reporting will depend on the type and scale of the non-compliance. All incidents that require some form of incident response, rectification or with the potential to cause material or serious environmental harm must be recorded in the incidents – complaints register.

Appendix E1 contains general procedures for Emergency Response (environmental components only), including notification requirements. This will be updated to comply with the final EA requirements following approval.

Trigger, Action and Response Plans (TARP) which outline actions and necessary responses should monitoring identify exceedances in the Project criteria are included for each sub-plan in Appendix C. In addition, the TARP outlines the criteria, monitoring and reporting measures for environmental incidents, unplanned events, or cases of unauthorised discharge or other activities.

5.8 Adaptive Management

This EMP details specific management measures to be implemented to mitigate impacts and incorporates adaptive management principles to allow for the adoption of new measures or cessation of existing measures where necessary as the Project progresses.

Management actions will be regularly reviewed by the HSE Manager and, if necessary, modified to ensure they remain current. Under the adopted adaptive management framework, circumstances under which changes to the management and monitoring program could be made include:

- change in the current state of knowledge - When new best practice knowledge arises, it should be integrated into the plan, so it remains consistent with the current state of knowledge of the species ecology and best practice
- change in base knowledge which underpins the original management approach
- change in site activities - as Project activities change in nature and location, or cease, an impact pathway or risk source and the potential for environmental harm will change accordingly.
- observed environmental impacts
- incident (spill) response
- in response to a trigger criteria breach and
- changes to legislative instruments or other regulatory requirements.

5.9 Reporting and Documentation

Reporting requirements are stipulated within the management plans in Appendix C and summarised in Appendix D1 Monitoring and Review Register.

All reports including audits, monitoring and inspection reports and results must be maintained on the site or, if not practicable, in another accessible location by the General Manager, HSE Manager and Site Manager for a period not less than 5 years.

5.10 Monitoring and Review

A review of this EMP and its sub-plans is to be conducted annually, or more frequently where a change in legislation, approvals or site activities are likely to affect the operation of this plan. No revisions of this report are to contravene any conditions of approval for the site.

Project contacts shall be updated as often as needed to ensure it remains up to date.

Changes are to be made in consultation with and approved by the General Manager / HSE Manager and relevant consent/administering authority prior to finalisation.

The key monitoring and review components of the EMP are summarised in Appendix D1.

All monitoring to be conducted by appropriately experienced persons, using properly calibrated, operated and maintained equipment.

6 Environmental Management Plans

6.1 Environmental Management Sub-Plans

Appendix C contains draft environmental management sub-plans for construction and operational impacts. These sub-plans have been prepared based on the environmental risks and commitments identified in the SEIS v3. These sub-plans will be reviewed and updated with comprehensive and detailed site-specific management procedures after approval of the Project.

The draft sub-plans are as follows:

- Appendix C1 – Generic Acid Sulfate Soil Management Plan (ASSMP)
- Appendix C2 – Air Quality Management Plan
- Appendix C3 – Greenhouse Gas Management Plan
- Appendix C4 – Hazardous Materials Management Plan (including spill management)
- Appendix C5 – Land Use Management Plan (LUMP), including:
  - Biodiversity Management Strategies
  - Weed and Pest Management Plan
  - Bushfire Management Plan
- Appendix C6 – Mineral Waste Management Plan (MWMP)
- Appendix C7 – Noise and Vibration Management Plan
- Appendix C8 – Waste Management Plan
- Appendix C9 – Surface Water Management Plan
- Appendix C10 – Groundwater Management and Monitoring Plan (GMMP)
- Appendix C11 – Biting Insect Management Plan

Additional management plans and strategies are referenced within this EMP and fall within the Environmental Management System framework, but have been prepared as stand alone documents, which includes the following draft plans (Appendices refer to the location within the SEIS v3):

- Erosion and Sediment Control Plan (ESCP) (Appendix A15a)
- Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP) (Appendix A10e)
- Water Management Plan (WMP) (Appendix A5c)
- Receiving Environment Monitoring Program (REMP) (Appendix A10f)
- Road Use Management Plan (RUMP) (Appendix A4c)
- Social Impact Management Plan (SIMP) (Chapter 19B) and
- Significant Species Management Plan (SSMP) (Appendix A9e).

A rehabilitation and closure strategy is detailed within Chapter 11 – Rehabilitation and Decommissioning, and is to be incorporated into a Progressive Rehabilitation and Closure Plan (PRCP) including regulatory approval following Project approval. In addition, a Cultural Heritage Management Plan (CHMP) is to be developed, with negotiations underway between CQC and indigenous parties.

7 References

Commonwealth of Australia (2014) *Commonwealth Environmental Management Plan Guidelines*. Canberra ACT.

Appendix A

Maps and Supporting Information

Relevant maps and supporting information to be summarised from SEIS v3 following Project approval.

Appendix A

EMP Management Documents

B1 – Legislation and Approvals Register

October 2020

B1 - Legislation and Approvals Register

B1.1 Purpose and Scope

This document includes a register of existing (and where relevant historic) approvals (Table B2.1) and relevant legislation, standards and codes (Table B2.2) to aid in maintaining overall compliance of site activities and the EMP with legislative requirements.

B1.2 Responsible Person

The Environmental Manager is responsible for maintaining this register and updating it as required.

B1.3 Update and Review

This register will be updated periodically to ensure it remains up to date. Any change in relevant legislation, standards and codes or in site approvals will require a review of the register.

B1.4 Information Sources

Key information sources which may be useful in updating this registry include:

- Queensland Legislation (Acts, SL as in force)
  https://www.legislation.qld.gov.au/browse/inforce
- Australian Government, ComLaw
  http://www.comlaw.gov.au
- Queensland Department of Environment and Science (DES)
  https://environment.des.qld.gov.au/management/env-policy-legislation/

B1.5 Terms and Definitions

n/a.

B1.6 References

n/a.

Table B1.1 Approvals Register (in force approvals)

Reference	Type	Approval / Anniversary Date	Expiry Date	Administered by*	Short Description	Relevance

Table B1.2. Relevant Legislative Register

Jurisdiction	Name	Administered by*	Short Description	Relevance

B2 - Document Map

October 2020

B2 - Document Map

B2.1 Purpose and Scope

This document provides a cross-reference between AS/NZS ISO 14001:2016 Environmental management systems - Requirements with guidance for use.

B2.2 Responsible Person

The HSE Manager is responsible for maintaining this register and updating it as required.

B2.3 Update and Review

The register will be updated periodically to ensure it remains up to date, with a review with any SEMP update that substantially changes the organisation or content of the SEMP, or with a change in AS/NZS ISO 14001.

B2.5 Terms and Definitions

n/a.

B2.6 References

AS/NZS ISO 14001:2016 Environmental management systems - Requirements with guidance for use.

Table OE.1 Document Map to AS/NZS ISO 14001:2016

PDCA Component	ISO14001:2015 Requirement	Environmental Management System Reference
Plan	4 Context of the organization 4.1 Understanding the organization and its context 4.2 Understanding the needs and expectations of interested parties 4.3 Determining the scope of the environmental management system 4.4 Environmental management system	SEIS v3 Chapter 1 – Introduction and Protect Description Section 2 (Project Description) to be updated following approval
	5 Leadership 5.1 Leadership and commitment 5.2 Environmental policy	Section 3 (Environmental Policy) Section 1.4 (Objectives and Targets), sub-plans in Appendix C
	5.3 Organizational roles, responsibilities and authorities	Section 5.3 (Roles and Responsibilities)
	6 Planning 6.1 Actions to address risks and opportunities 6.1.1 General 6.1.2 Environmental aspects 6.1.4 Planning action	Section 1.4 (Objectives and Targets), sub-plans in Appendix C Section 5.1 (Environmental Risk Management Framework), risk register to be updated following approval Section 5.2 (Relevant Legislation and Approvals), Appendix B2 (to be updated following approval) Section 5.9 (Monitoring and Review)
	6.1.3 Compliance obligations	Section 5.2 (Relevant Legislation and Approvals) , Appendix B2 (to be updated following approval)
	6.2 Environmental objectives and planning to achieve them 6.2.1 Environmental objectives 6.2.2 Planning actions to achieve environmental objectives	Section 1.4 (Objectives and Targets), sub-plans in Appendix C
	7 Support 7.1 Resources	Section 5.3 (Roles and Responsibilities)
	7.2 Competence 7.3 Awareness	Section 5.4 (Training and Awareness) Section 5.6 (Supplier and Contractor Management)
	7.4 Communication 7.4.1 General	Section 5.5 (Communication)

PDCA Component	ISO14001:2015 Requirement	Environmental Management System Reference
	7.4.2 Internal communication 7.4.3 External communication	
	7.5 Documented information 7.5.1 General 7.5.2 Creating and updating 7.5.3 Control of documented information	Section 5.10 (Reporting and Documentation)
Do	8 Operation 8.1 Operational planning and control 8.2 Emergency preparedness and response	Section 5.1 (Environmental Risk Management Framework), risk register to be updated following approval Appendix C management procedures Appendix E Contingency Response
Check	9 Performance evaluation 9.1 Monitoring, measurement, analysis and evaluation 9.1.1 General 9.1.2 Evaluation of compliance 9.2 Internal audit 9.2.1 General 9.2.2 Internal audit programme 9.3 Management review	Section 5.9 (Monitoring and Review), Appendix D
Act	10 Improvement 10.1 General 10.2 Nonconformity and corrective action 10.3 Continual improvement	Section 5.7 (Non-conformance and corrective action) Section 5.5.4 (Complaints)

Appendix C

Environmental Management Sub-plans

C1 - Acid Sulfate Soil Management Plan

October 2020

Table C1.1: Acid sulfate soil management plan

<table>
<tr><th colspan="2">Element</th><th>Detail</th></tr>
<tr><td colspan="3">Applicable site activities

Construction and operation activities that may potentially disturb acid sulfate soils (ASS) during excavation works or activities that may result in groundwater drawdown on the site.

Note – Chapter 5 – Land of the SEIS v3 demonstrates that ASS are not present on the site nor in the groundwater drawdown extent. As such, ASS will not be disturbed as part of the Project. This plan has been included to address situations where works external to the lease may occur in areas closer to the coast related to the Project.</td></tr>
<tr><td colspan="3">Aim

No oxidation of acid sulfate soils on the site as a result of site activities, to minimise the risk of environmental pollution and to maintain the ecological health and land uses both now and in the future.</td></tr>
<tr><td>Objectives</td><td>Targets</td><td>Key performance indicators</td></tr>
<tr><td>• Undertake and complete works in compliance with statutory environmental requirements</td><td>• No statutory infringements
• No breaches of licence/approval conditions</td><td>• Number of infringements
• Number of non-compliances identified in audits and reviews</td></tr>
<tr><td>• No oxidation of ASS as a result of Project related works</td><td>• Pre-works inspection for areas to be excavated below 20 m Australian Height Datum (AHD) (within the ASS special management area) undertaken
• Identified ASS are avoided, contained or adequately neutralised</td><td>• Number of non-compliances:
- ASS exposed but not treated
- exceedances of water quality results for pH in leachate, runoff and receiving waters
- laboratory neutralisation results showing net acidity remaining after treatment</td></tr>
<tr><td colspan="2">Responsibility</td><td>Construction: Construction Manager

Operation: Site Manager</td></tr>
<tr><td colspan="2">Actions/mitigation measures</td><td>Pre-Construction -

Where off-lease works are required, and these works are located at or below 20 m AHD, and where excavation will or may extend to or below 5 m AHD, pre-construction investigations are to be conducted, as follows:
1. In the first instance, the geology of the location is to be analysed by a suitably experienced and qualified soil scientist (e.g. Certified Professional Soil Scientist (CPSS) with Soil Science Australia) to determine the likelihood of ASS being present.
2. Where the geology does not rule out the potential for ASS to be present, conduct testing to the depth of disturbance + 1.0 m in accordance with Ahern et al (1998) (field and oxidised pH at 0.25 m intervals, chromium reducible sulfur suite analysis at 0.5 m intervals).

Based on this investigation and in relation to the construction plan, identify areas at risk of intercepting ASS, and prepare an Acid Sulfate Soil Management Plan (ASSMP) in accordance with the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al 2014).</td></tr>
</table>

Element	Detail
	Construction and operation No excavation at or below 20 m AHD and where excavation extends or may extend to or below 5 m AHD without undertaking the pre-construction investigations described above. If ASS is encountered, the ASS Management Plan must be implemented. If only small amounts of ASS are encountered during excavations, and the total quantity for a location is <100 m^3, the material can instead be re-buried within 12 hours, and below the layer where they were excavated (without mixing of layers), without pre-testing. The material should be limed at a nominal rate of 240 kg CaCO3/m^3 soil to be disturbed (as per Dear *et al* 2014). Include training and education on ASS in the site induction with updates or changes communicated during daily pre-start meetings. All staff must be aware of the ASS soil indicators, including: • Any jarosite (a pale-yellow mineral deposit) or iron oxide (rusty) colouring, including identifying pyritic materials. • Extensive iron stains on any drain surfaces, or iron stained drain water and ochre deposits. • Corrosion of concrete and/or steel structures. • Surface or ground water on or draining from the site with a pH < 5.5, or of an unusually clear or milky green. • Sulphurous (rotten egg gas) smell when soils are disturbed.
Monitoring	Implement pre-construction investigations where excavations will be located at or below 20 m AHD, and where excavation extends or may extend to or below 5 m AHD. Implement monitoring outlined in ASSMP. Regular visual monitoring of work areas will be undertaken to identity signs of ASS oxidation. This monitoring will include looking for signs of: 1. Unexplained scalding, degradation or death of vegetation. 2. Unexplained death or disease of aquatic organisms. 3. Areas of green-blue water or extremely clear water indicating high concentrations of aluminium. 4. Formation of the mineral jarosite and other acidic salts in exposed or excavated soils. 5. Rust coloured deposits on plants and on the banks of drains, water bodies and watercourses indicating iron precipitates. 6. Excessive corrosion of concrete and / or steel structures in contact with soil or water. 7. Black to very coloured waters indicating de-oxygenation. 8. Any sulphurous smells, e.g., hydrogen sulphide or rotten egg gas. Monitor surface run-off and seepage from waste rock stockpiles and any rehabilitated areas for a standard suite of water monitoring parameters in accordance with the ASSMP.
Reporting	All test results shall be retained on-site and electronically by CQC or the lead contractor (in which case reports shall be provided to and retained by CQC). Implement a tracking system in the form of an ASS register, to record at a minimum:

Element	Detail
	• all areas of potential ASS all of which are to be subjected to testing (other than reinternment areas) • the key testing results • time from exposure to reinternment or treatment recorded as start date time, or if addressed on the same day, just the date of exposure and treatment/reinternment • post treatment key results (and link to full results) recorded in the register and • location of where ASS was excavated, treated, and disposed. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F (or similar) and enter into the incident-complaint register for rectification and follow up. Once final ASS treatment and restoration is completed, prepare an ASS Closure Report and retain on site or submit to the Department of Environment and Science (DES) on request.
Corrective Actions	**Corrective action triggers** • Where off-lease works are required, and these works are located at or below 20 m AHD, and where excavation will or may extend to or below 5 m AHD. • Excavations or other ground disturbing works encounter presence of pyritic materials. • Water sampling (surface/groundwater) indicates a drop in pH (pH < 5.5), or of an unusually clear or milky green. • Runoff waters exhibit iron staining, or pools and receiving waters are excessively clear (indicative of low pH). • Identified sites on the register (refer to reporting above) have not been tested, treated or reinterred (or entry was not marked in the register). **Corrective actions** • Stop excavations. • Implement the ASSMP. • Implement monitoring and sampling as soon as possible to identify the source of any oxidising ASS material. • Implement testing regime, or record treatment and/or reinterment plan in the register (and implement the treatment and/or reinternment plan). • Determine if register was not properly filled out and update if required. • Test receiving surface waters and ground water quality.

References:

Ahern, C.R. Ahern, M.R. and Powell, B. (1998) *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* (QASSIT), Department of Natural Resources, Resource Sciences Centre, Indooroopilly.

Dear, S.E. Ahern, C.R. O'Brien, L.E. Dobos, S.K. McElnea, A.E. Moore, N.G. and Watling K.M. (2014) *Soil Management Guidelines in Queensland Acid Sulfate Soil Technical Manual* (QASSIT). Department of Science, Information Technology, Innovation and the Arts. Queensland Government. June 2014.

C2 - Air Quality Management Plan

October 2020

Table C2.1: Air quality management plan

Element	Detail		
Applicable site activities Construction: Wind erosion, wheel generated dust and site clearance and topsoil stripping activities. Operation: Coal handling preparation plant (CHPP) operations, waste handling, wind erosion, wheel generated dust, mining operation (conveyors, crushing and screening), blasting/drilling, diesel combustion, power generation and train loadout.			
Aim Protect the health, welfare and amenity of people and environmental values due to noise and air quality impacts.			
Objectives		**Targets**	**Key performance indicators**
Undertake and complete works in compliance with statutory environmental requirements		No statutory infringements No non-compliances of licence/approval conditions	Number of infringements Number of non-compliances
No dust or air quality impacts to sensitive receptors from the Project Manage air quality related community complaints in a timely and effective manner		No dust or air quality related complaints Air quality at sensitive receptors to meet criteria in Table C2.4	Number of complaints Number of exceedances: no more than five exceedances recorded each year.
Responsibility	Construction: Construction Manager Operation: Site Manager		
Actions/mitigation measures	**General dust suppression** Minimise topsoil and vegetation removal and revegetate disturbed areas as soon as possible. Minimise topsoil pre-strip to a maximum of one block ahead, and stabilise exposed surfaces as soon as practicable once the area is no longer active. Maintain watering of haul roads, unsealed road and construction area surfaces used for mobile plant and vehicle traffic to minimise dust generation. The schedule for truck use will incorporate consideration of recent rainfall and weather conditions, including a net evaporation calculation (evaporation – rainfall) to determine the likely amount of water required (to balance against net evaporation). Undertake visual monitoring of dust daily with ramping down of activities in the instance of high dust emissions. Water run-of-mine (ROM) stockpiles using timers (including manual operation when required) to avoid the potential for missing a scheduled watering operation. Operate a dust suppression system (e.g. fogging or misting system) on outlets from transfer points and sizing stations with the potential to generate dust. Install physical barriers around dust generating activities (dust fences), where practical. Apply dust suppressants on stockpiles or berms / slopes), where practical. Implement control measures to also control dust while the site is unattended, e.g. at night or on weekends. Implement a site ‘shut down and cover up’ policy during periods of extreme weather conditions.		

Element	Detail
	Use benign adhesives if water suppression methods are not effective. If chemical suppressants are required to control dust, undertake a risk assessment to assess potential for adverse impacts to water quality. Develop protocols to regularly maintain plant and equipment to minimise the potential for fugitive dust emissions prior to the commencement of mining activities. Minimise speed of on-site traffic, where applicable, to minimise wheel generated dust. Check weather reports daily to enable action to be taken immediately if conditions change. **Coal dust** Refer to Table C2.2. **Engineering Controls** Implement and maintain engineering control measures, such as: • Dust enclosure of transfer points and sizing stations • Belt washing and belt scrapers for returning conveyors to minimise dust • Reduced drop height from stackers to stockpiles • Eliminating side casting • Enclosure of raw coal surge bins. • Design of haul roads to have a less erodible surface, such as using materials with a lower silt content. Regularly clean and maintain machinery and vehicle tyres to prevent wheel entrained dust emissions. **Traffic and transport** Access points for the Project will be via sealed roads to limit dust emissions. No hauling of coal or mineral waste will be undertaken on public roads. Load covers will be required on heavy vehicles carrying material that has the potential to generate dust to or from the Project site. Prior to leaving the site, overly dirty vehicles will be required to be washed. **Rehabilitation** Undertake rehabilitation of exposed surfaces progressively as mining and stockpiling activities are completed and include the use of fast-growing temporary cover material to accelerate the effectiveness of dust controls. Where open cut mining areas or waste rock stockpiles remain inactive for a considerable period of time, temporary rehabilitation activities will be undertaken. **Complaints management** Implement the complaints procedure in the EMP to address issues raised by community members or stakeholders in regard to air quality. Any complaints will be further investigated, recorded and corrective actions implemented if required and communicate back to the complainant where reasonable and actions were taken. Where appropriate, undertake air quality monitoring at the affected location. The monitoring will determine if further corrective actions are required to be undertaken.
Monitoring	**Visual inspections** Undertake daily visual monitoring of dust and adjust activities in the instance of high dust emissions. Undertake regular inspections of the access roads to ensure there is no build-up of mud or and dust leading onto the Bruce Highway.

Element	Detail
	Air quality monitoring Undertake dust deposition and suspended particulate monitoring during construction and operation of the Project in accordance with relevant Australian Standard methodology to determine whether predicted emissions levels occur, in general: • Dust deposition in accordance with the most recent version of AS 3580.10.1 - Methods for sampling and analysis of ambient air - Determination of particulate matter—Deposited matter - Gravimetric method. • $PM_{2.5}$ in accordance with the most recent version of AS/NZS 3580.9.10 - Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM2.5 low volume sampler - Gravimetric method. • Total suspended particulates (TSP) in accordance with the most recent version of AS/NZS 3580.9.3 - Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method. Install a system of dust monitors upwind and downwind of the Project to monitor dust levels at background and potentially impacted sites. Install dust monitors at the identified sensitive receptors listed in Table C2.3 predicted to receive dust levels close to or reaching the air quality criteria in Table 2.4. Should BAR H-2 be renovated back to a liveable condition and used as a residence, air quality monitoring will be undertaken for the receptor. **Project weather station** Maintain the weather station on Mamelon Property. The weather station is to record local wind conditions at the time of any high-dust event to inform future management measures. Apply management measures to mitigate emissions impacts wherever air quality criteria is confirmed to be exceeded.
Reporting	Retain any monitoring results and summarise into an annual monitoring/ environmental performance report. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter it into the incident-complaint register for rectification and follow up.
Corrective actions	**Corrective action triggers** • Dust or gaseous emissions complaint. • Observed excessive dust or emissions. • Exceedance of air quality criteria. **Corrective actions:** • Respond to the complaint on the same day if possible and determine the time, location and possible source. • Conduct on going and/or additional monitoring at the affected location. • Rectify any problems identified if practicable. • Report any corrective actions undertaken back to the affected persons and record in a complaint register or as required in the EA conditions. • Follow up on complaints after rectification works to determine if they have been successful.

Table C2.2: Coal Dust Mitigation Measures

Element	Detail
Actions/mitigation measures	Implement and maintain an Integrated Coal Moisture Regulating System at the product coal stockpile and Train Loadout Facility (TLF) to minimise dust emissions from the product coal stockpile and to ensure that product coal delivered for train-loading has a coal-surface water content at the optimum level to ensure the effectiveness of veneering of loaded coal. As part of the system, implement water spray or fogging systems to apply optimum levels of supplementary coal watering. Prepare and implement a Project specific Coal Dust Management Plan (CDMP) which identifies control measures to effectively mitigate dust emissions from loaded and unloaded coal haulage trains. The CDMP will contain mitigation measures that are consistent with the following: • Wagon design - wagons have been designed such as sloped sills so that no coal 'sits' on the wagon sills or external surfaces. The wagon design also ensures the door design has a proper 'over centre' arrangement to ensure full door contact and the door is adequately stiff (but not too heavy) to ensure continued straightness and no gaps appear in the door seals over time. • Veneer suppressant - application of a veneer suppressant to the surface of loaded coal wagons binds the surface particles together to provide a membrane that is resistant to dust lift off. The suppressant can be applied to the surface of loaded wagons using a spray system. • Wagon loading practices and profiling - undertake train loading procedures in such a way that significantly improves the effectiveness of veneering, reduces the amount of parasitic coal that drops off during transit and reduces residual coal at unloading terminals. The load-out operator must commence loading so the first drop of coal impacts the leading inside wall of the wagon, avoiding the kwik-drop doors. The profile must be a flat top surface and spillage over the ends and sides must be avoided. • Coal type testing for dustiness - determining the dustiness of coal types being produced assists in identification of those more likely to cause nuisance. This allows preventative measures to be effectively implemented before the train causes nuisance. • Load-out facility infrastructure - consideration of the design and operation of mine load-out infrastructure can improve mitigation of coal dust. Examples include mine load-out equipment and mechanisms that contain the coal within the wagon, load accurate volumes of coal, weigh incoming and outgoing wagons, minimise dumping coal onto wagon doors, veneer and profile the loaded coal. • Coal stockpile dust suppression system - implement a system that adds moisture to the surface of the product coal stockpile to maintain an optimum moisture level to reduce dust and improve veneer effectiveness (whiles not attracting moisture penalties from customers). • Internal communications - Raise general awareness of the initiatives being undertaken to reduce coal dust within the organisation. Awareness of the issue will enable staff at all levels to conceive of new initiatives (including improved operating procedures) to help minimise coal dust. • Batch weighing load out systems - batch weighing systems accurately control the quantity of coal loaded into each wagon, resulting in optimised loads, providing the ideal volume of coal into the wagon minimising dust lift off and spillage in transit.

Table C2.3: Sensitive receptors

Receptor ID	Receptor name	Location - latitude	Location - longitude	Distance and direction
Sensitive Receptors				
R1	BAR H-1	149.654152	-22.644752	4.1 km (N)
R2	Brussels	149.69164	-22.736011	3.2 km (SE)
R3	Neerim-1	149.716823	-22.761051	6.9 km (SE)
R4	Neerim-2	149.701064	-22.768169	3.4 km (SE)
R5	Oakdean	149.668225	-22.642817	4.5 km (NE)
R6	Ogmore Township	149.658111	-22.619961	6.8 km (N)
R7	Strathmuir	149.732975	-22.705505	6.3 km (E)
R8	Tooloombah Service Station (incl. both residences)	149.625007	-22.688686	2.2 km (W)
R9	Tooloombah Homestead	149.541997	-22.733402	10.2 km (W)
Wetland Receptors				
R10	Tooloombah Creek	149.625007	-22.688686	2.2 km (W)
R11	Deep Creek	149.679248	-22.710677	0.7 km (E)
R12	Western Boundary 1	149.636031	-22.709301	0.3 km (W)
R13	Western Boundary 2	149.635369	-22.697116	0.8 km (W)

Table C2.4: Project air quality criteria

Pollutant	Basis	Criteria	Source	Averaging time
TSP	Human Health	90 μg/m^3	Model Mining Conditions (MMC) and EPP (Air)	1-year
PM_{10}	Human Health	50 μg/m^3	National Environment Protection (Ambient Air Quality) Measure (Air NEPM) and EPP (Air)	24-hour
	Human Health	25 μg/m^3	Air NEPM and EPP (Air)	1-year
$PM_{2.5}$	Human Health	25 μg/m^3	MMC and EPP (Air)	24-hour
	Human Health	8 μg/m^3	Air NEPM and EPP (Air)	Annual
Dust deposition	Amenity	120 mg/m^2/day	MMC	1-month
	Vegetation - wetlands	200 mg/m^2/day	Cumulative Impact Assessment (CIA)	3-month

C3 – Greenhouse Gas Management Plan

October 2020

Table C3.1: Greenhouse gas management plan

<table>
<tr><th>Element</th><th>Detail</th></tr>
<tr><td colspan="2">Applicable site activities
The main sources of greenhouse gas (GHG) emissions from the mining activities are estimated to be: coal handling preparation plant (CHPP) operations, mining operation (conveyors, crushing and screening), blasting/drilling, diesel combustion, transport of staff and materials, power generation.</td></tr>
<tr><td colspan="2">Aim
No adverse impacts to the environment associated with mine activity emissions.</td></tr>
<tr><td>Objectives</td><td>Targets</td><td>Key performance indicators</td></tr>
<tr><td>• Undertake and complete works in compliance with statutory environmental requirements
• Minimise gaseous emissions (sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and carbon monoxide (CO)) from blasting activities</td><td>• No statutory infringements
• No non-compliances of licence/approval conditions
• Gaseous blasting emissions criteria for Bruce Highway receptors (R13 to R17)
<u>Criteria mg/m^2/day</u>
<u>1-hour SO_2</u> 570
<u>1-hour NO_2</u> 250
<u>8-hour CO</u> 11,000</td><td>• Number of infringements
• Number of non-compliances
• Number of exceedances</td></tr>
<tr><td>Responsibility</td><td colspan="2">Construction: Construction Manager
Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="2">Planning and design
Mine layout will use existing cleared land, where practicable, therefore minimising the amount of vegetation removed.
Revegetation for biodiversity habitat and riparian zone stability has been integrated in the design – this will also indirectly provide for carbon sequestration
Provision of environmental offsets for Matters of State and National Environmental Significance have been provided – these will also indirectly provide for carbon sequestration
Construction
Optimise blasting activities to reduce the quantity of explosives used, and consequently reduce the associated GHG emissions (NO_x).
Implement operating guidelines to promote efficient operation of vehicles and machinery.
Equipment and vehicles will be maintained in good working condition to maximise fuel efficiency.
Procurement policies that promote the selection of energy efficient equipment and vehicles.
Operation
Undertake regular assessment, review and evaluation of GHG reduction opportunities.</td></tr>
</table>

Element	Detail
	Progressive rehabilitation program will be employed to reduce disturbance to the environment. Monitoring and maintenance of equipment in accordance with manufacturer recommendations.
Monitoring	Annual energy audits to progressively improve energy efficiency. Perform ongoing internal measurements and monitoring emissions (such as key emission indicators (KEI)). Review annual energy use to identify potential energy efficiency opportunities on a regular and ongoing basis. Perform regular reviews of new technologies in emission reduction opportunities and implement energy efficiency measures consistent with the industry best practice.
Reporting	Calculate annual GHG emissions as required and report GHG emissions for all years of operations under the *National Greenhouse and Energy Reporting Regulations 2008* (NGER Regulations) (annual greenhouse gas rates are expected to exceed 25,000 t CO_2-e and therefore triggers NGER reporting requirements). Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter into the incident-complaint register for rectification and follow up. Monitoring results will be retained and summarised into annual monitoring / environmental performance reporting.
Corrective actions	**Corrective action triggers:** • Energy consumption from the Project increases. • Energy efficiency opportunities are not being reviewed or identified. • Energy audits detect non-compliance in energy efficiency. • Reporting shows no progressive improvement in energy efficiency. • Observed excessive emissions or energy use. • Energy consumption is inconsistent with the best practice guidelines. **Corrective actions:** • Conduct a review and identify measures to improve energy efficiency and GHG emissions. • Ensure that appropriate personnel are provided with adequate environmental awareness regarding energy efficiency, emissions management and the environmental management commitments relating to GHG emissions.

C4 – Hazardous Materials Management Plan

October 2020

Table C4.1: Hazardous materials management plan

Element	Detail
Applicable site activities	All activities involving the storage, handling and transport of dangerous goods and hazardous substances. This may include: • diesel fuels in minor quantities and bulk tanks • bulk explosive including ammonium nitrate – Fuel Oil (explosive, blasting, Type B or agent blasting Type B) • detonators, primers, boosters, detonating cords • lubrication, hydraulic oils • solvents, thinners • paints • batteries • sulfuric acid (H_2SO_4) • waste oil and waste from anything above and • used vehicle tyres.
Aim	Any hazardous substances and events, such as potential spills, collisions, accidents and natural hazards do not pose a risk to the safety of Project employees, contractors, visitors or impact the existing environmental values.
Hazardous Substances	A hazardous material is a material which, in sufficient quantities, has the potential to cause harm to people, property or the environment due to its chemical, physical or biological properties. This includes: • Dangerous goods, classified as having the potential to cause immediate harm to people, property or the environment due to their explosive, corrosive, toxic, oxidising or flammable nature. • Chemicals if they are listed on the national Hazardous Substances Information System and are above the concentration level which is harmful to human health. This management strategy covers both hazardous chemicals and dangerous goods, all of which are termed here hazardous substances, whether products to be used, or wastes to be stored and disposed.

Objectives	Targets	Key performance indicators
• Undertake and complete works in compliance with statutory environmental requirements	• No statutory infringements • No non-compliances of licence/approval conditions • Hazardous substance thresholds are not exceeded	• Number of infringements • Number of non-compliances • No exceedances of thresholds
• No adverse health or environmental impacts as a result of storage and handling of materials or hazardous substances	• No releases of hazardous substances outside of containment areas or off-site • All rags, absorbents, soils, or containers containing hazardous substances contained on the site • Removal of waste or surplus hazardous substances from site by licenced transporters to licenced sites	• Number of incidents • Number of failures/non-compliances recorded in site inspections

Element	Detail
Responsibility	Construction: Construction Manager Operation: Site Manager
Actions/mitigation measures	**General** All personnel to be trained in the safe handling, storage, use and disposal of hazardous substances. All plant, containers or other equipment used for the storage, handling, or transporting of hazardous substances to be maintained in a safe condition. Potentially hazardous substances or chemicals to be disposed of in accordance with the requirements of the Material Safety Data Sheet (MSDS). This includes any spill absorbent material, rags, containers, soil, etc. contaminated with the material. Hazardous wastes removed from site or fully contained under cover and above flood levels before the wet season. Minimal quantities of hazardous substances will be kept on site. **Storage and containment** Dangerous goods and hazardous materials and wastes will be stored in designated storage areas to appropriate Australian Standards. These require as a minimum: <u>Construction</u> • Internally bunded fuel tanks, with spill kits on hand. • Externally bunded permanent installations around fuel dispensing areas. • Storage of hazardous substances in temporary (or permanent once built) hazardous storage facilities. • Hazardous waste storage facilities will be locked to prevent unauthorised access. <u>Operation</u> • Separation of incompatible chemicals by using specific storage containers or sections for specific items (refer to MSDS or appropriate Australian Standard). • Storage of diesel away from other hazardous substances at onsite fuel farm (anticipated total capacity of 1,200,000 L). • Storage of ammonia nitrate offsite. • Storage of all hazardous substances in signed areas, within roofed, concrete bunded areas (in accordance with the most recent version of AS 1940-2017 – The storage and handling of flammable and combustible liquids. • Plant and equipment to be washed down in designated areas that have been clearly marked. • Storage of hazardous substances stored in appropriately labelled containers and MSDS available for all substances in accordance with the National Guidelines for Occupational Health and Safety Competency. • Maintenance of the following design features: - Sumps and pipework to allow the area inside the bund to be completely drained. - Sumps with oily water separators included in concrete pads. - Bunding floors and walls lined with impermeable material to prevent leaching and spills. - Collision protection – bollards or restricted access for storage tanks. - Storage and ‘dirty’ areas drain to environmental dams.

Element	Detail
	- Foam injection systems in appropriate storage tanks. - Water cooling system on each storage tank. - Check pressure vent valves prior to fill/discharge on each storage tank. A detailed site plan is to maintained for each storage location including; a layout plan of hazardous substances, location of spill kit, emergency exit, any emergency/contingency measures (emergency stops etc.), location of personal protective equipment (PPE), MSDS for all substances stored, and location and direction of any overflow discharges (if they were to occur) and receiving environment for these discharges **Fuel transfer and refuelling operations** Construction Adopt operational controls when they have been constructed. Small or day tanks double lined and/or stored in suitable containers to mitigate the risks of spills or leaks. Store all other quantities and bulk hazardous substances within suitably bunded areas. Spill control equipment is to be deployed prior to the transfer of fuel or oil within 30 m of a drainage line or the pond, and refuelling is to be attended at all times. Operation All bulk transfer and regular re-topping or refuelling points to be bunded to contain the largest likely spill. Refuelling locations to also contain: • automatic wet weather diversion, to capture all flows while refuelling, plus the first flush (typically 15mm) after refuelling stops, triggered by the refuelling hose. • emergency stops in prominent locations to close off all valves and pipes to tanks. • auto shut off valves. Fuel will be stored within impermeable and bunded areas (and double skinned storage tanks where required), with refuelling areas being either a built for purpose bunded, concreted refuelling area (larger central storage), or smaller bunded refuelling location (permanent or temporary). Chemicals and waste chemicals, fuel and oil, oil-water mixtures, and waste drums or containers will be stored within designated roofed and bunded chemical and waste storage facilities. **Transport** All requirements for the transport of dangerous goods and hazardous materials as required by the Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008 will be complied with. Only vehicles suitable for the hazardous substance to be conveyed with required signage (e.g. corrosive, flammable and toxic) will be used for transport. Hazardous substance transport vehicles will be maintained regularly. All regulated contractors must be licensed in accordance with Transport Operations (Road Use Management – Drivers Licensing) Regulation 2010.

Element	Detail
	All identified trackable wastes are required to be accompanied by a Waste Transport Certificate. **Spill response** Utilise appropriate spill containment material and spill kits which are stored in easily accessible locations at all times where chemicals and liquid waste is being stored and handled including on all trucks carrying dangerous goods and at refuelling facilities Do not hose spills of hazardous substances. Employ dry clean up procedures as appropriate to the substance. Comply with the Spill Response in the Contingency Management Strategy (Appendix E). **Health and Safety** Comply with the site Health and Safety Plan. In particular, ensure that workers and others are not exposed to risks to health or safety arising from the Project, based on risk assessment and management of risks.
Monitoring	Frequently monitor (weekly at a minimum) hazardous goods storage areas including refuelling/servicing areas to detect any leakages or spills and ensure spillages and incidents are observed, cleaned up and recorded. Inspect spill kits monthly and following each use of a spill kit to ensure they are appropriately stocked. Monthly inspections of containment bunds to ensure bund integrity, and rectify any issues found. Undertake annual tank integrity testing for all bulk hazardous or dangerous goods storage tanks.
Reporting	Undertake a risk assessment for all chemicals or potentially hazardous substances (products or waste) stored on the site to identify the level of risk, quantities of all classes of hazardous substances and appropriate controls (e.g. using Chemalert or similar). Any new chemicals purchased for use to be subject to this risk assessment prior to use. Retain hazardous substances register to identify all types and quantities of hazardous substances, storage details and location on site, an inventory of MSDS and maintain this in accordance with legislative requirements and the Project's Safety and Health Management System. Maintain a regulated waste and tracking register for all regulated wastes generated on site including the date, quantity, type, name of transporter, source and intended treatment or disposal destination. All leakages, spillages and incidents to be reported to the Construction or Site Manager immediately. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F1 and enter into the incident-complaint register for rectification and follow up.
Corrective actions	**Corrective action triggers:** • Hazardous substance located outside of containment facility • Leaks or spills of any substance (hazardous or otherwise, assuming at first it is hazardous)

Element	Detail
	• Structures found to be in need ofrepair, or potential for spill, leak or breach of containment identified • Maximum quantities of dangerous goods storages exceed the thresholds **Corrective actions:** • Initiate spill response (refer Spill Response in the ContingencyManagement Strategy (Appendix E)) • Rectify leaks, defects or potential for leaks or spills, ensuring first it is safe todo so, and appropriate personnel and PPE are utilised
References National Transport Commission (2020) Australian Dangerous Goods Code. Edition 7.7. AS 1940-2017 – The storage and handling of flammable and combustible liquids.	

C5 – Land Use Management Plan

October 2020

C5 – Land Use Management Plan

This Land Use Management Plan (LUMP) provides management measures for those aspect of the Project related to land. Below are provided the following management tables:

- Table C5.1: Land and soils management plan
- Table C5.2: Biodiversity management plan
- Table C5.3: Weed and pest management plan and
- Table C5.4: Bushfire management plan.

Table C5.1: Land and soils management plan

Element	Detail	
Applicable site activities • Site establishment. • Vegetation clearing and earthworks. • Operations. • Site stabilisation and rehabilitation.		
Aim Ensure that land and soil resources are protected both now and in the future, such that the ecological health and land uses, and the health, welfare and amenity of people are maintained.		
Objectives	**Targets**	**Key performance indicators**
Undertake and complete works in compliance with statutory environmental requirements	• No statutory infringements • No breaches of licence/approval conditions	• Number of infringements • Number of breaches
Protection of non-impacted site soils and land systems (i.e. outside of the project footprint) to enable stable, self-regulating soil-vegetation environments (management of cover, fertility and contamination)	• No damage to vegetation outside of areas identified on vegetation clearing plans • Monitoring of vegetation abundance and health over time shows no impacts to vegetation outside of areas identified on vegetation clearing plans • No traffic outside of defined roadways • No grazing of project site during operations	• Compliance with Biodiversity Management Plan • Area disturbed by traffic outside of project footprint • Area disturbed by cattle grazing outside of project footprint
Avoid soil contamination	• No significant releases of chemicals, spills • All unexpected findings notified, works stopped and addressed prior to works proceeding	• Number of incidents involving leaks, spills or soil contamination • Number of contamination incidents reported, and number not addressed as required and in the timeframes outlined
Plan for rehabilitating site to a stable, non-polluting and self-sustaining condition suitable for low-intensity cattle grazing	Addressed in the Rehabilitation and Closure Strategy in Chapter 11	

Element	Detail
Responsibility	Construction: Construction Manager Operation: Site Manager
Actions/mitigation measures	**Land use management** Cattle will be removed (destocked) to reduce the level of erosion and land degradation. This will involve the removal of cattle in the northern part of the project site during operations years 1 to 9 and in the southern parts, during years 10 to 19. **Erosion and sediment control** The draft Erosion and Sediment Control Plan (ESCP) is to be updated prior to construction commencing by a suitably qualified person and implemented in accordance with relevant legislation and guidelines. **Soil management** Topsoil and subsoil stripping during construction to be carried out under an approved Permit to Work and supervision of environmental staff. Prior to stripping, additional soil testing will be conducted to include at least salinity (EC), exchangeable cations, ESP and chloride to confirm the stripping depths for top and subsoils. Supervisors and earthmoving plant operators will be trained to visually identify the topsoil and subsoil layers to ensure that stripping operations are conducted in accordance with stripping plans and in-situ soil conditions. Care will be taken to ensure soil moisture conditions are appropriate for stripping and stockpiling, for example the moisture content of the topsoil material is not too dry or too wet. All soils to be appropriately stockpiled away from mining operations for future rehabilitation use. Soil stockpiles are to be: • Topsoils: a maximum height of 3 m • Subsoils: a maximum height of 6 m. • Revegetated to prevent soil erosion and weed invasion and to maintain soil biology. • Located well away from works areas, access paths and overland flow paths. Records will be retained tracking the removal, stockpiling and movement of topsoil, particularly where the topsoil contains weed species. **Soil contamination** Implement the Hazardous Materials Management Plan and Waste Management Plan, and Spill Response in the Contingency Management Strategy (Appendix E). **Rehabilitation and revegetation** Develop and implement a Progressive Rehabilitation and Closure Plan (PRCP) to the satisfaction of Queensland Department of Environment and Science prior to the commencement of mining operations. The PRCP will be prepared in accordance with the Guideline Progressive Rehabilitation and Closure Plans (PRC Plans) (PRCP Guideline) (DES 2019). The PRCP will adopt the rehabilitation and closure strategy outlined in Chapter 11 – Rehabilitation and Decommissioning.
Monitoring	Regular site inspections will be conducted, with potential issues identified and corrective actions undertaken to rectify. An incident-complaint register will be maintained and reviewed for all spills and leaks to keep track of and where required improve spill management on the site.

Element	Detail
	Implement the Unexpected Findings Protocol provided in the Contingency Management Strategy (Appendix E).
Reporting	Site inspections will be recorded in a logbook, or the site visual inspection form. Any non-conformance, incident or potential incident will be recorded on the incident complaint form in Appendix F (or similar) and entered into the incident-complaint register for rectification and follow up
Corrective actions	**Corrective action triggers:** • Evidence of erosion or sedimentation. • An Unexpected Finding of contamination or other soil issue during construction (typically vegetation clearing/earthworks). • Spills or leaks of potential contaminants. **Corrective actions:** • Repair erosion and sediment controls, stabilise exposed surfaces and reinstate drainage or other controls and review ESCP. • Undertake general site housekeeping to tidy up loose rubbish, ineffective stockpile controls, etc. • Implement the Unexpected Findings Protocol provided in the Contingency Management Strategy (Appendix E). • Implement the Spill Management process within the Contingency Management Strategy (Appendix E).
References Department of Environment and Science (DES) (2019) *Guideline Progressive rehabilitation and closure plans (PRC plans).* Queensland. ESR/2019/4964, v1.00. Available from: https://environment.des.qld.gov.au/ data/assets/pdf_file/0026/95444/rs-gl-prc-plan.pdf Engeny Water Management (Engeny) (2020) *Conceptual Erosion and Sediment Control Plan*. Prepared for: Central Queensland Coal.	

Table C5.2: Biodiversity management plan

<table>
<tr><th colspan="2">Element</th><th colspan="2">Detail</th></tr>
<tr><td colspan="4">Applicable site activities
Site establishment.
Vegetation clearing and earthworks.
Site stabilisation and rehabilitation works.</td></tr>
<tr><td colspan="4">Aim
To avoid or mitigate adverse impacts on terrestrial and aquatic flora and fauna environmental values.
To minimise the risk of significant impacts to threatened species and communities, and migratory species listed under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) and species listed under the Nature Conservation Act 1992 (NC Act).
Maintain rehabilitated areas of the site, with endemic species where possible.</td></tr>
<tr><td colspan="2">Objectives</td><td>Targets</td><td>Key performance criteria</td></tr>
<tr><td colspan="2">Undertake and complete works in compliance with statutory environmental requirements</td><td>No statutory infringements
No licence/approval conditions non-compliances</td><td>Number of infringements
Number of non-compliances</td></tr>
<tr><td colspan="2">Minimise the impacts to vegetation and fauna on or adjacent to the site</td><td>No damage to vegetation in 'no-go' areas and outside of areas identified for clearance on vegetation clearing plans
No impacts to protected vegetation or fauna species or communities listed under the NC Act and/or EPBC Act outside of the project site
No harmful incidents involving wildlife
No barriers to fish passage erected in waterways
All construction personnel to complete a site induction, including awareness training in regard to this management issue</td><td>Number of incidents of clearing/damage outside no-go areas
Number of incidents involving harm to fauna
As-cleared area and location of clearing compared to vegetation clearing plans
Number of vegetation monitoring program trigger exceedances
Degree of changes to vegetation abundance and health in areas outside of vegetation clearing plan areas</td></tr>
<tr><td>Responsibility</td><td colspan="3">Construction: Construction Manager
Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="3">Significant Species Management
Implement the Significant Species Management (SSMP).
Aquatic Ecology and GDEs
Implement the Groundwater Dependent Ecosystem Monitoring and Management Plan (GDEMMP) and
General Biodiversity Management
<u>Pre-Clearing</u></td></tr>
</table>

Element	Detail
	Prior to construction, ground truth proposed clearing areas, prepare site specific Vegetation Clearing Plans with the extent of clearing and 'no go' areas clearly defined. Boundaries of clearing and 'no go' areas will be clearly pegged/flagged on the ground prior to clearing starting. Training for all personnel will include information on identifying these marked areas. Prior to clearing at artificial dams, a qualified ecologist is to inspect and if required remove native aquatic fauna to a suitable pre-determined area. **Vegetation clearing** The amount of land required to be disturbed is to be minimised as much as practicable. No lay down areas or materials storage will be located within wetland areas or areas of retained vegetation. A fauna-spotter catcher will be present for all vegetation clearing activities. Clearing activities will avoid damage to the roots, trunks and canopy of adjacent retained vegetation. **Waterway crossings** Design waterway crossings in compliance with: • Austroads – Guide to Road Design Part 5B – Open Channels, Culverts and Floodways. • Design detail requirements of the Code for Self-Assessable Development; Minor Waterway Barrier Works Part 3: Culvert Crossings, Code number: WWWBW01 (April 2013), Department of Agriculture and Fisheries. • Department of Agriculture and Fisheries (DAF) guidelines - Accepted development requirements for operational work that is constructing or raising waterway barrier works. Construct during the dry season / during periods of no flow, and design to ensure that surface water flows into creeks represent natural conditions as much as possible. Banks of creek crossings will be stabilised post construction to allow revegetation and reduce scour potential. Any fish that become trapped during construction will be salvaged in accordance with the DAF *Guidelines for fish salvage* (DAF 2020). In the event of a fish kill, the appropriate steps provided in the guidelines will be followed. During operations, all stormwater and waterway crossings will be maintained so that they contain suitable flood and low flow passage to avoid creating barriers to fish passage or more than minor changes to surface hydrology. **Traffic** Where there is a fauna-vehicle interaction which results in a mortality, the site manager is to ensure that animal is relocated off the road (well away from the road) as soon as possible, to reduce potential for scavengers to be subsequently struck. **Riparian Vegetation** Implement a revegetation program in areas within the riparian corridor expected to be affected by groundwater drawdown. The revegetation program will involve: • The expansion of the existing riparian corridor by a width of 10 m.

Element	Detail
	• Planting of drought tolerant, and non-groundwater dependent, species of similar ecological function as those with the potential to be impacted. **Offsets** Offsets will be provided in accordance with the Biodiversity Offset Strategy to compensate for the unavoidable direct significant residual impacts to matters of national and state environmental significance.
Monitoring	**Pre-clearing** Pre-clearance surveys to be undertaken in accordance with the SSMP. **Vegetation clearing** Weekly monitoring will be conducted of retained vegetation to detect any damage or decline in the health and condition of retained vegetation within the construction site and adjacent sites. **Vegetation Health** Monitor vegetation health in remnant vegetation areas adjacent to the mining activities to identify whether indirect impacts are occurring because of dust, runoff direct or other indirect impacts.
Reporting	**General** Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter into the incident-complaint register for rectification and follow up. **Pre-clearing** A report is to be prepared documenting the results of the pre-clearing surveys (including methodologies, target species, results, significant findings, etc.), appropriate fauna relocation sites, and any additional management measures identified from the findings of the pre-clearing surveys. **Vegetation clearing** A weekly report will be prepared by the fauna spotter/catcher on the clearing of any native vegetation and any animals encountered or relocated. A weekly log is to be completed during vegetation clearing operations. The weekly log is to contain an audit of key requirements, e.g. clearing contained within designated limits, integrity of clearing boundary devices, no damage to vegetation outside clearing boundaries, and that the fauna spotter/catcher was present throughout operations. Document progress, non-compliances, outcomes and recommendations relating to vegetation clearing, revegetation and management in annual reports. **Fauna interactions** Any interactions with fauna (e.g. vehicle and fauna interactions) are to be reported to the site manager and details recorded on the incident-complaint form in Appendix F and entered into the incident-complaint register.
Corrective actions	**Corrective action triggers:** • Clearing occurs outside of clearing areas. • Clearing where a spotter-catcher has not inspected or was not present.

Element	Detail
	• Vegetation die-back or deterioration is found in areas outside of the clearing footprint. • Fauna injury or mortality recorded. • Changes in surface water flows into creeks due to road crossing works or blockages to waterways. **Corrective actions:** • Notify relevant authorities of clearing outside approved boundaries. • Engage spotter catcher to inspect site as soon as possible to identify any injured fauna or fauna in distress to relocate or manage. • Investigate the potential cause of vegetation die-back and rectify. • Implement drainage controls and construct or rectify fish passages.

References

Austecology (2020) *Significant Species Management Plan*. Central Queensland Coal Project. Prepared for: Central Queensland Coal Pty Ltd.

Department of Agriculture and Fisheries (DAF) (2020) *Guidelines for fish salvage*. Available from: https://www.daf.qld.gov.au/business-priorities/fisheries/habitats/policies-guidelines/factsheets/guidelines-for-fish-salvage

Ecological Australia (ELA) (2020) *Draft Groundwater Dependent Ecosystem Management and Monitoring Plan*. Prepared for: Central Queensland Coal Pty Ltd.

Eco Logical Australia (ELA) (2020) *Receiving Environment Monitoring Program, Central Queensland Coal Project*: Prepared for Central Queensland Coal, July 2020.

Table C5.3: Weed and pest management plan

<table>
<tr><th>Element</th><th colspan="3">Detail</th></tr>
<tr><td colspan="4">Applicable site activities

Construction activities, particularly:
• Transport of equipment, vehicles and materials to site.
• Clearing, stockpiling and movement of topsoil on the site, particularly from where weed species were present.

Operational phase of the Project, for natural or other (vehicles, materials etc.) spread and movement of weeds on the site.

Waste handling, changes to land use and management (relating to pest fauna species).</td></tr>
<tr><td colspan="4">Aim

To maintain the conservation status, abundance, diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts on the Project area and adjacent areas.</td></tr>
<tr><td colspan="2">Objectives</td><td>Targets</td><td>Key performance criteria</td></tr>
<tr><td colspan="2">• Undertake and complete works in compliance with statutory environmental requirements</td><td>• No statutory infringements
• No licence/approval condition non-compliances</td><td>• Number of infringements
• Number of non-compliances</td></tr>
<tr><td colspan="2">• Minimise weed and pest introduction or spread on the site and on adjacent areas
• Avoid the creation of favourable environments for new or to sustain existing populations of invasive pests</td><td>• No prohibited weeds present on the site
• No increase in the distribution and number of weed and pest species on the site
• No new weed or pest species identified on the site
• Less than 5% weed cover in rehabilitated riparian habitat</td><td>• Number/area/location of each weed and pest species identified on the site</td></tr>
<tr><td>Responsibility</td><td colspan="3">Construction: Construction Manager

Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="3">General

Employee and contractor training will include identification of key weeds and pests on the site. Instructive materials will be displayed around the site identifying key weeds and pests that require control to aid in employee reporting.

Weeds and pests will be controlled as per the requirements of statutory management plans for particular species, where available.

Weed Control

Implement the Significant Species Management Plan (SSMP) MP5 – Management and Control of Invasive Weeds to minimise the impact of invasive weeds.

In general, the following actions/mitigation measures will be implemented:
• Records will be retained that track the removal, stockpiling and movement of topsoil, particularly where the topsoil contained weed species. Topsoil from</td></tr>
</table>

Element	Detail
	weed infestation areas will be stockpiled and if moved, not stored or reused in areas where those weeds are not present. • Endemic vegetation species will be used for revegetation and landscaping activities. • Disturbed areas will be rehabilitated at the earliest opportunity, and buffers will be created around identified riparian and wetland areas to reduce edge effects. • Vehicles to keep to roads or compacted surfaces wherever possible and reduce vehicle movements in wetted soil where avoidance is not possible. • Any weeds identified as being of management concern, including declared and environmental weeds, will be controlled in accordance with local best practice management as described in the Pest Fact sheets published by the Queensland Department of Agriculture and Fisheries. **Pests** Implement the SSMP MP4 – Management and Control of Pest Animals to minimise the impact of introduced pest animal species. Implement the Waste Management Plan to ensure that wastes are appropriately managed onsite and access to food wastes by pest species is limited.
Monitoring	**Pre-Construction** Prior to construction commencing, conduct a baseline weed and pest survey in the Project footprint plus a 200m buffer. The results of the survey will be used to develop a digital weed map of the site identifying the distribution and density of weed infestations. **Construction and Operation** Conduct weed and pest monitoring surveys in the Project footprint plus a 200m buffer every two years following the baseline surveys. Surveys are to consist of a dry season survey and a survey post-wet season. For any significant weed infestations, take photos prior to and after treatment applications to provide a visual assessment of the effectiveness of methods to reduce weed density.
Reporting	Following the pre-construction survey, develop mapping of weeds and pests present on the site and a register of pertinent information in relation to weed and pest distribution, numbers and control requirements (weed and pest register). Record locations and details of any weed and pest control undertaken in the weeds and pest register. Report weeds according to the requirements of Biosecurity Queensland. Where prohibited invasive plant or Category 1 or 2 Restricted Matter are found to be present on site notify Biosecurity Queensland within 24 hours on 13 25 23. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter into the incident-complaint register for rectification and follow up.
Corrective actions	**Corrective action triggers:** • Presence of prohibited invasive plant/s or Category 1 or 2 Restricted Matter. • Spread of existing weeds or pests, or introduction of new pests or weeds to the site.

Element	Detail
	• Plant or equipment being brought to the site shows signs of carrying weed seeds. • Plant or equipment being brought to the site has not weed wash certificate. **Corrective actions:** • Where prohibited invasive plant/s or Category 1 or 2 Restricted Matter are found to be present on site notify Biosecurity Queensland within 24 hours on 13 25 23 • Initiate control measures to stop the spread of weeds or pests and where practicable eradicate them on the site. • If topsoil from weed infestation areas is spread across the site ongoing monitoring and control must be undertaken to eradicate or suppress the spread of weeds. • Stop plant/equipment from entering the site without appropriate weed wash documentation. If required, subject plant/equipment to weed wash prior to entry. • Update training and inductions to include key weeds and staff responsibilities to prevent the introduction and spread of weeds.

References

Austecology (2020) Significant Species Management Plan, Central Queensland Coal Project. Prepared for: Central Queensland Coal Pty Ltd.

Table C5.4: Bushfire management plan

Element	Detail		
Applicable site activities Construction, operation and rehabilitation, land management.			
Aim To minimise the risk of adverse impact from bushfire on life, property and the environment.			
Objectives		**Targets**	**Key performance criteria**
• Undertake and complete works in compliance with statutory environmental requirements		• No statutory infringements • No licence/approval condition non-compliances	• Number of infringements • Number of non-compliances
• No bushfire ignition as a result of Project activities		• No human-induced bushfire ignitions that cause loss of life, and/or damage to property and the environment	• Number of human-induced bushfire ignitions that cause loss of life, and/or damage to property and the environment
• Reduce the spread and intensity of bushfires, while maintaining an ecological sensitive mosaic of fire history		• No uncontrolled bushfires in the Project area • Manage fuel loads taking into consideration ecological impacts on listed species known to be fire-sensitive • Fire management conducted in accordance with the approved regime	• Measured fuel loads • Number of confirmed losses of listed fire-sensitive species attributable to fuel management activities
• Reduce the community's vulnerability to bushfires by improving its preparedness		• Prepare, maintain and review Bushfire Management Plan (BMP) and Emergency Response Plan	• Availability and familiarity of BMP and Emergency Response Plan to all employees and contractors
Responsibility	Construction: Construction Manager Operation: Site Manager		
Actions/mitigation measures	Consult with Queensland Fire and Emergency Services (QFES) and rural fire service (RFS) regarding this Bushfire Management Plan. Undertake bushfire site assessment with consideration to the State Planning Policy state interest guidance material –Natural hazards, risk and resilience – Bushfire (Department of State Development, Manufacturing, Infrastructure and Planning 2019), to determine level of bushfire risk affecting the site. Develop and implement an Emergency Response Plan. The ERP is to outline specific response procedures in the event of a bushfire including: • Details of provisions for site access roads for firefighting and emergency vehicles. • Safe evacuation procedures for staff in the event of an emergency. Develop a management system to minimise the risk of spontaneous combustion of product coal stockpiles. These procedures will include the routine monitoring of stockpiles, stockpile compaction and minimising the stockpile stagnancy.		

Element	Detail
	Develop a management system to manage outbreaks of fire from spontaneous combustion of waste rock material in active spoil areas. Management will depend on the location of waste rock material: • If outbreaks occur in inaccessible areas, management will involve visual monitoring prior to developing accesses into the areas for remediation works. • If outbreaks occur in readily accessible areas, remediation will be planned and undertaken with minimal changes to operations Regularly maintain firebreaks, including a firebreak along the haul road. Identify and maintain alternative emergency access to and from the train load-out facility (TLF) in the event of haul road closure. Regularly slash grass around infrastructure, particularly electrical substations and fuel storages. Manage vegetation adjacent to site for fuel load and fire risk through with appropriate fire management regimes and weed management. Firefighting equipment on site will be aligned with that used by local emergency service providers. Staff will be trained in use of firefighting equipment. Smoking onsite will be restricted to designated areas.
Monitoring	Inform all staff and contractors about the impacts of bushfires and preventative measures. Weather conditions will be monitored to identify high fire risk days and controls upgraded on these days. Liase with the local authorities (e.g. RFS) on severe bushfire hazard days. Undertake annual assessment of fuel loads prior to the fire season.
Reporting	Prepare a report following all bushfires that occur on the property, including details of location, source and management actions (if any). Prepare annual reports outlining implementation of the bushfire management activities identified in the this BMP. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter it into the incident-complaint register for rectification and follow up.
Corrective actions	**Corrective action triggers:** • Ignition of a bushfire as a result of Project activities. • Incidence of uncontrolled and/or intense bushfire. • Elevated fuel loads in fire management areas. **Corrective actions:** • Investigate the source and cause of the bushfire ignition. • Implement emergency response firefighting procedures. • Undertake fuel load reduction measures. • Review effectiveness of fire management measures, including fuel load management and fire breaks.

Element	Detail
	Ensure the BMP and any updates is made available and familiar to all employees and contractors.

References

Department of State Development, Manufacturing, Infrastructure and Planning (2019) *State Planning Policy state interest guidance material –Natural hazards, risk and resilience – Bushfire*. Available from: https://dsdmipprd.blob.core.windows.net/general/spp-guidance-natural-hazards-risk-resilience-bushfire.pdf

C6 – Mineral Waste Management Plan

October 2020

Table C6.1: Mineral waste management plan

Element	Detail
Applicable site activities Construction and operation phases of the Project will generate mineral waste in the form of spoil (from overburden and interburden removal and ex-pit emplacement) and rejects from coal processing (i.e. coarse and dewatered fine rejects).	
Aim To identify potential pollution from waste rock during all phases of the Project and manage it to prevent leachate and acid drainage. Temporary rehabilitation of the waste rock stockpiles will aim to stabilise the waste rock materials stored within the temporary landform whilst assisting with the management of water runoff to avoid pollution to neighbouring waterways. The final landform design will be refined throughout the mine life to ensure that the landform established will be stable, safe and support the intended final land use (i.e. low intensity cattle grazing) for the Project area.	
Objectives	**Targets** / **Key performance indicators**
• Undertake and complete works in compliance with statutory environmental requirements	• No statutory infringements • No licence/approval condition non-compliances • Number of infringements • Number of non-compliances
• Ensure waste rock and reject materials are appropriately managed to prevent leachate and acid drainage to the surrounding environment	• No unacceptable contamination of surface water and groundwater • No acid and metal toxicity in the revegetation layers • No post-closure pollution or long-term liability • Number of site-specific groundwater and surface water quality objective exceedances • Performance indicators and completion criteria for ex-situ Waste Rock Stockpiles are presented in Table C6.2.
Responsibility	Construction: Construction Manager Operation: Site Manager
Actions/mitigation measures	**Prior to Construction** Utilise the existing soil and geological data, including CQC's geological block model, to develop a geo-environmental block model to determine the material types, physical and chemical properties which will be encountered during mining. Undertake a gap analysis and develop and implement a drilling and testing program (for pre-construction and during mining) to ensure that the block model is sufficiently defined to understand the materials to be encountered to enable the landform to be designed and built for long term stability. Develop a landform haulage schedule as part of detailed design of the progressive and final landforms to ensure landforms are built for long term physical and chemical stability. Undertake geochemical assessment of the stockpile and final landform compositions based on the above information to confirm likely leachate, erodibility and runoff characteristics. Identify pyritic materials, sodic materials, and other potentially problematic materials for amelioration, capping / containment, or avoidance, and materials that

Element	Detail
	are suitably hardy to be useful in providing low erodibility surfaces for external waste rock stockpile surfaces. **During Mining** While mining is being conducted, continue to update the geo-environmental block model, detailed haulage schedule and waste rock stockpile / landform design to ensure long term physical and chemical stability. Identify pyritic materials, sodic materials, and other potentially problematic materials for amelioration, capping / containment, or avoidance, and materials that are suitably hardy to be useful in providing low erodibility surfaces for external waste rock stockpile surfaces. Where rock from the Project area is to be used in the construction of roads and hard-standing areas, undertake engineering and geotechnical testing prior to their use to determine the propensity of the materials to erode given their potential sodicity. Implement the Project ESCP to manage the potentially sodic nature of the waste rock material with appropriate erosion and sediment control measures. Regolith materials with low sodic values (either naturally or after treatment) are to be stockpiled separately where possible to be used underneath soil replacement in rehabilitation to aid in the success of rehabilitated landforms. **Temporary waste rock stockpiles** Waste rock stockpiles are to be: • Emplaced with slopes generally less than angle of repose for geotechnical stability. • Graded and compacted to ensure no internal pooling of water and to minimise the infiltration of water into the stockpiled materials. • Armoured with competent and durable rock materials which is to be sourced from strata identified in pre-mining investigations (or ahead of mining) within the mining areas. • Bunded around their perimeter to capture and divert any rainfall runoff from these stockpiled materials into the mine water management system. **Sodic Material Management** Dispose of materials identified as sodic dispersive materials within the core of waste rock stockpiles (or return to voids during mining) well below the final landform surfaces, wherever possible. Where required, sodic materials requiring emplacement on the outer slopes and cannot be appropriately covered with benign materials, are to be treated with gypsum (or other suitable material) to facilitate vegetation establishment and minimise the potential for dispersion and erosion of these materials. Where sodic waste materials are required for use as an additional growth media, undertake prior treatment. **Final Landforming / Rehabilitation** Waste rock used for the final landform covering must comprise material that has a relatively low salinity and low potential for dispersion and placed for geotechnical stability as per the PRCP.

Element	Detail
	Minimise deep infiltration of surface water flows into the final rehabilitated waste rock stockpiles by compacting surface waste rock materials and if required capping using a low permeability material (i.e. clay) recovered from the mining area. **Coarse and Fine Rejects** Dewater (filter press) fine rejects prior to their disposal using filter press technology. Mix dried coarse rejects and filter pressed rejects with overburden waste and strategically place within the waste rock stockpiles or the open cut mine void. Emplace reject materials either at the core of the waste rock stockpiles or deep within the completed mining areas (below the final landform heights). **Run-off and seepage from waste rock stockpiles** Divert clean water catchments around mining affected catchments. Divert surface runoff away from reject materials prior to these areas being covered with waste rock. Ensure all surface water runoff and seepage from waste rock stockpile areas and any rehabilitated areas is contained within the mine water management system using site environmental dams and associated water management structures, preventing the water from uncontrolled release of water from entering local waterways. Based on characterisation of waste material the proposed placement and disposal strategy, predict the quality of run-off and seepage generated including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances. Water must be compliant with the Mine Site Water Management Plan (WMP) discharge criteria prior to release.
Monitoring	**Pre-Mining** Undertake further geochemical and geotechnical investigations prior to mining operations and ongoing investigations during mining operations, as identified in the gap analysis of the geo-environmental block model and detailed design of waste rock stockpiles and final landforms. **Operations and Rehabilitation** Monitor waste rock stockpile embankments for performance and integrity, including placement of survey monuments along each embankment of the waste rock stockpiles. Survey these monuments on a regular basis to detect any embankment movements. Use the information derived from both piezometers and monuments to assess the overall stability of the embankments and detect the potential for adverse dispersion and erosion issues. Continue to monitor and record rainfall and evaporation data at the meteorological station installed at the site. Visually inspect disposal areas for seepage and vegetation die back. **Geochemical Testing Program** Test waste rock and reject solids monthly to determine pH, EC, sulfur species and acid neutralising capacity until geochemical trends have been established. Monitoring will then continue annually. Characterisation of waste rock and reject samples including water extract (leachate) and whole rock multi-element testing, including: • pH and electrical conductivity

Element	Detail
	• Acidity, alkalinity and net alkalinity (as mg $CaCO_3$/L) • Major cations and anions, exchangeable cations • Major soluble metals/multi-element composition (solutions, mg/L).
Reporting	Document the geo-environmental block model, the testing program and the haulage schedule. Maintain a waste rock inventory during extraction to track placement and physical/chemical properties of emplaced rock to assist in later reforming and void filling activities.
Corrective actions	**Corrective action triggers:** • Groundwater and surface water monitoring results show exceedance of trigger levels, while reference / background sites do not. • Other contamination detected in groundwater aquifers. • Spill, leak or uncontained leachate is detected. **Corrective actions:** • Identify the source and pathway of leaks, spills, seepage or contamination by: - Undertaking a review/inspection of the site and incident-complaints register for recent events that may explain the findings - Performing a water balance on potential sources of leaks - Comparing the water quality signatures (anions, cations), and/or - Apply a non-toxic tracer compound • Rectify leaks as soon as practicable once identified. • Cease works which are causing potential high-risk contamination. • Management of water quality or leaching if impacts detected above water quality trigger levels: - Complete an investigation (multiple lines of evidence) into the potential for environmental harm, including comparisons with baseline concentration ranges, and notify the administering authority in accordance with the EA requirements. - Review and update this MWMP as required to ensure it remains current and adequate and that actual and potential environmental impacts are managed.

References

Department of Minerals and Energy (DME) (1995) *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*. Queensland Mining Council.

Engeny Water Management (Engeny) (2020) *Conceptual Erosion and Sediment Control Plan*. Prepared as appendix A15a for CQC SEISv3 2020.

RGS (2020) Technical Report. *Geochemical Assessment of Waste Rock and Coal Reject*. Central Queensland Coal Project. Prepared as appendix A3b for CQC SEISv3 2020.

WRM Water & Environment Pty Ltd (WRM) (2020) *Mine Site Water Management Plan*. Prepared as appendix A5c for CQC SEISv3 2020.

C7 – Noise and Vibration Management Plan

October 2020

Table C7.1: Noise and vibration management plan

<table>
<tr><th colspan="2">Element</th><th>Detail</th></tr>
<tr><td colspan="3">Applicable site activities
Preparation of the open cut mining area and surface infrastructure areas.
Additionally:
• Construction works – truck movements, blasting, and constructing the train load-out facility (TLF).
• Operations – power generation</td></tr>
<tr><td colspan="3">Aim
To operate in a way that protects the environmental values of the acoustic environment and to protect the health, welfare and amenity of people due to project related noise impacts.</td></tr>
<tr><td colspan="2">Objectives</td><td>Targets</td><td>Key performance Indicators</td></tr>
<tr><td colspan="2">• Undertake and complete works in compliance with statutory environmental requirements</td><td>• No statutory infringements
• No licence/approval condition non-compliances</td><td>• Number of infringements
• Number of non-compliances</td></tr>
<tr><td colspan="2">• Minimise noise and vibration related impacts on surrounding sensitive and commercial places</td><td>• No complaints
• Noise generated by activities must not cause following criteria to be exceeded at a sensitive or commercial place:
<table>
<tr><th colspan="7">Sensitive Receptor</th></tr>
<tr><td rowspan="2">Noise level dB(A) measured as:</td><td colspan="3">Monday to Saturday</td><td colspan="3">Sundays and Public Holidays</td></tr>
<tr><td>7am to 6pm</td><td>6pm to 10pm</td><td>10pm to 7am</td><td>9am to 6pm</td><td>6pm to 10pm</td><td>10pm to 9am</td></tr>
<tr><td>$L_{Aeq,\ adj,15\ min}$</td><td>37</td><td>37</td><td>30</td><td>37</td><td>37</td><td>30</td></tr>
<tr><td>$L_{A01,\ adj,15\ min}$</td><td>42</td><td>42</td><td>35</td><td>42</td><td>42</td><td>35</td></tr>
<tr><th colspan="7">Commercial Place</th></tr>
<tr><td rowspan="2">Noise level dB(A) measured as:</td><td colspan="3">Monday to Saturday</td><td colspan="3">Sundays and Public Holidays</td></tr>
<tr><td>7am to 6pm</td><td>6pm to 10pm</td><td>10pm to 7am</td><td>9am to 6pm</td><td>6pm to 10pm</td><td>10pm to 9am</td></tr>
<tr><td>$L_{Aeq,adj,15\ min}$</td><td>42</td><td>42</td><td>35</td><td>42</td><td>42</td><td>35</td></tr>
</table>
• Low frequency noise must not exceed 50 dBZ inside a sensitive place or 55 dBz if measured outside a sensitive place.</td><td>• Number of complaints
• Number of exceedances</td></tr>
</table>

<table>
<tr><th>Element</th><th colspan="2">Detail</th></tr>
<tr><td>• No blasting related impacts on surrounding sensitive and commercial places</td><td colspan="2">• No complaints related to blasting activities
• Blasting must not cause the following limits for peak particle velocity and air blast overpressure to be exceeded:
<table><tr><td></td><td></td><td></td></tr><tr><td>Airblast overpressure</td><td>115 dB (Linear) peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) peak at any time</td><td>No blasting</td></tr><tr><td>Ground vibration peak particle velocity</td><td>5 mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time</td><td>No blasting</td></tr></table>* Should blasting during these hours be required, approval will be sought from the appropriate Authorities, and will be covered by a specific Blast Management Plan.</td><td>• Number of complaints
• Number of exceedances</td></tr>
<tr><td>Responsibility</td><td colspan="2">Construction: Construction Manager
Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="2">Noise
Construction activities will only be undertaken during the day.
Staff will be trained (e.g. through site inductions and regular training programs) to operate the equipment to minimise unnecessary noise emissions.
Unnecessary revving will be avoided and equipment will be switched off when not required.
Internal roads will be kept well maintained.
Rubber linings or constrained layer damping will be used on chutes and dumpers to reduce impact noise.
The drop heights of materials will be minimised where possible, particularly at the TLF.
Ultra-low noise idlers will be used on conveyors.
Where practicable, overburden and topsoil piles will be positioned in between haul roads and receptors to provide noise shielding.
As far as is reasonably practicable, the movement of plant onto and around the site will have regard to the normal operating hours of the site and the location of any sensitive receptors.
An industry state-of-the-art fleet management system (such as Wenco) will be installed on the mining equipment to monitor and control the movement of mining equipment.</td></tr>
</table>

Element	Detail
	Audible reversing warning systems will be installed on mobile plant and vehicles that are of a type that have minimal noise impact on persons outside the site. As far as reasonably practicable, sources of significant noise will be enclosed. The extent to which this can be done depends on the nature of the machine or process to be enclosed and their ventilation requirements. Plant will be operated in accordance with manufacturers' instructions. Machines will be shut down between work periods or throttled down to a minimum. **Blasting** A Blast Management Plan (BMP) will be developed and implemented for the Project. Blasting programs will be planned and safely executed to comply with the vibration standards. Blasting, overpressure and flyrock will be controlled to an acceptable level with the following control measures: • Blasting will occur on Monday to Sunday between 7am and 6pm only. No blasting will occur outside of these hours unless approval has been obtained from the relevant authorities and a specific Blast Management Plan has been prepared. • 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 and in accordance with Australian Standard (AS) 2187 Explosives - Storage, Transport and Use. • Blasting activities will account for the direction the wind is blowing to reduce the risk of potential airblast overpressure impacts at noise sensitive receptors. • Real time noise monitoring will be undertaken as outlined in the ACARP Live Noise Prediction Method for Australian Conditions (Sanderson 2013). Consultation with surrounding landholders will be undertaken to develop protocols for notification of blasts. All workers and surrounding landowners and will be notified prior to blasting activities. An exclusion zone to be established for people and livestock around each blast site prior to firing. **Complaints procedure** Implement the complaints procedure in Section 5.5.4 of the EMP to address issues raised by community members or stakeholders in regard to noise or vibration. Any complaints will be further investigated, recorded and corrective actions implemented if required and communicate back to the complainant where reasonable and actions were taken. Where appropriate, undertake noise or vibration monitoring at the affected location. The monitoring will determine if further corrective actions are required to protect sensitive receptors.
Monitoring	Noise monitoring will be undertaken at the Brussels and the Tooloombah Creek Service Station sensitive receptors.

Element	Detail
	Further noise monitoring will be undertaken to investigate a complaint, or if noise levels are reasonably likely or can be assumed to be exceeded at a sensitive receptor to determine the level of compliance / non-compliance. Meteorological conditions will be monitored on the morning of a blast to identify adverse weather conditions that have potential to exacerbate blast overpressure impact on surrounding sensitive receptors. Vibration and blasting monitoring will be undertaken as needed during each blast event to provide feedback to control environmental impacts.
Reporting	Any non-conformance, incident or potential incident will be recorded on the incident- complaint form in Appendix F and entered into the incident-complaint register for rectification and follow up. Any monitoring results will be retained and summarised into annual monitoring/ environmental performance reporting.
Corrective actions	**Corrective action trigger:** • Exceedance of the noise criteria for daytime, evening, or night time. • Noise complaint. **Corrective action:** • The site manager can request the cessation of works at any time should a breach of performance criteria occur or is at risk of occurring. • If a compliant is made, conduct further monitoring at the affected location. • Should noise monitoring identify that the actual noise levels do exceed the noise criteria for daytime, evening, or night time, the following corrective actions will be implemented: - Screens (i.e. vegetative, earthen mounds) will be established between operational areas and the Brussels, Tooloombah Creek Service Station, TSC Res 1 and TSC Res 2 sensitive receptors. - Should ongoing noise monitoring identify exceedances despite implementation of screening measures, internal and external noise mitigation such as double glazing on windows and wall insulation will be provided at the affected sensitive receptors. • Report any corrective actions undertaken back to the affected persons and record in a complaint register or as required in the EA conditions. • Follow up after corrective actions have been implemented to determine if they have been successful.

C8 – Waste Management Plan

October 2020

Table C8.1: Waste management plan

<table>
<tr><th colspan="2">Element</th><th>Detail</th></tr>
<tr><td colspan="3">Applicable site activities
All construction and operational activities generating, managing or interacting with non-mineral wastes.</td></tr>
<tr><td colspan="3">Aim
Ensure wastes generated during the construction, operational and decommissioning phases of the Project, both solid and liquid, are appropriately managed in accordance with the waste management hierarchy to minimise the risks of environmental pollution and public health nuisances.</td></tr>
<tr><td>Objectives</td><td>Targets</td><td>Key performance indicators</td></tr>
<tr><td>• Undertake and complete works in compliance with statutory environmental requirements</td><td>• No statutory infringements
• No licence/approval condition non-compliances</td><td rowspan="3">• Number of infringements
• Number of non-compliances
• Number of incidents
• Regulated waste receipts / records
• Number of breaches in site visual inspections
• Post-storm site condition assessment failures
• Assessment against waste targets</td></tr>
<tr><td>• Protection of environmental ecosystems, quality and amenity</td><td>• No leaks or spills
• No uncontrolled waste on the site
• Correct storage, handling, management and disposal of all Project waste streams, including regulated wastes</td></tr>
<tr><td>• Minimise waste generation and environmental pollution or nuisance from waste</td><td>• Waste targets met
• 100% of recyclables are recycled
• No circumstances of inappropriate waste segregation
• Set and periodically review targets for waste disposal (waste hierarchy level 6) with the aim to reduce intensity over time</td></tr>
<tr><td colspan="3">Waste hierarchy
<u>Avoid and reduce</u>
This element involves effective choices and management in procurement and site practices, to limit the amount of waste actually generated.
<u>Reuse and recycle</u>
Reuse and recycling are the next best waste management options, avoiding disposal by maintaining the material in a productive state. The preferred approach is reuse of materials without further processing, being lower energy and material intensive, followed by recycling, where materials may be turned into other materials, potentially with different uses.
<u>Recover</u>
Recovery refers to recovery of energy or other materials from a waste stream prior to it going to disposal, or rectifying a waste so that it doesn't ultimately require disposal, such as on-site soil conditioning.
<u>Dispose</u></td></tr>
</table>

Element	Detail
Disposal is the least preferred option, and the waste management system will seek to minimise as much as practicable disposal of waste, either in the on-site landfill, or off-site landfill sites, by using the above more preferred approaches.	
Responsibility	Construction: Construction Manager Operation: Site Manager
Actions/mitigation measures	**Pre-construction** Update the waste inventory in Table C8.2 prior to construction to identify all types of waste and volumes of each waste stream. Consult with the nominated waste transporter to conduct a review of possible recycling opportunities available. Cooperate with the Livingstone Shire Council (LSC) and Rockhampton Regional Council (RRC) waste stations to develop a sustainable and sufficient annual volume of waste (all types) that can be transported to each waste management site. **General** Implement the waste hierarchy above to preference practices at the top of the hierarchy (avoid, reduce, reuse) below those lower down (recycle, recover, dispose). This is to include: • Use care in ordering of products and materials to minimise waste. • Provide segregation of wastes at source where practicable. • Purchase in bulk to reduce the amount of packaging waste and costs. • Where possible, purchase recyclable materials, reuse and recycle generated waste material. • Use biodegradable and non-hazardous materials where options available. • Increase the efficiency in the use of chemicals. • Improve the maintenance and operation of equipment. • Return excess materials such as drums, buckets and used chemical containers to the supplier or other local users for reuse. Ensure that all construction personnel are aware of their environmental obligations in relation to waste management by conducting training and education on litter and waste management in the site induction and during daily pre-start meetings. Use a material/energy flow analysis to provide details of natural resource use efficiency (such as energy and water), integrated processing design, and any co-generation of power and by-product reuse. **Non-mineral and recyclable waste** <u>Separation and storage</u> All waste will be contained within the defined (temporary or permanent) waste storage areas and waste bins. Waste storage areas to be located away from overland flow paths and stormwater to be directed away from these areas. Waste storage areas to consist of a bunded waste station on a concrete pad with concrete wing walls and clearly identifiable waste skips or bins. Waste storage areas to be fenced and secured to prevent access by pest animals.

Element	Detail
	Separate bins to be provided for general waste, cardboard, scrap metal and comingled recycling. Wash waters and rainfall that drain from waste storage areas to be captured in wastewater treatment dams. Use spill pallets or drip trays for waste that may leak. Cover all litter and waste materials to prevent spillage or loss of materials. Maintain general housekeeping, remove waste regularly and ensure there is no overflow of bins or other loss of material from storage bins/ area. Spare receptacles to be kept on site in the event of a collection failure. <u>Disposal</u> Waste products to be disposed of correctly as described in Table C8.2. No waste to be burnt on the site. Green waste is to be mulched and re-used as much practicable. Waste to be regularly removed from site by appropriately licensed waste contractors, to appropriately licensed facilities. Putrescible waste to be removed at least weekly. The waste contractors are to have appropriate designed vehicles, tanks and containers to transport the proposed waste. **Regulated wastes** <u>Separation and storage</u> All regulated waste to be contained within the defined (temporary or permanent) waste storage areas. Waste storage areas for regulated wastes will be designed to appropriate Australian Standards. Waste oils and chemicals to be separated and stored for offsite treatment and recycling. Used oil to be decanted into a large bunded container or stored within the original drums that the oil was purchased in within a bunded area. <u>Sewage management</u> Portable toilet facilities to be used on site until such time that permanent facilities are constructed. All sewage and septic waste to be removed from site by licenced contractors to suitable licenced facilities (in the Rockhampton region) for treatment. <u>Contaminated soil</u> A bio-remediation pad to be established within the Mining Lease (ML) for any hydrocarbon contaminated soils requiring remediation. The remediation pad is to be constructed with an impermeable base layer to prevent leaching and be suitably bunded to contain runoff and prevent ingress of clean water. Water from the bioremediation area is to be captured and returned to a licenced facility for treatment. Should onsite treatment of contaminated soil be necessary, the Queensland Department of Environment and Science is to be consulted regarding amending the Environmental Authority to include ERA 60(1)(a) Waste disposal - operating a facility

Element	Detail
	for disposing of less than 50,000 t per year of limited regulated waste and general waste. **Spill response** Training in spill response to be conducted for all relevant employees. Spill response equipment of a suitable type and capacity to be located on-site in easily accessible locations. These are to include material for spill clean-up within waterways where waterways could be affected. In the event of a spill, follow the Spill Response Procedures located in Appendix E1 - Contingency Management Plan. **Social responsibility** Carry out waste management in a manner that will have the least impact and most benefit on local community resources, including working with local businesses so that they can take advantage of opportunities for reuse and recycling.
Monitoring	Regular checks surrounding work sites and main trafficable roads for litter to be undertaken and clean ups carried out, if required. Regular inspection (at least monthly) of waste storage facilities to be undertaken to ensure waste management measures are being adhered and to ensure spill kits are present/contain sufficient materials for potential spillages. Undertake a site audit prior to each wet season to ensure the site is adequately prepared. Undertake a similar process prior to forecast storms or other extreme weather events, to ensure all wastes are contained and restrained so as to avoid loss of materials during the event. The waste inventory in Table C8.2 is to be updated and maintained during construction and operational phases to record all waste types, quantities produced, and management measures used for each. An annual review is to be conducted, and waste targets set for the coming year. Each annual review will assess the progress against the waste targets and identify opportunities (and constraints) for continued waste minimisation and optimisation.
Reporting	Maintain a tracking register for all regulated wastes generated on site. The register is to include the following details: • source of waste • type of waste • quantity of waste • storage location and details • dates of collection • date of disposal / recycling and • name and details (including licencing details) of transporter and facility used to dispose the waste. Any transfer of waste from the site is to be recorded, either by the retention of a receipt from waste transporters or recording the date, quantity, type, name of transporter, source and intended treatment or disposal destination. Record and summarise annually the waste produced on the site and the ultimate end-point to determine opportunities for waste minimisation.

Element	Detail
	Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F1 and enter into the incident-complaint register for rectification and follow up.
Corrective actions	**Corrective action triggers:** • Inappropriate disposal of wastes, either into the environment, or disposal of wastes that can practicably be recycled. • Uncontrolled waste disposal. • Wastes removed from the site without appropriate waste tracking, and/or by an unlicensed person, and/or to an unlicensed site. **Corrective actions:** • Evaluate the cause and severity of the non-compliance with this Waste Management Plan. • Contain, clean up and appropriately dispose of any waste as needed. • Investigate whether the impact is considered to be ecologically significant. • Assess management options to prevent recurrence. • Ensure only licensed waste transporters are utilised to transport wastes. • Communicate non-compliance with to all site personnel and provide waste management awareness training if required.

Table C8.2: Waste inventory, characterisation and management methods

Waste category	Source	Project phase and estimated quantities (per annum)			Management methods
		Construction	Operation	Decommissioning	
General Waste					
Green waste	Clearing of vegetation	Minimal – restricted to non-woody vegetation	Negligible	N/A	Onsite reuse - Mulching of waste vegetation/timber by reuse onsite during rehabilitation. Burning of vegetation may be considered if retention is considered an unacceptable fire risk.
General waste* - food scraps, packaging waste non-regulated general waste. non-recyclable plastics and timber	Kitchenettes, administration areas and workshop	<100 t	<100 t	35 t	Offsite disposal - Stored onsite in sealed green bins for transportation to offsite municipal landfill.
Recyclable waste - aluminium cans, glass, paper hand towel, cardboard, used paper, plastic drink bottles, packing materials	Kitchenettes, administration areas and workshop	<30 t	<100 t	<10 t	Offsite recycle/disposal - For materials not able to be recycled, store in allocated waste disposal bins for collection by a licensed waste contractor for disposal at a licensed facility.
Scrap metal - steel, copper, brass, cast iron, stainless, aluminium, wire and any other ferrous or non-ferrous metal item	Equipment not suitable to be reconditioned	<50 t	< 50 t	> 500 t	Offsite recycle/disposal - For materials not able to be recycled, store in allocated waste disposal bins for collection by a licensed waste contractor for disposal at a licensed facility.
Personal Protective Equipment (PPE) and other small items*	Operational activities	<1 t / 5 m^3	<1 t / 5 m^3	<1 t / 5 m^3	Onsite reuse - Routine checks on PPE for damages and/or faults. Reuse water coolers and other equipment that is not deemed damaged and unusable. Offsite recycle - A licensed contractor will transport plastic or glass items offsite to a recycling facility.

Waste category	Source	Project phase and estimated quantities (per annum)			Management methods
		Construction	Operation	Decommissioning	
					Offsite dispose - Only sufficiently used/damaged PPE is disposed of where possible. Waste that cannot be recycled will be disposed offsite in a municipal landfill.
Air filters*	Maintenance of vehicles and machinery at workshops	<1 t / 5 m^3	<1 t / 5 m^3	<1 t / 5 m^3	Offsite disposal - Air filters will be temporarily stored in the appropriate air filter skip/bin. Final disposal will be offsite from a licensed contractor to a regulated waste station.
Refurbishable items* hoses, cables and pipe work, scrap metal, plastic manifolds, couplings, conveyor rollers and other plastic waste	Operational activities	<1 t / 5 m^3	<5 t / 25 m^3	500 t	Onsite reuse - Excess waste (material that has not been used during construction) will be stored in the workshop or storage shed for future use (for example for maintenance or servicing). Offsite recycle/dispose - Other items (not deemed usable) will be temporarily stored in their designated area/skip/bin for recycling or disposal at a landfill or licenced facility.
Timber pallets*	Workshop and administration areas	<5 t / 25 m^3	<1 t / 5 m^3	<1 t / 5 m^3	Offsite recycle - Those that are recyclable are returned to the supplier. Offsite dispose - Any unserviceable pallets will be sent to general offsite landfill.
Regulated Waste					
Waste oils and grease	Machinery maintenance, interceptors within Mine Infrastructure Area (MIA) and workshops	<50 kl	<700 kl	<50 kl	Offsite recycle/disposal – Collected and stored in tanks or appropriately sealed containers within dedicated bunded areas for removal and recycling/disposal by licensed waste contractor with vacuum truck (licensed contractor). All sewage waste will be routinely

Waste category	Source	Project phase and estimated quantities (per annum)			Management methods
		Construction	Operation	Decommissioning	
					removed offsite by truck to be disposed of at an approved facility.
Fuel filters	Machinery maintenance and workshop	<15 t	<60 t	<1 t	Offsite disposal - Transportations off-site by a licensed regulated waste transporter. Disposal of waste will be to a regulated waste receiver.
Tyres	Tyres from light and heavy vehicles	<40 t	<150 t	<5 t	Offsite recycle - Tyres will be transported off-site to supplier.
Oily water	Wash pads, workshop, refuelling station, wash downs and fuel farm	<100 kl	<200 kl	<50 kl	Offsite recycle/disposal - Removed by vacuum truck by licensed contractor for recycling or disposal at licensed facility.
Sewage effluent	Construction and administration offices	<20 Ml	<20 Ml	< 20 Ml	Offsite disposal – All sewage effluent waste will be taken offsite for treatment by licensed contractors.
Clinical waste	First aid and medical administration	<0.01 t	<0.01 t	<0.01 t	Offsite disposal – Clinical waste will be stored in yellow labelled receptacles and removed by licensed contractor to a medical waste facility for treatment and disposal.
Chemical containers / drums	Administration area and other surface facilities	<2 t	<4 t	N/A	Offsite recycle - Containers and drums to be emptied of contents sealed and stored in a designated area for collection by licensed contractor, for transport and recycling off-site.

Waste category	Source	Project phase and estimated quantities (per annum)			Management methods
		Construction	Operation	Decommissioning	
Miscellaneous chemicals (various surplus / miscellaneous chemicals such as coolant, solvents, sealants)	Surface activities and administration areas	<2 kl	<5 kl	<1 kl	Offsite recover/dispose - Oily rags and oil spill kit materials will be collected within regulated waste wheelie/industrial bins, before being transported by a licensed waste transport contractor to a licensed waste disposal facility for energy recovery and/or disposal.
Contaminated soil	Spills	100 m^3 / 120 t	100 m^3 / 120 t	500 m^3 / 600 t	Onsite remediation or disposal within mine pit.
Vehicle batteries – lead acid	Vehicle maintenance	<1 t / 4 m^3 (2 pallets)	<2 t / 8 m^3	<1 t / 4 m^3 (2 pallets)	Offsite recycle/dispose - Stored onsite in designated area within weatherproof battery storage containers. Licensed contractor to collect and transport offsite for recycling.
All other miscellaneous oily / hydrocarbon wastes - oily rags, materials from oil / fuel spillage clean ups*	Maintenance and mine pit activities and spill clean ups	<1 t	<1 t	<1 t	Offsite recover/dispose - Materials will be stored within designated bins for collection by licensed contractor and transported to a licensed waste disposal facility for energy recovery and / or disposal.
Paints* (Dried paint containers)	Workshop and maintenance activities	<1 t / 4 m^3	<1 t / 4 m^3	N/A	Offsite dispose - Sealed and disposed of with other general waste in dedicated storage bins for collection and disposal off-site.

*The volumes included in this table are representative of uncompacted solid waste (that is 200 kg/m^3) a typical landfill should achieve a compaction rate of approximately 800 kg/m^3.

C9 – Surface Water Management Plan

October 2020

Table C9.1: Surface water management plan

Element	Detail	
Applicable site activities Construction. Operations. Rehabilitation. Activities with the potential for spills, leaks or other discharges to surface waters.		
Aim Construct and operate the Project in a way that protects the environmental values of surface waters.		
Objectives	**Targets**	**Key performance indicators**
• Undertake and complete works in compliance with statutory environmental requirements	• No statutory infringements • No licence/approval conditions non-compliances	• Number of infringements • Number of non-compliances
• Minimise uncontrolled discharges from the mine water management system • Prevent surface water contamination and maintain the quality and flow of surface water to protect surface water EVs in the downstream receiving environment • Contain water affected by mining operations within the Site • Ensure no adverse impact on receiving water quality • Ensure the site has sufficient water available for operation in dry times • Where possible, divert catchment runoff from undisturbed areas around the mine • Prevent acid rock and/or saline drainage	• Controlled discharges to only occur from the nominated discharge point/s during wet conditions when receiving watercourses are flowing and comply with the proposed discharge water quality rules/criteria in the Water Management Plan (WMP) • Receiving waters comply with the adopted objectives and trigger values as per the Receiving Environment Management Plan (REMP)	• Number of exceedances of discharge rules/criteria and site-specific water quality objectives attributable to Project activities • Downstream water quality is within the range of natural variability • Number of incidents related to erosion and site drainage issues • Number of complaints • Number of incidents or breaches of the WMP
• Ensure the protection and resilience of groundwater dependent ecosystems (GDEs)	• No negative change in the quality (chemistry) and quantity of surface water in GDEs due to Project activities	• Degree of change in water level in GDE • Degree of change in surface water quality in GDE • Compliance with Groundwater Dependent Ecosystem Monitoring and Management Plan

Element	Detail
Responsibility	Construction: Construction Manager Operation: Site Manager
Actions/mitigation measures	During detailed design, review and where required update and then implement the following management plans: • Mine Site Water Management Plan (WMP) • Erosion and Sediment Control Plan (ESCP) • Receiving Environmental Monitoring Plan (REMP) • Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP) In addition: • Implement Land and Soils Management Plan (Appendix C5 to this EMP) • Implement the Hazardous Materials Management Plan and Waste Management Plan to prevent leaks, spills or release of contaminants to surface waters. • Design and construct road crossings across waterways and culverts in accordance with the requirements detailed in the Biodiversity Management Plan. • Where practicable, reuse water captured in environmental dams (onsite) and mine dewatering before using raw water.
Monitoring	Implement the monitoring programs in the WMP, ESCP, REMP and GDEMMP. Additionally, undertake geomorphic monitoring in areas of potential instability. Geomorphic monitoring will involve: • Visual site inspections of sites listed in Table C9.3 as part of the regular inspections within the ESCP. • Topographic comparisons of sites listed in Table C9.3: - Once every year for the first three years, then every 5 years thereafter. - Following visual observations that indicate ongoing geomorphic impacts. A summary of the surface water monitoring program to be implemented is provided in Table C9.2.
Reporting	Implement the WMP, ESCP, REMP and GDEMMP. Record any non-conformance, incident or potential incident on the incident-complaint form in Appendix F and enter into the incident-complaint register for rectification and follow up.
Corrective actions	Refer to Trigger Action Response Plans in the WMP for the following triggers: • Mine affected water storage (Table 9.1) • Receiving water quality (Table 9.2) and • Sediment dams (Table 9.3). Refer to Table C9.4 for the TARP for reduced pools persistence (i.e. reduced baseflow or enhanced leakage due to dewatering).

Table C9.2: Summary of surface water monitoring program

Element	Source Programs/ Reports[1]	Monitoring Locations	Parameters[2]	Frequency
Water Quality	WMP REMP	Freshwater, St1 and St2 receiving water sites identified in REMP and Figure C9.1	Phys-chem, major cations and anions, total and dissolved metals and metalloids, nutrients, organics	Monthly or when daily rainfall > 50mm 1 – 2 days after first flush in wet season During and/or in the days immediately following a mine affected water release
		Marine Sites identified in REMP and Figure C9.1		Quarterly
		Dam 1		Quarterly
		Dam 1 release point		Daily during releases
		All site dams	pH, EC, turbidity (field)	Monthly or when daily rainfall > 50mm
Water Quantity	WMP REMP	On site	Rainfall	Continuous
		CHPP	CHPP water consumption	Monthly
		Mine Water Dam 1	Total water volume for dust suppression	Monthly
		Mine Water Dam 1	Water level	Weekly
		Mine Water Dam 1 Release point	Flow rate	Continuous during releases
		Tooloombah Creek and Deep Creek flow gauging stations	Flow rate	Continuous
		Open Cut Pit	Pit water level	Weekly
			Volume of pumping from pit	Weekly

Element	Source Programs/ Reports[1]	Monitoring Locations	Parameters[2]	Frequency
	GDEMMP	Pools along Deep and Tooloombah Creeks, within the predicted maximum drawdown extent	Pool size (GPS coordinates of each end, locations along the length, width and water depth) Pool size (as above), fish assemblages	Annually in approximately May of each year (end of wet season, plus enough time for baseflows to cease and only pools remaining) Annually at the end of the dry season
	-	Tooloombah Creek Pools – stream gauge, To2 pool	Re-run modelling to estimate inflows to track changes to inflow volumes and salinity	Annually at the end of the dry season
Erosion and Sediment Control	WMP ESCP	Sediment Dams	Inspection to assess sediment accumulation	Monthly or when daily rainfall > 50mm
		Sediment Dams	Evidence of overflow	Daily rainfall > 50 mm
		Clean & sediment laden water drains	Inspection for erosion damage or sediment accumulation	Monthly or when daily rainfall > 50mm
Geomorphic Monitoring	FG	Locations identified in Table C9.3	Topographic comparisons	Once every year for the first three years, then every 5 years thereafter Following visual observations (refer next) that indicate ongoing geomorphic impacts
			Visual site inspections	As part of regular ESCP site inspections
Sediment (bottom sediments) Monitoring	REMP	Freshwater and marine sites identified in REMP and Figure C9.1	Total metals (total and dissolved metals and metalloids in footnote to table, plus antimony and cobalt) Particle size distribution Total organic carbon	Twice per year: At start of wet season 4 – 6 weeks after first flush (Oct – Nov) Post wet season when flows have ceased (Jun – Jul)

Element	Source Programs/ Reports[1]	Monitoring Locations	Parameters[2]	Frequency
Macroinvertebrates	REMP	Freshwater sites identified in REMP and Figure C9.1, excluding St2, Mam01, Mo2, Ba1x, Am1	Physical habitat assessment Presence and abundance	
Fish	REMP	Freshwater sites identified in REMP and Figure C9.1 excluding Mam01, Mo2, Ba1x, Am1	Presence and abundance Total length, general health assessment	A third targeted sampling of surface pools within Tooloombah and Deep Creek prior to the wet season (Aug-Sep)
Mangrove Monitoring	REMP	Styx River and Waverley Creek Estuaries, as identified in the REMP	Size and extent of mangrove habitats utilising satellite imagery	Once every 3 years

Table notes:

1 WMP – Water Management Plan, REMP – Receiving Environment Monitoring Program, ESCP – Draft Erosion and Sediment Control Plan, FG - Supplementary Technical Study Report, Fluvial Geomorphology; GDEMMP – Groundwater Dependent Ecosystem Management and Monitoring Plan

2 Phys-chem – EC, pH, dissolved oxygen, temperature, turbidity; Major cations and anions – alkalinity (hydroxide, carbonate, bicarbonate, total) as $CaCO_3$, hardness, sulphate, chloride, fluoride, dissolved major cations (calcium, magnesium potassium, sodium); Total and dissolved metals and metalloids – aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, vanadium and zinc; Nutrients – ammonia, nitrate, nitrite, nitrate + nitrite, total kjeldahl nitrogen, total nitrogen (all as N), filterable reactive phosphorous, total phosphorous (both as P); Organics – total recoverable hydrocarbons

Table C9.3: Geomorphic monitoring sites

Site[1]	Location	Mitigation
1	The 400 m-long area where drainage from the western sub-catchments concentrates, then discharges to Tooloombah Creek.	Ensure good vegetation cover
2	Discharge channel from Dam 1 to Deep Creek.	Install and/or stabilise with rip-rap of similar
3	Where sub-catchments upstream of the mine discharge to the Northern Diversion Drain.	Ensure good vegetation cover
4	The Northern Diversion Drain, particularly the lower 500 m (likely to also apply to the Southern Diversion Drain).	Construct to civil engineering design
5	At the proposed rail bridge crossing over Deep Creek.	Construct to civil engineering design
6	An isolated location near Dam 1 wall.	Ensure good vegetation cover
Control Sites	TBC - select sites upstream or outside of the flood impact area of the Project.	N/A

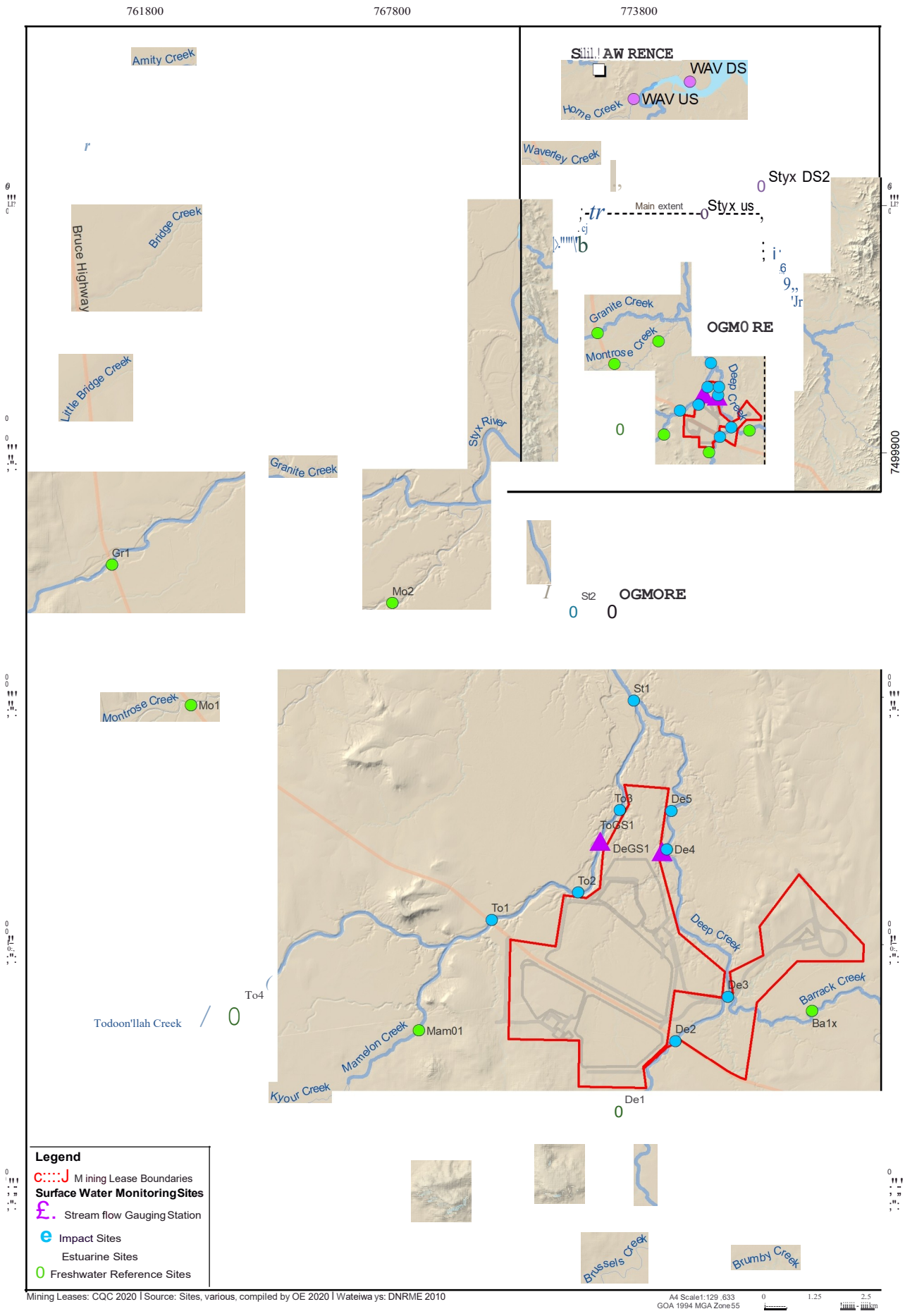

Figure C9.1: Water monitoring sites

Table C9.4: TARP – Reduced pools persistence

Level	Trigger	Action	Response
Level 1 (Normal)	Pool levels and predicted inflows from pool balance models show no difference to pre-mining	• Continue monitoring	• No response required
Level 2 (Early warning)	Pool levels and/or predicted inflows show a 10% change or more	• Increase monitoring frequency - monthly • Update pool balance model monthly • Investigate response at nearby bores in comparison to predicted responses	• Report findings to Site Environmental Manager • Include findings in regular management meetings
Level 3 (Potential impact)	Pool levels and/or predicted inflows show a 25% change or more	• Compare responses at local bores and in pools to predictions from SEIS. If not the same, re-run modelling and determine cause of reductions. • Undertake increased aquatic ecology monitoring to detect impacts – study design to include affected pools and pools upstream and downstream that are unaffected, and to be designed and undertaken by a suitably qualified and experienced ecologist, generally as per the study designs for the REMP and GDEMMP.	• Report findings to Site Environmental Manager • Include findings in regular management meetings • Report findings to DES
Level 4 (Likely impact)	Any pools show a change in permanence – particularly from permanent to ephemeral	• Undertake above (level 3) works, and engage with DES to develop a remedial action plan, to investigate engineering controls, offsets or other mitigation measures as required.	• Report findings to Site Environmental Manager • Include findings in regular management meetings • Engagement with DES

C10 – Groundwater Management and Monitoring Plan

October 2020

Table C10.1: Groundwater management and monitoring plan

Element	Detail
Applicable site activities Mining and construction activities which intersect groundwater. Dewatering the open cut pits during operations. Activities with the potential to cause spills and leaks.	
Aim Construct and operate the Project in a way that protects the environmental values of groundwater including any associated surface ecological systems.	
Objectives	**Targets** / **Key performance criteria**
• Undertake and complete works in compliance with statutory environmental requirements	• No statutory infringements • No licence/approval condition non-conformances **Key performance criteria:** • Number of infringements • Number of non-conformances
• Prevent groundwater contamination, maintain the quality, quantity and flow of groundwater to protect the environmental values of groundwater for ecological systems and anthropogenic water users	• No negative change in the quality (chemistry) of groundwater • No change in the quantity of a groundwater resource attributable to Project activities groundwater greater than modelled drawdown/depressurisation predictions • Comply with the adopted objectives and trigger values in Table C10.4 and Table C10.5 • Existing bore beneficial uses retained • No subsidence or other effects from dewatering and depressurisation • No leaks, spills or release of contaminants to groundwater **Key performance criteria:** • Number of incidents • Statistically significant increasing trend of interim site-specific groundwater quality objectives attributable to Project activities • Degree of change in groundwater level • Groundwater inconsistent with make good agreements • Compliance with Hazardous Materials and Waste Management Plans
• Ensure the protection and resilience of groundwater dependent ecosystems (GDEs)	• No change greater than modelled predictions in seasonal groundwater level in the vicinity of GDEs due to Project operations • No negative change in the quality (chemistry) of groundwater in the vicinity of GDEs due to project activities **Key performance criteria:** • Degree of change in groundwater level, flow in GDE • Degree of change in groundwater quality in GDE • Compliance with Groundwater Dependent Ecosystem Monitoring and Management Plan
Responsibility	Construction: Construction Manager Operation: Site Manager

Element	Detail
Actions/mitigation measures	**Groundwater management** Implement actions/mitigation measures detailed in the following management plans: • Mineral Waste Management Plan. • Groundwater Dependant Ecosystem Monitoring and Management Plan (GDEMMP). • Receiving Environment Monitoring Program (REMP). • Progressive Rehabilitation and Closure Plan (PRCP). Develop the geo-environmental block model and detailed landform haulage schedule to optimise the construction and rehabilitation sequence, and to ensure that waste rock is backfilled and stockpiled to ensure long term stability in terms of both the landforms and the quality of runoff and leachate generated. **Groundwater modelling** Review the numerical groundwater model prior to mining commencing on-site, and every three years from commencement of mining, and revise and update as required. Utilise update data to validate the model. Incorporate the numerical groundwater model into other Project models including: • Local cross-sectional investigations and coupled numerical models linked to the numerical model regional water table aquifer predictions. • Mine water balance model. **Make good agreements** Undertake a baseline assessment of landholder bores within the predicted impact area prior to mining activities being undertaken, and in accordance with the DES Guideline 'Baseline Assessments' (DES 2017). Prepare and implement an Underground Water Impact Report (UWIR) for the Project prior to works commencing on-site, including the development of make-good arrangements for potentially impacted bores. **Installation of additional bores** Install additional shallow (alluvial) groundwater monitoring bores located upstream and downstream of the identified wetland and groundwater dependant ecosystem (GDE) areas associated with Tooloombah Creek and Deep Creek, to monitor alluvial groundwater level and quality from bank storage at pre-mining (baseline), operations and post-mining. **Fault delineation works** Undertake further fault delineation works, including drilling, to better locate and understand the local north-south fault line.
Monitoring	**Baseline data – pre-mining and construction** Continue to monitor bores prior to mining commencing to obtain data suitable to define SWL and water quality triggers (18 – 24 data points as per QWQG and ANZG 2018, or where statistics can be shown to be stable and further data unlikely to significantly change statistics). Monitor sites identified in Table C10.3 and Figure C10.1. **Operations** Implement the groundwater monitoring program summarised in Table C10.2.

Element	Detail
	Monitoring will be undertaken in accordance with guidance from the following: • Groundwater Sampling and Analysis – A Field Guide (Geoscience Australia 2009) • Sampling, Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples (AS/NZS 5667.1:1998) • Sampling, Part 11: Guidance on Sampling of Groundwaters (AS/NZS 5667.11:1998) and • Monitoring and Sampling Manual (DES 2018). The monitoring program will be reviewed following collection of further baseline data and after the initial two years of operations. Where justified, monitoring sites may be rationalised. **Monitoring for seepage** Seepage monitoring and control will be included in the design of site water dams.
Reporting	**Groundwater modelling** Any details of reviews of the numerical groundwater model predictions or updates to the numerical groundwater model (e.g. re-calibration, additional sensitivity analysis or revised forward predictions) should be reported to DES. **Groundwater monitoring** Prepare quarterly internal monitoring compliance reports, summarising: • All monitoring data and interpretation of results, exceedances, potential issues and the most probable source of the groundwater exceedances as assessed using the multiple lines of evidence approach • Appropriate statistical analyses • Key findings • Recommended rectification measures (if any) or refinement to the monitoring program as the Project proceeds through different phases. Prepare an annual monitoring report on the relevant groundwater datasets for the annual return period and provide to the Qld Government administering authority (DES) on request. Relevant water monitoring data and reports will be submitted to the Qld Government's Water Tracking and Electronic Report System (WaTERS) database, as and when required. The water monitoring data and reports would be used to inform future groundwater model validation.
Contingency Planning	Trigger – Action – Response Plans (TARPs) are provided in Tables C10.6 and C10.7 for the following triggers: • Reduction in bore standing water levels • Change in bore water quality

References

ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments. Australia. Available from: www.waterquality.gov.au/anz-guidelines

Department of Environment and Science (DES) (2017) *Guideline: Baseline Assessments*. Queensland. Ref: ESR/2016/1999, V3.02, effective 5 July 2017.

Queensland Water Quality Guidelines (QWQG): Department of Environment and Heritage Protection (EHP) (2013) *Queensland Water Quality Guidelines 2009*.

Table C10.2: Groundwater monitoring program

Element	Corresponding Programs / Reports[1]	Monitoring Locations	Parameters[2]	Frequency
Baseline assessment	-	All third party bores within the predicted zone of drawdown impact	Undertake baseline assessment in accordance with the DES Guideline 'Baseline Assessments' (DES 2017)	Prior to mining commencing
Water Quality	WMP REMP GMMP	Sites identified in Table C10.3 and Figure C10.1	Phys-chem, major cations and anions, total and dissolved metals and metalloids, nutrients, organics	Quarterly
		Mine affected water dams (Dam 1, Dam 4, Environmental Dam 1C)		Quarterly
		Pit sumps		Quarterly
Water Level / Pressure	GMMP	Sites identified in Table C10.3 and Figure C10.1	Water level	Quarterly
		Pit inflows	Water level Pumped volumes to Dam 1	Quarterly Continuously
		Tide level at Ogmore Bridge	Water level	Quarterly for 2 years
		Streamflow gauges on Deep and Tooloombah Creeks	Water level, flow	Continuously
Seepage	GMMP MWMP	At toe and existing bores	Water level	Monthly for first 2 years, quarterly thereafter
Surface Water	Refer to Surface Water Management Plan			

1 WMP – Mine Site Water Management Plan; REMP – Receiving Environment Monitoring Plan; GMMP – Groundwater management and monitoring plan; MWMP – Mineral Waste Management Plan

2 Phys-chem – EC, pH, dissolved oxygen, temperature, turbidity; Major cations and anions – alkalinity (hydroxide, carbonate, bicarbonate, total) as $CaCO_3$, hardness, sulphate, chloride, fluoride, dissolved major cations (calcium, magnesium potassium, sodium); Total and dissolved metals and metalloids – aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, vanadium and zinc; Nutrients – ammonia, nitrate, nitrite, nitrate + nitrite, total kjeldahl nitrogen, total nitrogen (all as N), filterable reactive phosphorous, total phosphorous (both as P); Organics – total recoverable hydrocarbons

Table C10.3: Monitoring sites

ID	Eastings	Northings	Elevation (mAHD)	Screen Depth (mbgl)	Casing Stickup (m)	Target Aquifer	Parameters
Project Monitoring Bores							
WMP02	773497	7491734	25	12 – 18	0.5	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP04	772865.3	7489359	28.33	12 – 18	0.9	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP04D	772859	7489351	28.33	18.5 – 36.3	0.9	Styx Overburden [Kx] / Weathered Regolith / Qpa [~GZ11]	Quality Level
WMP05	774487.5	7491625	17.22	9 – 12	0.48	Alluvial (Qa) [~AZ6]	Quality Level
WMP06	770020	7488120	33.98	12 – 18	0.58	Regolith / Styx Underburden [Kx] [~GZ11]	Quality Level
WMP06D	770039	7488119	34.06	38 - 44	0.52	Styx Underburden [Kx] [~GZ11]	Quality Level
WMP07	771264	7483151	131	48 – 60	0.85	Styx Underburden [Kx] [~GZ11]	Level
WMP08	774134	7481232	43.49	10 – 16	0.58	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP08D	774134	7481232	43.49	24 – 36	1	Styx Underburden [Kx] [~GZ11]	Quality Level
WMP09	773459	7484062	37.63	7.1 – 15	1	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP10	775878	7486688	29.26	12 – 18	1	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP11	774194	7493610	18.75	18 – 24	1	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP11D	774201	7493623	18.7	30 – 36	0.9	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP12	773266	7490731	26.37	11 – 17	0.9	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP13	772604	7495931	18.4	12.7 – 19.7	0.8	Styx Overburden [Kx] / Weathered Regolith / Qpa [~GZ11]	Quality Level
WMP14	770477	7487637	32.89	9 – 18	0.95	Regolith / Styx Overburden [Kx] [~GZ11]	Level
WMP15	771774	7485564	43.25	9 - 21	1.2	Regolith / Styx Underburden [Kx] / Back Creek Group [Pb] [~GZ11]	Quality Level

ID	Eastings	Northings	Elevation (mAHD)	Screen Depth (mbgl)	Casing Stickup (m)	Target Aquifer	Parameters
WMP16	767930	7494387	41.91	25.5 – 31.5	0.65	Back Creek Group [Pb] [~FZ10]	Level
WMP16D	767923	7494380	41.84	35.7 – 41.7	0.75	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP17	775465	7483308	42.83	9 - 12	0.77	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Level
WMP17D	775470	7483286	42.83	21 - 24	0.53	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP18	775366	7487144	30.54	9.2 - 12.2	0.56	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Level
WMP18D	775358	7487152	30.62	18.5 - 23.5	0.44	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP19	768808	7485676	41	13.1 - 16.1	0.64	Regolith / Back Creek Group [Pb] [~FZ10]	Level
WMP19D	768801	7485692	41	24.9 - 27.9	0.58	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP20	768251	7490084	42.95	14.5 – 20.5	0.53	Regolith / Back Creek Group [Pb] [~FZ10]	Level
WMP20D	768246	7490082	42.98	24 – 30	0.5	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP21	774294	7490072	23.79	6.9 - 9.9	0.66	Alluvial (Qa) [~AZ6]	Level
WMP21B	774294	7490072	27.99	86 - 92	0.52	Styx Underburden [Kx] [~GZ11]	Quality Level
WMP21D	774243	7490004	25.99	14 - 20	0.54	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP22A	772008	7488891	29.67	27 – 30	0.35	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP22B	772011	7488896	29.74	50 – 56	0.3	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP22C	772012	7488900	29.76	200 - 206	0.5	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP23A	773651	7484701	36.38	48.5 - 54.5	0.9	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP23B	773638	7484709	36.36	187 - 193	0.9	Back Creek Group [Pb] / Carmila Beds [Pc] [~FZ10]	Quality Level
WMP24	771965	7489093	19.36	23.4 - 26.4	0.48	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP25	770812	7486227	44.21	10.1 - 13.1	0.58	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP26	773655	7489372	27.56	11.5 - 20.5	0.52	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level

ID	Eastings	Northings	Elevation (mAHD)	Screen Depth (mbgl)	Casing Stickup (m)	Target Aquifer	Parameters
WMP27	770606	7487750	33.03	14.5 - 20.5	0.85	Regolith / Styx Overburden [Kx] [~GZ11]	Level
WMP28	772192	7489099	21.91	8.9 - 11.9	0.58	Regolith / Styx Overburden [Kx] [~GZ11]	Quality Level
WMP28B	772128	7489102	21.91	5 - 7	0.52	Alluvial (Qa) [~AZ6]	Quality Level
WMP29A	771298	7497385	11.97	6.5 – 12.5	1	Alluvial (Qa/Qhe) [~AZ6]	Quality Level
WMP29B	771301	7497385	11.97	16 – 20	1	Pleistocene Alluvial (Qpa) / Regolith [~CZ2]	Quality Level
WMP29C	771318	7497394	11.97	52 – 58	1	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP29D	771317	7497387	11.97	115 – 121	1	Styx Overburden [Kx] [~GZ11]	Quality Level
WMP29E	771312	7497397	11.97	222.5 – 228.5	1	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP30A	772028	7488896	29.79	27 – 30	0.9	Regolith / Styx Overburden [Kx] [~GZ11]	Level
WMP30B	772028	7488900	29.75	50 – 56	0.9	Regolith / Styx Overburden [Kx] [~GZ11]	Level
WMP30C	772029	7488905	29.72	200 – 206	0.8	Back Creek Group [Pb] [~FZ10]	Level
WMP31	778070	7489063	50.49	50; 94; 103.5; 171	0.6	Back Creek Group [Pb] [~FZ10]	Continuous Level (VWP)
WMP31B	778074	7489051	50.24	33 - 42	0.6	Back Creek Group [Pb] [~FZ10]	Quality Level
WMP32	776384	7485834	32.31	57 - 63	0.6	Styx Underburden [Kx] [~GZ11] Styx	Quality Level
WMP33	772890	7490344	22.79	6 - 8	0.6	Alluvial (Qa) [~AZ6]	Quality Level
WMP33B	772890	7490344	22.29	15 - 18	0.6	Styx Overburden [Kx] [~GZ11]	Quality Level
Landholder Bores							
BH16	773592	7494520	9.67	9.2 - 9.5	ID	Alluvial (Qa) [~AZ6]	Quality Level
BH01x	773561	7494524	11	ID	ID	Alluvial (Qa) [~AZ6]	Quality Level

Figure C10.1: Groundwater monitoring program

Table C10.4: Groundwater level triggers (after HydroAlgorithmics 2020)

Monitoring Points	Preliminary Groundwater Level (Change) Investigation Trigger Threshold		
	Year 3	Interim (75% of maximum)	Maximum
WMP05, WMP08, WMP08D, WMP11, WMP11D, WMP13, WMP16, WMP16D, WMP17D, WMP19, WMP19D, WMP20D, WMP29A, WMP29B, WMP33	2.0	2.0	2.0
WMP06D, WMP29C, WMP29D, WMP29E, WMP31	5.0	5.0	5.0
WMP02, WMP06, WMP07, WMP10, WMP12, WMP14, WMP17, WMP18, WMP18D, WMP20, WMP21, WMP27, WMP28	2.0	Dry	-
WMP04, WMP22A, WMP22B, WMP30A, WMP30B	Dry	Dry	-
WMP04D	13.4	16.2	21.6
WMP09	2.0	2.9	3.8
WMP15	2.0	5.3	7.1
WMP21B	5.0	11.0	14.6
WMP21D	2.1	Dry	-
WMP22C	12.4	27.6	36.7
WMP23A	2.0	12.0	16.0
WMP23B	5.0	20.3	27.1
WMP24	4.5	4.5	5.3
WMP25	2.0	2.0	2.7
WMP26	5.3	Dry	-
WMP28B	3.3	3.2	4.2
WMP30C	12.6	27.9	37.1
WMP33B	5.0	5.5	7.3

Table C10.5: Groundwater quality triggers (80th percentiles, or 20th to 80th percentiles for pH)

	Sites	pH*	Alk	EC	TDS	Al	As	Fe	Mn	Mo	Se	V	Zn
Cenozoic Deposits - Quaternary Alluvium (1)	BH01x	6.6 - 7.1	378	1290	660	<0.01	0.0164	3.93	0.807	<0.001	<0.01	<0.01	0.0118
	BH16	6.4 - 6.8	195	1050	645	0.01	0.0044	0.262	0.917	<0.001	<0.01	<0.01	0.0146
	WMP05	7.1 - 7.5	662	2890	1770	0.22	0.0048	0.25	0.323	0.003	<0.01	0.02	0.0232
	WMP21	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP29A	7.0 - 7.2	446	8720	5610	ID	0.0056	ID	ID	ID	ID	ID	0.0252
Cenozoic Deposits - Quaternary Pleistocene Alluvium / Regolith (2)	WMP02	6.5 – 7.0	446	17400	12400	0.01	0.002	<0.05	0.381	0.002	<0.01	<0.01	<0.005
	WMP04	7.4 - 8.1	539	21900	14500	0.02	0.004	<0.05	0.0648	0.033	<0.01	<0.01	<0.005
	WMP08	6.7 – 7.0	722	27800	19800	<0.042	0.003	0.056	1.3	0.00297	<0.042	<0.042	0.0234
	WMP09	6.6 - 6.9	800	22200	15300	<0.01	0.002	<0.05	0.595	0.001	<0.01	<0.01	0.0314
	WMP12	6.9 - 7.3	391	8710	5740	0.064	0.0042	0.058	0.378	0.0056	<0.01	0.01	0.002 - 0.006
	WMP15	6.8 - 7.2	491	4720	2610	0.49	0.002	1.21	0.129	0.002	<0.01	<0.01	0.058
	WMP17	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP18	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP25	6.1 - 6.7	45.8	801	612	ID	0.002	ID	ID	ID	ID	ID	0.029
	WMP26	6.8 – 7.0	910	49700	37500	0.354	<0.005	0.218	0.601	<0.005	<0.05	<0.05	0.0584
	WMP29B	6.5 - 6.9	421	22500	15800	ID	0.029	ID	ID	ID	ID	ID	0.0586

	Sites	pH*	Alk	EC	TDS	Al	As	Fe	Mn	Mo	Se	V	Zn
Styx Coal Measures - Overburden (and Quaternary Alluvium [Lower] / Weathered Regolith / Underburden (3)	WMP04D	6.8 - 7.1	686	26400	17700	0.01	0.001	<0.05	0.0918	0.002	<0.01	<0.01	0.058
	WMP10	6.9 - 7.2	1290	19000	11800	0.036	0.002	0.124	0.55	0.0028	<0.01	<0.01	0.0116
	WMP13	6.2 - 6.6	524	48700	39600	<0.05	<0.005	0.88	1.84	<0.005	<0.05	<0.05	0.038
	WMP14	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP21D	6.7 – 7.0	889	42000	31800	<0.05	0.0098	0.164	0.497	ID	<0.05	<0.05	ID
Styx Coal Measures - Overburden / Coal Seams / Interburden / Underburden (4)	WMP06	6.6 - 6.9	886	6120	4000	0.01	0.0182	2.61	2.35	0.006	<0.01	0.01	0.011
	WMP07	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP08D	7.3 - 7.5	279	14800	8820	0.026	0.004	0.35	0.306	ID	<0.01	<0.01	0.0278
	WMP11	6.5 - 6.9	506	32100	23800	<0.05	0.0038	3.12	1.91	0.00293	<0.05	<0.05	0.0786
	WMP11D	6.6 – 7.0	541	31600	23200	0.01	0.0108	2.82	0.379	0.00302	<0.05	<0.05	0.0794
	WMP17D	6.8 - 7.1	525	40400	28000	ID	<0.005	ID	ID	ID	ID	ID	<0.025
	WMP18D	6.8 - 7.3	908	31200	22200	ID	<0.005	ID	ID	ID	ID	ID	0.0448
	WMP21B	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP22A	6.8 - 6.9	930	24600	16300	<0.01	0.004	1.6	0.624	0.004	<0.01	<0.01	0.022
	WMP22B	7.2 - 7.4	828	35000	23200	<0.05	<0.005	<0.05	0.267	ID	<0.05	<0.05	<0.025
	WMP23A	8.0 - 12.6*	3120	25800	16200	0.188	0.0108	1.21	4.99	0.302	<0.05	<0.05	0.271
	WMP24	7.1 - 7.5	972	23200	14300	0.01	<0.001	0.344	0.0984	<0.001	<0.01	<0.01	0.0108
	WMP27	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP28	6.8 - 6.9	555	8350	5620	ID	0.004	ID	ID	ID	ID	ID	0.0222
	WMP29C	11.3 - 11.6*	297	20100	12200	1.92	0.0046	0.05	0.001	0.28	<0.01	0.01	ID

	Sites	pH*	Alk	EC	TDS	Al	As	Fe	Mn	Mo	Se	V	Zn
	WMP29D	9.7 - 10.7*	103	22700	14700	0.09	0.0124	<0.05	0.05	0.132	<0.01	<0.01	0.166
	WMP30A	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP30B	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Permian Measures - Back Creek Group and/or Styx Coal Measures – Underburden (5)[2]	WMP16	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP16D	7.3 - 7.5	434	8510	5060	0.02	<0.001	0.116	0.145	0.0046	<0.01	<0.01	0.12
	WMP19	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP19D	6.6 - 6.9	531	1900	1260	<0.01	0.007	0.81	0.0702	0.0048 - 0.0054	<0.01	<0.01	0.045
	WMP20	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
	WMP20D	7.1 - 7.5	784	2010	1270	0.012 - 0.016	0.006	<0.05	0.0734	0.0016	<0.01	<0.01	0.1
	WMP22C	9.9 - 10.1	273	5230	2840	ID	0.0032	ID	ID	ID	ID	ID	0.0138
	WMP29E	12.2 - 12.9	3030	16000	5560	2.4	0.0074	<0.05	<0.001	0.272	<0.01	0.026	0.0406
	WMP30C	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Permian Measures - Back Creek Group and/or Carmila Beds (6)	WMP23B	12.2 - 12.6	2350	16900	6830	0.86	0.003	<0.05	0.006	0.283	<0.01	<0.01	0.0296

Table notes:
* Bore investigations need to be conducted to determine the source of the identified high pH
Alk = total alkalinity; EC = electrical conductivity; TDS = total dissolved solids; Al = dissolved aluminium; As = dissolved arsenic; Fe = dissolved iron; Mn = dissolved manganese; Mo = dissolved molybdenum; Se = dissolved selenium; V = dissolved vanadium; Zn = dissolved zinc

Table C10.6: TARP – Reduction in bore standing water levels

Level	Trigger	Action	Response
Level 1 (Normal)	Water level is within pre-mining 80th percentile range of water levels (i.e. depth to SWL is not deeper than 80th percentile)	• Continue monitoring	• No response required
Level 2 (Early warning)	Water level exceeds the 80th percentile range but is less than 10% greater than the maximum range	• Check bore recovery in following rounds to determine if it is seasonal or due to drawdown impacts. • If a third party bore, ensure bore is subject to baseline assessment. Undertake baseline assessment if required.	• Add bore to watch list
Level 3 (Potential impact)	Water level exceeds the 80th percentile range but is within the trigger range from Table C10.4.	• Compare to groundwater model predictions to ensure levels are as expected. • If not: - check bore integrity, and compare to climatic data to determine whether changes are likely to reflect altered climatic conditions - Review surrounding water use to determine whether any external pumping or landform changes could explain the differences - review model and provide gap analysis to determine upgrade requirements. Where required, update groundwater model - develop response plan and brief regulators. • Where drawdown occurs in a third party bore where a make-good arrangement is not in place, prepare one for implementation.	• Report findings to Site Environmental Manager identifying dewatering impact zone from bore data • Include findings in regular management meetings • Report findings to DES
Level 4 (Likely impact)	Water level exceeds the trigger levels in Table C10.4	• Undertaken actions from level 3 above. • Where drawdown occurs in third party landholder bore, compare to pre-mining baseline assessment data, and if necessary, implement make-good arrangements. • Where larger impacts are identified than predicted, engage with DES and revise groundwater model. Develop response plan and brief regulators.	• Report findings to Site Environmental Manager identifying dewatering impact zone from bore data • Include findings in regular management meetings • Engage with DES and Commonwealth DAWE

Table C10.6: TARP – Change in bore water quality

Level	Trigger	Action	Response
Level 1 (Normal)	Water quality is within pre-mining 20th to 80th percentile range	• Continue monitoring	• No response required
Level 2 (Early warning)	Water quality exceeds the 80th percentile range on one occasion	• Check bore recovery in following rounds to determine if it is seasonal or due to mining related impacts, and check integrity of sampling procedures to determine if contamination or error has occurred. • Ensure bore is subject to baseline assessment. • Repeat sampling within one month of previous round, and increase monitoring frequency for this bore to monthly.	• Add bore to watch list • Report rectification requirements to Site Environmental Manager
Level 3 (Potential impact)	Water quality exceeds the 20th to 80th percentile range and is sustained over three (3) follow up monthly rounds	• Check integrity of sampling procedures to determine if contamination or error has occurred, and check bore integrity to determine if the bore itself is the cause (leaks, insufficient bore development, etc.). • Where bore or sampling error is identified, rectify. • Investigate cause of change in water quality: - Check bore integrity, and compare to climatic data to determine whether changes are likely to reflect altered climatic conditions - Review surrounding water use to determine whether any external pumping, spills or contamination, or other changes could explain the differences - Depending on type of exceedance, investigate for point source contamination, particularly: ▪ Oil, fuel and/or chemical leaks – check nearby sources for potential leaks or spills ▪ Seepage from waste rock stockpiles – test seepage monitoring network to detect gradient of impact from stockpiles • Where contaminant point source is found, stop the leak, clean up and remediate. Prepare a response plan and brief regulators. • Where change is due to non-point source changes due to the Project	• Report findings to Site Environmental Manager • Include findings in regular management meetings • Report findings to DES

Level	Trigger	Action	Response
Level 4 (Likely impact)	Investigations undertaken under Level 3 indicate an impact has occurred	• Where change occurs in third party landholder bore, compare to pre-mining baseline assessment data, and if necessary, implement make-good arrangements. • Where larger impacts are identified than predicted, engage with DES and revise groundwater model. Develop response plan in consultation with regulators.	• Report findings to Site Environmental Manager identifying dewatering impact zone from bore data • Include findings in regular management meetings • Engage with DES and Commonwealth DAWE

C11 – Biting Insect Management Plan

October 2020

Table C11.1: Biting insect management plan

<table>
<tr><th colspan="2">Element</th><th colspan="3">Detail</th></tr>
<tr><td colspan="5">Applicable site activities
Construction, operation
Rehabilitation</td></tr>
<tr><td colspan="5">Aim
Ensure that mosquito breeding sites are not created or exacerbated through the development of the Project and to manage mosquitoes (and midges) for public health at the site and broader community.</td></tr>
<tr><td colspan="2">Objectives</td><td>Targets</td><td colspan="2">Key performance criteria</td></tr>
<tr><td colspan="2" rowspan="2">• No biting insect impacts on staff or adjacent landowners as a result of the Project</td><td>• No complaints
• No biting insect nuisance problems from the Project site</td><td colspan="2">• Nuisance levels onsite attributed to biting insects</td></tr>
<tr><td>• No occurrences of biting insect transmitted diseases in Project workforce</td><td colspan="2">• Number of biting insect transmitted diseases</td></tr>
<tr><td>Responsibility</td><td colspan="4">Construction: Construction Manager
Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="4">Personnel protection measures
Personnel will be educated on the mosquito and midge problem onsite and educated in management strategies and responsibilities for their own health.
Personnel to wear hats, socks, and loose fitting, light coloured clothing with long pants and long sleeves when outdoors. Head nets and gloves will also be worn, if required.
Personnel to use mosquito repellents when required.
Personnel will be notified if there is a mosquito or biting midge problem and individuals will take appropriate personal protection.
Building design
All onsite accommodation will be air-conditioned and screened. Screens will be the correct mesh size, fit tightly and be kept in good repair.
All screen doors on buildings should open outward and have automatic closing devices. Where required, Bifenthrin barrier treatments around personnel areas will be implemented to reduce adult biting midge numbers.
Yellow or red lights will be used in personnel areas, where possible, to prevent attracting midges. White lights will be used away from non-personnel areas to divert the midges.
Source reduction
<u>Construction</u>
Roads will be fitted with culverts where necessary, to prevent water ponding.
Rehabilitated sites will be re-contoured to prevent ponding.
Landscaping and drainage will be designed so that no stagnant ponding occurs during and after construction.</td></tr>
</table>

Element	Detail
	Drainage systems Drainage systems will be designed to prevent the accumulation of silt and debris that may create pooling of water Erosion control measures will be installed on drain batters to prevent silting. The discharge of water into mangrove and vegetated wetlands will be avoided. Drains will be maintained free of siltation and debris. Sediment basins to be designed to fully empty, or where not possible any remaining sump must be deep (preferably >60 cm) and relatively steep sided without fringing vegetation. Permanent ponds or dams to be managed to minimise fringing vegetation or emergent aquatic vegetation that create still water that encourages mosquito breeding. Temporarily flooded areas will be managed through filling depressions and draining pooling areas. Container breeding The creation of areas and structures in which water could be retained for more than five days will be avoided. If not able to be avoided (e.g. bunded areas), these will be drained and treated as required. Rainwater tanks shall be appropriately screened at the inlet and outlet. Artificial receptacles will be stored undercover away from rain where possible or stored in a manner that prevents the ponding of water.
Monitoring	Regular inspections for potential mosquito breeding sites within five days of rain occurring in the wet season and as required during the dry season.
Reporting	Occurrences of biting insect transmitted diseases are to be reported to the Construction Manager and/or Site Manager and the communicable diseases team for mosquito borne diseases are to be contacted for advice (phone: (07) 3328 9728).
Corrective actions	**Corrective action triggers:** • Monitoring within detects biting insect breeding sites. • Occurrences of biting insect transmitted diseases. **Corrective actions:** • Implement biting insect control measures and communicate to workers. • Consult with relevant authorities (i.e. Queensland Health, Department of Environment and Science), particularly where control measures such as larvacides to be used.

C12 – Traffic and Transport Management Plan

October 2020

Table C12.1: Traffic and transport management plan

<table>
<tr><th colspan="2">Element</th><th colspan="3">Detail</th></tr>
<tr><td colspan="5">Applicable site activities
Construction and operations, vehicles on public roads, and on-site roads.</td></tr>
<tr><td colspan="5">Aim
To minimise risks of accidents on-site and off-site, and reduce the impacts of traffic on environmental and social receptors.
To minimise impacts and maintain productive use of site and off-site roads.</td></tr>
<tr><td colspan="2">Objectives</td><td>Targets</td><td colspan="2">Key performance indicators</td></tr>
<tr><td colspan="2">• Undertake and complete works in compliance with statutory environmental requirements</td><td>• No statutory infringements
• No breaches of licence/approval conditions</td><td colspan="2">• Number of infringements
• Number of breaches</td></tr>
<tr><td colspan="2">• Minimise impacts from traffic on and off-site</td><td>• No complaints
• No accidents on-site
• No increase in accidents off-site</td><td colspan="2">• Number of complaints
• Number of accidents on-site (by severity) and off-site involving site vehicles or staff</td></tr>
<tr><td>Responsibility</td><td colspan="4">Construction: Construction Manager
Operation: Site Manager</td></tr>
<tr><td>Actions/mitigation measures</td><td colspan="4">General
Site protocols will be established which restrict authorised area access by activity to the approved track network.
All contractors shall attend training as part of the site induction and instructed on their obligations in regard to road safety and movement restrictions.
Road Use Management Plan and Impact Assessment
Update and finalise the Road Use Management Plan (RMP) at least six months prior to commencement of Project construction.
Update and finalise the Road Impact Assessment (RIA) at least six months prior to the commencement of Project construction, in consultation with Department of Transport and Main Roads (DTMR). The RIA will include a Traffic Impact Assessment as per DTMR's Guide to Traffic Impact Assessment and a Road Safety Assessment in accordance with DTMR's Guide to Traffic Impact Assessment.
Provide a Construction Management Plan to DTMR at least three months prior to commencement of Project construction for consultation regarding any construction related road safety risks.
Speed limits
For areas outside the Project footprint, establish an enforceable maximum vehicle speed limit of 60 km per hour.
Set an enforceable maximum vehicle speed limit of 50 km per hour between 1900 hrs and 0500 hrs for the following areas:
• The crossing of Deep Creek and for a distance of 100 m either side.</td></tr>
</table>

Element	Detail
	• The section of Mount Bison Road which traverses through remnant habitat on the western side of the Project and for a distance of 100 m east of that remnant vegetation. • The full extent of the haul road which extends along the western side of the Project area and connects between Mount Bison Road (in the south) and the Bruce Highway (in the north). Install appropriate speed limit signage. **Safety bunds** Safety bunds will be installed to prevent access to pits, screen off mining operations from the Bruce Highway and control run off water, including any sedimentation. The proposed safety bunds will be: • 6 m high with crest widths of 10 m. • Batters will be 1.5 (horizontal) on 1 (vertical) at the angle of repose. • Batters will be topsoiled and seeded to prevent scour and erosion. • Crests will be formed to a slope at 1% towards the lease. • Constructed from track compacted, fresh spoil. **Blasting** Undertake bi-annual geotechnical assessments, commencing from six months prior to Project operations, to ensure that there are no impacts of project blasting on the Bruce Highway. Provide a Blast Management Plan (BMP) to DTMR at least three months prior to the commencement of blast activities that may impact upon the safety of users of the Bruce Highway. **Dust and noise** Implement the Air Quality Management Plan and the Noise and Vibration Management Plan. **Dangerous goods and hazardous materials** Implement the Hazardous Materials Management Plan. **Driver safety** Communal transport for workers will be provided for mine staff between Ogmore and Marlborough, and further out to The Caves / Rockhampton and St Lawrence / Clairview if workforce numbers from those areas warrant shuttle services. Fatigue management strategies will be developed for external mine traffic and detailed in the RMP. Shift changes and delivery of dangerous goods and oversize machinery will be scheduled to avoid school bus services. Consultation will be undertaken with local bus service providers to ensure appropriate scheduling is retained.
Monitoring	Monitor road pavement condition on-site and undertake visual observations of external haul routes.
Reporting	All accidents and near misses on-site to be recorded in the incidents-complaints register in Appendix F. All off-site accidents involving Project drivers, employees and/or vehicles to be recorded in the incidents-complaints register in Appendix F.

Element	Detail
	All accidents and complaints will be reported and investigated in accordance with relevant traffic management legislation and guidance.
Corrective actions	**Corrective action trigger:** • Accident or near-miss involving drivers, employees and/or vehicles. • Complaint regarding Project drivers, employees and/or vehicles. • Impacts to off-site roads as a result of Project activities. **Corrective action:** • Undertake investigation of cause of accident or near miss. • Provide further training for Project employees and/or contractors regarding road safety. • Review and update the RMP.

Appendix D

Monitoring and Review Register

D1 - Monitoring and Review

October 2020

D1 - Monitoring and Review

D1.1 Purpose and Scope

This procedure consolidates the monitoring requirements from the Environmental Management Plan (EMP) and provides assessment and planning for the monitoring programs on the site, where required, as well as procedures for ongoing management of the monitoring program.

D1.2 Responsible Person

The HSE Manager is responsible for maintaining this document and updating it as required, and the Site Manager is responsible for implementing it on-site.

All monitoring is to be undertaken by suitably qualified, experience and trained persons.

D1.3 Update and Review

The program will be updated periodically to ensure it remains up to date, with a review with any changes to monitoring and review undertaken on the site. Ongoing review is to be undertaken, triggered by:

- any health and safety incidents during sampling, or potential incidents that could occur during sampling (e.g. near miss)
- any failure in the monitoring program – e.g. QA/QC failure, inappropriate equipment, missed sampling, etc. and
- any exceedance of criteria not identified or communicated immediately as part of the monitoring program.

D1.5 General Requirements

All monitoring is to be conducted in accordance with the relevant approvals (refer Appendix B3) and general standards (refer Section D1.6), and using properly calibrated, operated and maintained sampling, monitoring and testing equipment.

Table D1.1: Approvals register (in force approvals)

Description	Monitoring Sites	Parameters	Criteria	Frequency	Responsible Persons	Reporting
Review and Auditing						
Update following approval and finalisation of Environmental Authority conditions						
Documentation and Records						
Update following approval and finalisation of Environmental Authority conditions						
Site Monitoring and Inspections						
Update following approval and finalisation of Environmental Authority conditions						

Appendix E

Contingency Management Strategy

E1 - Contingency Management

October 2020

E1 - Contingency Management

E1.1 Purpose and Scope

This draft contingency strategy aims to outline a basic set of actions to follow when responding to an incident to ensure the correct containment, clean-up and reporting is undertaken for incidents occurring on-site.

E1.2 Health and Safety

Health and Safety concerns will always take precedence when managing an incident. If a situation is not safe, personnel will not enter the area unless they are:

- properly fitted with Personal Protective Equipment (PPE) and trained in its use
- sufficiently experienced to deal with the situation and
- acting under an approved Safety Management Plan or Procedure.

The site health and safety management procedures will take precedence in the case where danger to human health and safety exists.

E1.3 Assess the Level of Impact – Environmental Incident

The general category of incident should be rapidly assessed to determine the correct course of action. The categories are outlined below.

- High Impact - applies to any one or more of the following:
  - where there is an immediate threat to human life and property
  - where the incident could be associated with significant harm to native fauna and flora creates an immediate observable harm to environmental receptors
  - where it occurs in water catchments for supply of the Project or other site (or off-site) uses, or
  - where the incident has the potential to seriously contaminate soil or water resources.
- Moderate Impact - applies to any one or more of the following:
  - where there is significant (but not immediate) threat to human life and property
  - where the incident may result in chronic or long-term harm to native fauna and flora, or
  - may have a long term (but not immediate) observable impact on environmental receptors.
- Low Impact - applies to any one or a combination of the following:
  - where there is no perceived threat to human life or property
  - where the incident is outside sensitive environments
  - where the incident poses no immediate or long-term threat to environmental receptors
  - no serious or material environmental harm caused or threatened
- Near Miss - no impact, however one of the above categories may have occurred had the incident occurred

E1.4 Incident Response – Environmental

Table E1.1 below shows the minimum responses to be undertaken based on a rapid assessment of the category of incident as above.

Table E1.1: Incident response – minimum requirements

Impact class	Clean up	Review EMP / Site procedures	Environmental monitoring
High	Immediate	Yes	Yes
Moderate	Immediate	Yes	Decide on effectiveness of clean-up
Low	Within 4 hours	No, *unless improvement opportunity identified*	No
Near Miss	-		

Record any incident or potential incident (near miss) on the incident- complaint form in Appendix F and enter into the incident-complaint register ASAP for rectification and follow up.

Generally, the control methods should follow the Control, then contain, then clean-up hierarchy of approaches, whereby the source of the spill is (safely) controlled, the spill itself contained so as to minimise or avoid its movement into the environment, and clean-up undertaken.

E1.5 Notification

The Site Manager or the delegated site environmental manager/officer must be notified of all incidents as soon as practicable. Following this, relevant Government authorities must be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment as soon as practicable for high impact events and within a maximum of 48 hours after the event for moderate impact events ("initial notification").

Following initial notification, written details ("written report") of the incident must be submitted to the relevant Government authorities within 14 days of the date on which the incident occurred, to include the following information:

- the location and time of the event
- the time site staff and the Site Manager became aware of the event
- the suspected cause and a description of the resulting effects of the event
- actions taken to mitigate any environmental harm or nuisance caused by the event and
- proposed actions to prevent a recurrence of the event.

Table E1.2: Notification requirements

Type of Event	Initial Notification[1]	Written Notification	Notify
Serious or Material environmental harm caused or threatened	In accordance with Environmental Authority (once issued)		Qld Department of Environment and Science (DES)
Release of contaminants (including site discharge) which exceeds licence limit(s)			
Any monitoring result which exceeds any licence (EA) limit – discharge or noise monitoring			
Regulated waste removed and/or disposed unlawfully	ASAP	As requested by agency	
Prohibited or Restricted (Category 1 or 2) pests, weeds or diseases identified on-site	24 hours		Biosecurity Queensland
Low impact class or Near Miss event	No external notification required		

[1] Time after becoming aware of the incident or results

E1.6 Training

Training of staff will include spill response specific to the types of spills that may occur - oil and liquid waste spills, larger spills to land and to water, including use of absorbents, floating booms and skimmers, and notification procedures.

E1.7 Wet Season and Extreme Weather Preparedness

Prior to the start of the wet season, the site will be prepared by ensuring all waste materials, receptacles and storages are properly contained and stable, and will be able to withstand wet season rainfall without leaching or other loss of contaminants. A site audit will be conducted prior to each wet season with the results provided internally in written form.

A similar process will occur prior to forecast storms or other extreme weather events, whereby all wastes are contained and restrained so as to avoid loss of materials during the event. The landfill will have the day's cover applied and compacted, if sufficient time allows (for safety), with any loose materials secured.

E1.8 Records

All incidents shall be recorded on the incident / complaints register or similar and maintained as a register of incidents on the site. Incidents that require reporting and inclusion in the register include:

- incidents causing or potentially causing environmental harm or a licence non-compliance
- spills or leaks of chemicals, fuels or similar that have or may cause environmental harm and
- any equipment malfunctions where failure of such equipment may result in environmental contamination, and any shut-down of treatment systems (include the time, date and duration of failure).

E1.9 Review

This contingency plan is to be reviewed and updated prior to works starting on the site, and periodically thereafter, at a minimum annually.

E1.10 Definitions

Environmental Harm is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.

Environmental Nuisance is unreasonable interference or likely interference with an environmental value caused by (a) aerosols, fumes, light, noise, odour, particles or smoke; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.

Material environmental harm is environmental harm (other than environmental nuisance) that is not trivial or negligible in nature, extent or context; or that causes actual or potential loss or damage to property, or that results in costs for appropriate action to prevent or minimise the harm and rehabilitate or restore the environment of more than $5,000 but less than $50,000.

Serious environmental harm is environmental harm (other than environmental nuisance) that is irreversible, of a high impact or widespread; or caused to an area of high conservation value; or an area of special significance, such as the Great Barrier Reef World Heritage Area; or that causes actual or potential loss or damage to property, or that results in costs for appropriate action to prevent or minimise the harm and rehabilitate or restore the environment of equal or more than $50,000.

Table E1.3: Contingency response

Element	Detail
Receipt of Complaint	• Record details of the complaint in the incidents-complaints register • Investigate and determine whether the complaint is vexatious or not • Further investigate the cause and possible rectification for non-vexatious complaints
Spill or leak	• Define the spills severity by type and scale of the incident (major, moderate, minor) (Table E1.1) Adopt the following spill response process: - Assess: determine if the spill can be safely controlled, or if other or external help is required (if so seek this help as soon as safely possible) - Control: if safe to do so, stop the spill, for example by turning off supply, righting barrels, etc. - Contain: apply containment measures, such as spill booms, absorbent material, or by scooping small spills by shovel, etc. - Cleanup: clean up the spill by sweeping, shovelling, scooping or otherwise cleaning up the spill. Dry methods are preferred over washing - Notify: the spill will be recorded and appropriate persons notified - Review: an incident will be logged, and opportunities for improvement identified where practicable.
Unexpected Findings (contamination, archaeology, heritage)	Implement the Unexpected Findings Protocol (UFP) as follows: **Contaminated Soil** • If contaminated or potentially contaminated material is found, actions should include, but not be limited to, the following: - immediately stop work in the area of concern - contact the Site Manager or their designated authority - erect temporary barricading to prevent access, and warning signs as required - provide cover or suitable suppressant if odorous - provide erosion and sediment control measures as required, and - contact appropriate organisations to provide specialist advice/support. • Indications of contamination include (but are not limited to): - staining or discolouration - excessive odour - waste materials such as ash or slag, construction or demolition wastes (brick, concrete, tile, timber, steel, carpet, etc.) - asbestos cement sheeting, pipe or fragments - bottles, chemical containers, broken glass, plastic, etc. in non-C&D or GPT waste - white goods, garbage, etc. **Unexploded Ordinance (UXO)** • Immediately stop work in the area of concern and evacuate the area • Contact the site manager or their designated authority and contact the police for further directions (police will contact defence) • Erect temporary barricading to prevent access, and warning signs as required • Do not disturb the UXO and allow defence personnel to remove or otherwise rectify

Element	Detail
	Heritage Finds • If any cultural heritage items are found, a similar process will occur as for contaminated soil, and in line with any heritage agreements: - immediately stop work in the area of concern - contact the Site Manager or their designated authority - erect temporary barricading to prevent access, and warning signs as required - Advice will be obtained from the Aboriginal Party for the area to determine the nature of the find (in conjunction with an archaeologist/anthropologist as required). If a genuine cultural heritage find, the cultural heritage register will be updated with the find - Set up a temporary exclusion zone and develop a strategy for protection and custody of the find. Works may not recommence in the exclusion zone until a strategy is agreed for protection and custody of the find. • Indigenous cultural heritage items or places may include (but are not limited to): - Ceremonial places - Scarred or carved trees - Burials - Rock art - Fish traps and weirs - Occupation sites - Quarries and artefact scatters - Grinding grooves - Contact Sites - Wells The UFP should be integrated with a site specific emergency response plan. If the unexpected findings present an immediate hazard, then the emergency response plan should take precedence over the UFP
Other contingencies	Refer to the relevant Management Plan, or the site Safety and Health Plan

Appendix F

Environmental Forms

NC - ….. FORM [*insert form number*]
Incident / Complain / Improvement

Date: .....

Name: .....

(Person filling out form)

□ Incident □ Complaint □ Improvement

Nature of Incident / Complaint (tick one): □ water □ air □ land □ other

.....

Details

Name and Address of person or company complaining / reporting incident (or anonymous)

.....

..... Phone: .....

If company, person lodging complaint / notification: .....

Time of Incident / Complaint: .....

Nature of Contact (phone, letter, personal, email, etc.): .....

Location of Incident:.....

.....

Description

.....
.....
.....
.....
.....
.....
.....

Actions Taken	Date Acted On	Signed
....	....	....