Central Queensland Coal Project

Appendix 5c – Draft Mine Site Water Management Plan

Central Queensland Coal

CQC SEIS, Version 3

October 2020

Central Queensland Coal Project Water Management Plan

Central Queensland Coal Pty Ltd

1596-01-I1_DRAFT, 26 August 2020

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1 Introduction

1.1 OVERVIEW

Central Queensland Coal Pty Ltd (Central Queensland Coal) and Fairway Coal Pty Ltd (Fairway Coal) are the joint Proponents of the Central Queensland Coal Mine Project (the Project). The Project includes coal mining and processing activities, along with a train loadout facility (TLF).

The location of the lease area is shown in Figure 1-1. The Project is located 130 km northwest of Rockhampton in the Styx Coal Basin in Central Queensland. The Project is located within the LSC LGA. The Project is generally located on the "Mamelon" property, described as real property Lot 11 on MC23, Lot 10 on MC493 and Lot 9 on MC496. The TLF is located on the "Strathmuir" property, described as real property Lot 107 on SP316283. A small section of the haul road to the TLF is located on the "Brussels" property described as real property Lot 85 on SP164785.

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

The Project consists of two open cut operations that will be mined using a truck and shovel methodology. At full production two CHPPs, one servicing Open Cut 1 and the other servicing Open Cut 2, will be in operation. Rehabilitation works will occur progressively throughout mine operation prior to final rehabilitation and mine closure.

1.2 PURPOSE AND SCOPE

This Draft Water Management Plan (WMP) has been prepared to accompany Version 3 of the Supplementary Environmental Impact Statement (SEIS v3) for the Project. The relevant requirements of the draft Environmental Authority (EA) conditions, and the locations where they are addressed in this WMP, are summarised in Table 1.1.

Whilst the Project has a 19-year life, this WMP has focused on the first five years of operation.

1.3 RELATED DOCUMENTS

This WMP forms part of the Project Environmental Management System and should be read in conjunction with the following reports:

- Central Queensland Coal Project Supplementary EIS Version 3 (August 2020);
- Flood study and site water balance technical report, Central Queensland Coal Project (WRM, 2020);
- Central Queensland Coal Project, Surface Water Quality Technical Report (OE, 2020).

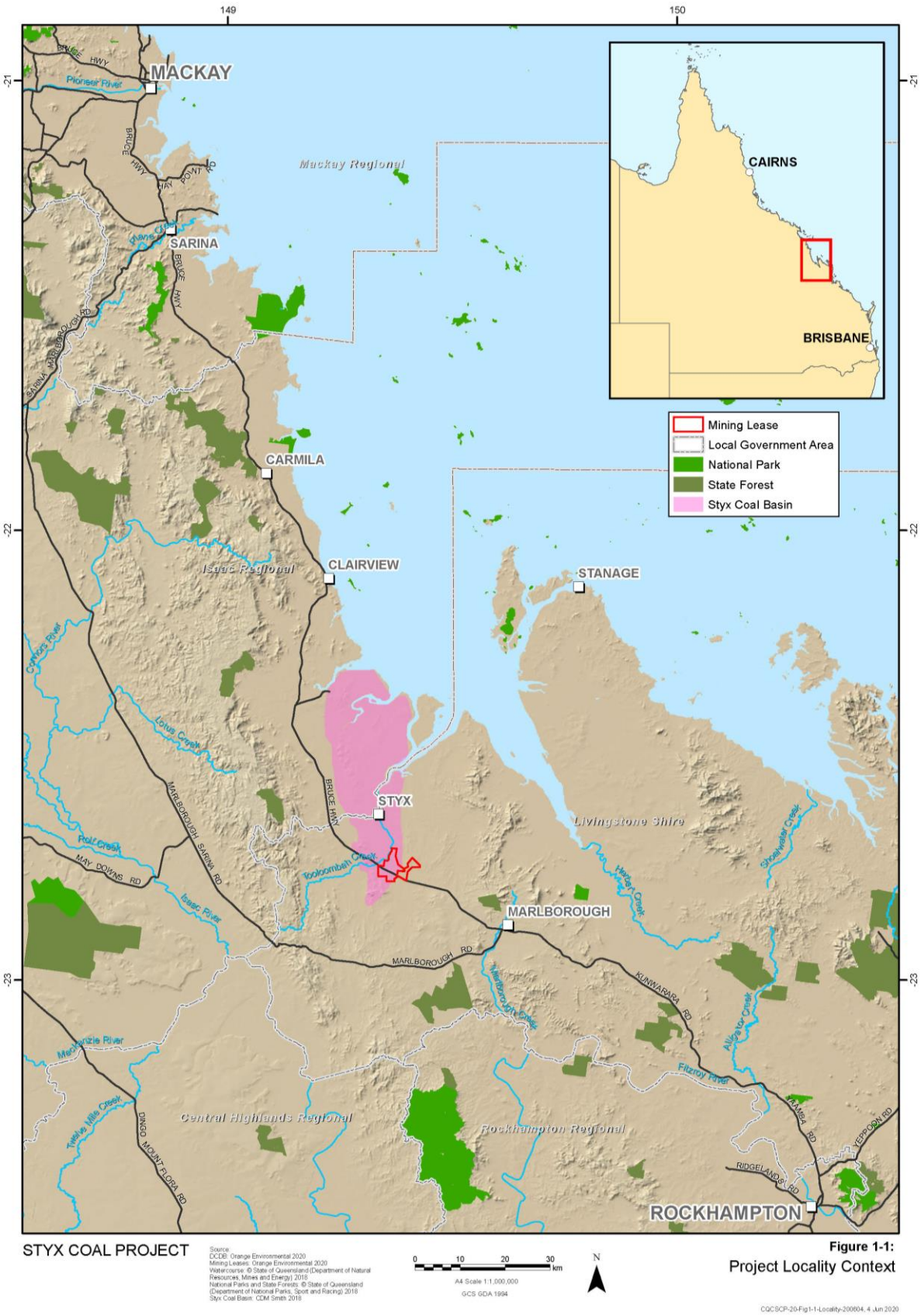

Figure 1-1 – Locality map

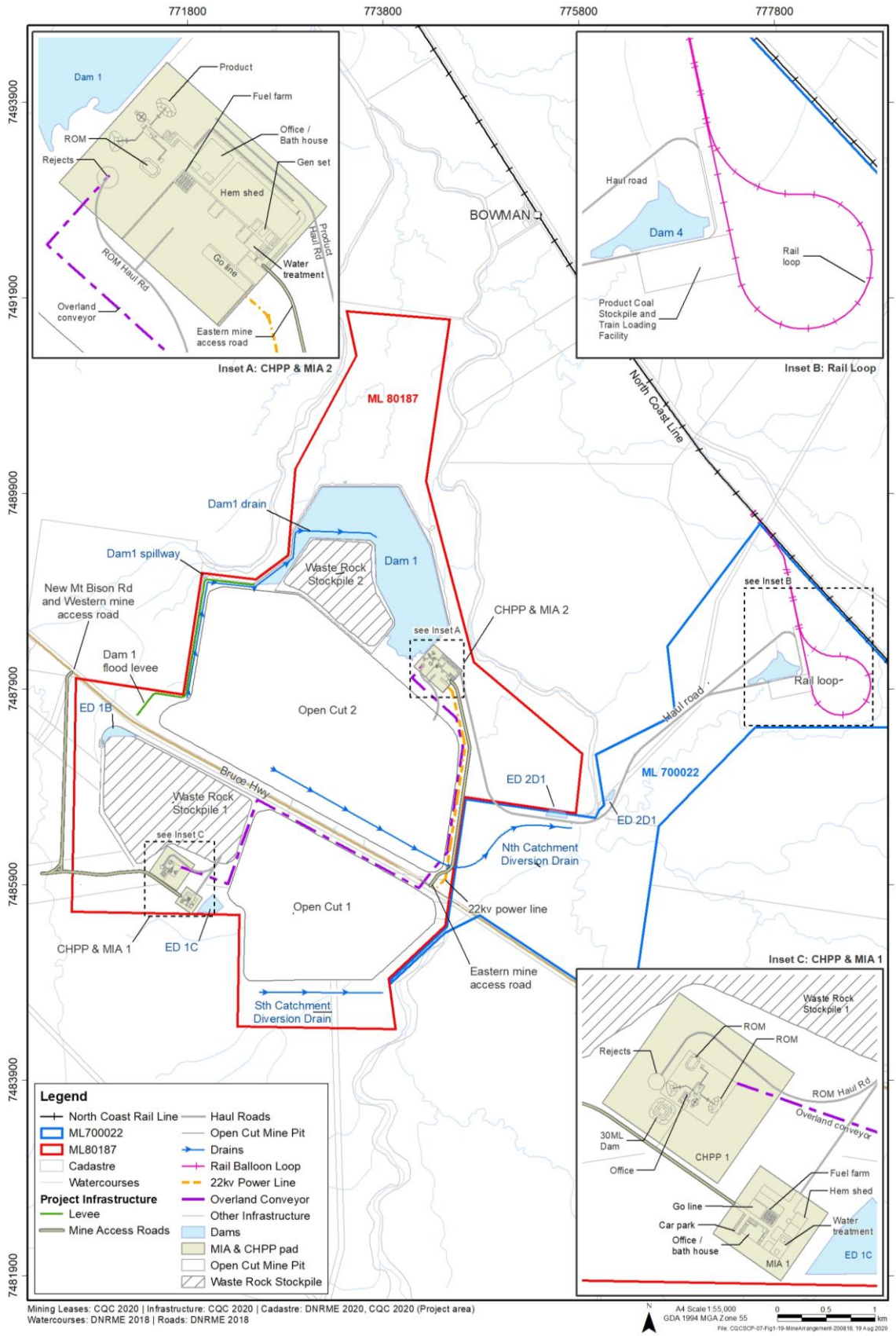

Figure 1.2 – Project – Project general arrangement

Table 1.1 – Draft EA Condition requirements

Condition xx requirements		WMP Section
The Water Management Plan must:		
1.	provide for effective management of actual and potential environmental impacts resulting from water management associated with the mining activity carried out under this environmental authority; and	All Sections
2.	be developed in accordance with administering authority's most recent version of the guideline for "*Preparation of water management plans for mining activities*" (EM324) or any updates that become available from time to time and must include at least the following components:	
	a) a study of the source of contaminants;	Section 0
	b) a water balance model for the site;	Section 7
	c) details of catchment areas and environmental values;	Sections 2 & 4
	d) a water management system for the site;	Section 4
	e) details of locations and design standards of water management infrastructure;	Section 4
	f) measures to manage and prevent saline drainage;	Section 6
	g) measures to manage and prevent acid rock drainage;	Section 6
	h) contingency procedures for incidents and emergencies; and	Section 9
	i) a program for monitoring and review of the effectiveness of the water management plan	Section 10

2 Environmental values and water quality objectives

2.1 OVERVIEW

This section of the Water Management Plan describes the environmental values and water quality objectives, as defined by the *Environmental Protection Act 1994* (EP Act), *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) and relevant regulations.

2.2 ENVIRONMENTAL VALUES

The EPP, which is subordinate legislation to the *Environmental Protection Act 1994*, provides a framework for identifying environmental values (EV) for a waterway and deciding water quality objectives (WQOs) to protect or enhance those EVs.

EVs for water are the qualities of water that make it suitable for supporting aquatic ecosystems and human water uses. These EVs need to be protected from the effects of habitat alteration, contaminated runoff and releases and changed flow to ensure healthy aquatic ecosystems and waterways that are safe for community use.

The processes to identify EVs and determine WQOs are based on the *National Water Quality Management Strategy* (NWQMS, 2018) and further outlined in ANZG (2018).

EVs and WQOs adopted for particular Queensland waters are included in Schedule 1 of the EPP. The waters relevant to the Project are scheduled in the 'Styx River, Shoalwater Creek and Water Park Creek Basins, Environmental Values and Water Quality Objectives' (DEHP, 2014). Accompanying mapping of the Styx River, Shoalwater Creek and Water Park Creek basins shows that the Project is located within the Southern Styx fresh waters, as shown in Figure 2.1.

The following EVs are identified in Schedule 1 for the Southern Styx fresh waters:

- Aquatic ecosystems;
- Irrigation;
- Human consumption;
- Farm supply/use;
- Stock water;
- Human consumer;
- Primary, secondary and visual recreation;
- Drinking water; and
- Cultural and spiritual values.

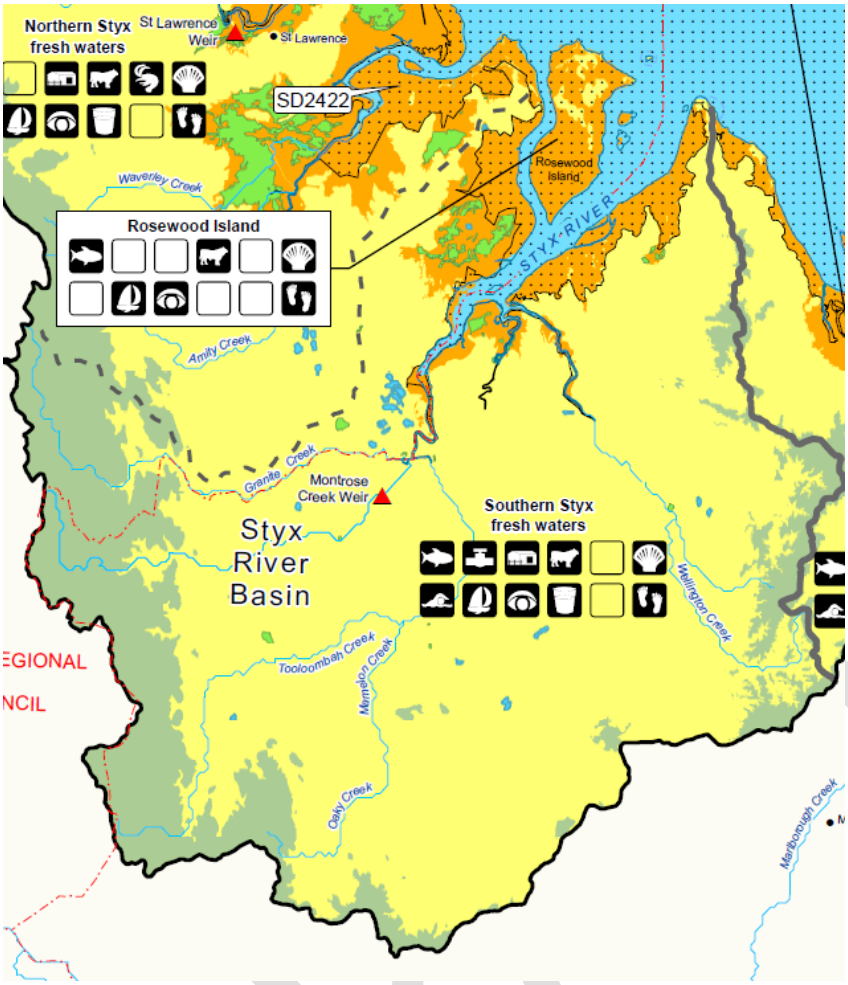

Figure 2.1 - Excerpt from WQ1271, Styx River basin

2.3 WATER QUALITY OBJECTIVES

Water quality objectives for the Styx River Basin are provided in Table 2.1 (OE, 2020).

Table 2.1 – Water quality objectives (Source: OE, 2020)

Criteria source (EV)	Parameter	WQO		
Stock watering – (EPP Water 2014)	Total Dissolved Solids			
	Beef	4,000 mg/L		
	Dairy cattle	2,500 mg/L		
	Sheep	5,000 mg/L		
	Horses	4,000 mg/L		
	Pigs	4,000 mg/L		
	Poultry	2,000 mg/L		
	Aluminium	5 mg/L		
	Metal or metalloids			
	Arsenic	0.5 mg/L		
	Beryllium	Not Determined		
	Boron	5 mg/L		
	Cadmium	0.01 mg/L		
	Chromium	1 mg/L		
	Cobalt	1 mg/L		
	Copper	0.4 mg/L (sheep), 1 mg/L (cattle), 5 mg/L (pigs and poultry)		
	Fluoride	2 mg/L		
	Iron	Not sufficiently toxic		
	Lead	0.1 mg/L		
	Manganese	Not sufficiently toxic		
	Mercury	0.002 mg/L		
	Molybdenum	0.15 mg/L		
	Nickel	1 mg/L		
	Selenium	0.02 mg/L		
	Sulphate	1,000 mg/L		
	Uranium	0.2 mg/L		
	Vanadium	Not Determined		
	Zinc	20 mg/L		
Human consumer (ANZECC / ARMCANZ 2000)	Sodium	<180 mg/L		
	Total dissolved solids (prior to treatment)	<600 mg/l		
	Sulfate	<250 mg/L		
Primary recreation (ANZECC / ARMCANZ 2000)	Temperature	16 - 34ºC		
	Dissolved oxygen	>80%		
	pH	6.5 – 8.5		
Irrigation (ANZECC / ARMCANZ 2000) Heavy metals and metalloid long-term trigger level	Metal or metalloid	Soil cumulative contaminant loading limit (CCL) (kg/ha)	Long-term trigger value (LTV) in irrigation water (up to 100 years) (mg/L)	Short-term trigger value (STV) in irrigation water (up to 20 years) (mg/L)
	Aluminium	Not Determined	5.000	20.000
	Arsenic	20	0.100	2.000
	Beryllium	Not Determined	0.100	0.500
	Boron	Not Determined	0.500	Refer to table 9.2.18 (vol 3) of ANZECC (Dependant on crop type)
	Cadmium	2	0.010	0.050
	Chromium (CRVI)	Not Determined	0.100	1.000
	Cobalt	Not Determined	0.050	0.100
	Copper	140	0.200	5.000
	Fluoride	Not Determined	1.000	2.000
	Iron	Not Determined	0.200	10.000
	Lead	260	2.000	5.000
	Lithium	Not Determined	2.500	2.500
	Manganese	Not Determined	0.200	10.000
	Mercury	2	0.002	0.002
	Molybdenum	Not Determined	0.010	0.050
	Nickel	85	0.200	2.000
	Selenium	10	0.020	0.050
	Uranium	Not Determined	0.010	0.100
	Vanadium	Not Determined	0.100	0.500
	Zinc	300	2.00	5.000

Criteria source (EV)	Parameter	WQO
Human consumer – Drinking water EV (ANZECC / ARMCANZ 2000)	Giardia	0 cysts
	Cryptosporidium	0 cysts
	Blue-green algae (cyanobacteria)	<100 cells/mL
	pH	6.5 -8.5
	Total Dissolved Solids (TDS)	600 mL
	Sodium	180 mg/L
Biological	Sulphate	250 mg/L
	Dissolved oxygen	>85% saturation

3 Existing surface water environment

This section of the Water Management Plan describes the regional and local drainage characteristics in the vicinity of the Project.

3.1 DRAINAGE NETWORK

The mining lease area is located between two major tributaries of the Styx River; Tooloombah Creek to the west and Deep Creek to the east, as shown in Figure 3-1. The confluence of these creeks, which forms the Styx River, is located three kilometres downstream of the northern extent of the mining lease area. The total catchment area of the Styx River to Ogmore Bridge is 717 km^2.

The catchment is rural with minimal development and unregulated streams. It is traversed by the Bruce Highway, which runs through the middle of the mining lease area, and the North Coast railway line to the north-east of the mining lease area. The Bruce Highway has bridge crossings over both Tooloombah and Deep creeks while the railway is outside of the floodplain and does not cross the Project area.

The upper reaches of Tooloombah and Deep creeks extend west to the Broadsound Range which is characterised by steep topography with grades of approximately 10%. The majority of the lower reaches of the catchment where the Project is located are characterised by generally flat terrain with slopes less than 0.5%. The main watercourses are deeply incised. The Tooloombah Creek channel is significantly larger than the Deep Creek channel.

The upper catchment is well vegetated with significant portions of the lower catchment cleared. Most of the incised creek channels of Tooloombah and Deep creeks remain well vegetated, with numerous pools. Based on historical aerial images and a site inspection during an extended dry period in late 2019, some of these pools appear to be permanent while other pools dry out during extended periods of low rainfall.

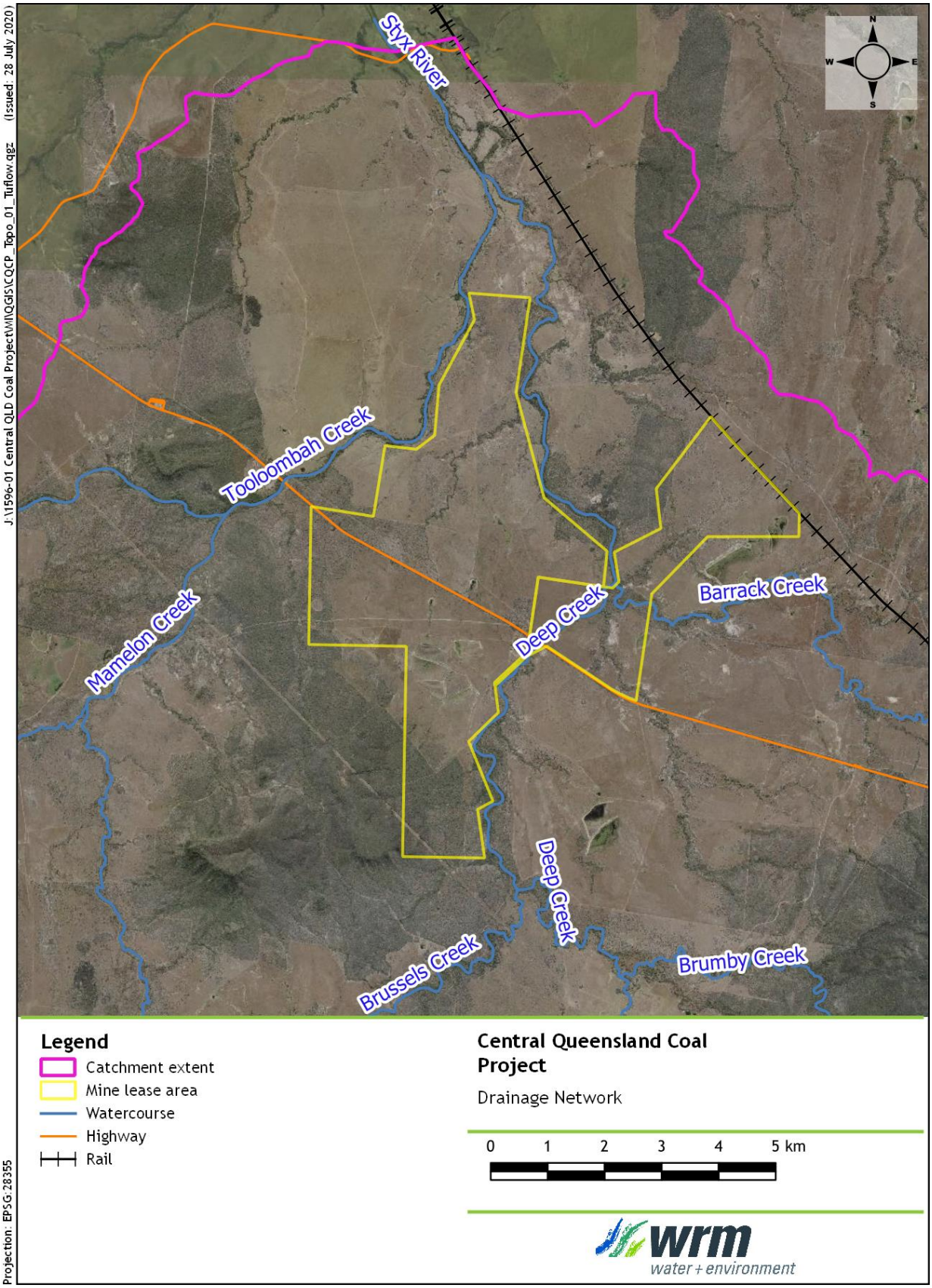

Figure 3-1 - Major watercourses draining the mine lease area

3.2 STREAMFLOW

No long-term streamflow data is available for the watercourses draining the Project area. Two stream gauges, one on Tooloombah Creek and another on Deep Creek, were established in 2019. Data from the Tooloombah Creek gauge, which had a better rating curve than the Deep Creek gauge, was used to calibrate a rainfall runoff model to represent natural catchment runoff. The calibrated model was run using an extended period of recorded rainfall to obtain a representation of the long-term runoff response of local catchments.

Figure 3-2 shows a ranked flow plot of simulated flow in Tooloombah Creek, based on a 131 year simulation using historical rainfall data (1889-2019). The results in Figure 3-2 show modelled "baseflow" and total flow. Note that the baseflow generated by the model represents a delayed rainfall response, rather than baseflow generated from groundwater.

The model results indicate that local watercourses are ephemeral and flow approximately 20% of the time.

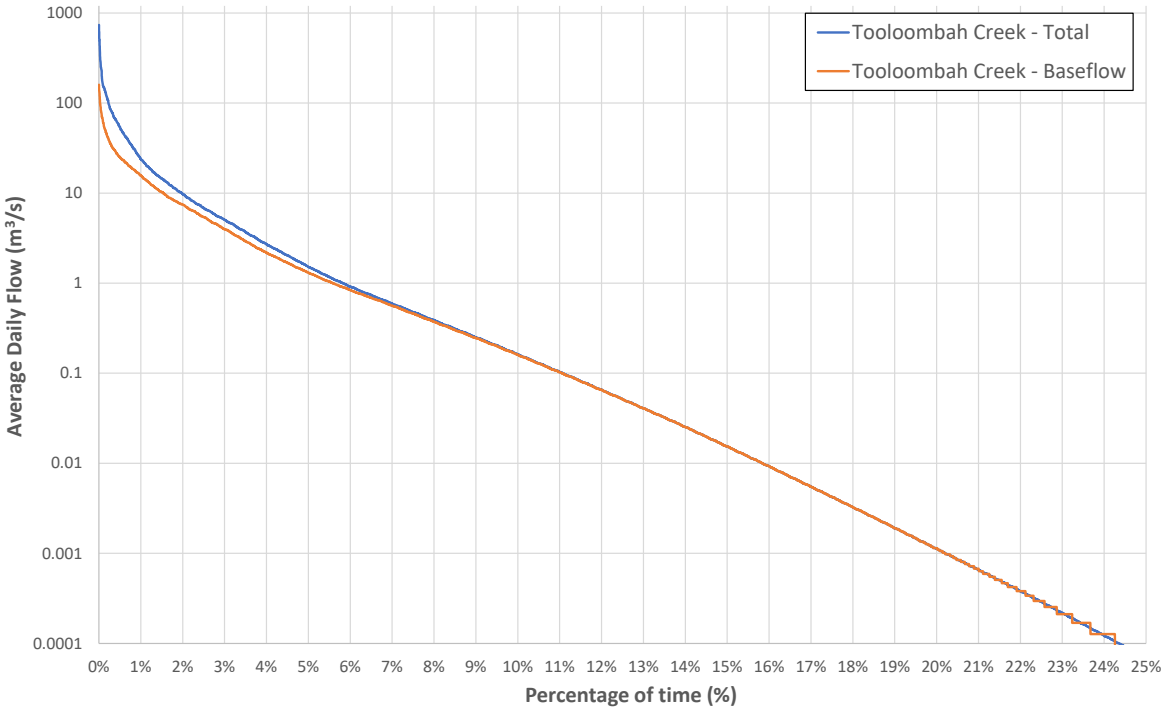

Figure 3-2 - Simulated long-term ranked flow plot for Tooloombah Creek

3.3 WATER QUALITY

Water quality sampling of surface waters has been undertaken in the vicinity of the Project for more than 10 years. Surface water quality data between January 2008 to 2020 is available from the following sources:

- January 2008 to March 2012 – 21 discrete monitoring events by the Fitzroy Basin Association covering mostly storm events
- June 2011 to July 2012 – 12 approximately monthly events sampled by the proponent covering several storm events and otherwise mostly baseflow events, and
- February 2017 to 2020 – 37 approximately monthly events sampled by the proponent, predominantly 'no flow' events – that is, events with little to no discernible flow in the creeks, due to the extended dry conditions.

Water quality sampling locations are shown in Figure 3.3. A detailed summary of water quality data in the watercourses relevant to the Project is provided in the Surface Water Quality Technical Report (OE, 2020).

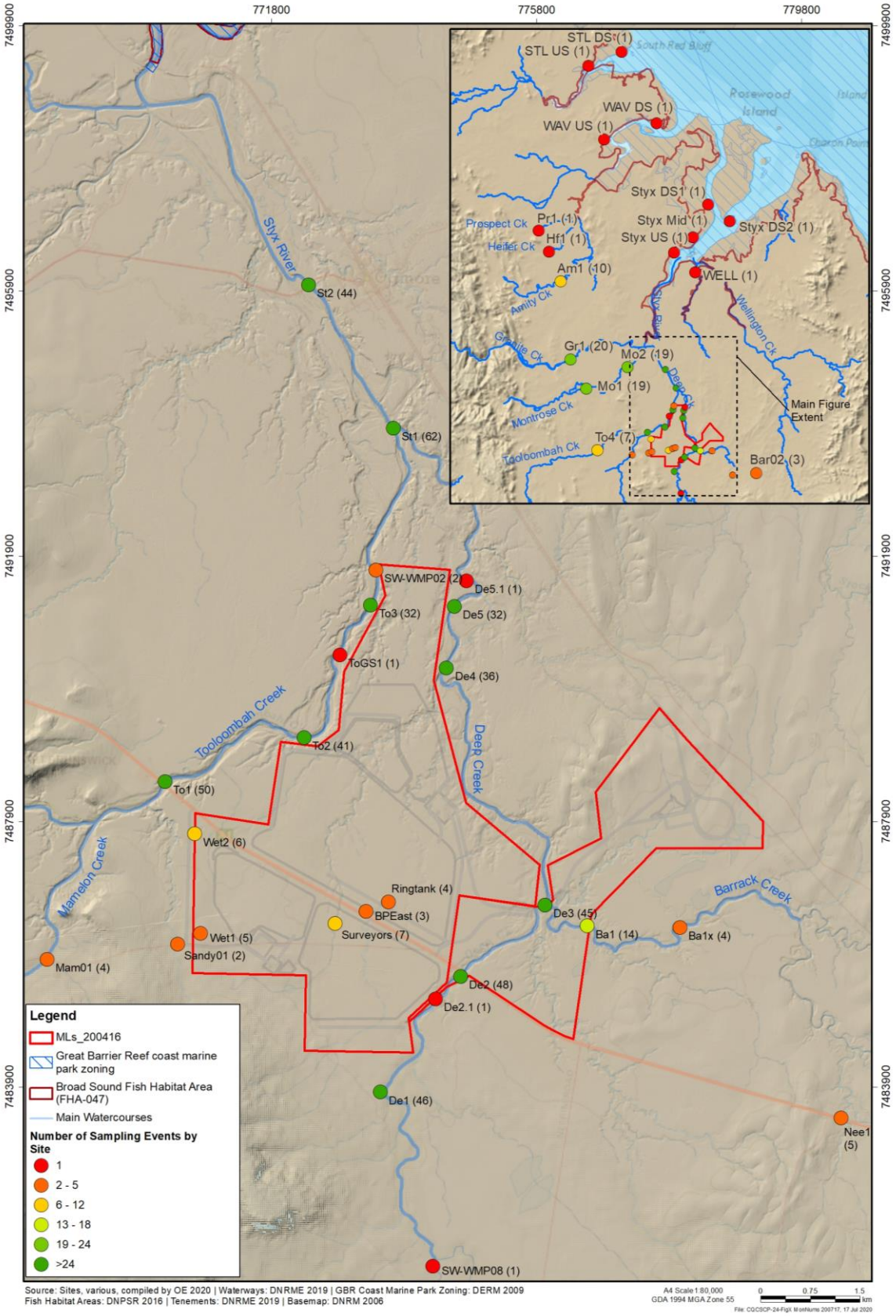

Figure 3.3 – Water quality monitoring locations

3.4 EXISTING WATER USE ENTITLEMENTS

The Project is predominately within the Mamelon cattle grazing property, which runs cattle and produces dryland crops. The Mamelon property is owned by the Proponent and is currently being leased for these uses. Supporting this land use is a series of farm dams and surface contour bunds that capture, and store runoff generated by the local contributing catchments. Groundwater bores also lift water to dams and / or storage tanks in the surrounding region for domestic and stock water use.

There are several surface water entitlements in Tooloombah and Deep Creek for irrigation, stock and domestic supply. These entitlements are summarised in Table 3.1, with those adjacent to or downstream from the Project being:

- 119/CP900367 - Irrigation entitlement located on parcel of land adjacent to the Mamelon property, separated by Deep Creek, and downstream of mine infrastructure and environmental dam release point on Deep Creek;
- 1/RP616700, 19/MC495 - Domestic / stock supply entitlement located on parcel of land adjacent to the Mamelon property and straddling Tooloombah Creek. The extraction point appears to supply a small off-stream storage on the western overbank of Tooloombah Creek, on the Bar-H property; and
- 45/MPH26062 - Irrigation entitlement on parcel of land directly bordering the Project to the north and extracting approximately 6 km downstream of the Bruce Highway on Tooloombah Creek.

Table 3.1 – Existing water entitlements (SEIS v3, Chapter 9)

Water source	Location	Authorised use	Entitlement per water year	Water name / type
Tooloombah Creek	1/RP616700 19/MC495	Domestic supply; Stock	18 ML	Tooloombah Creek / Watercourse (Surface water)
Deep Creek	119/CP900367	Irrigation	20 ha	Deep Creek / Watercourse (Surface water)
Tooloombah Creek	45/MPH26062	Irrigation	8 ha	Tooloombah Creek / Watercourse (Surface water)
Tooloombah Creek*	633/MC630	Irrigation; Stock	3 ha	Tooloombah Creek / Watercourse (Surface water)

* Located upstream of the Project

4 Proposed surface water management strategy and infrastructure

4.1 WATER MANAGEMENT PRINCIPLES

The key principles of surface water management for the Project are:

- Minimise external catchment runoff draining into pits;
- Protect receiving water quality by containing runoff from disturbed areas within the mine water management system;
- Reuse water captured on the site to meet on-site demands;
- Maximise recycling of captured water;
- Manage site water inventory by releasing water from the mine water management system to receiving watercourses during wet conditions when receiving watercourses are flowing.

The proposed water management strategy for the Project is based on targeted management of water from different sources based on anticipated water quality. Water in the site is categorised as:

- Clean water – surface runoff from undisturbed catchment areas;
- Mine affected water - seepage, groundwater and surface runoff inflows to the open cut mining areas which could potentially have elevated salinity;
- Sediment laden water - surface runoff from overburden emplacement areas and other non-mining disturbed areas which is likely to have high concentrations of suspended sediment; or
- Contaminated water – water from workshop or fuel storage areas that may have elevated oil, grease and other contaminants.

4.2 MANAGEMENT OBJECTIVES

The objective of the site water management system is to manage all types of water on site to meet operational and environmental objectives.

The key WMS objectives are to:

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

Specific objectives for each water type are as follows:

- Mine affected water:
    - Contain within the site water management system.
    - Ensure any controlled releases do not result in environmental harm.
    - Minimise uncontrolled discharges in wet periods to protect downstream water quality and ensure adequate water supplies are maintained for site demand during dry periods.
- Sediment water:

- Contain within the site water management system and recycle to meet site water demands.
- Treated to remove sediments to a level suitable for release

- Clean catchment water: Separate from the mine affected and sediment water systems as much as practicable and allow it to pass uninterrupted through the catchment.
- Contaminated water: Ensure full separation from other water sources and manage under the specifications of AS1940 - *Storage and Handling of Flammable and Combustible Liquids*.

4.3 PROPOSED WATER MANAGEMENT INFRASTRUCTURE

The site water management system for the early years of the Project (to Project Year 8 [P8]) is shown in Figure 4.1 (P3) and Figure 4.2 (P8), and includes the following components:

- A large (2,783 ML) mine water dam (Dam 1) which is the main storage for runoff from active mining areas and groundwater inflows to the open cut pits. Dam 1 will also collect undisturbed catchment runoff in the early stages of the Project to provide water supply for mining operations.
- A controlled release system from Dam 1 to Deep Creek. The controlled release system will enable site water volumes to be managed during wet periods when significant inflows to the site water management system are expected. Releases will only occur during flow events in Deep Creek.
- A clean water diversion drain (Northern Diversion Drain) to divert clean catchment runoff around the open cut pit to Deep Creek.
- Sediment dams to collect and treat runoff from overburden emplacements.
- Environmental dams to collect and contain runoff from the haul road and rail loop.

A schematic of the Project water management system is presented in Figure 4.3.

Table 4.1 summarises the capacity and proposed maximum operating volume (MOV) for the key water storages within the proposed water management system. Storage interactions and operating rules are summarised in Table 4.2.

Table 4.1 - Proposed storage details

Storage	Full storage capacity (ML)	Max. operating volume (ML)
Dam 1	2,783	1,800
Env. Dam 1B	23.7	*operated empty*
Env. Dam 1C	44.1	*operated empty*
Env. Dam 2D1/2	26.9	*operated empty*
Dam 4	95.8	*operated empty*

Table 4.2 – Storage interactions and operating rules

Storage	Operating Rules
Open Cut 1 & 2	• Receives groundwater inflows • Dewaters to Dam 1 if water level exceeds 50 ML (nominal sump volume)

Dam 1	• Primary mine affected water storage for the Project
	• Captures runoff from the following areas:
	  ○ Waste Rock Stockpile 2
	  ○ CHPP 2 and associated MIA area
	  ○ Part of the haul road and access road
	  ○ Upstream clean water catchment
	• Sources water from the Open Cut 1 & 2, Env. Dam 1B, Env. Dam 1C, Env. Dam 2D and Dam 4
	• Supplies water to the following demands as required:
	  ○ CHPP demands
	  ○ Haul road dust suppression
	  ○ Vehicle washdown and fire water
	• Controlled releases to Deep Creek
	• If capacity exceeded, would overflow to Tooloombah Creek

Env. Dam 1B	• Sediment dam • Captures runoff from Waste Rock Stockpile 1 • Dewaters to Dam 1 to maintain storage as empty • If capacity exceeded, would overflow to Tooloombah Creek
Env. Dam 1C	• Mine affected water dam • Captures runoff from CHPP 1 and associated MIA area • Dewaters to Dam 1 to maintain storage as empty • If capacity exceeded, would overflow to Dam 1
Env. Dam 2D*	• Sediment dam • Captures runoff from part of the haul road • Dewaters to Dam 1 to maintain storage as empty • If capacity exceeded, would overflow to Deep Creek
Dam 4	• Sediment dam • Captures runoff the rail loop and haul road • Dewaters to Dam 1 to maintain storage as empty • If capacity exceeded, would overflow to Deep Creek

* Split into 2 nearby dams – 2D1 and 2D2 – to avoid vegetation/habitat areas

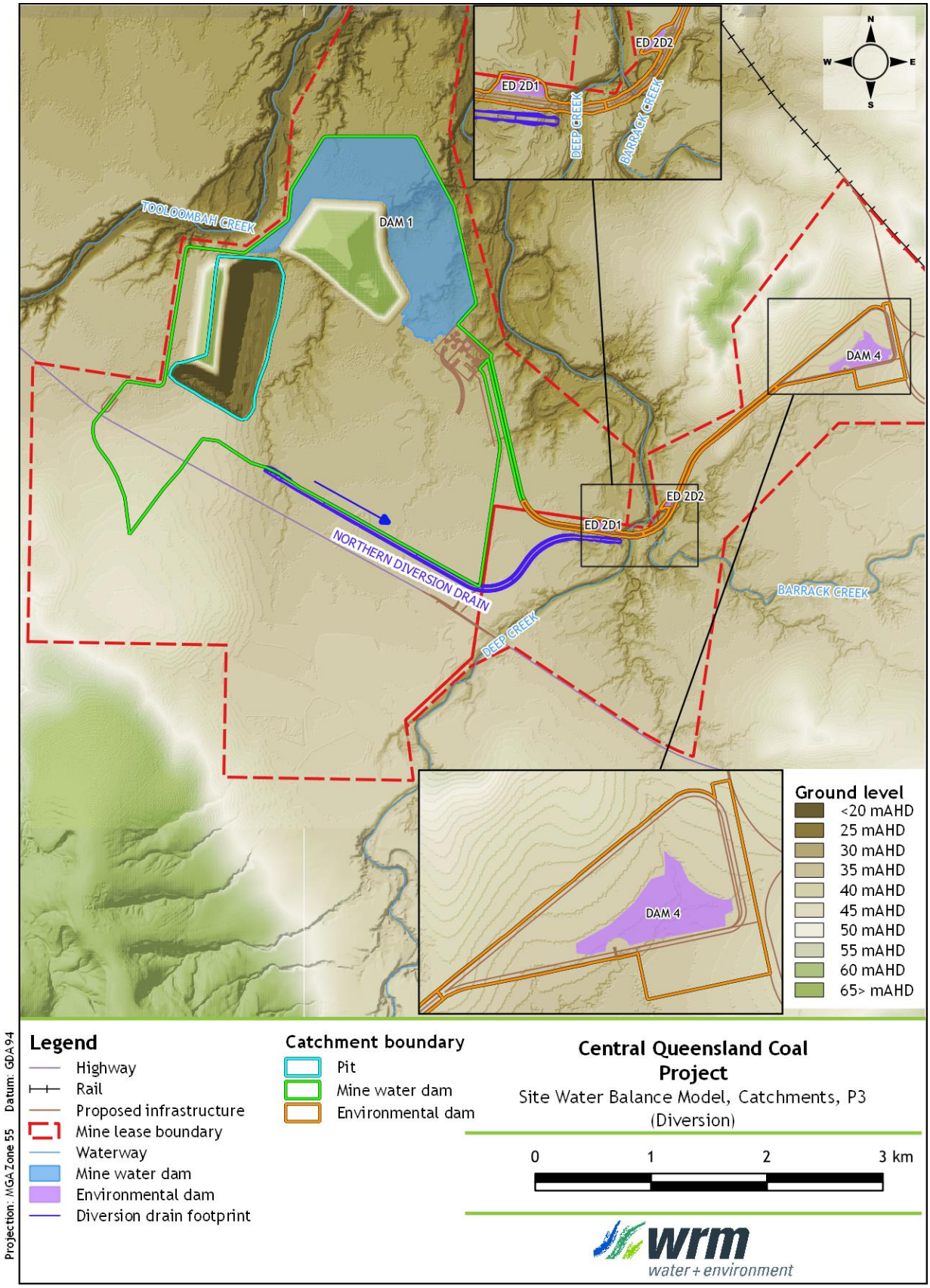

Figure 4.1 - Catchment Plan, Year 3

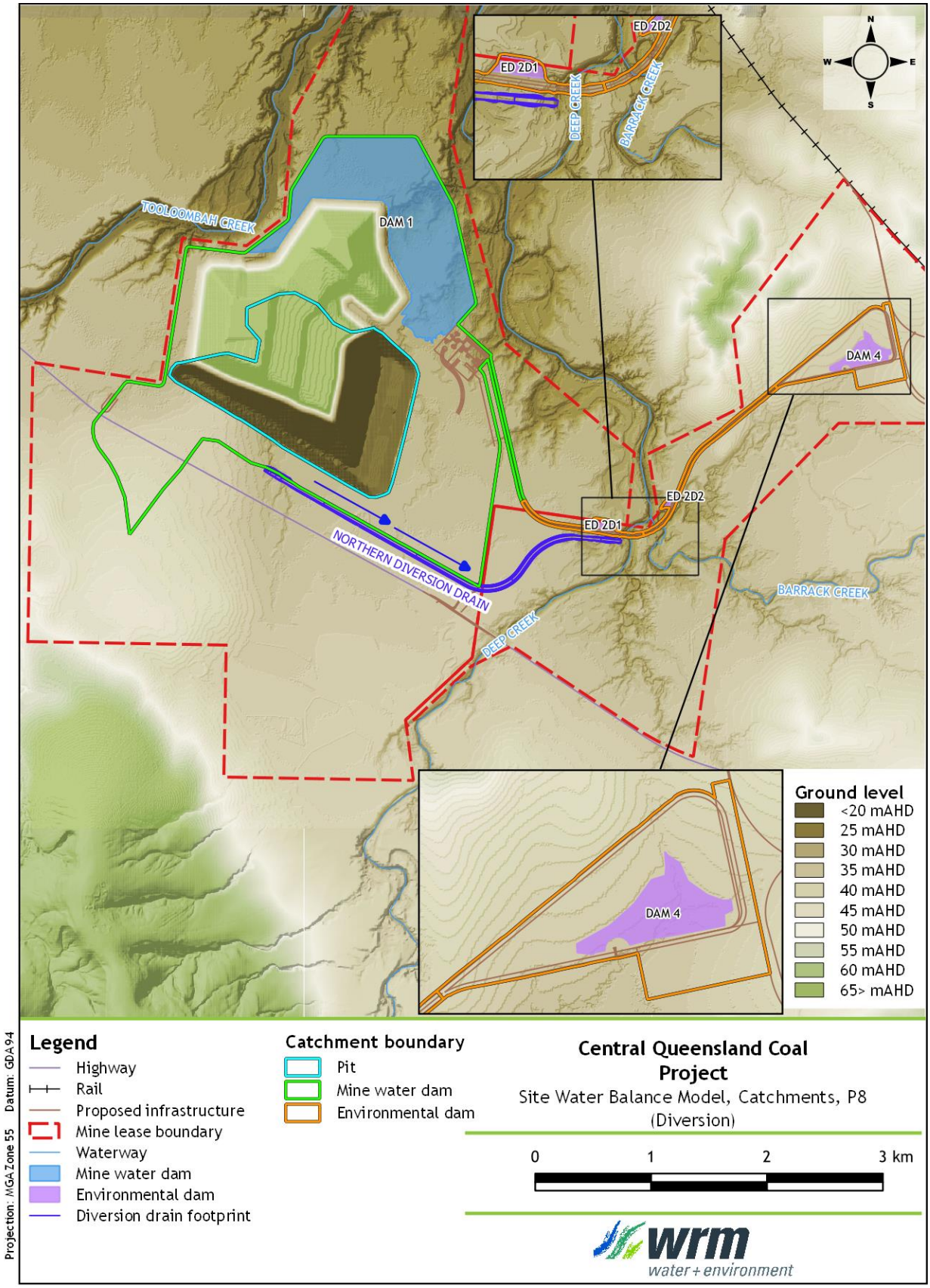

Figure 4.2 - Catchment Plan, Year 8

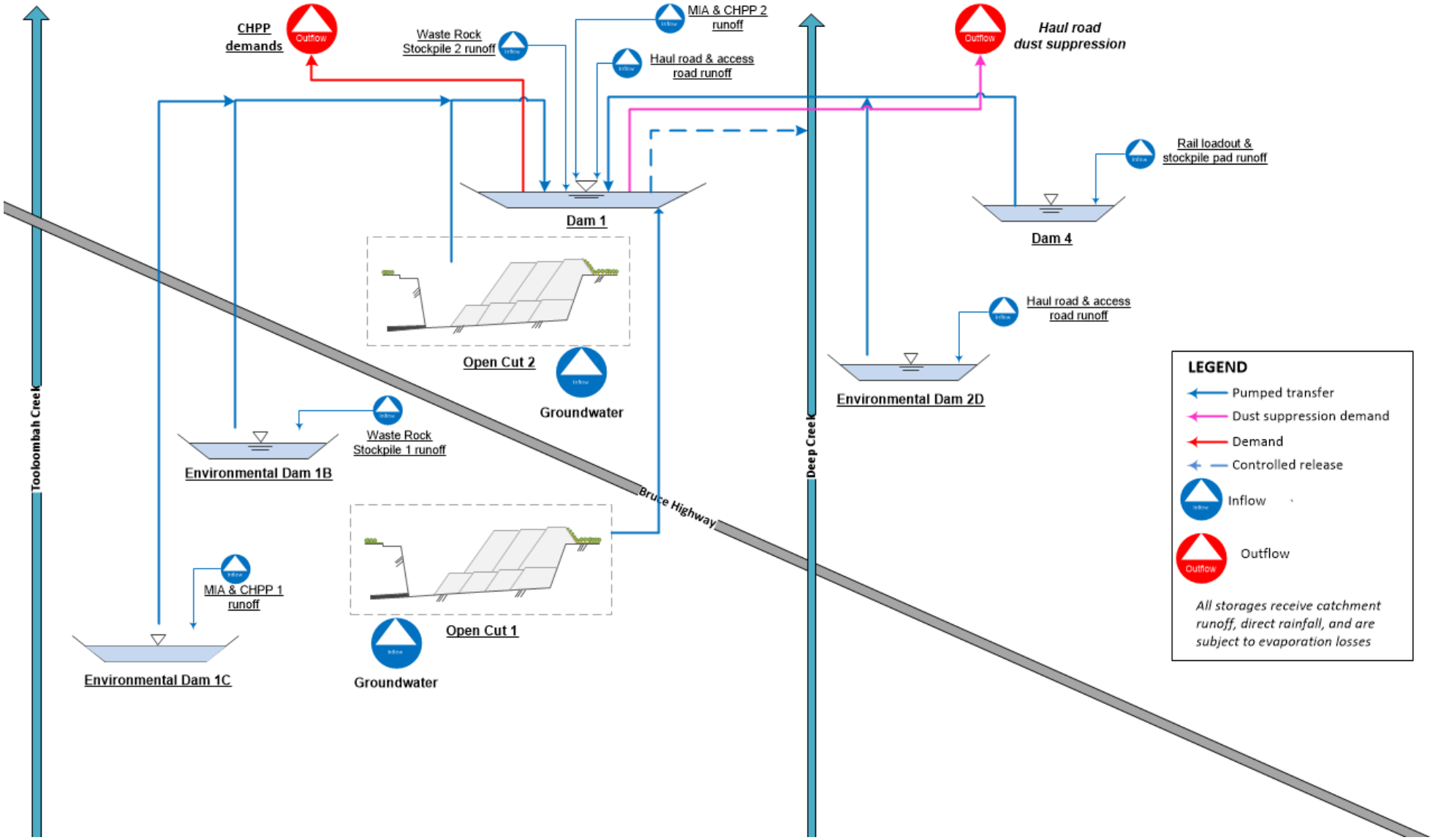

Figure 4.3 – Project water management system schematic

4.4 CLEAN WATER DIVERSIONS

The Project includes two clean water diversion drains to divert undisturbed area runoff away from active mining areas to Deep Creek.

- *Northern Diversion Drain*: Located on the northern side of the Bruce Highway (see Figure 4.1). This is a temporary drain which will be in place for approximately the first half of the Project life before being mined through.
- *Southern Diversion Drain*: Located south of Open Cut 1, this drain will be constructed in the latter half of the Project life to divert catchment runoff away from the open cut pit to Deep Creek.

4.5 OIL/GREASE SEPARATION

Runoff from the vehicle wash down and workshop areas will be treated by an oil and grease separator prior to collection in the mine water management system for re-use.

4.6 CONTROLLED RELEASES

During wet climatic conditions, controlled releases from Dam 1 will be required to prevent excessive accumulation of water within the site storages and minimise the risk of uncontrolled discharges to the receiving environment. The controlled release point will be located on Dam 1, with discharges into Deep Creek.

Table 4.4 shows the proposed release conditions. The release of mine affected water from the authorised release point to receiving waters must meet these conditions (dependant on receiving water flow for some parameters, as shown in Table 4.4).

4.7 MINE AFFECTED WATER RELEASE POINTS

Potential releases of mine affected water to the receiving environment may occur at the release points identified in Table 4.3. The locations of the release points are shown in Figure 4.4.

Table 4.3 – Proposed storage details

Release point	Location (Lat, Long)	Mine affected water source	Monitoring point	Receiving waters
RP1	-22.675868, 149.669363	Dam 1 controlled release	Sampling tap on riser pipe outlet	Deep Ck
RP2	-22.683835, 149.647105	Dam 1 spillway	As close as practical to the spillway in Dam 1	Tooloombah Ck
RP3	-22.692928. 149.703360	Dam 4	Sampling tap on riser pipe outlet	Deep Ck tributary

Table 4.4 - Proposed controlled release rules

Receiving Waters/Streams	Release Point (RP)	Gauging Station	GS Latitude (dec. degree, GDA94)	GS Latitude (dec. degree, GDA94)	Receiving Water Flow Criteria for Discharge (m^3/s)	Maximum release rate	Release Limits
Deep Creek	RP1	330452 Deep Creek	-22.6737°S	149.6697°E	**Low Flow**		
					0.1 m^3/s (8.64 ML/d)	0.018 m^3/s (1.55 ML/d)	Electrical conductivity - 1,000 µs/cm Sulphate (SO_4^{2-}) - 38 mg/L
					Medium Flow		
					4 m^3/s	0.142 m^3/s	Electrical conductivity - 2,000 µs/cm Sulphate (SO_4^{2-}) - 80 mg/L
					High Flow		
					50 m^3/s	1.09 m^3/s	Electrical conductivity - 3,000 µs/cm Sulphate (SO_4^{2-}) - 120 mg/L
					Very High Flow		
					100 m^3/s	2.02 m^3/s	Electrical conductivity - 4,000 µs/cm Sulphate (SO_4^{2-}) - 160 mg/L
					Flood Flow		
					250 m^3/s	3.07 m^3/s	Electrical conductivity - 8,000 µs/cm Sulphate (SO_4^{2-}) - 330 mg/L

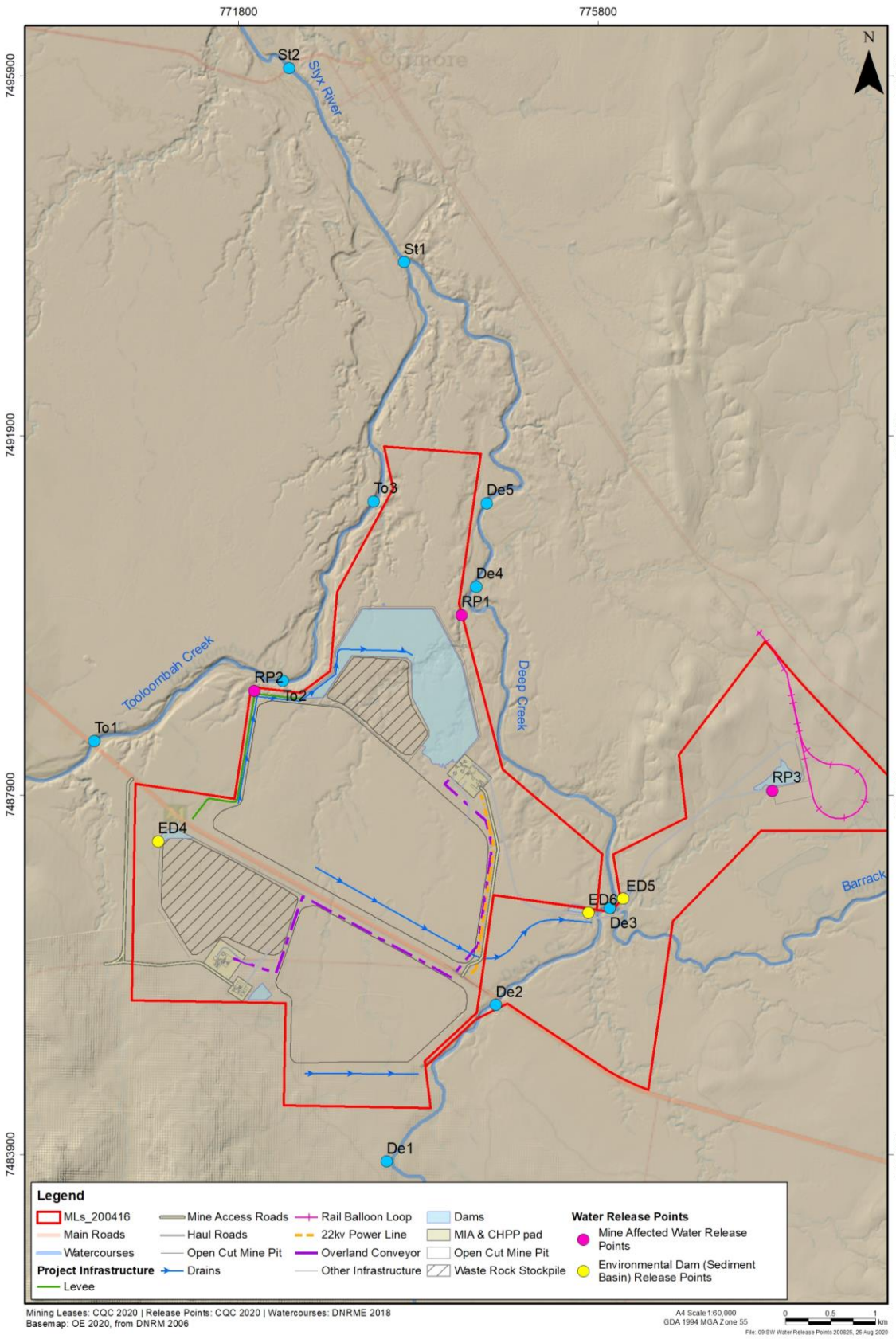

Figure 4.4 – Location of water release points

5 Contaminant source study

5.1 OVERVIEW

This section of the water management plan describes the activities during the operation of the Project that could potentially generate contaminants that may impact on the EVs of the receiving waters, if not managed. The sources of the potential contaminants have been identified and evaluated based on expected water quality during operations.

5.2 SITE OPERATING ACTIVITIES

The major components of the Project are shown in Figure 1.2 and include:

- two open cut pits;
- waste rock stockpiles;
- access and haul roads;
- ROM coal stockpiles;
- Two coal handling and preparation plants (CHPPs) including crushing facility, a product coal stockpile pad, a temporary reject stockpile, fuel storage area, a rail loop and rail loading facilities;
- mine infrastructure areas; and
- water management structures including mine affected water dams and sediment dams.

5.3 SURFACE WATER TYPES

Land disturbance associated with mining activities has the potential to adversely affect the quality of surface runoff in downstream receiving water through increased sediment loads. In addition, runoff from active mining areas (including coal stockpiles, etc.) may have increased concentrations of salts and other contaminants when compared to natural runoff. The proposed strategy for the management of surface water at the Project is based on the separation of water from different sources based on water quality.

Definitions of the types of water generated within the Project are shown in Table 5.1.

Table 5.1 – Types of water

Water type	Definition
Mine affected water	In accordance with the *DEHP Guideline Model Mining Conditions*, mine affected water means the following types of water: i) pit water, tailings dam water, processing plant water ii) water contaminated by a mining activity which would have been an environmentally relevant activity *under Schedule 2 of the Environmental Protection Regulation 2008* if it had not formed part of the mining activity iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the

Water type	Definition
	standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated v) groundwater from the mine dewatering activities vi) a mix of mine affected water (under any of paragraphs I to v) and other water.
Sediment water	Surface water runoff from areas that are disturbed by mining operations (including out-of-pit waste rock emplacements). This runoff does not come into contact with coal or other carbonaceous material and may contain high sediment loads but does not contain elevated level of other water quality parameters (e.g. electrical conductivity, pH, metals, metalloids, non-metals). This runoff must be managed to ensure adequate sediment removal prior to release to receiving waters.
Clean catchment water	Surface runoff from areas unaffected by mining operations. Clean catchment water includes runoff from undisturbed areas and fully rehabilitated areas
Raw water	Untreated water, generally from an external water supply, that has not been contaminated by mining activities.
Potable water	Treated water suitable for human consumption.

5.4 EXPECTED SURFACE WATER QUALITY

The expected salinity of runoff from the various water sources and land disturbance areas is summarised in Table 5.2. These estimates are based on available data and will be progressively updated once data from the operational Project is available.

The results of geochemical analysis (SEIS Chapter 8) indicate that the waste rock is expected to have a low capacity to generate acidity but a moderate saline drainage potential. Kinetic leach column (KLC) results indicated that leachate may contain elevated concentrations of dissolved arsenic, molybdenum, selenium and vanadium compared to background concentrations. The leachate derived from the kinetic leach study generally showed that there is an initial flush of soluble metals / metalloids and salts which decreased after the first two to three flushes. This initial flush is likely related to the particle size; the fine materials with smaller particle size have a larger surface area for chemical reactions to occur and thus tend to yield higher leached metals / metalloids and salts concentrations. Proposed mitigation measures to manage water contaminants are discussed in Section 6.

Table 5.2 – Adopted runoff water quality parameters

Land use/ water source	EC (µS/cm)	Basis of adopted value
Natural/ undisturbed	210	Median value from 64 stormflow samples in local waterways.
Roads/ hardstand	1,000	Typical value adopted for Bowen Basin open cut coal mines
Pit floor	4,500	Typical value adopted for Bowen Basin open cut coal mines
Spoil dump	580	Median value from KLC tests
Rehabilitated spoil	210	Assumed to be same as natural/undisturbed.
Groundwater inflows	15,000	Range for Zone 11 (Styx Coal Measures excl. WMP13) is ~5000 to 31,400.

5.5 CHEMICAL AND FUEL STORAGE

Primary chemical storage areas will be located within the mine infrastructure and CHPP areas. These storage facilities will be constructed and bunded in accordance with the relevant specifications of *AS1940 - Storage and Handling of Flammable and Combustible Liquids (AS1940)*. Hazardous Substances Safe Operating Procedures (SOP) will be in place at these operations. A register will also be maintained on site for all chemicals. Where appropriate, Material Safety Data Sheets (MSDS) will be kept in storage areas or available for on-line access, as required.

Fuel storage areas are a potential source of hydrocarbons. Primary fuel storage areas at the mine infrastructure area will be constructed and bunded in accordance with the relevant specifications of *AS1940 - Storage and Handling of Flammable and Combustible Liquids* (AS1940).

Fuel storage areas associated with Project operations will be inspected regularly, with repair and maintenance work completed as required. Bunds filled with stormwater will be drained or pumped out by a licensed contractor as soon as practicable to maintain the bund volume.

Incident reporting and the management of spills will be undertaken in accordance with the site operational incident reporting and emergency management procedures.

6 Acid rock and saline drainage

6.1 OVERVIEW

The proposed management strategies for acid rock drainage and overburden alkaline and saline drainage are described in the geochemical assessment within the SEIS v3 (Chapter 8 – Waste Rock and Rejects).

A summary of the expected conditions relating to acid rock and saline drainage at the Project, as well as the proposed management and mitigation measures, are provided in the following sections (taken from the above SEIS v3 Chapter).

6.2 WASTE ROCK STOCKPILES DESIGN AND DISPOSAL METHOD

The proposed disposal method for waste rock is to initially truck rejects to an out-of-pit waste rock stockpile area during the development phase of each open cut. This area would be graded and compacted to ensure no internal pooling of water and to minimise the infiltration into soils within the disposal area. The cells will be bunded around its perimeter to capture and divert water away from the cells and to contain water within it.

As operations progress through the open cuts, the area behind the working face will receive the waste rock where it will be permanently disposed of to fill the void. Any surplus material will remain in the waste rock stockpile areas. This provides an opportunity to minimise land disturbance by the Project and to provide a final landform at the end of the mine life. The siting of the waste rock stockpile areas has considered potential surface and groundwater drainage impacts.

Testing of overburden, interburden and potential coal reject materials indicate a very high potential for dispersion (erosion). The disposal of waste rock, whether out-of-pit or in-pit will be designed to avoid and minimise the potential for erosion. Weathered rock will be placed at the base of the waste rock stockpiles and capped beneath unweathered materials (i.e. interburden and overburden from transition or primary zones). This measure will cover the rock with most potential to disperse and reduce erosion impacts. Sourcing of material with low sodicity will be important for shaping and rehabilitating the out-of-pit waste rock stockpiles.

Materials characterised and validated as non-dispersive and non-sodic will be used for the outer slopes of waste rock stockpiles to limit dispersion and erosion, with identified sodic materials disposed of within the central (inner) zones of waste rock stockpiles.

6.3 COARSE AND FINE REJECTS DISPOSAL AND CONTAINMENT

Only a very small portion of overburden will have the potential to generate acidic drainage. Rejects management will:

- Produce stable rejects that will be mixed with overburden and buried in-pit;
- Minimise disturbance to the environment by diluting all rejects with overburden material in a central location at the base of the out-of-pit waste rock stockpiles in the initial years of operation, prior to steady state mining and all rejects in the open cut mine void, after mining operations have reach steady state; and
- Minimise risks to the environment through appropriate design and construction of rejects management facilities and waste rock stockpiles.

Dried coarse rejects and filter pressed rejects will be mixed with overburden waste and strategically placed within both the out-of-pit waste rock stockpiles and in the open cut mine void. All overburden will be characterised and the benign material will be preferentially placed in the upper layers and on the surface of the waste rock stockpiles, ensuring the surface material contains a percentage of clay, prior to top soiling and seeding. If PAF or

saline material is unavoidably placed near the surface of the waste rock stockpiles, this area will be capped with inert material prior to top soiling and seeding. The reject solids will be monitored to determine pH, EC, sulphur species and acid neutralising capacity (initially monthly) until geochemical trends have been established. Monitoring will then continue annually.

6.4 WATER AND FINE REJECTS

Fine rejects will be dewatered prior to disposal using filter press technology to treat the rejects. The coal fraction of the rejects will be beneficiated using spirals with desliming cyclone overflow being pumped to the fine rejects thickener where flocculent will be added. The thickened fine rejects are then passed through a filter press where the moisture content is reduced to approximately 26%. A dry paste material is produced and these pressed fine rejects are then discharged onto the rejects conveyor for disposal via the reject bin. Haul trucks which offload coal at the ROM stockpiles will be backloaded at the reject bin to transport rejects to the pit. Water recovered through filter press dewatering will be recycled for use in coal processing.

6.5 WASTE ROCK MANAGEMENT PLAN

A detailed Mine Waste Management Plan (MWMP) will be prepared for the Project including:

- Effective characterisation of the mining waste to predict, under the proposed placement and disposal strategy, the quality of run-off and seepage generated including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances;
- Mineral waste field and laboratory testing procedure for validation of the acid-forming and potential erodibility characterisations of each phase;
- Classifying waste rock zones (based on acid forming potential, salinity and sodicity), placement and use of waste rock materials and appropriate disposal of PAF waste or waste designated as not suitable for use on final surfaces (including potential PAF material identified during mining);
- Ex-situ waste rock stockpile design criteria, including preferred selective placement of each waste domain, stockpile heights, stockpile profiles, conceptual final landform design;
- Monitoring and management of erosion, groundwater and surface water (including run-off and seepage) at ex-situ waste landforms; and
- Progressive rehabilitation strategies, including a site wide hydro-geochemical model to assist with waste rock stockpile design, water management and closure planning.

7 Site water balance

7.1 OVERVIEW

This section of the WMP presents a water balance for the initial phase (Stage 1) of the Project, representing the first 5 years of mining.

The performance of the proposed water management system over the life of the Project was assessed in detail in the latest site water balance technical report (WRM, 2020), which fully documents the water balance model and assessment outcomes.

7.2 WATER BALANCE MODEL

The water balance model was used to assess the dynamics of the site water balance under historical climatic conditions. The model was run multiple times with different climate sequences to assess the performance of the system under the full range of historical conditions. The model dynamically simulates the operation of the water management system and keeps complete account of all site water volumes and representative water quality on a daily time step. The simulated inflows and outflows included in the model are given in Table 7.1.

Table 7.1 – Simulated inflows and outflows to the mine water management system

Inflows	Outflows
Direct rainfall on water storage surfaces	Evaporation from water surface of storages
Catchment runoff	CHPP demand
Groundwater inflows to the open cut pit	Haul road dust suppression demand
	Coal crushing/conveyor dust suppression demand
	Miscellaneous raw water demands
	Mine infrastructure demands
	Dam overflows
	Controlled releases

The model incorporates the Australian Water Balance Model (AWBM) rainfall runoff model (Boughton, 2003) to determine the runoff characteristics of the various catchment types on the mine site. The water and solute balance model was used to determine the behaviour of the mine water management system over time.

7.3 WATER MANAGEMENT SYSTEM ASSESSMENT

The site water balance model was used to assess the performance of the Project water management system, using the following key performance indicators:

- Overall water balance – the average inflows and outflows of the water management system based on all model realisations;
- Mine affected water inventory – the risk of accumulation (or reduction) of the overall mine affected water inventory;
- In-pit storage – the risk of accumulation of water in the mining pits, and the associated water volumes;

- Controlled water releases – the risk and associated volumes (and salt loads) of controlled water releases to the receiving environment;
- Uncontrolled spillway discharges – the risk and associated volumes (and salt loads) of uncontrolled discharge from the mine affected water storages and sediment dams to the receiving environment.

The use of a large number of climate sequences reflecting the full range of historical climatic conditions provides an indication of the system performance under very wet, very dry and average climatic conditions. It is important to note that the results of the water balance modelling are dependent on the accuracy of input assumptions. There is inherent uncertainty with respect to some key site characteristics (e.g. catchment yield/runoff, groundwater inflows etc.).

A summary of the site water balance for Stage 1 operations is provided in Table 7.2, based on an average of all climate sequences run through the model. The actual water balance will vary from year to year depending on climatic conditions. Full details of the water balance model and assessment outcomes are provided in the latest site water balance technical report (WRM, 2020).

Table 7.2 – Average annual water balance for Stage 1 operations

Component	Process	Average annual volume (ML/yr)
		Stage 1
Inflows	Catchment runoff & direct rainfall	1,510
	Groundwater inflows	310
	External supply	29
	Total inflows	**1,849**
Outflows	Evaporation	746
	Dust suppression	436
	Net CHPP demand	178
	Service water demand	50
	Spillway overflows – mine water dams	5
	Spillway overflows – sediment dams	3
	Controlled releases	295
	Total outflows	**1,713**
	Change in volume	**136**

7.4 MODEL UPDATES

Once mining operations commence, the site water balance model will be updated to reflect the as-constructed configuration of the water management system and verified against recorded site data (such as dam water levels, pump metering etc).

8 Surface water monitoring program

8.1 OVERVIEW

Surface water monitoring will be undertaken to demonstrate compliance with regulatory requirements, as well as improve the understanding and efficiency of the site water management system. The proposed monitoring program addresses the following issues:

- Water quality – to understand the quality of water stored on site and demonstrate no adverse impact on receiving waters.
- Water quantity – to understand the volumes of water associated with key processes on site and any contribution to receiving waters.
- Erosion and sediment control – to ensure effective operation of erosion and sediment control measures.

A summary of the surface water monitoring program is provided in Table 8.1.

Table 8.1 – Surface water monitoring summary

Issue	Monitoring Location	Monitored Parameter	Monitoring Frequency
Water quality	Receiving water sites as per REMP[a]	Receiving waters suite (see Table 8.2)	Monthly or when daily rainfall > 50 mm
	Mine Water Dam 1	Receiving waters suite (see Table 8.2)	Quarterly
	Mine Water Dam 1 Release point	Receiving waters suite (see Table 8.2)	Daily during releases
	Mine Water Dam 1 & sediment dams	pH, EC, Turbidity (Field)	Monthly or when daily rainfall > 50 mm
Water quantity	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 rate	Continuous
	Open Cut Pit	Pit water level	Weekly
		Volume of pumping from pit	Weekly
Erosion & sediment control	Sediment dams	Inspection to assess sediment accumulation	Monthly or when daily rainfall > 50 mm
	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 > 50 mm

[a] Receiving Environment Monitoring Program (Eco Logical, 2020)

Table 8.2 – Receiving water quality monitoring parameters

Characteristic	Parameter
Physico-chemical	Electrical Conductivity, 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, sodium and potassium)
Total and dissolved (field filtered) metals and metalloids	Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Vanadium and Zinc
Nutrients	Ammonia, Nitrite, Nitrate, Total Kjeldahl Nitrogen as N, Total Nitrogen, Total Phosphorus, Reactive Phosphorus
Organics	Total Petroleum Hydrocarbons

8.2 RECEIVING WATER QUALITY MONITORING

The surface water monitoring program includes the monitoring of water quality at a number of locations upstream and downstream of the Project. Receiving water monitoring locations are shown in Figure 8.1. Full details of monitoring sites, field sampling procedures, laboratory analysis and quality control are provided in the Receiving Environment Monitoring Program (Eco Logical, 2020).

8.3 RECEIVING WATER TRIGGER LEVELS

The receiving water trigger levels for the Project are presented in Table 8.3. Required actions when trigger levels are exceeded are given in the Trigger Action Response Plan (TARP) for receiving water quality (see Section 9.2).

Table 8.3 – Receiving water contaminant trigger levels

Quality characteristic	Units	Trigger Level		
		Deep Creek	Tooloombah Creek	Deep / Tooloombah confluence (St1)
Electrical conductivity	µs/cm	740	1640	-
pH	-		6.5 – 8.3	
Total suspended solids	mg/L	26	11	15
Turbidity	NTU		50	
Sulphate	mg/L	25	54	-

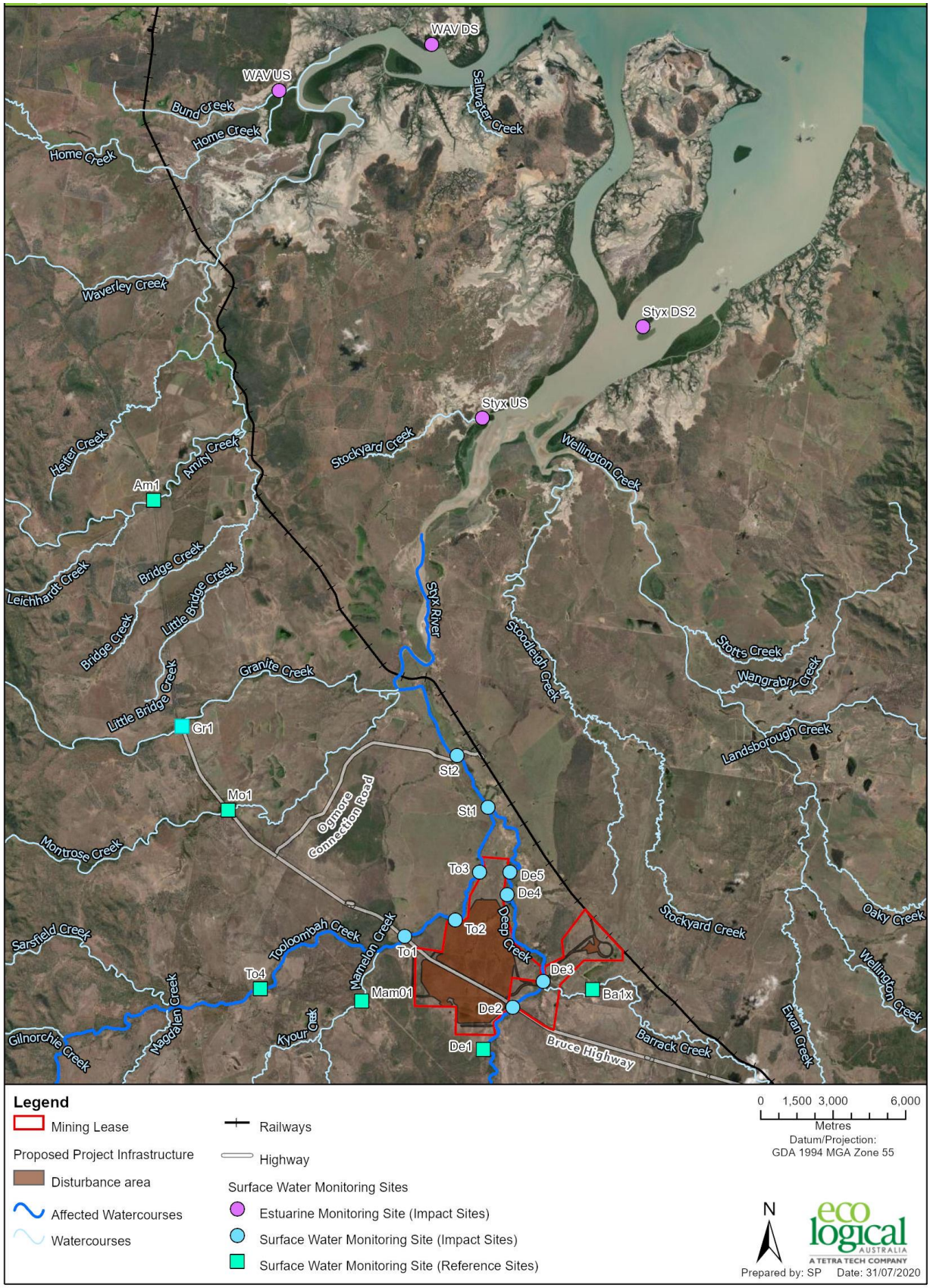

Figure 8.1 – REMP monitoring sites

9 Emergency and contingency planning

9.1 OVERVIEW

The Project water management strategy has been developed for both normal operation periods and extreme wet weather events to:

- minimise the periods that the active pits store water; and
- ensure compliance with the EA conditions.

The emergency response plan for the Project is managed in the Safety and Health Management System (SHMS). A number of Trigger Action Response Plans (TARPs) relating to surface water management are provided in the following section.

9.2 TRIGGER ACTION RESPONSE PLANS (TARPS)

A TARP to respond to exceedances of trigger levels is provided below for:

- Mine affected water storage (Table 9.1);
- Receiving water quality (Table 9.2); and
- Sediment dams (Table 9.3).

Table 9.1 – TARP – mine affected water storage

Level	Trigger	Action	Response
Level 1 (Normal)	Mine affected water dams < Maximum Operating Volume (MOV)	• Continue to monitor level	• No response required
Level 2 (Early warning)	Current or forecast heavy rainfall	• Ensure inter-dam transfer pumping network is operational • Review options for water transfer if required	• Post-event review to confirm event was well managed and appropriate resources in place
Level 3A (Exceedance of trigger level)	Mine water storage level exceeds MOV with inflows still occurring	• Reduce process inflows if practical • Commence transfer from storages with highest risk of spill	• Post-event review to confirm sustainability of water transfer infrastructure & operational rules • Update operational rules if required • Prepare recommendations for modifications or upgrades to water transfer infrastructure
Level 3B (Possible discharge of mine affected water)	Mine water storage exceeds 95% capacity with inflows still occurring	• Cease process inflows to storages with highest risk of spill • Maximise pumping capacity for dewatering of storages with highest risk of spill (e.g. relocate mobile pumps)	• Post-event review to confirm suitability of water transfer infrastructure & operational rules • Update operational rules if required • Implement required modifications or upgrades to water transfer infrastructure
Level 4 (Discharge of mine affected water)	Discharge of mine affected water from one or more storages	• Monitor water quality and quantity of the discharge and assess the potential for environmental harm. • Contain any contaminated water where possible to prevent environmental harm. • Report the non-compliance to the DES and other relevant parties in accordance with the requirements of the EA.	• Initiate investigation into reasons for overflow, including assessment of environmental harm • Take actions recommended by investigation to prevent recurrence

Table 9.2 – TARP – receiving water quality

Level	Trigger	Action	Response
Level 1 (Normal)	All surface water quality samples below trigger levels in Table 8.3	• No action	• Continue to monitor water quality in accordance with monitoring plan
Level 2 (Early warning)	Single value at downstream sampling site exceeds trigger level in Table 8.3	• Verify sample analysis to confirm result • Check upstream water quality to assess potential for impact from operations • Advise regulator of trigger exceedance	• If upstream pollutant concentration is higher or within 5% of downstream value, then no further action required • Otherwise, assess whether operation could potentially have affected water quality and take remedial action, if appropriate
Level 3A (Potential water quality impact – no discharge)	Two or more sequential samples at a downstream sampling site exceed trigger level in Table 8.3	• Check upstream water quality to assess potential for impact from operations • Report on likely causes of exceedance and any potential mitigation measures • Advise regulator of trigger exceedance	• If upstream pollutant concentration is higher or within 5% of downstream values, then consider need for review of trigger levels • Implement appropriate mitigation measures
Level 3B (Potential water quality impact – sediment dam discharge)	Water quality at multiple downstream sampling sites exceeds trigger levels in Table 8.3 and discharge from site sediment dams has occurred	• Check upstream water quality to assess potential for impact from operations • Report on likely causes of exceedance and potential mitigation measures • Advise regulator of trigger exceedance	• If upstream pollutant concentration is higher or within 5% of downstream values, then no further action required • Implement appropriate mitigation measures
Level 4 (Likely water quality impact – mine affected water discharge)	Single value at downstream sampling site exceeds trigger level in Table 8.3 and discharge from mine water dam has occurred	• Check upstream and downstream water qualities to confirm any impact to water quality from operations • Remediate any environmental harm where possible • Advise regulator of trigger exceedance	• Complete detailed incident review to identify cause of water quality exceedance • Review systems and update procedures as required to prevent recurrence • Implement any other appropriate mitigation measures

Table 9.3 – TARP – sediment dams

Level	Trigger	Action	Response
Level 1 (Normal)	No site runoff	• Continue ongoing inspection and maintenance of sediment dams	• No response required
Level 2 (Early warning)	Current or forecast heavy rainfall	• Ensure transfer pumping network is operational • Undertake inspection to check sediment accumulation	• If required and possible prior to forecasted event, de-silt sediment dam(s) • Post-event review to confirm event was well managed • Check post-event sediment dam levels in sediment dams and de-silt if required
Level 3A (Sediment dam discharge)	TSS concentration of discharge from sediment dam less than trigger level[1]	• Collect sample of sediment dam outflow • Confirm TSS in dam outflow is less than trigger level[1]	• Post-event review to confirm rainfall exceeded design standard • Review system configuration to ensure operating as designed • Check post-event sediment levels in sediment dams and de-silt if required
Level 4 (Exceedance of water quality target)	TSS concentration of discharge from sediment dam greater than trigger level[1]	• Check if event rainfall exceeds design standard • Notify regulators if rainfall below design standard • Collect water quality samples of spills at dam overflow point and in receiving watercourse • Remediate any environmental harm if possible	• Check post-event sediment levels in sediment dams and de-silt if required • Initiate investigation into reasons for system failure, including assessment of environmental harm • Take actions recommended by investigation to prevent reoccurrence

Note: 1/ Limit to be determined in accordance with Table xx of the EA

9.3 CONTINGENCY ACTIONS

Contingency actions for a number of specific events related to the water management system are provided in Table 9.4.

Table 9.4 – Surface water management contingency actions

Trigger	Action
Mechanical failure of pumping equipment prevents scheduled transfers	Ensure adequate spares are available. Source temporary equipment if possible.
Damage to water storage infrastructure	Regular visual inspections of infrastructure, especially following significant rainfall. Annual geotechnical inspection
Failure of water storage structures	Notify downstream residents (if applicable) and DES of the failed structure. Investigate the downstream impacts of the failure and complete a detailed report on the impacts of the failure, including an assessment of likely water volume and quality, and required remedial actions. Investigate the reason for failure of the structure and ensure the stability of other water storages at risk. Assess the effects of the failure on the water management system and implement mitigation measures.
Site water supply shortfall due to inadequate water available on site	Further improvements in water use efficiency. Investigate procurement of additional water from licensed sources. Extraction of groundwater from existing or new bores. Increase retention of site runoff without discharge.
Community complaints received of impacts to stock and domestic water supply.	Undertake an investigation into the potential cause of water supply impacts.

10 Reporting and review

10.1 REVIEW OF THE WMP

The draft EA conditions include a requirement for the WMP to be reviewed each calendar year and for a report to be prepared by an appropriately qualified person. The review must:

- Include a statement that the WMP has been prepared by an appropriately qualified person;
- Assess the plan against the requirements under the relevant conditions of the Project EA;
- Include recommended actions to ensure actual and potential environmental impacts are effectively managed;
- Provide details and timelines of the actions to be taken; and
- Identify any amendments made to the WMP.

The WMP will be reviewed annually and a review report prepared in accordance with the above requirements.

10.2 ROLES AND RESPONSIBILITIES

Table 10.1 shows responsibilities for implementation of various aspects of the WMP.

Table 10.1 – Roles and responsibilities

Role	Responsibility/Accountability
General Manager	• Ensure water management projects are planned and budgeted for. • Ensure adequate storage is available to enable ongoing production through wet and dry climatic conditions. • Manage implementation of water management improvement projects. • Design, budget for and arrange the construction of sediment, erosion control and mine affected water drains/dams. • Communicate the WMP to the Project Management team and other relevant stakeholders. • Ensure the Plan of Operations (or Progressive Rehabilitation and Closure Plan [PRCP] schedule) addresses water management. Specifically plan to ensure that: ▪ Adequate storage is available to enable ongoing production through wet and dry climatic conditions; ▪ Contingencies are in place for climatic extremes; ▪ Interaction with waste disposal strategies are understood and planned for; ▪ Closure planning is incorporated. • Ensure that planned infrastructure is in compliance with the WMP. • Communicate the WMP to the Planning team. • Ensure planned maintenance schedules are implemented to maximise the availability of fixed and mobile pumps in the mining area.

Role	Responsibility/Accountability
	• Ensure all water pipelines and control structures in the maintenance area are regularly inspected, maintained and promptly repaired. • Communicate the WMP to the Maintenance team
Asset Management Superintendent	• Ensure that water is managed in compliance with the WMP. • Ensure all water pipelines and control structures at the CHPP area are regularly inspected, maintained and promptly repaired. Specifically: ▪ Prevent spills, leaks and unlicensed discharges; ▪ Maintain adequate dewatering capability for high rainfall events; ▪ Ensure systems to protect against sudden inrushes of water are fully operational at all times; ▪ Maintain storage capacity in runoff capture dams; ▪ Ensure efficient recycling and preferential use of mine water. • Ensure water supply meets supply demands of the CHPP. • Ensure all storages are maintained and operated in accordance with the EA. • Ensure contingency plans for climatic extremes are adhered to. • Communicate the WMP to CHPP team.
HSEC Senior Advisor	• Preparation, implementation & maintenance of the site WMP. • Advise the General Manager on water management control & planning requirements. • Prepare site water balances to define water use, storage & discharges; and to monitor and forecast site water management needs. • Arrange the inspection & maintenance of clean, sediment, erosion control & mine water drains & dams. • Communicate requirements for incident reporting to Project team. • Advise the Site Superintendent on water metering requirements. • Design, implement and maintain the water monitoring program. • Report on and communicate performance against water plans and targets. • Audit record report.

11 References

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