SARAJI EAST MINING LEASE PROJECT

Environmental Impact Statement

Chapter 3
Project Description

Table of contents

Table of figures

Table of tables

3.0 Project Description

3.1 Introduction

BM Alliance Coal Operations Pty Ltd (BMA) is seeking approval to develop the Saraji East Mining Lease Project (the Project) involving a single-seam underground mine and supporting infrastructure on Mining Lease Application (MLA) 70383 and MLA 70459 adjacent to, and accessed through, the existing open cut mine void within Mining Lease (ML) 1775.

This chapter of the Environmental Impact Statement (EIS) describes the infrastructure and activities involved in the development of the Project throughout its construction, operation and decommissioning phases, including interactions with the adjacent Saraji Mine owned and operated by BMA under existing approvals.

3.2 Project overview

BMA proposes to develop the Project involving a greenfield single-seam underground mine development and supporting infrastructure to produce an estimated 110 Mt of high-quality metallurgical product coal by longwall mining methods over the 20-year life of mine.

The key objectives of the Project are to:

- use BMA-owned land on the adjacent existing Saraji Mine Mining Lease (ML) to minimise new disturbance and facilitate Project efficiencies
- operate a profitable Project providing high-quality hard coking coal, semi hard coking coal and pulverised coal injection coal to the export market
- design, construct and operate the Project to:
  - minimise adverse impacts on the surrounding bio-physical and social environments
  - comply with relevant statutory obligations and employ processes to enhance sound environmental management.

The Project will be developed on Mining Lease Application (MLA) 70383 and MLA 70459 adjacent to, and accessed through, the existing open cut mine void within ML 1775. Supporting infrastructure will comprise a new Coal Handling and Processing Plant (CHPP), a Mine Industrial Area (MIA), a conveyor system, stockpiles, rail spur and balloon loop, water pipelines and dams, powerlines, incidental mine gas (IMG) management, supporting transport and infrastructure corridor, and construction accommodation village; to be developed on MLA 70383, MLA 70459 or co-located on the adjacent Saraji Mine tenure (ML 70142, ML 1775 and ML1782).

3.3 Project location

Located within the Isaac Regional Council (IRC) Local Government Area (LGA), the Project is situated approximately 30 km north of Dysart and approximately 170 km southwest of Mackay in Queensland.

The Project is located within an existing mining precinct, surrounded by operational and proposed resource projects targeting high-quality coal resources of the Bowen Basin, including coal mines operated by BMA and others, as illustrated on Figure 3-1.

The Project is immediately east of the existing Saraji Mine where BMA is approved to undertake open cut operations on ML 1775, ML 1782, ML 1784, ML 2360, ML 2410, ML 70142, ML 70294, ML 70298 and ML 70328 and ML 700021 under existing approvals (Environmental Authority (EA) EA Permit No. EPML 00862313).

The Project Site covers 11,427 ha of land incorporating MLA 70383, MLA 70459, and parts of granted ML 70142, ML 1775 and ML 1782. Exploration permit – coal (EPC) 837 and EPC 2103 underly portions of the Project Site MLs and MLAs. Mining tenure is discussed in Section 3.5.

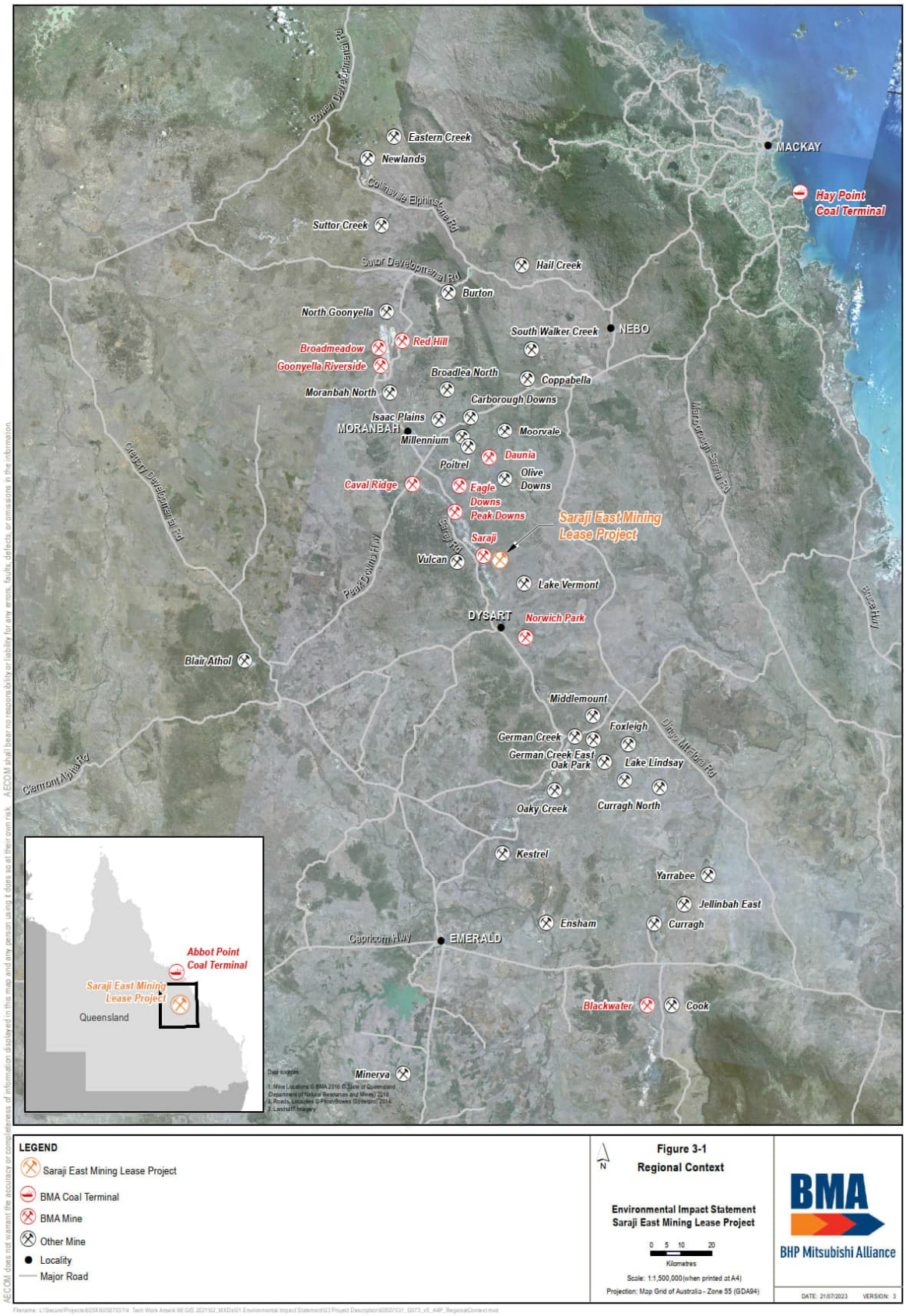

Figure 3-1 Regional Context

3.4 Key features of the Project

The Project is a greenfield single-seam underground mine development on MLA 70383 and MLA 70459 adjacent to, and accessed through, the existing open cut highwall of the Saraji Mine within ML 1775, with new infrastructure primarily located on ML 70142. The Project infrastructure and activities proposed on MLA 70383 and MLA 70459 will be authorised by a standalone Project EA.

Accessed via the existing open cut mine void on ML 1775, the underground mine and IMG management infrastructure will be developed on MLA 70383 (and into existing ML 1775). The Project will develop surface infrastructure such as CHPP, a MIA, raw water dam, product stockpiles, rail spur and balloon loop on existing ML 70142, a conveyor system on existing ML 1775, and process water dam and construction accommodation village on MLA 70383. South of the Project Site, an overhead powerline will extend off lease and connect to the Dysart Substation. The Project Site and key infrastructure components are described in Section 3.4 and shown in Figure 3-2.

The Project is designed to use aspects of the existing approved Saraji Mine infrastructure, as described in Section 3.11. New infrastructure and upgrades to existing Saraji Mine infrastructure will also be required such as new water and electricity infrastructure.

Mining and the infrastructure required to support the Project will be confined to a much smaller area of the Project Site, with the Project Footprint assessed as 3,348 ha. This area is a conservative estimate, meaning it likely overestimates the actual area. The Project is described by the following spatial features shown in Figure 3-2:

- relevant mining tenements (MLA 70383 and MLA 70459 and Saraji Mine tenure ML 1775, ML 70142 and ML 1782)
- the Project Site – delineated by the extent of surface infrastructure and relevant mining tenements
- the Project Footprint – the maximum extent of proposed surface disturbance associated with surface infrastructure and underground mining activities
- underground layout – a mine layout related to the optimised 20-year mine life.

New Project infrastructure will be preferentially located on previously disturbed areas to minimise the overall impact of the Project on environmental values. The Project layout reflects the following key objectives:

- an optimised underground mine layout based on available analysis of environmental and operational constraints
- MIA close to the mine access point on Saraji Road
- proposed rail loading infrastructure close to the existing rail line
- CHPP sized and located to enable a practical connection between the underground mine and the rail load out
- proposed infrastructure constructed in areas not impacted by future mining
- new utility (water, powerline, telecommunication) infrastructure to be extended from the Saraji Mine existing infrastructure
- minimise disturbance of environmentally sensitive areas.

Project alternatives are discussed in **Chapter 2 Project Alternatives and Justification**.

Where supporting infrastructure is planned to extend beyond mining tenure (powerline connection to Dysart Substation), subsequent negotiation with relevant authorities and legislative approvals will be undertaken where required.

The key features of the Project are summarised in Table 3-1 and shown in Figure 3-2.

Table 3-1 Key features of the Project

Aspect of the project	Proposed operations
Total production	Approximately 150 Mt run of mine (ROM) coal equivalent to approximately 110 Mt of product coal over 20-year life of mine.
Average annual production	• 7.5 Mt per annum (Mtpa) ROM coal annual average with a maximum of 11 Mtpa • 5.5 Mtpa product coal annual average with a maximum of 8 Mtpa.
Capital expenditure	Approximately AU$1.3 billion.
Mine life • construction • production • rehabilitation	 • approximately 2 years • approximately 20 years • nominally 10 years.
Operating hours	24 hours per day, 7 days a week.
Workforce • construction • operation	 • up to 1,000 full time equivalent (FTE) • up to 500 FTE.
Accommodation • construction • operation	 • construction accommodation village with capacity for 1,000 personnel • offsite accommodation options in Dysart and Moranbah during operation.
Mining method	Underground long wall mining.
Existing mining lease areas	ML 70142, ML 1775 and ML 1782.
Proposed mining lease areas	MLA 70383 and MLA 70459.
Mine infrastructure and tailings/rejects management	The Project will maximise use of existing Saraji Mine infrastructure and operations on ML 70142 and ML 1775, including: • underground mine entry/access via the existing open cut pit and highwall on ML 1775 to minimise environmental impacts, costs, time and risks involved in construction of a new mine portal • use of the Saraji Mine CHPP for processing Project coal in years where ROM tonnes exceeds 7 Mtpa • existing haul roads and trucks for the transportation of ROM coal to the Project CHPP and, where there is need and available capacity, excess ROM coal from the proposed CHPP to the existing Saraji Mine CHPP • integrated power supply network for Saraji Mine and the Project • use of existing Saraji Mine spoil dumps to distribute and dispose of dewatered tailings and rejects from the Project CHPP • preferentially locating above-ground infrastructure within previously disturbed areas. Additional components proposed for the Project include: • a mine infrastructure area (MIA) located on ML 70142 • a CHPP with capacity for processing up to 7 Mtpa located on ML 70142 • a conveyor system and haul road on ML 1775 and ML 70142 to transport coal, mining equipment and personnel between the underground portal, CHPP and MIA, and rail loading facilities. • ROM stockpile and product stockpile pads on ML 70142 • a new rail spur, balloon loop and signalling system on ML 70142 adjacent to the existing Norwich Park rail line • a network of IMG drainage bores and associated gas and water collection networks and access tracks across the underground mine footprint on ML 1775 and MLA 70383.

Aspect of the project	Proposed operations
Water infrastructure	Dams, catchment diversions and drains will be required to support mining operations, manage mine affected water (MAW) and protect downstream environmental values by minimising uncontrolled releases. Project water infrastructure will consist of: • process water dam (PWD): Runoff from disturbed areas of the Project, including the MIA, CHPP, stockpiles (ROM and product coal), train load out, and portal entry sump will be collected at source and transferred to the PWD. The PWD will be constructed as a turkey's nest (no external catchment) and located on MLA 70383 • temporary gas dewatering storage: The pre-drainage of IMG will result in the production of water. This water will be collected in local facilities near the well head. These facilities will act as a balancing storage to allow transfer at a constant rate to the PWD • raw water dam (RWD): The RWD will be a turkey's nest design and will receive clean water inflows from BMA's 10,000 mega litres per year (ML/yr) allocation from the Northern Network Pipeline. Water from the RWD will be used to satisfy the Project's potable water and underground mining equipment demands, as well as makeup supply for dust suppression and CHPP process demand when supplies of MAW are unavailable for reuse. The RWD will be located on ML 70142 • additional highwall pumps: The access portal to the underground workings will be via the existing open cut highwall. Water collected in the highwall portal pit sumps will be pumped to the PWD to maintain the flood immunity of the underground workings • pipelines: Relocation and re-connection of the existing Eungella Water Pipeline Company (EWPC) Southern Extension Water Pipeline into a new infrastructure and transport corridor to the eastern boundary of MLA 70383 and northern boundary of MLA 70459. A water pipeline will be constructed connecting the Project's surface infrastructure located on ML 70142 to the PWD located on MLA 70383. Water transport associated with the Project will be achieved via the utilisation (and enhancement where necessary) of BMA's existing water pipeline network connecting Saraji Mine to BMA mines to the north and south of Saraji Mine. • mine-affected stormwater drainage infrastructure: Mine affected runoff dams, bunds and drains to capture and treat run-off from disturbed areas, including ROM and product stockpile pads, CHPP and MIA. Under normal operating conditions, the Project mine water system will operate independently; however, water may be transferred between the Project and the broader BMA network of mines via the existing water pipeline network to enhance available water supply and storage capacity. Site transfers will be subject to operational demand and water quality testing and control.
Electricity infrastructure	Relocation and re-connection of an existing 132 kilovolt (kV) powerline into a new infrastructure and transport corridor located towards the eastern boundary of MLA 70383 and northern boundary of MLA 70459. Bulk electricity demand will be supplied by the existing Ergon Supply (Dysart 66 kV supply to Saraji Mine). Two new powerlines will be constructed to support the provision of power to the Project: • a co-aligned 66 kV powerline and connection extending off lease and connecting to the Dysart Substation via MLA 70383 and ML 1782 • a 66 kV northern extension connecting the Project to the infrastructure and transport corridor via ML 70142 and ML 1775. To the extent that the powerline extends beyond lease boundaries, subsequent negotiation with relevant authorities and legislative approvals will be undertaken where required. Transmission will not need to be authorised by an EA. Required approvals will be confirmed following detailed design. The existing Saraji Mine currently has an authorised maximum allowance of 43 megawatts (MW). The current maximum demand of the Saraji Mine is between 26 MW and 30 MW. The anticipated demand for the Project (underground and surface infrastructure) is estimated to be between 11 MW and 14 MW.

Aspect of the project	Proposed operations
Public and private roads	The Project will require the construction of an access road within the new infrastructure and transport corridor near the eastern boundary of MLA 70383 and the northern boundary of MLA 70459. Intersection development will occur: • between the proposed transport and infrastructure corridor and Lake Vermont Road • between Saraji Road and the existing Saraji Mine at the identified access point for the CHPP and MIA.
Communications	Communications will be provided by extending the services from the Saraji Mine via the existing service corridor. Telecommunications will be controlled and monitored through a new Project control room located on site or from a centrally located facility in Brisbane. An existing telecommunication tower within the Saraji Mine Coolibah Mine Pit is located approximately 1 km southwest of the Project Site.
Rehabilitation	The following rehabilitation and decommissioning strategies will be implemented for the Project: • mine roads will be rehabilitated unless otherwise agreed with the subsequent landowner and in accordance with the EA. • water dams not required for long term water management will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and in accordance with the EA. • major infrastructure, including the CHPP, will be decommissioned, dismantled and removed from site. • concrete pads will be covered with benign waste rock or ripped and removed, then topsoiled and re-vegetated in accordance with the EA. • other facilities, including workshops and warehouses, will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and in accordance with the EA. BMA will comply with the legislative amendments associated with the *Mineral and Energy Resources (Financial Provisioning) Bill 2018*. The EA will require a Progressive Rehabilitation and Closure Plan (PRCP) to be developed prior to construction commencing and will demonstrate that the proposed Project will: • be rehabilitated to a safe and stable landform • not cause environmental harm • sustain post mining land uses. Progressive rehabilitation will be carried out as described within **Chapter 5 Land Resources** and **Appendix K-1 Rehabilitation Management Plan.**

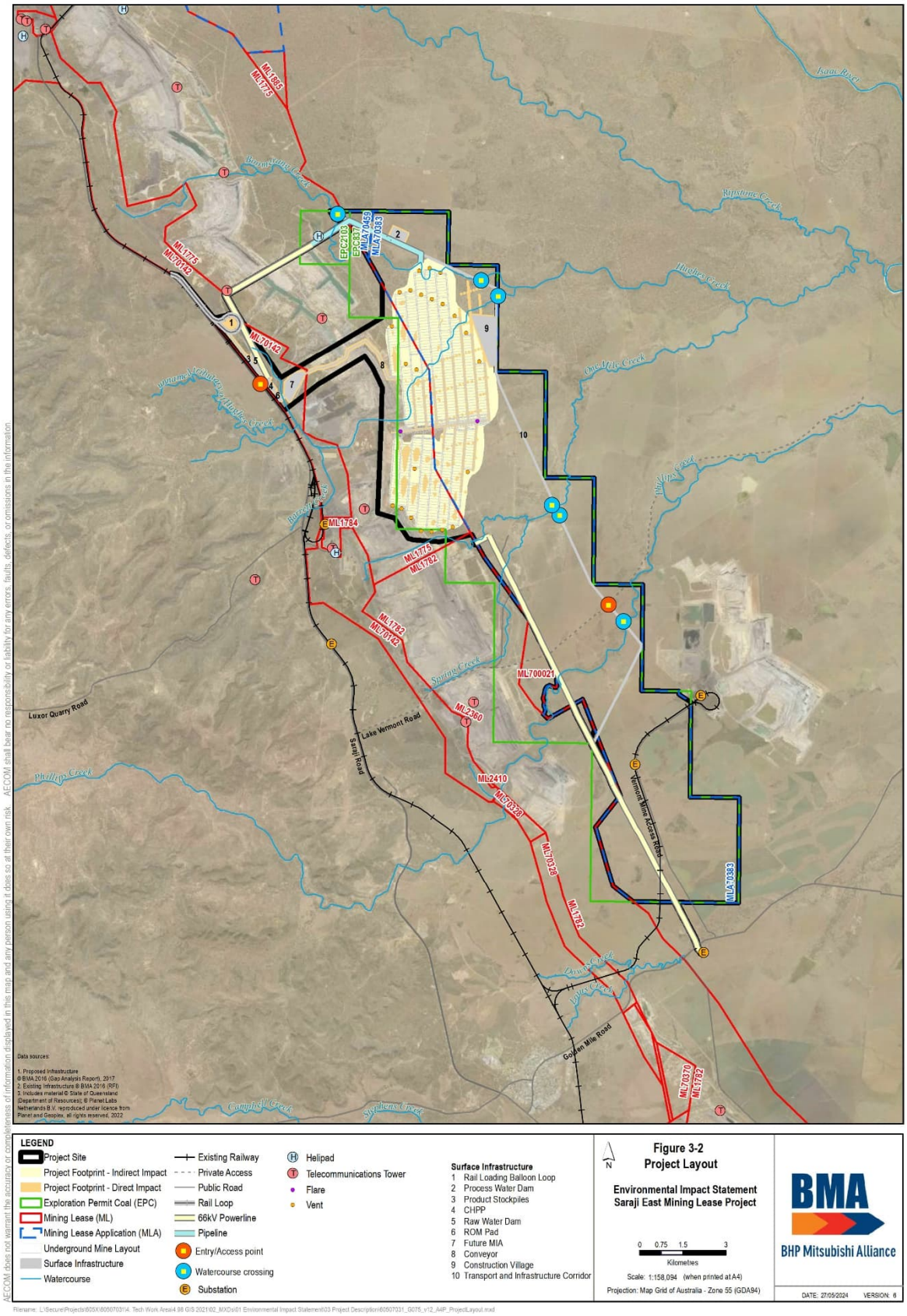

Figure 3-2 Project layout

3.5 Project disturbance

To enable the assessment of potential Project impacts, a conservative maximum disturbance area encompassing both direct and indirect impacts has been established. This area (the Project Footprint) is 3,348 ha in size and is presented in Table 3-3 and Figure 3-3.

Direct impacts (1,294.5 ha) comprise areas associated with:

- surface infrastructure and indicative IMG drainage network layout (Stage 1 – Construction)
- temporary ponded areas (Stage 2 – Operation).

Due to the overlap between infrastructure components such as surface infrastructure and IMG drainage network, the sum of the direct impact disturbance areas listed in Table 3-2 does not equal the total direct disturbance area of 1,294 ha. The total direct disturbance area was calculated as the surface area of all components in combination, rather than the area of each individual infrastructure component.

Indirect impacts (2,054.3 ha) are represented by the balance of the Project's predicted subsidence areas.

Table 3-2 Project disturbance area

Project stage	Infrastructure component	Direct	Indirect	Disturbance area (ha)	Total Impact Areas (ha)
Stage 1 – Construction	Surface infrastructure	✓		799.6	1,294.5
Stage 1 – Construction	IMG drainage network	✓		376.3	
Stage 2 – Operation	Temporary ponded areas	✓		145.7	
Stage 2 – Operation	Subsidence impacts (balance)		✓	2,054.3	2,054.5
Total disturbance area (ha)					**3,348.7**

Note: The Project disturbance area overlaps authorised disturbance area under the Saraji Mine EA. This EIS assesses the entire disturbance area for the Project regardless of any overlap in order to provide impact assessment that represents the entire Project operation. Further discussion of the relationship between the Project and Saraji Mine is provided in Section 3.11.

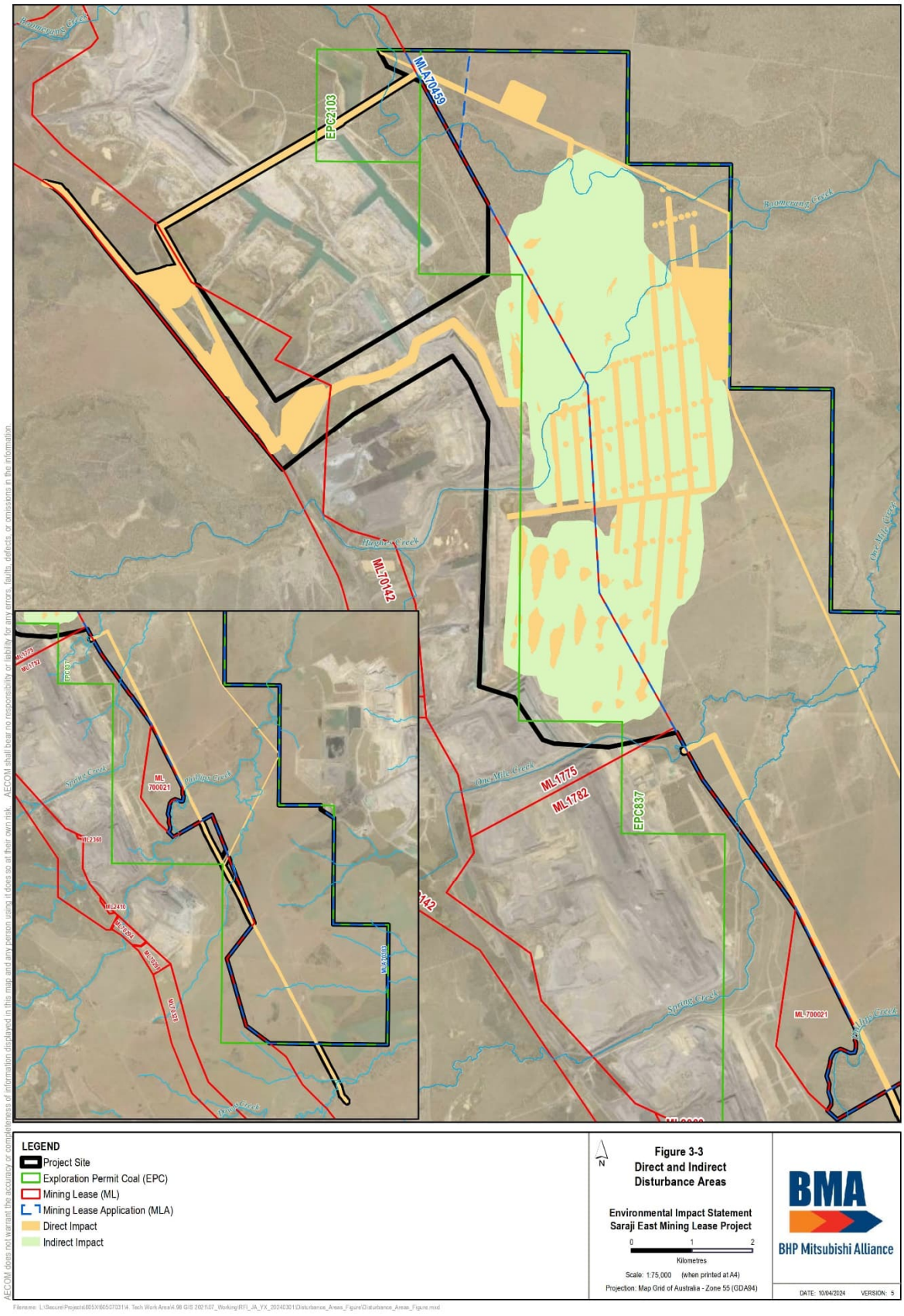

Figure 3-3 Direct and Indirect Disturbance Areas

3.6 Tenements, land tenure and ownership

3.6.1 On lease

The Project Site consists of existing mining tenure ML 1775, ML 70142 and ML 1782, MLA 70383 and MLA 70459, and underlying EPC 837 and EPC 2103. Application is being made for mining leases, MLA 70383 and MLA 70459 held by BHP Coal Pty Ltd and Others, being the Central Queensland Coal Associates Joint Venture (CQCA JV). Project Site tenure is shown in Figure 3-4.

EPC 837 and EPC 2103 held by the CQCA JV, as listed in Table 3-3, underly portions of the Project MLA and MLs. Following approval of the Project and the subsequent conversion of the two MLAs to MLs, both EPCs will be superseded and fall away.

Table 3-3 Prerequisite tenements for the Project

Tenement	Holder	Overlying tenement	Status	Granted/lodged	Expiry
EPC 837	CQCA JV	MLA 70383 MLA 70459	Granted	20/10/2003	19/10/2027
EPC 2103	CQCA JV	MLA 70459	Granted	12/10/2010	11/10/2027

The Project Site will be located adjacent to the existing Saraji Mine and development will occur on some areas currently approved for mining. BMA holds mining tenure and relevant approvals to continue open cut mining at Saraji Mine to the extent authorised on ML 1775, ML 1782, ML 1784, ML 2360, ML 2410, ML 70328, ML 70142, ML 70294, ML 70298 and ML 700021. The Project Site does not include the following ML associated with Saraji Mine: ML 700021, ML 2360, ML 2410, ML 1784, ML 70328, ML 70294 and ML 70298; no developments are proposed on these leases as part of the Project. Saraji Mine tenure is shown in Figure 3-4.

The underground mine and IMG management infrastructure will be developed within MLA 70383 and ML 1775. Most surface infrastructure, including the MIA, CHPP, conveyors, stockpiles, water storages, access roads and a rail spur and balloon loop will be preferentially located in previously disturbed areas on ML 1775, ML 70142 and MLA 70383. The infrastructure and transport corridor allowance will include the relocated 132 kV Powerlink powerline, EWPC Southern Extension Water Pipeline and new access roads within ML 1775, ML 1782, ML70142, MLA 70383 and MLA 70459. For each mining tenure, the estimated disturbance extent associated with Project components is detailed in Table 3-4 and presented in Figure 3-4. These build on the disturbance areas presented in Table 3-2 and Figure 3-3. The impacts summarised below are detailed and discussed further throughout the relevant chapters of this EIS.

Table 3-4 Mining tenure and associated disturbance

Tenure	Size (ha)	Effective date	Indirect impacts	Direct impacts	Associated disturbance
MLA 70383 (Application)	9,079	From: 18/10/2007 To: To confirm on granting of ML	1278.36 ha (14.08% of total MLA size)	703.07 ha (7.74%)	Underground mining, IMG management network, infrastructure and transport corridor - specifically roads, pipelines and powerlines, access roads and rail crossing, water storages and construction workers accommodation village.
MLA 70459 (Application)	91	From: 27/09/2011 To: To confirm on granting of ML	0 ha	9.3 ha (10.22%)	Infrastructure and transport corridor, specifically pipeline.
ML 1775 (Granted)	18,240	From: 22/12/1983 To: 31/12/2031	775.25 ha (4.25%)	301.22 ha (1.65%)	Entry portal, underground mining, MIA, conveyor system, IMG management networks, water storages, access tracks and services.

Tenure	Size (ha)	Effective date	Indirect impacts	Direct impacts	Associated disturbance
ML 70142 (Granted)	3,859	From: 23/05/2002 To: 31/12/2031	0 ha	224.1 ha (5.81%)	CHPP, conveyor system, ROM pad, product stockpile, train load out facility, rail spur, balloon loop and signalling system.
ML 1782 (Granted)	14,452	From: 22/12/1983 To: 31/12/2031	0 ha	38 ha (0.26%)	Co-aligned 66 kV powerline only.
Off-lease	20.5		0 ha	20.5 ha	Powerline extension to Dysart Substation and relocation and re-connection of the existing EWPC Southern Extension Water Pipeline.

Land tenure subject to certain land use known as 'Notifiable Activities' listed in Schedule 3 of the *Environmental Protection Act 1994* (EP Act) may be registered as potentially contaminated on the Environmental Management Register administered by Department of Environment and Science (DES). The following Notifiable Activities are relevant to the Project:

- 7 – Chemical storage (other than petroleum products or oil under item 29)
- 15 – Explosive production or storage
- 24 – Mine wastes
- 29 – Petroleum product or oil storage
- 37 – Waste storage, treatment or disposal.

Overlapping tenure

Project tenure is overlapped by two petroleum exploration permits, being Authorities to Prospect (ATP) 1103 and ATP 814. ATP 1103 is managed by Arrow Energy on behalf of Arrow CSG Pty Ltd, ACL Energy Pty Ltd and CH4 Pty Ltd. ATP 814 is held by Eureka Petroleum Pty Ltd (Blue Energy). ATP 1103 has associated Potential Commercial Area (PCA) 144 and PCA 262, while ATP 814 has assigned PCA 199. A PCA provides the resource holder additional time to maintain the ATP area for future resource commercialisation purposes.

Overlapping petroleum tenements held by resource authority holders will be subject to the provisions of the *Mineral and Energy Resources (Common Provisions) Act 2014*. In the event ATP 1103 or ATP 814 are converted to Petroleum Leases (PL), coordination arrangements will be negotiated with the above companies as a prerequisite for developing both the coal and gas resources and securing the grant of MLA 70383 and MLA 70459. Overlapping petroleum tenements impacted by the Project are summarised in Table 3-5.

Gas drainage and management for the Project will be undertaken in accordance with the requirements of the Queensland *Mineral Resources Act 1989* (MR Act) and the Queensland *Petroleum and Gas (Production and Safety) Act 2004*.

Table 3-5 Overlapping petroleum tenements

Mining tenure	Overlapping tenure	Overlapping tenure holder	Status	Date
MLA 70383 MLA 70459	ATP 1103 (Potential Commercial Area (PCA) 144 and 262)	Arrow CSG Pty Ltd, ACL Energy Pty Ltd and CH4 Pty Ltd	Granted	23/12/2010
EPC 837 and MLA 70383	ATP 814 (PCA 199)	Eureka Petroleum Pty Ltd	Granted	02/02/2006

Underlying tenure

The land underlying MLA 70383 and MLA 70459 is freehold land in title with various associated easement encumbrances currently used predominantly for cattle grazing and utilities. The following easements and associated infrastructure underly parts of the Project tenure:

- Lake Vermont Road (converted to a BMA private road during 2021)
- Powerlink 132 kV powerline
- Saraji Mine 66 kV powerlines
- EWPC Southern Extension Water Pipeline
- Lake Vermont Queensland Rail (QR) rail spur
- Pipeline licence for the Central Queensland Gas Pipeline (CQGP) access easement.

Details of the underlying land tenure and ownership within the Project Site are provided in Table 3-6 and presented in Figure 3-4. Land tenure and ownership is assessed in **Chapter 4 Land Use and Tenure**.

Table 3-6 Tenure and ownership

Lot and plan	Tenure	Registered owner	Tenement
201SP321205, including Meadowbrook Homestead and Lake Vermont Homestead	Freehold	BHP Coal Pty Ltd Central Queensland Coal Associates Joint Venture (CQCA JV)	MLA 70383 ML 700021
10SP208611	Leasehold	CQCA JV	ML 1775 ML 70142 MLA 70459
2SP190748	Freehold	Bowen Basin Coal Pty Ltd	MLA 70383
5SP190749	Freehold	Private landholder	MLA 70383
7CNS144	Leasehold	CQCA JV	ML 1775
9SP235297	Leasehold	CQCA JV	ML 1775 ML 70142 ML 1784
1SP190748	Freehold	Bowen Basin Coal Pty Ltd	MLA 70383
1SP190749	Freehold	Bowen Basin Coal Pty Ltd	MLA 70383
2SP190749	Freehold	Bowen Basin Coal Pty Ltd	MLA 70383
26CNS125	Leasehold	Aurizon Network Pty Ltd (Queensland Rail)	ML 70142 ML 1775
Easement 715929927 in land parcel 201SP321205 Road Parcel, Lake Vermont Road	N/A	CQCA JV	MLA 70383 ML 700021 ML 1782

No Project activities, except for the transport and infrastructure corridor, are proposed in the southern area of MLA 70383 as illustrated in Figure 3-2. This area includes Lake Vermont Road and the Lake Vermont QR rail spur, which terminates at the Lake Vermont Industrial Area rail-loop off MLA 70383 and an infrastructure corridor.

Exploration activities will continue across the entire MLA 70383 and MLA 70459 for ongoing definition and delineation of the Saraji and Saraji East coal resource and structure. Disturbance due to exploration activities in areas not authorised to be mined will be rehabilitated in accordance with the Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP 2016a).

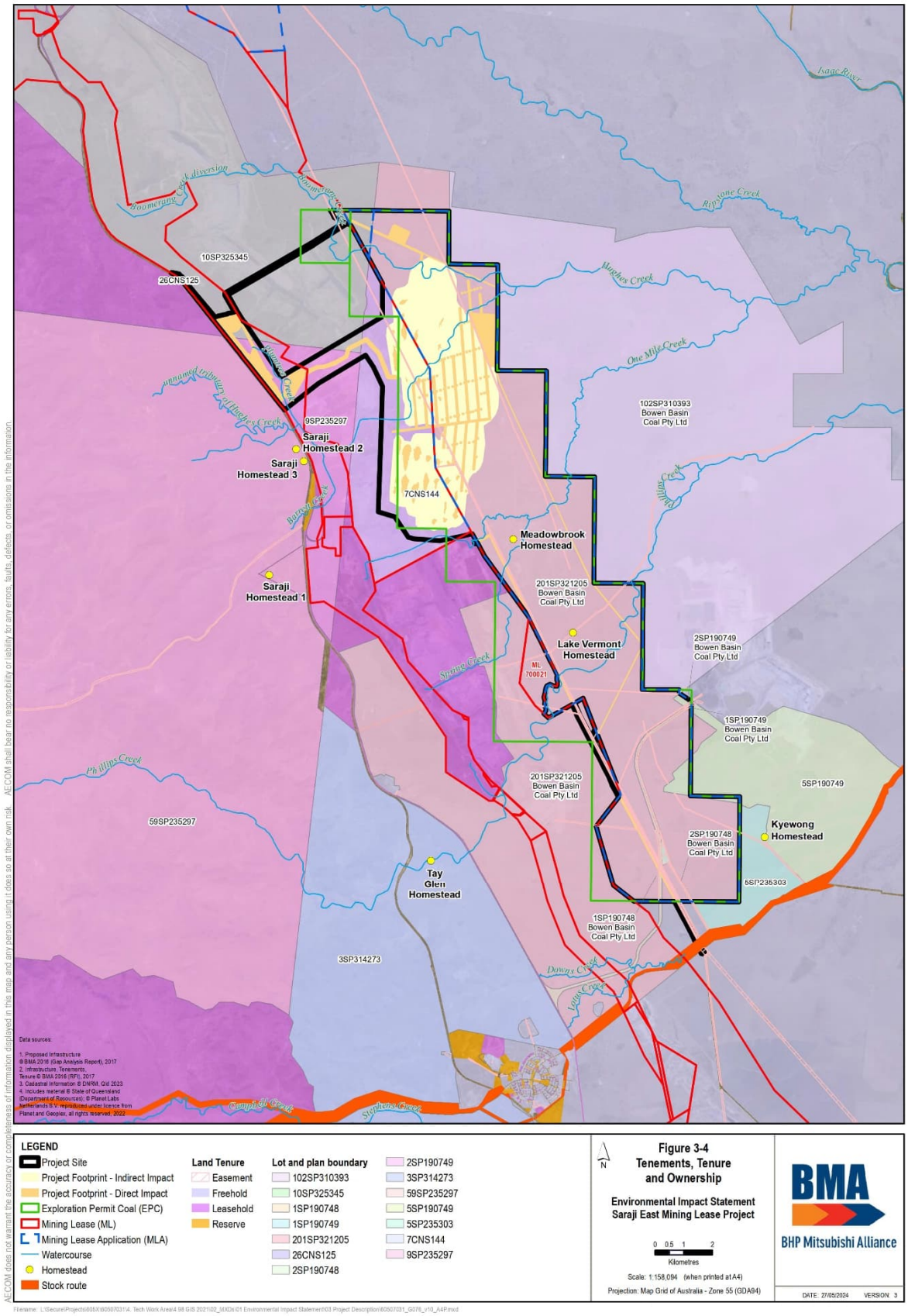

Figure 3-4 Tenements, tenure and ownership

3.6.2 Off lease

Off lease infrastructure including powerline extension to Dysart Substation and relocation and re-connection of the existing EWPC Southern Extension Water Pipeline do not form part of the MLA and subsequent applications for surface disturbance. Off lease infrastructure utilised by the Project is further described in Section 3.7 and Section 3.9. Allowance is made for siting infrastructure within corridors up to 50 m in width, which is greater than the anticipated disturbance. It is expected that up to 2.1 km of off-site linear infrastructure corridors will be required for the Project with the total footprint of off-lease disturbances expected to be approximately 21 ha.

To the extent supporting infrastructure extends beyond lease boundaries, BMA will require subsequent consultation and negotiation with relevant authorities and landholders; subject to accepted development requirements, the Project does not anticipate further development approvals. Required approvals will be confirmed following detailed design.

The five homesteads that surround the Project Site (Figure 3-4) are privately owned and discussed further in **Chapter 4 Land use and Tenure**.

3.7 Pre-construction and Mine Development

3.7.1 Prior to Commencement of Underground Mining

The actual timing for commencement of underground mining activities will be determined based on several commercial factors and capital investment decisions. With access to the underground mine through the highwall of an existing open cut pit of the Saraji Mine, the timing for when to cease mining the open cut pit and commence underground requires detailed analysis. As such, the area of overlap between the Project and Saraji Mine is considered to be a 'trade-off' area for further analysis.

Within the trade-off area open cut mining and underground mining methods will not overlap. Commercial drivers are likely to determine the time at which it is preferred for the Saraji Mine highwall progression to pause and for underground mining to commence.

It is expected that, once timing is identified, a variety of planning and detailed design work will be required. From a regulatory perspective there will be a range of commitments required 'prior to commencement of the activity' (commitments as described in the EIS and draft EA). Planning and detailed design will (though not limited to):

- incorporate a review against the Project environment approval –triggering an amendment (ie pending Project EA and EPBC approvals)
- amendment of the Saraji Mine EA – to adequately define the type and location of Project activities that will be located within the Saraji Mine EA boundary and how the interaction between the two EAs will be managed
- include development of the transitional Project PRCP – which will need to align with the PRCP schedule and PMLUs associated with the Saraji Mine. Up until the development of a Project transitional PRCP, the Saraji Mine EA and PRCP conditions will be in affect within the trade-off area.

BMA will provide the necessary notifications to Regulators in advance of commencement of the underground mining, and apply to amend conditions of relevant approvals.

3.7.2 Pre-construction

The pre-construction phase of the Project includes the collection of information required for the detailed design phase of the Project, including:

- geotechnical investigations to assess ground conditions and enable detailed design of Project infrastructure and structures associated with the Project
- soil investigations to assess potential for contamination
- geological exploration activities such as continued drilling to further define the coal resources associated with the Project.

Exploration activities will continue across the entire MLA 70383 and MLA 70459 for ongoing definition and delineation of the Saraji and Saraji East coal resource and structure. Disturbance due to exploration activities in areas not authorised to be mined will be rehabilitated in accordance with the Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP 2016a).

These activities will be carried out under BHP's Safety – Our Requirements (BHP, 2018b) to identify and manage health and safety risks appropriately.

3.8 Project construction

Construction will commence following the granting of relevant approvals and BMA's decision to proceed with the Project.

For EIS-related impact assessment purposes, the two-year construction stage (referred to as Stage 1 in subsequent impact assessments) was assumed to commence FY 2023 (Year 1) and production / operations beginning FY2025 with a total mine life of 20 years (Stage 2).

It is estimated an initial construction workforce of 500 people will be required in Year 1, increasing to 1,000 people by Year 2. Mine construction hours during this peak period will be in two 12-hour shifts, seven days a week, 365 days per year.

Areas disturbed during construction that are not proposed to be utilised during operational activities will be progressively rehabilitated.

Table 3-7 provides a summary of the anticipated activities occurring during construction.

Table 3-7 Construction activities

Assumed timeframe	Anticipated activities
Year 1	Construction of: • construction accommodation village • mine portal • gas drainage infrastructure (western-most gas wells, pipelines) • raw water dam and process water dam.
Year 2	Construction of: • powerlines • MIA • CHPP • rail loop and load out facility • vent shafts • water pipelines. Construction area rehabilitation

3.8.1 Mine facilities and infrastructure

Mine facilities and infrastructure associated with the Project include the MIA, CHPP, water management infrastructure, roads, as well as water and power supply to the Project Site. The construction of this infrastructure will occur in three stages:

- site preparation
- civil works including water storage and transport network and powerlines/connections
- MIA building and CHPP construction.

To manage and facilitate the construction of Project infrastructure, temporary buildings will be constructed close to the work centres such as the MIA. The facilities will be located within mostly previously disturbed areas within the Project Footprint.

Temporary construction power will be sourced via a connection into the Saraji Mine 66 kV overhead electrical network. This connection will require a short 66 kV overhead power line constructed within the existing mining lease boundaries to supply an interim 66 kV/11 kV substation located close to the underground portal entries. The interim 66 kV/11 kV substation could be a transportable substation

structure type sourced from an existing BMA mine site or procured for the Project. The 11 kV construction supplies for the CHPP will be sourced from the underground mine interim 66 kV/11 kV substation or the Saraji Mine 11 kV overhead electrical network. Both options require sections of a new 11 kV overhead powerline to be constructed. The preferred option will be finalised once construction power requirements are confirmed.

Construction water supply will be sourced from the existing Saraji Mine water management system.

A construction accommodation village is proposed and is discussed in Section 3.8.5.

Site preparation

Prior to construction, staged clearing will occur where required. Once vegetation has been cleared, topsoil will be stripped and stockpiled for use in rehabilitation. Clearing activities will be staged to minimise the exposure of disturbed areas and degradation of topsoil. Plant and equipment involved in clearing activities will include, but not be limited to, excavators, dozers, scrapers, graders and water carts. All site vehicles and equipment will be properly serviced and maintained.

Civil works

Civil works will generally occur early in the construction phase and will include, but not be limited to:

- compaction and associated geotechnical works
- civil earthworks, including piling and foundation construction
- installation of permanent and temporary drainage and water storage/transport structures
- construction of powerline and connection network
- trenching and laying of reticulated services and any other underground pipelines and services
- providing all-weather pavements for roads and vehicle parking
- hard stand construction
- progressive re-vegetation of embankments, disturbed areas and open channel drains where practical.

Hard stand areas will be constructed according to relevant design criteria. Excavations will occur during construction for most infrastructure components of the Project. Bulk earthworks will be undertaken within the train load out, rail loop and CHPP area. Where the excavated material has properties suitable for engineering purposes it will be used as bulk fill, road sub-base, construction material for lay down areas, and foundations, where practical. Unsuitable material will be disposed at the existing Saraji Mine.

Mine entry

Access to the underground workings will be through an entry portal developed in the existing eastern Saraji Mine open cut highwall. The access portal will cater for a conveyor and incoming/outgoing movement of mining equipment and personnel. Initially, the access portal will be connected to a portal fan and act as the mine return until the down slope (down dip) main ventilation shaft is commissioned.

As part of the Project, the highwall will be designed and engineered to provide additional stability to support the underground portal entry and operations over a 20-year production schedule. The design features of the highwall will include:

- a conservative angle of repose
- batter and drainage design
- pre-splitting the highwall to minimise fracturing of the highwall from blasting over-break, which occurs as cracks widen due to rain and exposure.

The portal will be designed and constructed in accordance with the Coal Mine Safety and Health Regulation 2017, including:

- construction of a frame that extends out from the highwall to provide protection for personnel and equipment entering the mine

- capacity for rapid sealing in the event of a catastrophic occurrence
- a docking station for deployment of a rapid inertisation system designed to control dangerous gases within the underground mine below safe levels.

CHPP and MIA building construction

The CHPP and MIA building construction will commence following completion of civil works. Where practicable and cost effective, infrastructure components will be modular units, fabricated and assembled offsite.

The industrial buildings within the MIA will be steel framed on a concrete slab with steel sheeting clad exterior. The administration office and other associated buildings are likely to be demountable construction materials or precast concrete panel walling on floor slabs.

The MIA will include:

- administration, operations, bathhouse, first aid, communications buildings and car parking
- workshop and warehouses
- compressor building
- water treatment plant and a sewage treatment plant
- diesel generator, gas monitoring, fuel storage facilities and vehicle refuelling stations
- waste handling facility
- washdown areas
- construction laydown
- long term warehouse and storage areas.

An indicative layout of the MIA is presented in Figure 3-5.

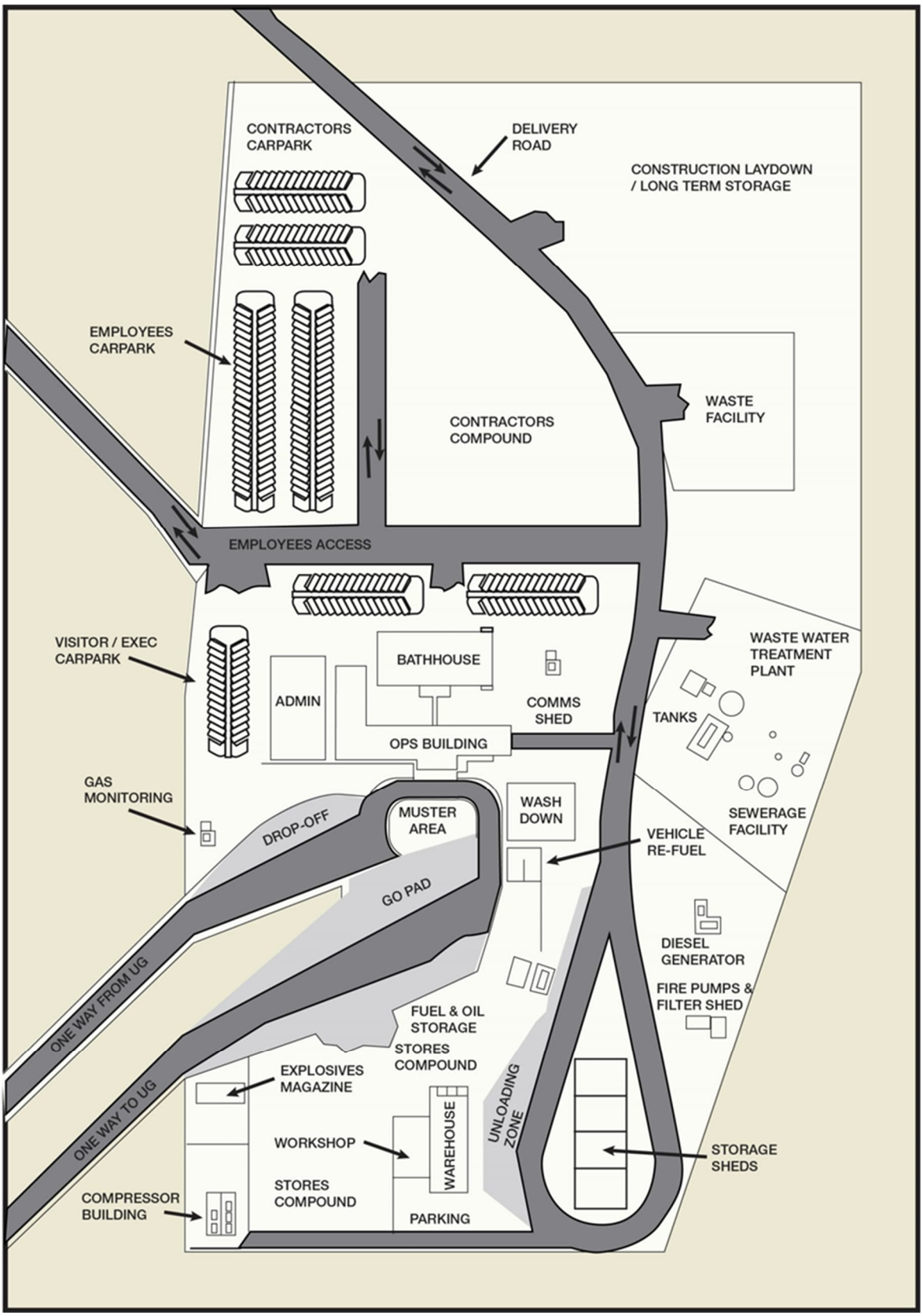

Figure 3-5 Indicative layout of the MIA

3.8.2 Material and equipment

Indicative types of construction materials required for the Project include:

- steel
- concrete
- haul road base (gravel)
- prefabricated buildings
- rail track
- conveyor components.

Raw materials for concrete and road base will be sourced from the Project Site or appropriately licensed local quarries. Concrete will be batched offsite, with potential for an onsite batching plant to be confirmed prior to construction.

The indicative types of construction equipment required for the Project include:

- road train
- body truck
- articulated dump trucks
- road header
- rock bolting machine
- bulldozer
- excavator
- backhoe
- grader
- scraper
- roller compactor
- water truck
- cranes
- elevated work platform
- scissor lift
- air compressor
- welder
- winches
- concrete pumps and trucks
- generators
- tamping machine
- grinding machine
- ballast train
- bitumen sprayer.

As the construction activities are staged, not all equipment is expected to be in use throughout the construction period. Construction equipment will be serviced and maintained at the Project Site's workshop within the MIA.

3.8.3 Transport of plant and equipment

Construction equipment will be transported by road to the Project Site on standard freight vehicles, not over-size, over-mass (OSOM) loads. Most of the materials and equipment for the construction stage will be sourced from Mackay and/or Rockhampton.

3.8.4 Construction workforce

BMA will own and operate the Project and contract the construction of the CHPP, MIA and associated infrastructure to a suitable construction contractor(s). The workforce will peak in Year 2 with up to 1,000 personnel. The workforce skills required for construction will include heavy equipment operators, boilermakers, carpenters, scaffolders and electricians. In addition, the Project will create opportunities for local employment in construction, transport and the supply of goods and services. An indicative breakdown of the construction workforce required by year is provided in Table 3-8.

Table 3-8 Indicative workforce numbers: construction

Project phase	Year 1	Year 2	Year 3
Construction workforce	500	1,000	1,000

Construction personnel will work across two 12-hour shifts, with an operating schedule of 24 hours a day, seven days a week, 365 days per year. Rosters will be confirmed prior to construction. For the impact assessment, the construction workforce roster will be 21 days on and seven days off, with two 12-hour shifts changing over at 6 AM and 6 PM respectively.

Workforce arrangements

The construction workforce will be determined by workforce planning, labour market conditions and general market conditions during detailed design. The workforce arrangement was informed by investigations into operational requirements, which take into consideration the skills required, labour availability, rostering and planning, and social impacts and benefits. The workforce will be sourced locally, where possible. Social impacts and benefits of the Project are discussed in **Chapter 17 Social**.

3.8.5 Accommodation

A temporary construction workers accommodation village may be required to support the Project's construction (Year 1-2) and has therefore been included in the Project scope for the purpose of this EIS. The village will have capacity for up to 1,000 personnel and will be located along the eastern boundary of MLA 70383 as shown in Figure 3-2. Sewage from the temporary workers accommodation will be pumped by licensed contractor and transported to local council sewage treatment plant for processing.

The construction accommodation village would be decommissioned as soon as practical after the construction phase is complete.

3.8.6 Watercourse crossings

The indicative location of proposed watercourse crossings for the Project are listed in Table 3-9 and illustrated in Figure 3-6. These locations will be confirmed during detailed design and will facilitate linear infrastructure such as access roads, pipelines and above-ground powerlines.

Table 3-9 Watercourse crossing locations

Watercourse crossing	Watercourse name	Northing (GDA94)	Easting (GDA94)
Powerline and pipeline crossings			
1	Boomerang Creek	7531026.506	631707.7
2	Spring Creek	7519344.927	637673.1
3	Phillips Creek	7515510.473	639559
4	Boomerang	7529576.414	635977.7

Watercourse crossing	Watercourse name	Northing (GDA94)	Easting (GDA94)
Road infrastructure crossings			
1	Boomerang Creek	7529309.487	636867.7463
2	One Mile Creek	7521111.154	639600.524
3	One Mile Creek	7521463.771	639336.0616
4	Phillips Creek	7517418.739	641821.5838
5	Boomerang Creek	7531601.494	631872.3461
6	Hughes Creek	7528751.178	637455.4404
IMG Infrastructure			
1	Hughes Creek	7528386	636835.6
2	Hughes Creek	7528263	636474.3
3	Hughes Creek	7527818	636136

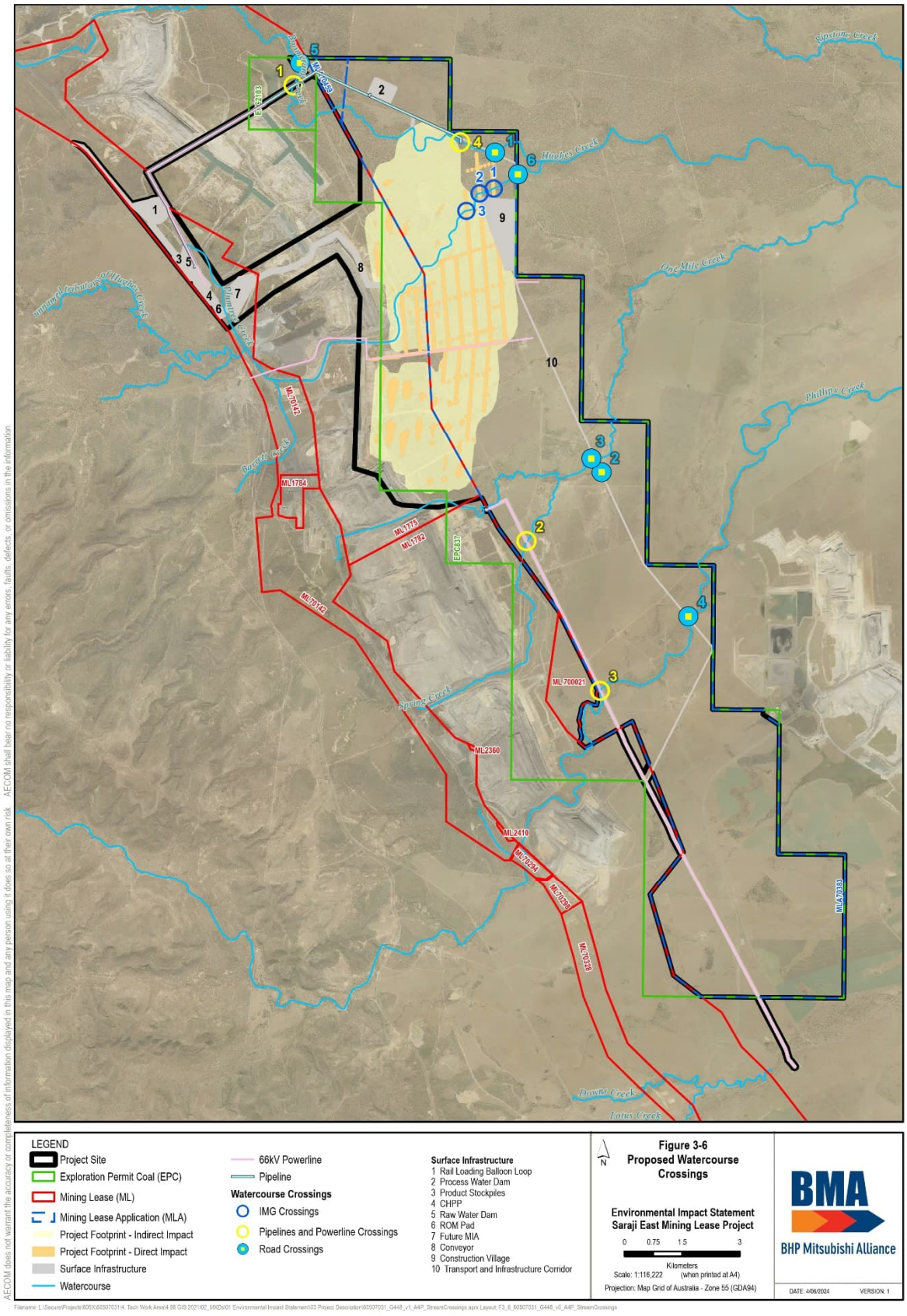

Figure 3-6 Proposed watercourse crossings

3.9 Project operation

3.9.1 Resource utilisation

The Project will be developed according to an optimised underground mine plan to minimise resource waste and sterilisation. Sequencing will be designed to maximise safe and efficient resource extraction.

Longwall panels across the underground mine footprint will extract coal from Dysart Lower (D24 and D14) seams. The approximate quality of the coal resource is summarised in Table 3-10 as per the Joint Ore Reserves Committee Code (JORC Code) of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia. Further exploration and resource definition work will further refine the description of the Project's resources. A discussion of the underlying geology and stratigraphy of the Project Site is provided in **Chapter 5 Land Resources.**

Table 3-10 Estimates of the mineral resource in accordance with the JORC code

Item and units	Measured	Indicative	Inferred	Total
Proportion of resource (%)	28.94	41.16	29.90	100
Total tonnes (Mt)	509	724	526	1,759
Average washed ash (%)	10.2	10.3	10.0	10.2
Average washed volatile matter (%)	16.0	15.8	15.3	15.7

The Project's deposit is located on the western limb of a northerly plunging syncline with uniform easterly dips of 2 to 5 degrees (°) and local steepening to 9° on the eastern margin of the MLA 70383. Both normal and thrust faults are present with mapped trends describing two structural domains one trending north-northwest and the other north-south. Major structures (those with throws of 10 m or more) are wide spaced with a periodicity of 1-5 km and localised steepening occurring around faults.

3.9.2 Mining methods

Conventional longwall mining is the preferred method when considering the economic, environmental and social factors together with project objectives as discussed in **Chapter 2 Project Alternatives and Justification**. The depths of the Dysart Lower Seam vary between approximately 120 m and 450 m below ground level (bgl) across the Project and generally increases down dip towards the eastern extent of the Saraji East deposit; at such depths, longwall mining is an operational necessity.

Within the Dysart Seam, thick seam mining by longwall coal mining is the most common underground coal extraction method in Australia because of its relatively low cost, strong safety record and efficiency in removing coal from deep seams with minimal resource sterilisation (Commonwealth of Australia, 2015). Longwall mining targets large panels of coal, removing the coal and allowing the roof and overlying rock to collapse into the void left behind. Each longwall panel of the underground mine layout will be up to approximately 320 m wide and up to 5,335 m long. Each longwall is mined progressively along the narrow dimension by a shearer shaving off slices of coal up to 1 m thick and 3.6 m high, under protection of self-advancing hydraulic supports, until all the panel is fully extracted.

Longwall panels are defined by excavating underground roadways in tunnels off the main header within the coal seam and around the perimeter of the panel. These roadways will be developed by the continuous miner. The main headings will feature roadways off the main shaft. The roadways will be approximately 3.2 m high and 5.6 m wide. This width includes an allowance for ventilation.

The mine ventilation will occur in two stages. During the initial development phase, the mine workings will be ventilated via a portal ventilation fan. In the second stage, ventilation will be via approximately 5.5 m diameter concrete lined shafts. The shafts will be located along the main headings. The main ventilation fan will have a capacity in the order of 320 cubic metres per second (m^3/s). This design will cater for 60 m^3/s at the longwall face, 30 m^3/s for each development face and the remainder will cater for leakages and ventilate faces not under production.

3.9.3 Underground mining layout, mining sequence and schedule

The timing for the development of the Project has not been finalised; timing is subject to approvals and BMA's investment decision. Timing for production will depend on commercial arrangements and infrastructure constraints. For assessment purposes, Year 1 (FY2023) is nominated as the start of

construction and Year 3 (FY2025) for commencement of long-wall coal production, in accordance with the underground mining sequence. Anticipated timing for production over the nominal 20-year life of mine is outlined in Table 3-11 and an overview of the optimised mining sequence is illustrated in Figure 3-7.

Table 3-11 Indicative coal production schedule

Year	Mining activities	ROM (Mtpa)	Product (Mtpa)
1-2	Development of the mine portal and associated infrastructure areas.	-	-
3-20	Thick seam mining commences within the Dysart Lower (D24 and D14) seam.	Up to 11	Up to 8

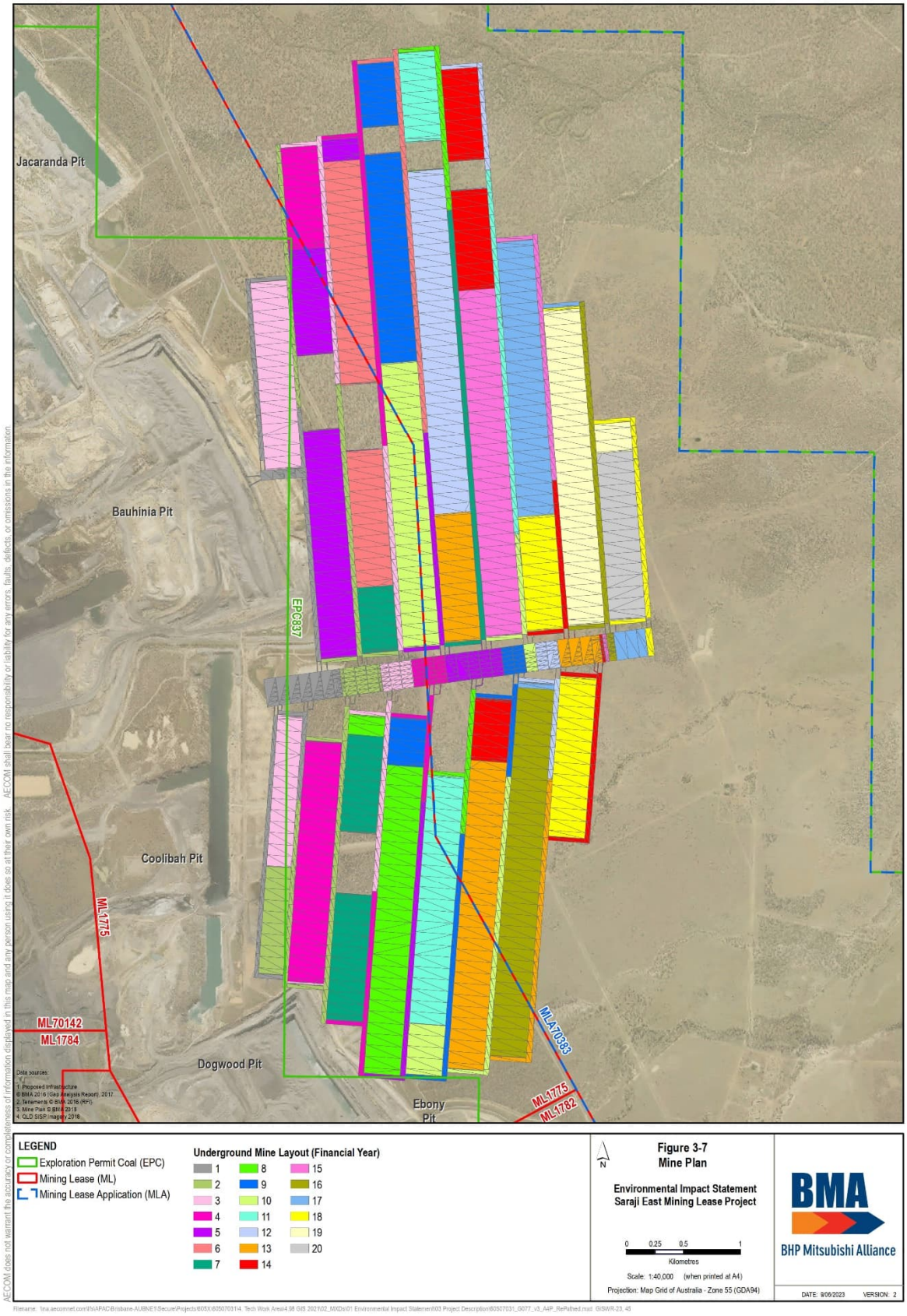

Figure 3-7 Mine plan

3.9.4 Mine equipment

The indicative mining equipment required for the Project's operational phase is detailed in Table 3-12.

Table 3-12 Indicative mine equipment

Mine activity	Indicative mine equipment
Development of mine	Continuous miners
	Shuttle cars
	Distribution control box
	Breaker feeders
	Development transmitter
	Auxiliary fans
Coal extraction (longwall equipment)	Longwall shearer
	Conventional longwall face
	Longwall supports
	Front and rear armoured face conveyors
	Beam stage loader
	Bootend
	Longwall transformer
	Longwall pump station
Conveyors	Stockpile conveyor
	Ramp conveyor
	In-pit conveyor
	Trunk conveyor
	Interseam conveyor
	Longwall maingate conveyor
	Development conveyor
Ventilation	Ventilation fan housing
	Fan motors
	Ventilation transformers
First response	Inertisation unit
	Diesel generator
Mobile fleet	Personnel carriers
	Load haul dump
Dewatering	Major pumping station
	Minor pumping stations
Surface (MIA)	Dual cab 4WD(s)
	Front end loader
	2.5 tonne forklift
	10 tonne forklift

Mine activity	Indicative mine equipment
Surface (portal)	2 person utility
	Grader
	Concrete agitator
	Slurry pumps

3.9.5 Hours of operation

Mine operation hours are expected to be 24 hours per day, seven days per week, 365 days per year.

3.9.6 Subsidence

As mining progresses, the unsupported strata or goaf, progressively collapses. With time, the overlying stratum compacts down into the collapsed area resulting in a lowering of the ground surface. This is referred to as subsidence and is illustrated in Figure 3-8.

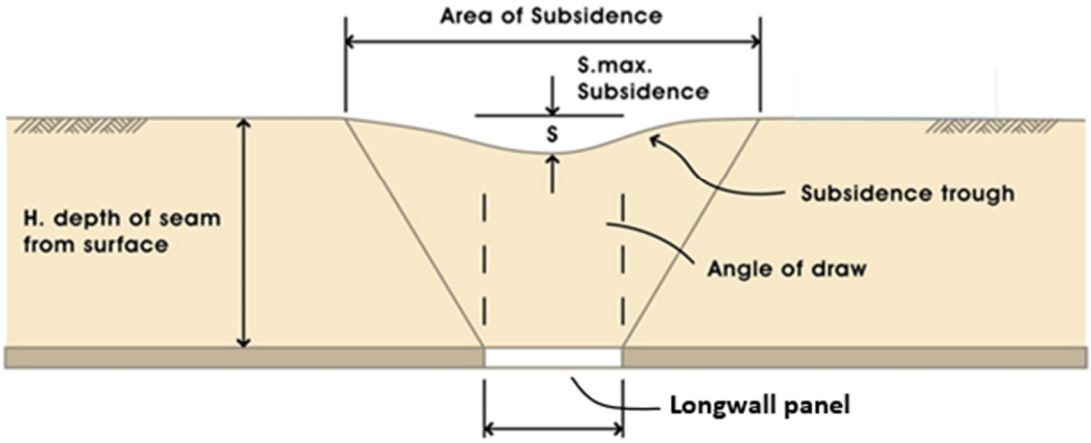

Figure 3-8 Overview of subsidence

The magnitude of the Project's subsidence varies along the length and across each of the longwall panels. Longwall top coal caving is predicted to result in a maximum vertical subsidence of 3.5 m. The potential level of subsidence and associated surface and subsurface impacts are discussed further in **Chapter 5 Land Resources**.

The surface subsidence profile perpendicular to the longwall panels will consist of distinct rolls in the subsided topography. It is noted that the subsidence will occur progressively with surface impacts from each panel appearing over a period of months or years, in line with the mining sequence shown in Figure 3-7.

3.9.7 Waterway management

The Project's underground mining operations will occur beneath Plumtree, Boomerang, and Hughes creeks, as well as a tributary of One Mile creek. These creeks are ephemeral and are downstream reaches of the catchment where the creeks are relatively well defined. The Project Site also includes several minor watercourses.

Boomerang, Hughes and One Mile creeks are currently diverted upstream of the Project by the existing Peak Downs (Boomerang Creek diversion) and Saraji Mines (Hughes and One Mile creek diversions). As part of the Project, sections of these creeks will be progressively managed to reduce the impact of subsidence on the creeks' physical and biological environments as well as the impact on flows to downstream users. **Chapter 8 Surface Water Resources** and **Appendix K-2 Subsidence Management Plan** provide management measures for works within waterways. Any work within a

watercourse will include progressive rehabilitation and specific monitoring programs as identified in the Project EA.

No new stream diversions are planned as part of the Project. Within the existing Saraji Mine tenement area, overland flows are managed through a series of existing diversion drains. These diversions are designed to provide conveyance of clean water flows across the existing Saraji Mine. These existing diversion drains will continue to operate and be maintained in accordance with Saraji Mine EA (see Section 3.12) EPML00862313.

A Subsidence Management Plan (SMP) has been prepared for the Project and existing diversion drains will be managed in accordance with the SMP where they extend above underground mining areas. Key components of the SMP include:

- ongoing subsidence monitoring, evaluation and review
- indicative mitigation measures to manage bed and bank stability
- reporting requirements, including the requirement to address watercourse condition and geomorphic process.

3.9.8 Gas drainage and management

IMG is present in the two major coal bearing geological formations of the Project Site. These formations are the Fort Cooper Coal Measures (FCCM) and Moranbah Coal Measures (MCM).

The Project will require construction of infrastructure to drain and manage IMG to enable the safe and efficient mining of coal. The gas drainage program will require dewatering infrastructure. The final extent or scale of drainage will be influenced by actual mining conditions and maintaining safety.

A hazard management strategy will be developed prior to construction to reduce the associated risks during operation. This will include:

- pre-drainage of coal measures prior to underground mining (pre-drainage methane)
- dilution of methane through mine ventilation during underground mining, known as ventilation air methane
- post-drainage of goaf after underground mining (goaf methane)
- co-development agreements are being discussed with relevant tenement holders to enable gas drainage activities which are expected to be resolved prior to granting of the mining leases.

IMG pre-drainage process is illustrated in Figure 3-9.

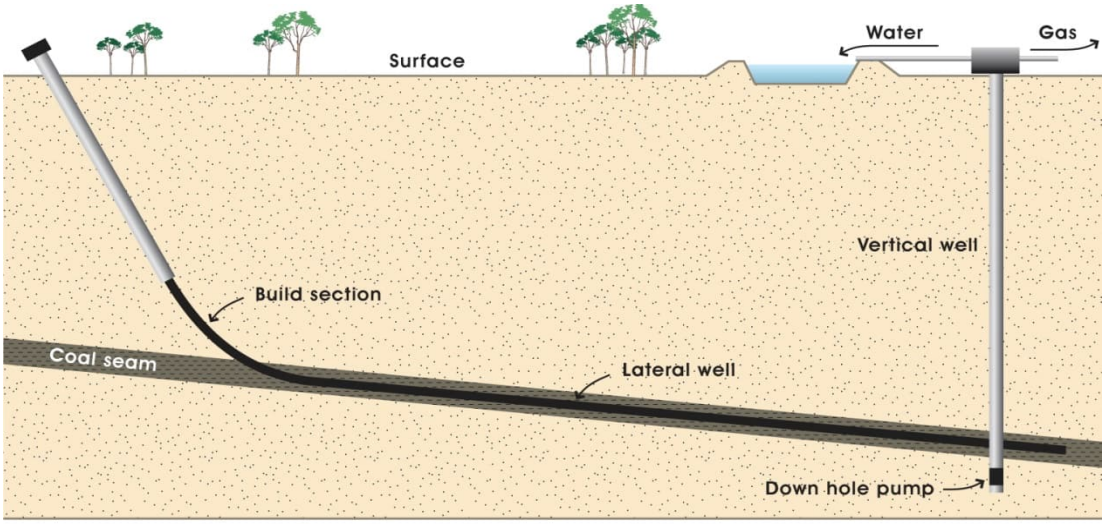

Figure 3-9 Incidental mine gas pre-drainage process

Use of incidental mine gas

Ventilation air methane will be vented to the atmosphere. IMG will be flared where it is not commercially or technically feasible to:

- use it beneficially for mining under the ML
- transport or store it within the area of the ML to allow it to be used beneficially for mining under the ML
- use or dispose of for a purpose other than mining in accordance with applicable legislation.

As ML 1775 includes gaseous hydrocarbon rights, BMA will continue to assess initiatives for IMG from the Project, including:

- the combustion of IMG for the purposes of onsite power generation
- the sale of IMG to a third-party for use offsite.

Collecting and piping the gas off the mining lease for any commercial use or generating electricity on the ML for sale to the grid is only allowed when the mining lease holder also holds a gaseous hydrocarbon right or has an agreement with the overlapping petroleum lease holder, together with all necessary approvals to permit these activities. BMA is not proposing to supply gas to a third party for use off site.

Flaring

Flaring of incidental gas is the process whereby methane collected from boreholes in advance of or during mining is destroyed by combustion in a flare. Flares are also required for safety purposes; it is generally not safe to shut off gas wells during operations where gas cannot be captured and beneficially used. Flaring of IMG significantly reduces greenhouse gas emissions; the oxidation of methane, which has a greater global warming potential compared to carbon dioxide, substantially reduces the potential impact of Project emissions.

Locations of gas flares will depend on the beneficial use opportunities and IMG surface infrastructure installation option progressed. At least one main central flare will be required.

3.9.9 Run-of-mine coal conveyor

The raw coal handling system will be required to size and deliver raw (or ROM) coal from the underground operation to the CHPP. The underground drift conveyors will release ROM coal into large primary sizers to reduce oversized lumps before discharging onto a stacking conveyor. The stacking conveyor will deliver ROM coal onto a large conical stockpile. This will provide underground surge capacity while de-coupling the mine from the CHPP. Feeders under the stockpile will reclaim coal and deliver it to the secondary sizing system for further sizing and reject removal using a rotary breaker.

3.9.10 Coal handling and preparation

Process selection and basis

The CHPP removes dirt, rock and other impurities from the ROM coal before it is sold as product coal. This increases the value of the coal and reduces transportation costs as impurities do not need to be transported. The CHPP uses physical and mechanical processes to clean coal and remove impurities and fine materials from the coal.

The indicative CHPP design will follow a standardised BMA design consisting of large diameter cyclones, reflux classifiers and flotation cells. The Project will utilise belt press filters to dewater the coal tailings so that only dewatered tailings are produced and a tailings dam is not required. The management of mine waste is discussed in **Chapter 10 Geochemistry and mine waste**.

The CHPP area will include the CHPP itself as well as rejects management systems, offices and amenities, control room, chemical and diesel storage, a water treatment (recycling) plant, maintenance facilities and stormwater management system. The CHPP operations and maintenance activities occur 24 hours per day, up to 365 days per year.

The CHPP has been designed with a maximum processing capability of 7 Mtpa ROM coal feed. In years the annual production exceeds the CHPP capacity, the remaining coal will be processed through the existing Saraji Mine CHPP.

CHPP process

Located within ML 70142, the CHPP will be designed and constructed for processing ROM coal at a rate of 800 tonnes per hour (tph). The CHPP will be designed to yield up to 5 Mtpa of metallurgical product coal (or 7 Mtpa ROM coal) which will be delivered to the train load out bin at a rate of approximately 4,500 tph. The CHPP will require a raw water supply of approximately 1,500 mega litres (ML) per annum to achieve this production rate. The 4,500 tph train load out system will be designed to comply with Aurizon regulations and standards. Appropriately sized ROM coal feed and product delivery systems will be designed and constructed to include:

- ROM coal stockpile
- sizing stations
- overland conveyors
- raw coal
- ROM bin
- plant feed
- surge bin
- product coal reject
- coal stackers
- stockpile stacker
- stockpile stacker reclaimer
- truck loading bin
- rejects bin
- train loadout.

The steps to processing coal within the CHPP are generally as follows:

- coal is delivered into the surge bins from the overland conveyor
- the coal will pass by gravity from the surge bins to a tertiary sizing system where coal size will be reduced ready for further processing
- the coal is deslimed to wash away very fine material and improve the quality of the coal. Dependent on the size of coal particles, the coal is mixed with water and separated into either:
    - dense medium cyclones for coarse coal
    - reflux Classifiers for fine coal
    - microcel column flotation for ultra-fine coal.
- coarse coal passes through a centrifuge (dense medium cyclone) to separate the very fine material from the coarser material. The product coal is drained and rinsed on a sloping screen and excess water is removed in another centrifuge before the coarse coal is released to the product coal conveyor
- fine coal passes through a series of centrifuges and then to a flotation circuit, which relies on gravity to separate the product coal from impurities. The product coal will pass through a series of centrifuges to remove water and, once dried, is directed to the product coal conveyor

- ultra-fine coal is pumped from the base of the column of the microcel column flotation where air and slurry are mixed under high-shear conditions to create the bubble dispersion of coal and slurry. The coal is then directed to the product coal conveyor
- the product conveyor will transfer product coal to stockpiles adjacent to the train load-out facility. Coal stackers will place the coal on to stockpiles, with segregation within stockpiles for different product types.

The conceptual processes described above may be modified. Figure 3-10 provides a flow diagram of the CHPP, coal washing process and interaction with other aspects of the mining operations.

The demand for CHPP process water is 5,100 kilolitres per hour (kL/hr). Process plant water will be recycled to minimise water make-up requirements for the site. An estimated 4,950 kL/hr (97 per cent) of the water in the CHPP will be recycled with a makeup water requirement of only 150 kL/hr. The CHPP layout will be designed to contain local area and stockpile runoff. Mine water collected from disturbed areas including from the underground working, will be preferentially used as the primary source of water, with the raw water dam used for make-up as required.

A combined fire, washdown and dust suppression reticulation system will be provided around the CHPP and will also service the MIA.

Dust suppression sprays will be provided at appropriate transfer points in the raw coal handling system including the ROM coal bin. A potable water system will be provided around the CHPP area and will also service the CHPP site offices and workshops. Potable water will be supplied from the raw water dam. The water management system will include reuse and recycling of MAW and is discussed in further detail in Section 3.11.2.

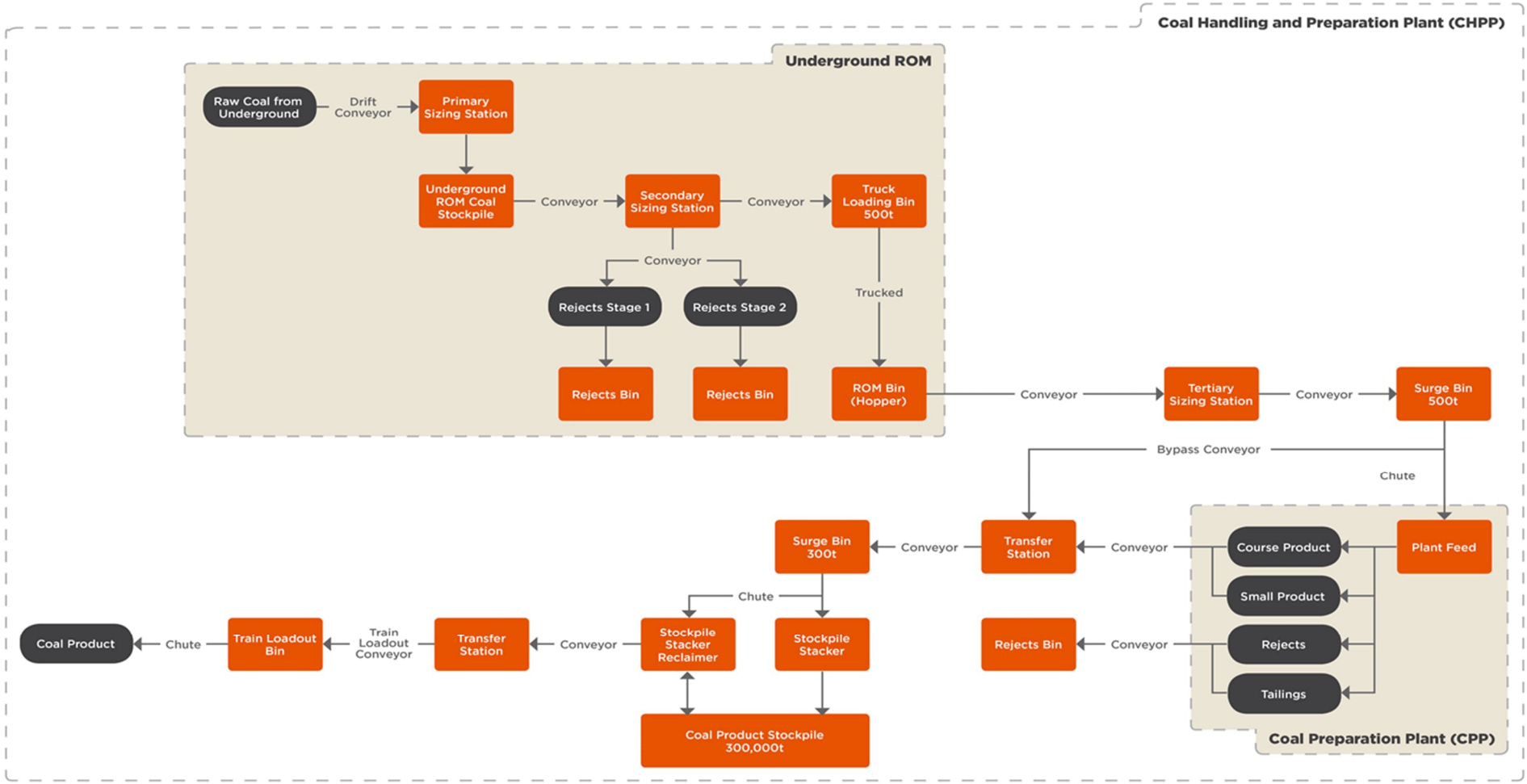

Figure 3-10 Indicative raw coal handling process

3.9.11 Tailings and coarse reject management

The rejects materials from the CHPP may consist of dense medium coarse reject material, reflux classifier reject material and dewatered flotation tailings material. The dewatered tailings and coarse rejects will be disposed of via a dry disposal system. Coarse rejects from the high frequency rejects screen will be fed onto the plant reject conveyor. Fine rejects will be transported to the fine coal reject dewatering screen. Dewatering of the CHPP tailings will be achieved by belt press filters. Reject and dewatered tailings material will be trucked to Saraji Mine's existing in-pit reject storage facilities for disposal (refer Section 3.11.3).

In the unlikely event reject haulage falls behind, the rejects bin will overflow to the designated bunker. The bunker will provide access for a loader to remove coarse rejects and dewatered tailings material as required.

3.9.12 Transportation

The Project's interaction with the existing traffic and transport conditions is discussed further in **Chapter 14 Transport** and **Appendix J-1 Traffic and Transport Impact Assessment**.

Road transportation

The state-controlled road (SCR) Saraji Road is a sealed, two lane road that runs along the western edge of the proposed MIA. Access to the MIA and the CHPP will require a new intersection into the Saraji Road. The intersection will be designed as per the existing Saraji Mine intersection, two lanes at a T-intersection with the existing Saraji Road. As the access road crosses the Goonyella Rail Line, the design and construction requirements for a modified railway level crossing are assessed in **Appendix J-1 Traffic and Transport Impact Assessment**.

The intersection proposed at the BMA-owned (private) Lake Vermont Road and the new transportation and infrastructure corridor will also be two lanes at a T-intersection with the existing Lake Vermont Road.

Additionally, an internal access road will be constructed to provide access to Lake Vermont Road. A new intersection at the juncture will be required. The location of these new intersections and road upgrades is shown on Figure 3-11.

Train movements

Product coal will be transported along the existing Goonyella rail system that currently runs along the western boundary of the existing Saraji Mine on ML 70142. The volume of coal to be transported via the network will be within Aurizon's existing approval limits. As such, no additional impacts from train movements are expected.

A new rail spur, balloon loop and signalling system will be required to connect to the existing rail network, which will be undertaken in consultation with the Railway Manager. The balloon rail loop will be an electrified line, approximately 4.4 km in length, located on ML 70142 and adjacent to the existing rail line. The requirements for works in a railway corridor are detailed further in **Chapter 14 Transport** and **Appendix J-1 Traffic and Transport Impact Assessment**.

The product coal will be transported by rail over approximately 250 km to ship loading facilities at the Hay Point Coal Terminal or approximately 400 km to the Abbot Point Coal Terminal. The total amount of coal railed will be up to 110 Mt over the 20-year production schedule, with an average of 5.5 Mtpa (including ramp up and ramp down periods). Estimated average number of additional trains required over the 20-year production schedule is outlined in Table 3-13.

Table 3-13 Number of additional trains

Project year	Average number of additional coal trains per day
Years 1-2	0
Years 3-20	2 (up to a maximum of 3)

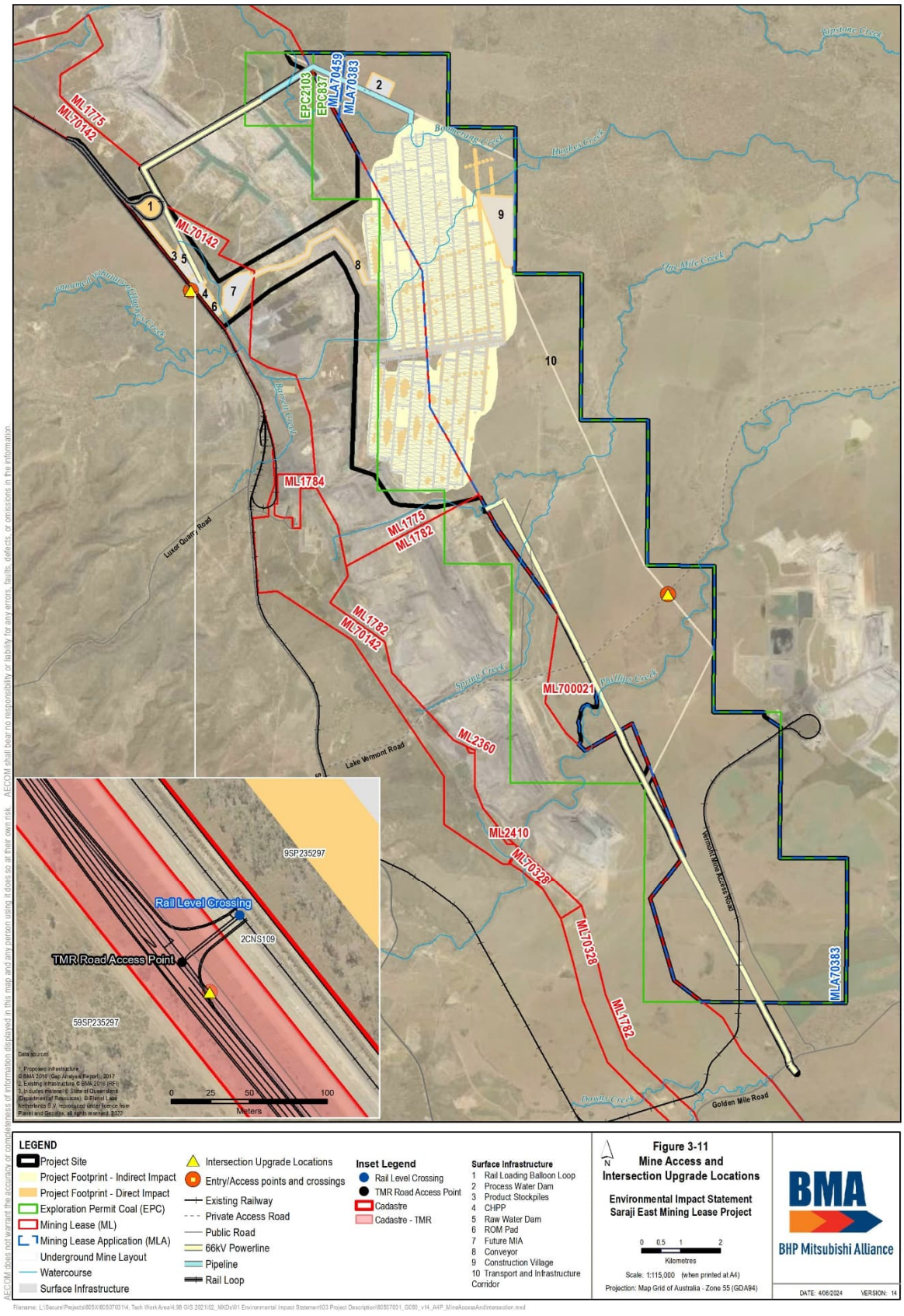

Figure 3-11 Mine access and intersection upgrade locations

Port capacity

Product coal from the Project will be exported to international markets via either:

- Hay Point Coal Terminal: located approximately 40 km south of Mackay and commenced operations in the 1970s. The Hay Point Coal Terminal is owned and operated by BMA.
- Abbot Point Coal Terminal: located approximately 25 km north of Bowen on the Central Queensland Coast.

The product coal shipped via these ports will be within the approved port and shipping capacity and throughput limits, as such no additional impacts to the surrounding environment are expected.

The average shipping size through the Hay Point Coal Terminal and Abbot Point Coal terminal is 93,000 tonnes (t). The approximate number of additional ships per year of operation is outlined in Table 3-14.

Table 3-14 Number of additional ships

Financial year	Average number of additional ships per year
Year 1-2	0
Year 3-20	67

Airport capacity

The existing Moranbah Airport operated by BMA will be utilised as required for the transportation of the Project workforce. Currently, the Moranbah Airport is operating approximately 36 flights per week on Dash 8 (or equivalent) aircraft with approximately 60 passengers per aircraft. During operations, the Project will result in up to 15 additional in and outbound flights per week. This increase can be accommodated within the existing capacity of the Moranbah Airport.

3.9.13 Power supply

Electrical power demand for the Project will be supplied via the existing Saraji Mine power network and the following new powerlines:

- a co-aligned 66 kV powerline and connection extending off lease and connecting to the Dysart Substation
- a 66 kV northern extension connecting the Project to the infrastructure and transport corridor.

The initial power demand increase associated with the Project is in the order of 14 MW and is required by Year 1. The total power demand for the Project is estimated to be between 11 MW and 14 MW and will be required by Year 3.

Preliminary assessment indicates that the proposed increase in Project power demand including the CHPP would not exceed the existing network capacity following the construction of the supporting power infrastructure.

Relocation of existing powerlines

The existing 132 kV powerline, which is owned and operated by Powerlink, will be relocated to the proposed infrastructure and transport corridor. Transformers will be required to reduce the voltage from the Powerlink powerline to supply mine infrastructure. During detailed design, BMA will work with Powerlink to determine the appropriate alignment. BMA commit to maintaining supply and will consult with all parties prior to works. Additionally, powerlines currently servicing the existing Saraji Mine will require decommissioning.

Proposed and existing powerlines are shown in Figure 3-12**.**

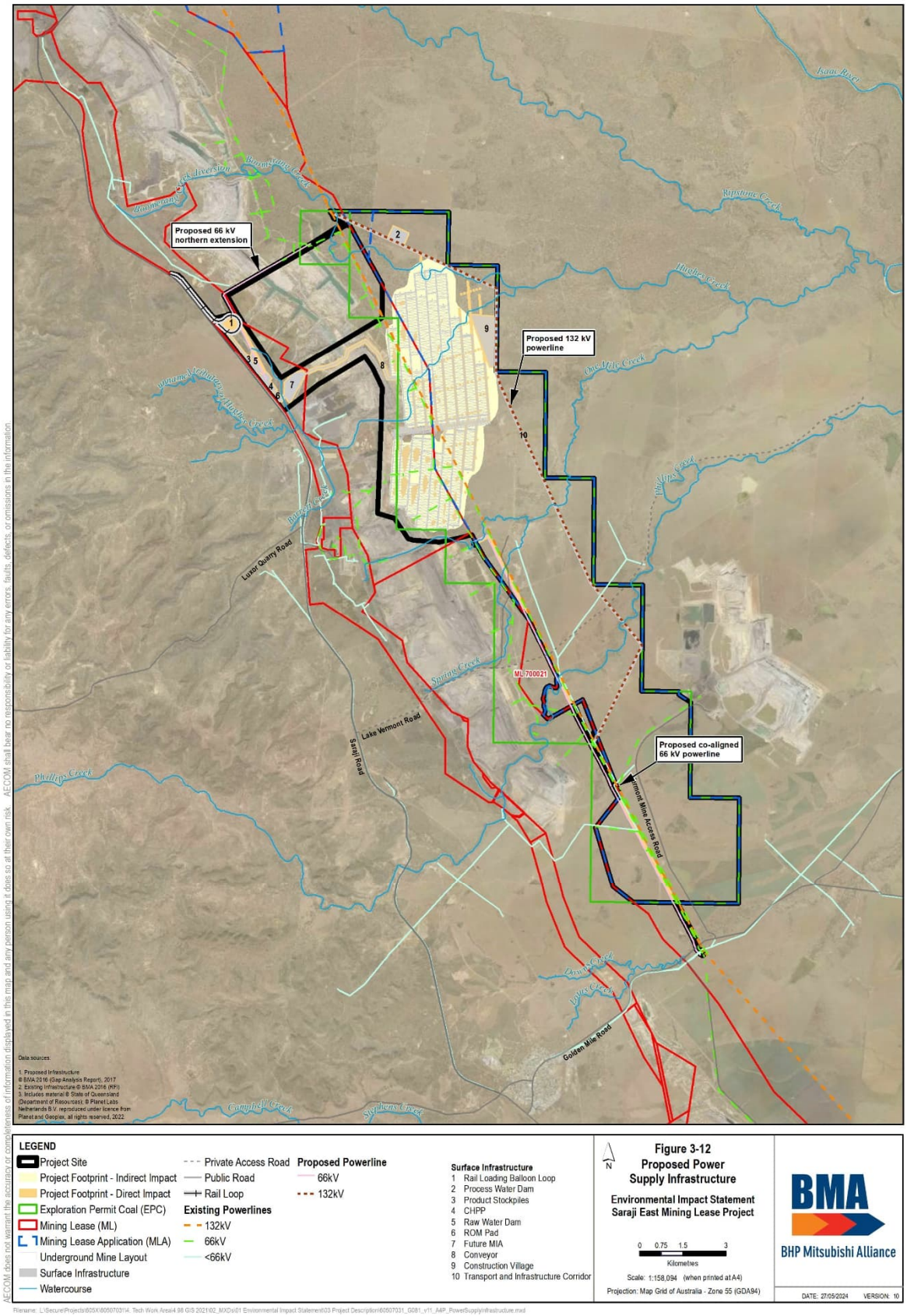

Figure 3-12 Propose power supply infrastructure

3.9.14 Raw water supply

Where MAW is unsuitable for particular Project uses, raw water will be provided via the existing EWPC Southern Extension Water Pipeline network supplying Saraji Mine. The initial water demand increase associated with the Project is approximately 2.3 mega litres per day (ML/d) and is required by Year 1. The peak water demand for the Project is 6 ML/d and will be required by Year 3.

Relocation of existing EWPC Southern Extension Water Pipeline

To avoid mining impacts and ensure continuity of reliable water supply, the existing EWPC Southern Extension Water Pipeline, which Sunwater uses to supply water to the Lake Vermont Mine, will be relocated to the designated infrastructure and transport corridor on the eastern edge of the Project Site. The relocation works will be undertaken in consultation with Sunwater and will ensure continuity of water supply to the Lake Vermont Mine is maintained.

The mine water management system is described in Section 3.9.15.

3.9.15 Mine water management

A conceptual schematic for the mine water management system is provided in Figure 3-13. Proposed and existing water infrastructure locations are illustrated in Figure 3-14.

Raw water supply

The Project's raw water supply will be linked to the existing Saraji Mine's water management system. While it is planned to reuse MAW whenever possible, raw water is still required for those consumptive demands for which MAW is not suitable or for when supplies of MAW are unavailable. Raw water demands are discussed in Section 3.9.14.

BMA operates a water pipeline network in Central Queensland (refer Section 3.11.2), servicing its mines, landholders and towns. BMA holds contractual rights to approximately 10,000 ML/yr of water from the Burdekin Pipeline (owned by SunWater) as a supply source for BMA operations in the vicinity of Moranbah. In addition, BMA has a water allocation of 6,200 ML/yr from the Eungella Dam also available for use in BMA operations in the Moranbah vicinity. In securing water rights, BMA has allowed for the current and potential future use of water from these sources at the Saraji Mine and for growth options associated with MLA 70383.

In relation to the proposed activities on MLA 70383, BMA will prepare, update and maintain a Water Management Plan. The Plan will identify sources of water used for Project operations:

- via an off take from the existing water pipelines developed to support BMA's current and future mining operations, along with various other purposes
- from the Eungella Dam and/or the Burdekin Pipeline.

The Project will have an internal BMA allocation to draw water from as part of the BMA-related water allocations. These allocations are held by BMA directly or indirectly via contractual arrangements with SunWater in accordance with the Burdekin Water Resource Plan and the *Water Act 2000* (Water Act). BMA also holds allocations of water from the Fitzroy and Burdekin water catchments and numerous licences to use and take water across BMA's mine sites.

Water produced by the Project

As illustrated conceptually in Figure 3-13, water will be produced by the Project activities from the following sources:

- mining processes using water and creating effluent
- groundwater from the coal seam during coal mining
- groundwater extracted through gas pre-drainage
- sewage treatment effluent
- surface water runoff from coal processing and stockpile areas and at the highwall entry.

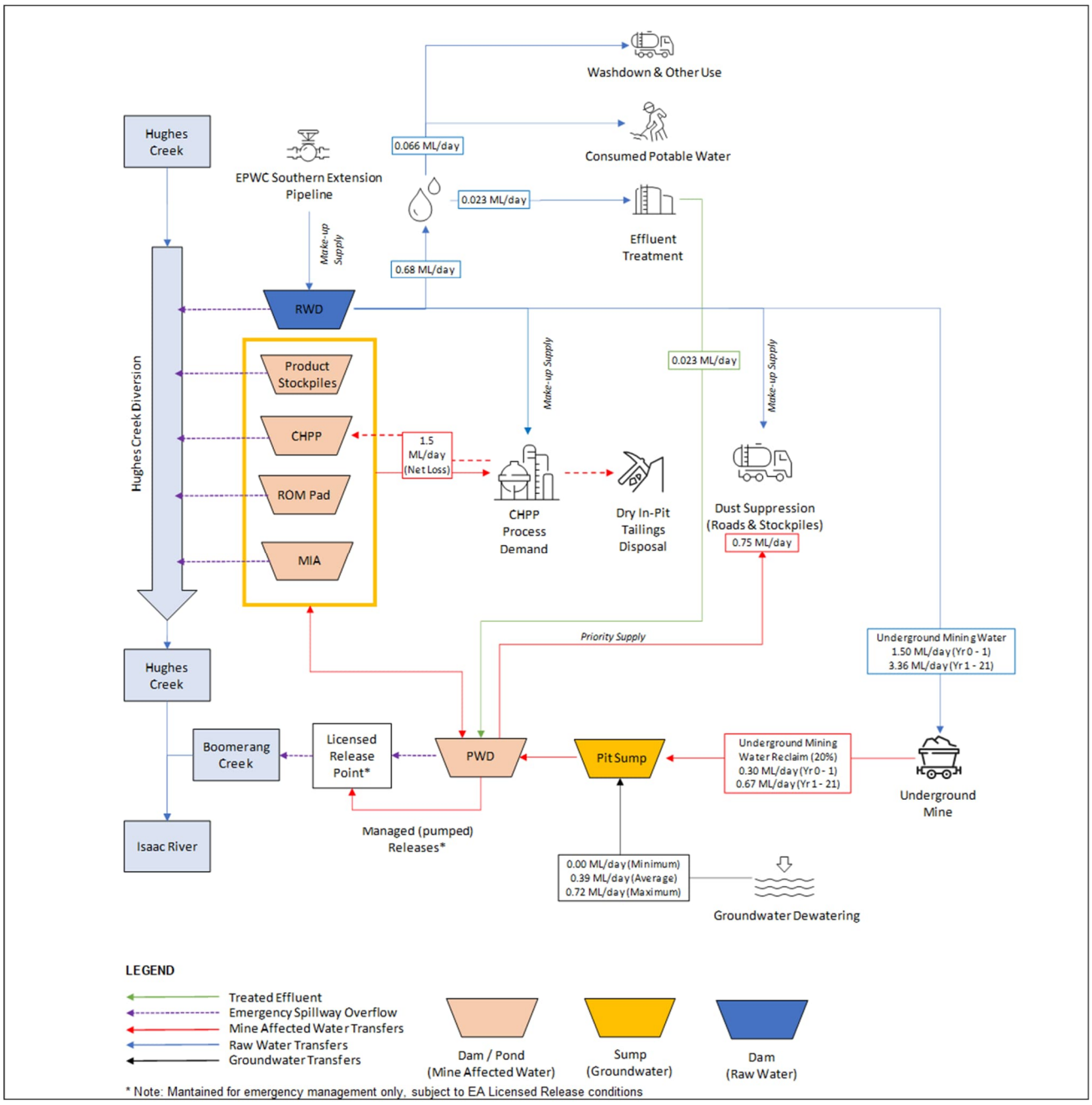

Figure 3-13 Mine water schematic

Mine water use

The Project's water requirements include:

- potable water for drinking, bathhouse, emergency showers and eyewashes
- operational demands such as coal processing and mining requirements, dust suppression, waste product movement, underground vehicle emission scrubbing, machine cooling and washdown
- fire control requirements, both in water and foam discharge forms.

Project water demands identified in Table 3-15 are based on the maximum use of water recycling and proposed water usage during the early stages of the operational phase. These figures may be higher than indicated until all recycling systems are fully functional. Construction water will be supplied temporarily to the Project through water stored within open-cut pits on the existing Saraji Mine. The volume of water within the existing pit storages will satisfy the construction demands for the Project.

Table 3-15 Projected water demands

Use	Daily demand (ML/d)	
	Years 1-2	Years 3-20
Potable water	0.66	0.66
Underground mining water	1.5	3.36
Processing makeup water*	-	1.5
Firefighting**	0.6	0.6
Surface road dust suppression	0.05	0.05
Total	2.67	6.03
Maximum potential process water demand***	-	5.77

*Note: * Does not include any allowance for stockpile dust suppression; ** Based on AS2419 requirements for hydrants; ***Based on no recycling of any site water.*

Water management structures

A summary of the indicative storage volumes for the proposed water management structures is provided in Table 3-16. Storage volumes will be reviewed following detailed design water balance modelling. Further detail on this can be found in **Chapter 8 Surface Water Resources**.

Table 3-16 Water storages

Storage	Approximate size (ML)
Raw water dam	200
CHPP dam	65
Product coal stockpile pad dam	87
ROM coal stockpile pad dam	42
MIA dam	74
Process water dam	125

Release and monitoring points

Mine water management structures for the Project are conservatively designed to avoid controlled releases of MAW to the receiving environment. Design capacities are intended to mitigate uncontrolled (spillway) release of MAW to the receiving environment. Under normal operating circumstances, no controlled or uncontrolled releases from the Project Site are anticipated. However, as an open system, there is potential for controlled (pumped) or uncontrolled (spillway) release of MAW from the proposed process water dam due to extreme rainfall events. As part of the EA for the Project, BMA are seeking authority and licence conditions to include a licensed release point. The proposed release point is on Boomerang Creek adjacent to the proposed process water dam, as shown in Figure 3-14.

Two new monitoring points are proposed downstream of the release point on Boomerang Creek. Existing PDM monitoring points MP2 (PDM) and MP10 (PDM) will double as Project upstream monitoring points on Boomerang Creek. Existing Saraji Mine monitoring points MP1 (SRM) and MP5 (SRM) will monitor water quality for Hughes Creek.

Existing downstream monitoring point MP9 (SRM) / MP18 (PDM) on the Isaac River will also be utilised as the downstream monitoring location for the Project.

The existing PDM and SRM monitoring locations and indicative locations of the two new Project monitoring points on Boomerang Creek are shown on Figure 3-14. The location for the proposed Project mine water release point is presented in Table 3-17.

Table 3-17 Mine water release location

Bore ID	Easting (GDA94)	Northing (GDA94)
Proposed mine water release point	635984	7529559

Potable water treatment

A potable water treatment plant will be installed at the MIA to address the potable water demand for the Project. Effluent from the water treatment plant will be captured and stored on site at the PWD and used for dust suppression.

Potable water will be regularly monitored to test the water quality. Potable water production will comply with the Australian Drinking Water Guidelines as published by the National Health and Medical Research Council (NHMRC and NRMMC, 2011).

Sewage treatment

A sewage treatment plant (STP) will be installed with capacity to service the sewage generated from ablutions at the MIA, CHPP and mine portal facilities. Sewage will be treated by primary filtration to remove solids and disinfected to ensure it is safe to work with before being piped to the Process Water Dam. Volumes from the STP will be insignificant to the volumes managed in the process water dam. No irrigation to land or release offsite is proposed.

Waste sludge will be pumped to storage tanks before being pumped out and transported off-site by a licensed contractor to a licensed disposal facility. Further information on the management and operation of the STP can be found in **Chapter 8 Surface Water Resources**.

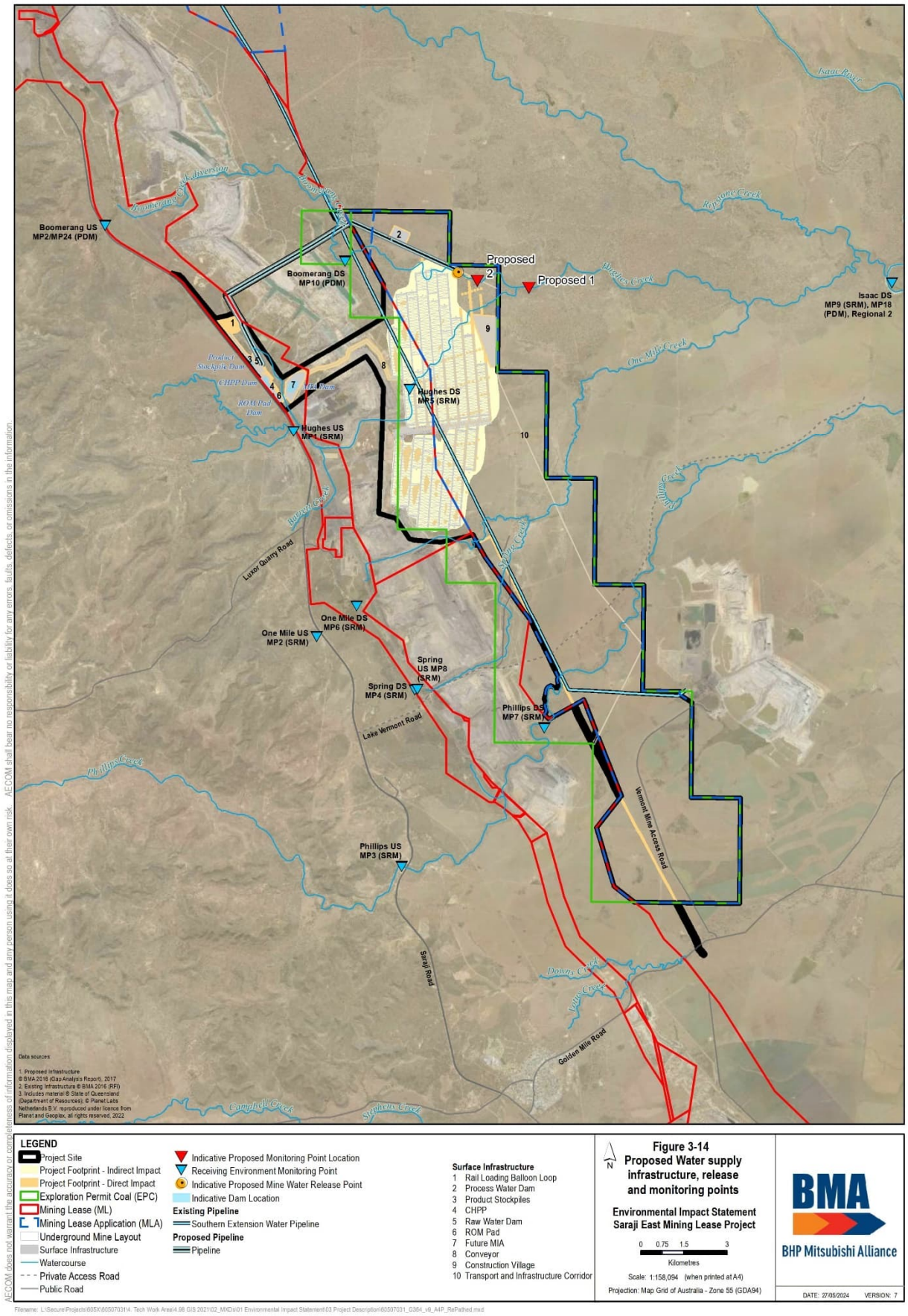

Figure 3-14 Proposed water supply infrastructure, release and monitoring points

3.9.16 Telecommunications

The telecommunications network will be managed by extending the services from the existing Saraji Mine through to the Project Site via the existing service corridor. Telecommunications will be controlled and monitored through the Project control room located on site or from a centrally located facility in Brisbane.

Underground voice communications

An underground telephone system will provide the primary means of voice communications throughout the mine to the surface of the mine. The surface communications station provides an interface into the Private Branch Exchange telephone system for the Project.

In addition, a public address voice communications system will be located along the entire length of each conveyor system as well as other strategic locations. This system will be used to broadcast emergency tones and voice messages if required.

Messaging and tracking

A text messaging system will be used to transfer text messages from the surface of the mine to individuals underground. The messaging system will be applied predominately for emergency situations but may also be utilised as a means of communications for normal operations.

The tracking system will be utilised in conjunction with the messaging system to keep track of the movements of personnel and vehicles underground.

Data communications

The Project will use supervisory control and data acquisition and data communications system with an ethernet based fibre optic data network for the communications between the surface stations and the distributed programmable logic controllers located within each major item of electrical plant.

This system will support continuous underground environmental monitoring through real time and tube bundle gas sensors and analysers. These systems include a gas chromatograph system, portable gas detectors and machine specific gas detectors. The gas monitoring system will be located on the surface within the MIA.

3.9.17 Hazardous substances

Fuel and other hazardous chemical storage onsite will be managed in accordance with *AS1940:2017 The Storage and Handling of Flammable and Combustible Liquids*. Fuel (diesel and unleaded petroleum) and lubricant storage and transfer facilities will include self-bunded storage tanks, bunded delivery areas and electronic process controls.

Hazardous materials and substances to be stored and used for the Project include:

- ammonia nitrate – for mining activities such as blasting
- acetylene – welding and cutting
- liquified petroleum gas – fuel
- diesel and unleaded petroleum – fuel
- lubricating oil, grease and waste oil – maintenance of vehicle and hydraulic equipment
- solvents and thinners – degreasing
- chlorine and other chemicals – water treatment
- methyl isobutyl carbinol – used at the CHPP
- paints.

Chapter 20 Hazards, Health and Safety provides further information on the management of fuel and other hazardous chemicals during construction and operations activities.

3.9.18 Fire protection system

The fire protection system for the Project will include:

- a pipeline from the raw water dam to the MIA, CHPP and the construction workforce accommodation village
- internal and external fighting systems include hydrants, portable extinguishers, hose reels and electric/diesel fire pumps spaced around the buildings and CHPP. The system will be constructed and operated according to relevant standards, statutory and local council requirements
- fire indicator panels with automatic detection and alarm system for default detection in buildings
- real time gas monitoring matched to Safegas software, gas chromatography and portable gas detection units
- where possible and practical, mobile mining equipment will be fitted with automatic fire detection and suppression options
- ROM and product coal conveyors will be fitted with automatic fire suppression systems
- the fire water storage tank at the MIA will be sized to include a firefighting allowance of 0.6 ML (40 litres/second for four hours).

3.9.19 Operational workforce

The Project's operational phase will employ up to 500 FTE. An operational roster pattern of eight days on, six days off, seven nights on and seven nights off is planned, offering a high ratio of rest days to workdays and a roster pattern which is conducive to work/lifestyle balance.

The full workforce will account for up to 500 employees, however based on the above 4-week roster rotation with 12-hour shifts, an approximate 125 workers are expected to be in residence at peak times during operation. Water usage and wastewater production estimates are based on these predicted workforce numbers.

The Project will provide additional opportunities for local employment through support services such as transport and the supply of goods and services.

The workforce skills required for operation will include heavy equipment operators, skilled trades (i.e. electricians, boilermakers) and professionals. Table 3-18 provides an indicative breakdown of the operational workforce by year and trade type.

Table 3-18 Indicative workforce numbers: operation

Labour role	Years 1-2	Years 3-18	Years 19-20
Operators	107	226	107
Skilled trades	78	140	78
Professionals	75	134	75
Total	**260**	**500**	**260**

The operational workforce will be determined by workforce planning, labour market conditions and general market conditions during the pre-project execution development process. The workforce arrangement was informed by investigations into operational requirements, which take into consideration the skills required, labour availability, rostering and planning, social impacts and benefits. The workforce will be sourced locally, where possible. The social impacts and benefits of the Project are discussed further in **Chapter 17 Social**.

3.9.20 Accommodation

Non-resident workers will reside at existing accommodation villages adopting an equal split between Moranbah and Dysart. The existing villages that may be used include Moranbah Single Persons Village (SPV), Dysart SPV and Dysart Ausco (Stayover). For the traffic impact assessment, the number of vehicles associated with non-resident workers will be equally assigned on Saraji Road between Moranbah and Dysart.

3.9.21 Waste management

The Project will consider the waste management hierarchy of avoid/reduce, reuse, recycle, recover, treat and dispose. An inventory of the types of waste expected from the Project is shown in **Chapter 15 Waste**. Sources, impacts, mitigation measures and management strategies (including efficiency of resource use) for these wastes are discussed in **Chapter 15 Waste**, where the emphasis is placed on adhering to the waste management hierarchy.

Queensland's Waste Management and Resource Recovery Strategy sets out the waste management hierarchy to provide a framework for order of preference for managing waste; priority will be given to avoiding waste before options for reuse and recycling are explored. For wastes unsuitable for recycling, there is opportunity to consider options for fuel production, energy production or, as a last resort option, disposal. The Project will manage waste production in accordance with this framework. Waste disposal will be undertaken in a manner that minimises adverse impacts on environmental values.

Construction wastes

During the two-year construction phase, waste will be generated by the temporary accommodation camp, construction offices, haul road, infrastructure upgrade works and services upgrades (communications, water, power supply and sewage). Waste generated during construction are anticipated to include:

- regulated waste such as clinical waste, grease trap waste, lead acid batteries, hydrocarbon waste, paints, resins, detergents, solvents, batteries, sewage sludge and tyres
- general waste such as food scraps, packaging materials, plastics, textiles and ceramics and recycling such as paper, cardboard and aluminium/steel cans, glass, timber offcuts and pallets
- reprocessing cleared vegetation, excavation materials, concrete, timber, scrap metal and steel offcuts, bricks, aggregates and sand from the construction of the CHPP and other mine related infrastructure, water supply pipeline and MIA.

Operational wastes

Operational waste will be generated through mine development, mining works and from workshops and offices. Waste types likely to be generated during operation include:

- regulated waste such as hydrocarbon wastes, waste oils, oily water and oil by-products (e.g. oil filters, drums, sludges, grease and rags), paints, resins, detergents, solvents, batteries, spoil, rejects, tyres, sewage effluent and sludge
- general waste such as food scraps, rags, glass, ceramics, plastics and packaging materials
- recycling such as cardboard and paper, aluminium cans, cans, glass, hard plastics, conveyor belt rubber, timber offcuts and pallets.

Decommissioning and rehabilitation wastes

Decommissioning and rehabilitation waste will be generated through the removal of infrastructure, water dams and other facilities, and the ripping and removal of concrete pads and mine roads. During decommissioning, the types of wastes expected to be generated include:

- regulated waste such as hydrocarbon wastes, detergents, tyres, batteries, solvents, paints and chemicals
- recycling such as construction materials including concrete, timber, metals, bricks and aggregates.

The wastes generated by the Project's construction, operation and decommissioning activities along with the proposed management methods and approximate quantities are discussed further in **Chapter 15 Waste.**

3.9.22 Environmental monitoring

Details of environmental monitoring for the existing Saraji Mine and proposed additional monitoring locations for the Project are outlined in this section. These locations exclude air quality and subsidence monitoring details which are presented in **Chapter 11 Air Quality and Greenhouse Gas** and

Appendix K-2 Subsidence Monitoring Plan respectively. The Project monitoring requirements are included as commitments in **Appendix O-1 Summary of Commitments**.

Existing monitoring point locations for Saraji Mine will be supplemented by monitoring locations for groundwater and surface water quality and stream flow. Proposed surface water monitoring locations for the Project are presented in Figure 3-14 with corresponding coordinates in Table 3-19.

Table 3-19 Surface water monitoring locations for REMP

Monitoring Point ID	Easting (GDA94)	Northing (GDA94)	Monitoring Point Name
Existing			
MP1 (SRM)	630293	7524061	Hughes Upstream (US)
MP2 (SRM)	631096	7516901	One Mile US
MP2 (PDM)	623739	7531218	Boomerang US / MP24
MP3 (SRM)	634054	7508913	Phillips US
MP4 (SRM)	634518	7515056	Spring Downstream (DS)
MP5 (SRM)	634346	7525530	Hughes DS
MP6 (SRM)	632488	7517976	One Mile DS
MP7 (SRM)	639027	7513729	Phillips DS
MP8 (SRM)	634603	7515079	Spring US
MP9 (SRM)	651114	7529225	Isaac DS / MP18 (PDM) / Regional 2
MP10 (PDM)	632087	7529980	Boomerang DS
Proposed			
Proposed 1	638483	7529068	Proposed location 1
Proposed 2	636701	7529300	Proposed location 2

Proposed groundwater monitoring locations for the Project are presented in Table 3-20 with corresponding coordinates in Figure 3-15.

Table 3-20 Existing and proposed groundwater monitoring bores for the Project

Proposed bore	Easting (GDA94)	Northing (GDA94)	Bore type
Existing			
MB19SRM01A	639919	7515681	Single Pipe Groundwater Monitoring Bores
MB20SRM01A	635922	7527665	
MB20SRM02T	635914	7527670	
MB20SRM03P	635907	7527677	
MB20SRM04A	631398	7530470	
MB20SRM05A	634476	7525798	
MW33	636640	7520199	
MW34	637926	7518269	
Proposed			
SEMLP1T	635070	7530680	Single Pipe Groundwater Monitoring Bores
SEMLP1P	638047	7523214	
SEMLP2T	637672	7523955	
SEMLP2P	637863	7524055	

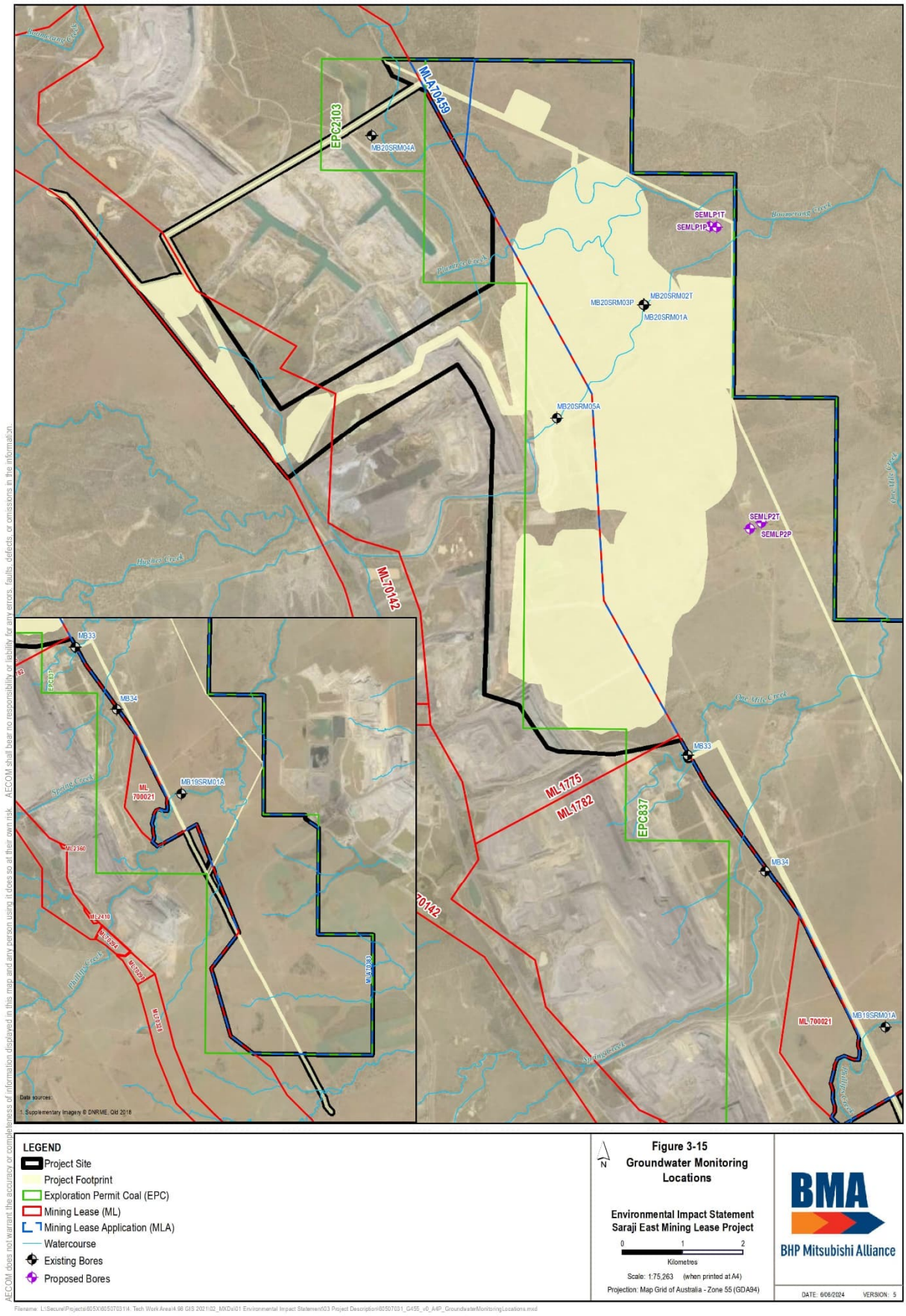

Figure 3-15 Groundwater monitoring locations

3.10 Project decommissioning and rehabilitation

3.10.1 Overarching strategies

Decommissioning of the operating Project Site infrastructure will occur on a staged basis over several years in the lead up to closure. The following decommissioning strategies will be implemented for the Project:

- all mine roads will be rehabilitated, unless otherwise agreed with the subsequent landowner and in accordance with the EA
- all water dams not required for long term water management will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and in accordance with the EA
- all major infrastructure, including the CHPP, will be decommissioned and removed offsite
- concrete pads will be covered with benign waste rock or ripped and removed, then topsoiled and re-vegetated
- other facilities, including workshops and warehouses, will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and in accordance with the EA.

The construction accommodation village will be decommissioned as soon as practical after the construction phase is complete.

An assessment of infrastructure requirements associated with the post mining land use will be undertaken in consultation with the landholder to determine the extent of removal. If required, infrastructure will be decommissioned and demolished and removed from site.

Towards the close of the Project, BMA in consultation with relevant parties will review all infrastructure assets to assess which structures will be retained, sold for recycling, relocated or disposed of as general or regulated waste. A comprehensive assessment of waste will be undertaken in line with the waste management hierarchy to identify the most appropriate measures to manage the remaining materials on the Project Site. Materials such as heavy gauge steel and non-ferrous scrap will be cut to size and trucked to offsite for recycling. Concrete and non-recyclable waste including light steel will be disposed offsite. BMA will assess the need to dispose of benign demolition waste within the existing open-cut pit.

Transport requirements for the decommissioning phase of the Project will be minor compared to the other Project phases and will mainly involve rehabilitation and infrastructure removal-based tasks. Transport offsite during the decommissioning phase of the Project will involve the removal of infrastructure for re-sale or recycling (if considered cost effective) and the removal of waste material by a licensed waste contractor.

BMA in consultation with the post mine landholder will determine which mine roads are to be retained for ongoing access purposes. All roads not retained will be rehabilitated to the required standard outlined in the final rehabilitation and decommissioning plans.

BMA will determine which of the Projects water management structures will be retained as water sources for use by the subsequent land holder. BMA will ensure that all water management structures agreed for retention are operating in an acceptable manner and considered to be in an acceptable condition by the regulator. Any water management structure not retained will be decommissioned and the area rehabilitated.

During the decommissioning phase, BMA will ensure all ‘notifiable activities’ conducted within the Project Site are investigated for in-situ soil contamination and as required under the EP Act will either:

- be released from the DES Environmental Management Register (EMR)
- be remediated, confirmed by follow-up investigation(s) and released from the DES EMR
- remain on the DES EMR with an agreed site management plan.

3.10.2 Workforce and accommodation

Personnel working on the rehabilitation and decommissioning program will travel to and from the Project Site based on their working arrangements. The maximum amount of people travelling to and from the Project Site will be minimal compared to the other Project phases. The workforce would decrease from up to 500 people to approximately 260 employees and contractors in the two years prior

to Project closure. After closure, if no extensions are sought and approved, the Project's workforce will decrease to a staff of approximately 20 personnel to manage decommissioning and rehabilitation.

3.10.3 Rehabilitation

BMA has prepared a draft Rehabilitation Management Plan (**Appendix K-1**) in line with the Mined Land Rehabilitation Policy (DES, 2018a). In accordance with the policy, land will be progressively rehabilitated as it becomes available, to minimise the risks of environmental impacts and reduce cumulative areas of disturbed land.

The Project will comply with the *Mineral and Energy Resources (Financial Provisioning) Act 2018.* The Project EA will require a PRCP to be developed prior to construction to demonstrate how land disturbed by mining activities will:

- be rehabilitated to a safe and stable landform
- not cause environmental harm
- sustain post mining land uses (PMLU).

BHP's Queensland Coal Rehabilitation Completion Criteria (BHP, 2018c) outline completion criteria for meeting satisfactory rehabilitation for PMLUs. Post mining land uses may include:

- grazing land
- dryland cropping
- woodland habitat
- watercourses
- water storage.

The completion criteria set out objectives, indicators and criteria for achieving acceptable rehabilitation in the PMLUs. The completion criteria consider goals of safety, stability, minimal pollution and the ability to sustain an agreed PMLU. **Chapter 5 Land Resources** describes these completion criteria and rehabilitation goals in further detail.

In general (excluding the trade-off area), the proposed PMLU will be an undulating landscape that could be used as grazing land, consistent with the surrounding pastoral land use that dominates the region. The exception to this is where remnant native bushland is disturbed. Where practicable, the PMLU for these remnant native bushland areas is woodlands habitat as this is compatible with the pre-existing land use for biodiversity values..

Post mining land uses for the Project will be confirmed prior to commencing of mining with mapping, schedule and criteria defined within the transitional PRCP to be developed. Land disturbed by the Project's mining activities will be developed to a condition that is self-sustaining or to a condition where maintenance requirements are consistent with an agreed PMLU.

The final PMLU delineation will be determined during development of the Project transitional PRCP (see Section 3.7). Noting the partial overlap of disturbance area with Saraji Mine and the Saraji Mine PMLU mapping (the trade-off area), the Project transitional PRCP and PMLU mapping will be required to align with contemporary Saraji Mine PMLUs and rehabilitation criteria.

At the time of development of the Project transitional PRCP, both the Saraji Mine EA and PRCP, and the other Project approvals will be reviewed and amendments applied for.

Rehabilitation monitoring will be undertaken in accordance with the BHP monitoring program current at the time of rehabilitation. Monitoring will focus on the following rehabilitation factors:

- erosion
- vegetation
- soil
- landform.

The data from the monitoring program will be used to determine whether the final rehabilitation outcomes have been met. BMA rehabilitation activities will be designed to ensure the final agreed post mining land use, surrender of the Project EA and surrender of mining leases are achieved.

3.11 Relationship with the existing Saraji Mine

The proximity of the existing Saraji Mine to the Project will provide BMA with the following operational flexibility and efficiency for the proposed Project:

- use of the existing open cut pits for underground mine access (roads and conveyor systems) and highwall entry (underground portal) to limit the environmental impacts, costs, time and risks involved in construction of new mine portals
- trucking of mine wastes generated by the construction of the mine portal, ventilation shafts and IMG bores to Saraji Mine in-pit spoil dumps for disposal
- trucking of all rejects (dense medium coarse rejects, fine rejects and dewatered tailings) generated by the Saraji East CHPP to Saraji Mine open cut spoil dumps located on ML 1775 and ML 1782, for disposal in accordance with Saraji Mine EA conditions
- locate and construct Project above-ground infrastructure, including the MIA, CHPP and rail loop, within previously disturbed areas on the Saraji Mine
- integration into the Saraji Mine power supply network by extending existing powerlines from the Saraji Mine via the proposed Project infrastructure and transport corridor
- option to transport MAW between the Project and the broader BMA network of mines via the existing BHP Central Regional Water Network (CRWN) that extends from Norwich Park Mine (now referred to as Saraji South by BMA) to Caval Ridge through Saraji and Peak Downs mines (noting that under normal operating conditions, the Project mine water system will operate independently)
- integration into Saraji Mine telecommunications by extending the services from the Saraji Mine via the service corridor.

Open cut operations at the Saraji Mine are forecast to extend into the 2040s within its existing approval boundaries (already granted mining lease areas ML 1775, ML 70142, ML 1784, ML 1782, ML 2360, ML 2410, ML 70294, ML 70298, ML 70328 and ML 700021) with potential extensions depending on future approvals. The Project, including infrastructure within the trade-off area, has been designed to be operated independently except for a small number of components (for example disposal of dewatered tailings and rejects). Where coordination is required (for example the receipt or conveyance of waste by either mine) there are existing conditions within the Saraji Mine EA in support and the Project draft EA conditions also include provision to authorise those activities.

As noted in Section 3.7.1, prior to commencement of underground mining the Project EA and EPBC Act approval (to be the outcome of the EIS process) will be reviewed and amendments applied for through the appropriate regulatory processes. The trade-off area between the Project and the Saraji Mine EA (Figure 3-16) will require review attention at that time.

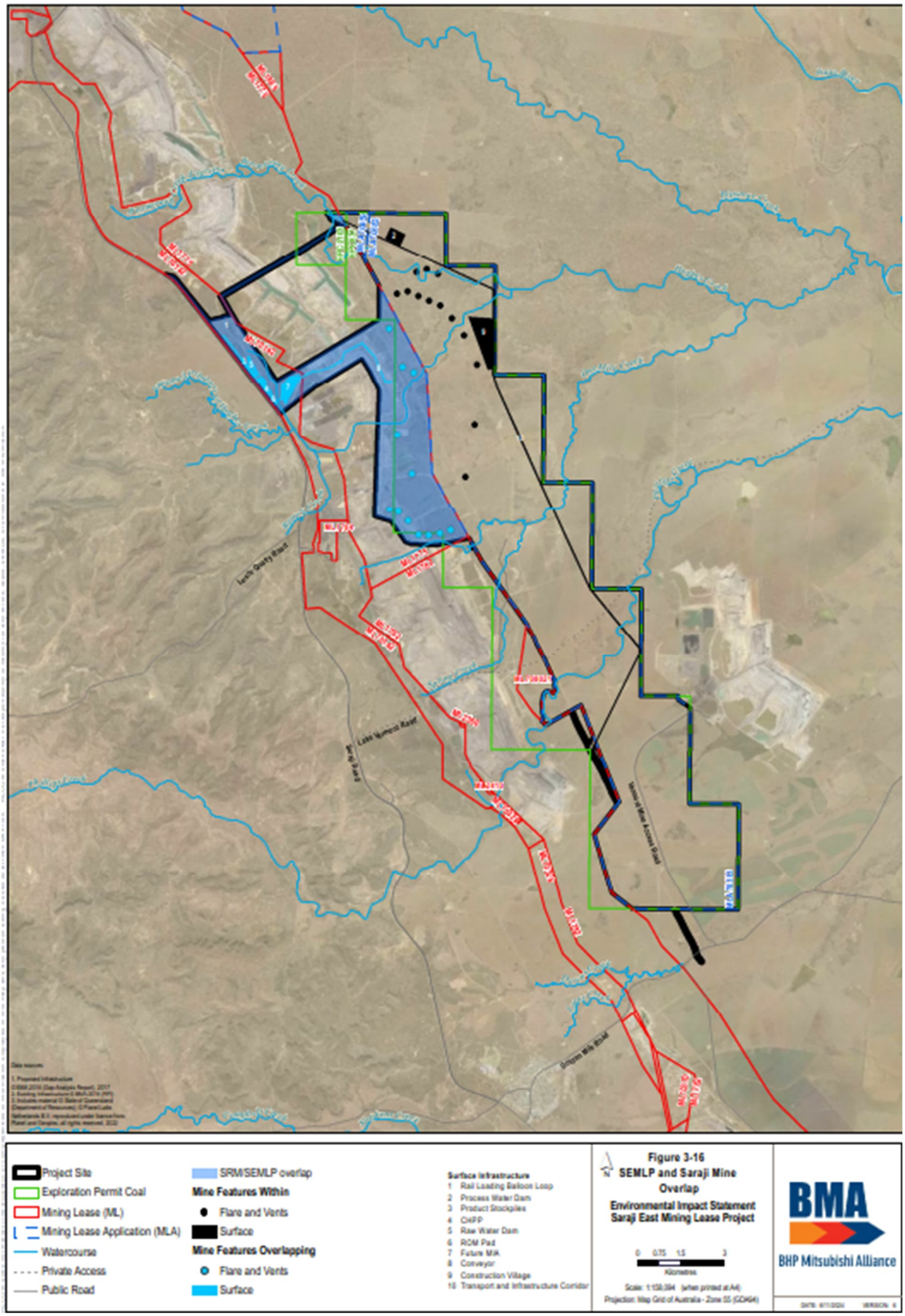

Figure 3-16 Saraji / Saraji East Trade-off Area and key components

3.11.1 Mining operations

Saraji Mine is authorised for open cut mining to the extent authorised by the EA (see Section 3.12) on existing approved ML. This authorisation includes processing annual product tonnage output from the Saraji Mine of around 18.4 Mtpa.

The current approved Saraji open-cut mine plan is expected to continue (some pits reaching the ML boundary). This means that the proposed underground mining and approved open-cut mining have the potential to occur concurrently (though not at the same location).

As open cut mining and underground mining may occur concurrently, the Saraji Mine CHPP will be available to supplement coal processing. The maximum processing capability of the Project CHPP is 7 Mtpa ROM coal feed. In years where the maximum processing capacity at the Project CHPP is exceeded, the nearby Saraji Mine CHPP will be used. Where required, the ROM coal would be hauled between the Project and the Saraji Mine CHPP via dump truck. Any ROM coal from the Project sent to the Saraji Mine CHPP will not increase annual product tonnage output from the Saraji Mine above 18.4 Mtpa.

3.11.2 Water management

Under normal operating conditions, the Project mine water system will operate independently of the existing Saraji mine water system. To manage storage capacity and supply (at both Saraji Mine and the Project operation) there is optionality to transfer water to/from Saraji and other BMA mines in accordance with existing Saraji Mine EA Condition D4.

In the event sufficient MAW is not available for the Project CHPP process and dust suppression, MAW may be imported from the Saraji Mine water system, and following water quality testing to confirm that water is of an appropriate quality for the intended use. Similarly, in the event there are water demands that cannot be met for the existing Saraji Mine, water from the Project that satisfies water quality testing may be exported from the Project to Saraji Mine.

A water inventory will be established for the Project with a respective Trigger Action Response Plan (TARP) to identify excess and insufficient water inventory levels and corrective actions to prevent an impact to mine production.

3.11.3 Waste management

The Project proposes to transfer mine waste to Saraji Mine waste management systems. Saraji Mine EA currently includes a condition (condition D3) authorising Saraji Mine to receive certain waste types (including rejects) from other BMA mines. The Project will be a ‘BMA mine’. Where waste is transferred to Saraji Mine it will be managed in accordance with existing Saraji Mine EA conditions.

The Saraji Mine is an open-cut operation with approved waste management practices allowing for disposal of mine waste within previously mined pits, along with overburden to assist in achieving the final landform design. On completion, disposal pits are covered with inert soil, capped and rehabilitated in accordance with the EA.

Given the proximity between the Project and the existing Saraji Mine, the ability to dispose of Project mine wastes in existing open-cut spoil dumps at the Saraji Mine reduces the need for unnecessary ground disturbance and creation of spoil dumps at the Project Site. Saraji Mine comprises a series of open cut pits that are expected to continue operating beyond 2040. Consequently, there will be ongoing capacity within Saraji Mine open cut pits (once mined) to accept mine wastes from the Project. Dewatered tailings and mine wastes will be transported from the Project to the Saraji Mine disposal pits via dump truck on mine haul roads located within both the Saraji Mine and the Project Site.

Further assessment in **Chapter 10 Geochemistry and Mine waste** and **Chapter 15 Waste** demonstrates sufficient capacity to adequately manage Project waste volumes through existing site practices subject to appropriate authorisation via EA conditions.

3.11.4 Decommissioning and rehabilitation

While it is expected that operational activities within the trade-off area can be managed in accordance with separate EAs (ie an amended Saraji Mine EA and the Project EA) it is acknowledged that rehabilitation and closure activities must be clearly defined and consistent between the Saraji Mine and the Project approvals.

The Saraji Mine EA and PRCP conditions currently define the authorised PMLUs, completion criteria and rehabilitation schedule within the trade-off area. Once timing of the Project is determined there will be a process of review and amendment to the relevant approvals in order to ensure a clear and consistent approach to rehabilitation and closure within the trade-off area.

3.11.5 Environmental management systems and compliance

BMA has an excellent record of responsible environmental management and a strong commitment to continual improvement of environmental performance. BMA has not been subject to any environmental related proceedings in any of the following Courts - High Court, Federal Court, Supreme Court, District Court, and Planning and Environment Court. BMA has been the subject of environmental related proceedings in the Queensland Magistrates Court, for matters related to State legislation. A fine was imposed and paid by BMA. No conviction was recorded.

BHP's approach to environmental management and sustainability is incorporated in our Charter. The Charter outlines 'an overriding commitment to health, safety, environmental responsibility and sustainable development'. BHP strives to achieve the efficient use of resources, including reducing and preventing pollution, and enhancing biodiversity protection by assessing ecological values and land use in our activities. Our stewardship approach is designed to ensure that the lifecycle health, safety, environment and community impacts associated with resources, materials, processes and products related to our businesses are minimised and managed. BHP's environmental policy describes these values and is available on the company's website (https://www.bhp.com/our-approach/our-purpose/).

Further information can be found in the annual BHP sustainability report available on the company's website (https://www.bhp.com/investor-centre/sustainability-reporting-2020/). During the 2021 period BHP reported zero work-related fatalities, zero significant environment incidents and zero significant community incidents. Social investment spending for the 2021 financial year reached (US) $174.84 million (BHP, 2021).

The Saraji Mine operates an Environmental Management System (EMS) consisting of systems, programs and procedures to manage water, biodiversity, dust and noise nuisance, waste, cultural heritage and rehabilitation. While the Saraji Mine and the Project are two independent operations, relevant Saraji Mine environmental management plans will be updated where necessary to address operational overlap.

3.12 Summary of EA interactions

On 24 May 2013, BMA applied to the former Department of Environment and Resource Management (DERM), now DES, for a new Project-specific EA for underground coal mining. On 25 June 2013, DERM issued a Notice of Information Request for the EA application requiring an assessment by EIS in accordance with the Terms of Reference (ToR) – addressed in **Appendix A-1 Terms of Reference Cross Check**.

The Project EA will authorise mining activities and ancillary activities that are environmentally relevant activities (ERA) under Schedule 2A and Schedule 2 of the Environmental Protection Regulation 2008. The ERAs proposed to be undertaken as part of the Project include:

- resource activity ERA 13 – mining black coal
- ERA 8 – chemical storage
- ERA 31 – mineral processing
- ERA 63 – sewage treatment.

The Project EA will impose environmental management conditions on the proposed mining activities and outline the environmental management requirements BMA will comply with related to regulated structures, water and waste management, monitoring and reporting.

While there are existing conditions within the Saraji Mine EA that facilitate transfer of water and waste the Saraji Mine EA will be amended prior to commencing mining in the SRE project area to define the type and location of Project activities that will be located within the Saraji Mine EA boundary. The Project EA and amended Saraji Mine EA will incorporate conditions to clearly define the interaction between the two EAs.

Table 3-21 Summary of the location of activities across Saraji Mine and Project Mine

Project Feature	Located within SRM EA	Comment
Exploration activities	✓ (also outside SRM EA)	Exploration activities will continue across the Project Site. Disturbance due to exploration activities in areas not authorised to be mined will be rehabilitated in accordance with the Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP 2016a). Saraji Mine exploration within the Saraji Mine EA boundary will continue to be undertaken in accordance with the Saraji Mine EA.
Underground long wall mining method	✓ (also outside Saraji Mine EA)	All underground mining and subsidence managed by Project EA, including (but not limited to): • general duty, notification, reporting requirements and production limits (Schedule A) • waste disposal (Schedule D) – which specifies waste types that will be transferred to SRM and disposed of in accordance with EPML00862313 • management and monitoring of mine affected water and other runoff (Schedule F) • monitoring and management of groundwater – including a GMMP specific to the underground operation (Schedule I) • subsidence disturbance, rehabilitation and remediation (Schedule J) • land and rehabilitation (Schedule E) – noting commitment for development of PRCP (see notes above regarding rehabilitation and PRCP) The Saraji Mine EA will be amended at the appropriate time to manage the interaction with underground mining activities.
Underground mine access via open cut pit	✓	All underground mining including portal access managed by Project EA. The Saraji Mine EA will be amended at the appropriate time to manage the interaction with underground mining activities.
Coal processing Project CHPP	✓ (no. 4 on Figure 3-16)	Project EA will manage operation of Project CHPP including (but not limited to): • general duty, notification, reporting requirements and production limits (Schedule A) • dust management (Schedule B) • waste (Schedule D) • mine affected water and other runoff (Schedule F) The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
Saraji Mine CHPP	✓	Where processing exceeds Project CHPP capacity (7Mtpa), ROM coal transported to Saraji Mine CHPP. Processing of coal at Saraji Mine CHPP to be managed in accordance with Saraji Mine EA.
Electricity	✓ (also outside Saraji Mine EA)	Electricity demand supplied through Saraji Mine with both new and relocated powerlines proposed across Project EA area.
Dewatered tailings and rejects	✓	Dewatered tailings and rejects from the Project CHPP will be transferred to Saraji Mine in accordance with Condition D4 of the Saraji Mine EA. Disposal of the material will be undertaken in accordance with the Condition D6 of the Saraji Mine EA. At Saraji Mine the preferred management for tailings and rejects is the sufficient encapsulation within suitable inert spoil within a waste landform. Rejects are MAW generating. The release of water that has been in contact with rejects is to be managed in MAW Release and Notification Procedures, authorised by the Saraji Mine EA.

Project Feature	Located within SRM EA	Comment
Mine infrastructure area (MIA)	✓ (no. 7 on Figure 3-16)	Project EA to manage operation of Project MIA including (but not limited to): • general duty, notification and reporting requirements (Schedule A) • dust management (Schedule B) • waste (Schedule D) • mine affected water and other runoff (Schedule F) The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
Transport around site	✓ (no. 8 on Figure 3-16)	Project EA conditions to manage operation of conveyors and haul roads including (but not limited to): • general duty, notification and reporting requirements (Schedule A) • dust management (Schedule B) • mine affected water and other runoff (Schedule F) The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
ROM stockpile and product stockpile	✓ (no. 3 & 6 on Figure 3-16)	Project EA to manage operation of stockpiles including (but not limited to): • general duty, notification and reporting requirements (Schedule A) • dust management (Schedule B) • mine affected water and other runoff (Schedule F) The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
Rail access for transport to port	✓ (no. 1 on Figure 3-16)	New Project rail spur, balloon loop and signalling system located within Saraji Mine EA boundary. Project EA conditions to manage operation of rail infrastructure. The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
<u>Water management</u> Drainage	✓ (also outside Saraji Mine EA)	MAW dams, bunds and drainage infrastructure to direct transfer runoff to water infrastructure. Project EA conditions to manage design and operation of water management infrastructure. The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
Process water dam (PWD) and release point	× (no. 2 on Figure 3-16)	Collected runoff from Project MIA, CHPP, stockpiles, train load out and portal entry sump. Project EA conditions to manage operation PWD and release point
Raw water dam (RWD)	✓ (no. 5 on Figure 3-16)	Project EA conditions to manage operation of RWD and interaction with Eungella Water Pipeline.
Underground water (in pit)	✓	Water collected at highwall portal pit sumps (within Saraji Mine EA boundary) pumped to PWD (outside the Saraji Mine EA boundary). Project EA conditions to manage operation PWD and release point. The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the SRM EA boundary.
Underground water (pre-drainage)	✓ (also outside Saraji Mine EA)	Water produced during pre-drainage of IMG will be collected near the well head. These facilities will act as a balancing storage to allow transfer at a constant rate to the PWD. While there may be temporary storage of produced water at well heads within the Saraji Mine EA boundary, water will be managed as part of the Project MAW system and under Project EA conditions. The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.

Project Feature	Located within SRM EA	Comment
Water management optionality	✓	Project will (under normal operating conditions) operate mine water system independent of Saraji Mine operations. To manage storage capacity and supply there is optionality to transfer water to/from Saraji Mine water system and other BMA mines in accordance with existing Saraji Mine EA Condition D4.
Incidental mine gas drainage	✓ (no. 9 on Figure 3-16)	Network of IMG drainage bores with associated gas and water collection infrastructure (dams and pipelines) with access tracks across the underground mine footprint (within ML1775 and MLA70383) Project EA conditions will manage construction and operation of the IMG network, including flaring (where required). The Saraji Mine EA will be amended at the appropriate time to define the management of Project activities within the Saraji Mine EA boundary.
Accommodation Construction	× (no. 9 on Figure 3-16)	Project EA will manage construction, operation and decommissioning of the temporary construction village, including management of sewage (to be pumped by licenced contractor and transported to local council STP)
Operation	×	No new infrastructure required. Non-resident workers will reside at existing accommodation villages adopting an equal split between Moranbah and Dysart.