MACHEnergy

Mount Pleasant Operation

A JOINT VENTURE WITH JCDA Japan Coal Development Australia

Section 3

Project Description

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3 PROJECT DESCRIPTION

This section describes the proposed Project. The approved Mount Pleasant Operation (Development Consent DA 92/97) is described in Section 2.

Should Development Consent be granted for the Project (which incorporates and optimises the approved Mount Pleasant Operation), subject to the proponent being satisfied with the consent conditions, Development Consent DA 92/97 would be surrendered so that the Project would operate under the new consent only.

3.1 PROJECT OVERVIEW

The Project would involve the continuation and optimisation of the Mount Pleasant Operation, including extraction of additional coal within the Mount Pleasant Operation MLs. This would be supported by the use and augmentation of existing Mount Pleasant Operation infrastructure.

The Project would support the extraction of approximately 247 Mt of additional ROM coal by deepening part of the pit floor to access additional coal reserves, and increasing the rate and duration of mining, without significantly increasing the approved mine disturbance footprint.

The Project would include the following activities:

- increased open cut extraction within the MLs obtained in support of the Mount Pleasant Operation to allow mining of additional coal reserves, including lower coal seams in North Pit;
- a staged increase in extraction, handling and processing of ROM coal up to 21 Mtpa (i.e. progressive increase in ROM coal mining rate from 10.5 Mtpa over the Project life);
- staged upgrades to the existing CHPP and coal handling infrastructure to facilitate the handling and processing of additional coal;
- a staged increase in rail transport, up to approximately 17 Mtpa of product coal, to domestic and export customers;
- upgrades to workshops, electricity distribution and other ancillary infrastructure;
- existing infrastructure relocations to facilitate mining (e.g. Castlerock Road, powerlines and water pipelines);
- construction and operation of new water management and water storage infrastructure in support of the mine;
- construction of CHPP reject dewatering facilities to allow co-disposal of fine rejects with waste rock as part of ROM waste rock operations;
- development of an integrated waste rock emplacement landform that incorporates geomorphic drainage design principles for hydrological stability, and varying topographic relief to be more natural in exterior appearance;
- construction and operation of new ancillary infrastructure in support of mining;
- extension to the time limit on mining operations to 22 December 2048;
- an increase in the operational workforce to an average of approximately 600 people, with a peak operational workforce of approximately 830 people;
- ongoing exploration activities; and
- other associated infrastructure, plant, equipment and activities.

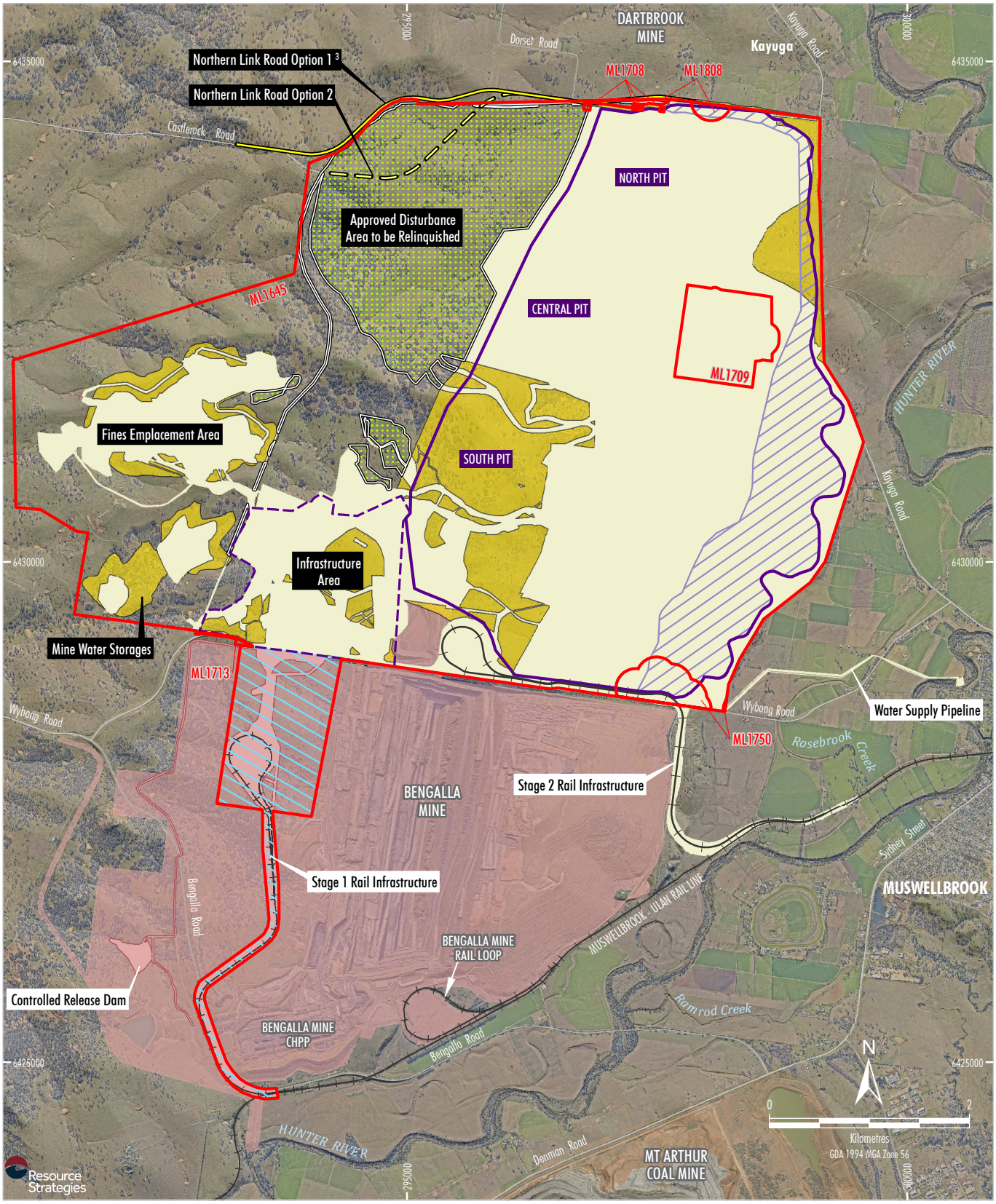
An indicative Project general arrangement is provided on Figure 3-1, including the infill disturbance associated with the Project extensions. The general arrangement also illustrates the existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished (Figure 3-1).

Table 3-1 provides a summary of the key characteristics of the Project.

3.2 COAL RESOURCE, GEOLOGICAL FEATURES AND EXPLORATION

Exploration within the Project mining areas has been conducted since the 1990s, with over 700 exploration boreholes completed to date. A number of radar and magnetometer surveys have also been conducted to characterise the geological features at the Mount Pleasant Operation.

The current geological model of the Mount Pleasant Operation includes two faults that trend east-west, similar to faults reported in adjacent areas. Igneous intrusions and heat-affected coal have also been identified by drilling or are inferred from magnetic surveys, including dykes, minor volcanic plugs and sills. A more detailed description of the local geological features (including faulting) in the vicinity of the Project is provided in Appendix C (Groundwater Assessment).



LEGEND

Existing Mine Elements

- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3 (DA92/97)
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]

Additional/Revised Project Elements

- Approved Disturbance Area to be Relinquished [2]
- Approximate Additional Disturbance of Project Extensions [1]
- Northern Link Road Option 1 Centreline [3]
- Northern Link Road Option 2 Centreline
- Approximate Extent of Project Open Cut and Waste Rock Emplacement Landforms
- Approximate Extent of Project Out-of-Pit Waste Emplacement
- Revised Infrastructure Area Envelope

NOTES

1. Excludes some incidental Project components such as water management infrastructure, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.
2. Subject to detailed design of Northern Link Road alignment.
3. Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020); Department of Planning and Environment (2016) Orthophoto: MACH (2020)

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MOUNT PLEASANT OPTIMISATION PROJECT

General Arrangement of the Project

Figure 3-1

Table 3-1
Overview of the Project

Component	Project
Mining Method	Open cut mining method, comprising truck and excavator and/or dragline operations, in North Pit, Central Pit and South Pit.
Resource	Mining of the Wittingham Coal Measures down to, and including, the Edderton Seam.
Approximate Disturbance Area	Estimated disturbance area of the Mount Pleasant Operation incorporating the Project of approximately 2,800 ha, similar in total extent to the approved Mount Pleasant Operation (Figure 3-1).
Mine Life	Until approximately 22 December 2048.
Annual Production	ROM coal production at a rate of up to 21 Mtpa.
Resource to be Recovered	Approximately 406 Mt of ROM coal, or approximately 444 Mt over the life of the Mount Pleasant Operation.
General Waste Rock Management	Waste rock would continue to be placed within open cut voids, the Eastern Out-of-Pit Emplacement and the Fines Emplacement Area, and would also be used to construct visual and noise bunds.
Waste Rock Production	Waste rock removal at a rate of up to approximately 89 Mbcm per annum.
Waste Emplacements	One integrated waste emplacement landform comprising in-pit and out-of-pit components.
Coal Beneficiation	Beneficiation of ROM coal in the on-site CHPP, with staged upgrades to allow the handling and processing of up to 21 Mtpa of ROM coal.
Coal Transport	Coal transported along the Muswellbrook–Ulan Rail Line and then the Main Northern Railway to the Port of Newcastle for export, or to domestic customers.
Coal Rejects	Coarse rejects would continue to be placed within mined out voids and the Eastern Out-of-Pit Emplacement, and used to build fines emplacement walls. Fine rejects would be stored in the Fines Emplacement Area or dewatered to allow co-disposal with waste rock as part of ROM waste rock operations.
Water Supply and Disposal	Water requirements would continue to be met from dewatering the open cut mining areas, recycling water from the Fines Emplacement Area, licensed extraction from the Hunter River, and use of excess water from the Bengalla or Dartbrook Mines. Surplus water would be discharged to the Hunter River (or its tributaries) in compliance with the HRSTS and EPL 20850.
Final Landform and Land Use	An integrated waste rock emplacement landform that incorporates geomorphic drainage design principles for hydrological stability, and varying topographic relief to be more natural in exterior appearance. One final void would remain at cessation of mining, in the west of the mine plan.
	Rehabilitation with a mixture of pasture and woodland, primarily revegetation with native tree species.
Hours of Operation	Operations would continue to be undertaken 24 hours per day, seven days per week.
Operational Workforce	An average workforce of approximately 600 people, with a peak of approximately 830 full-time equivalent operational personnel (including MACH staff and on-site contractor personnel).
Construction Workforce	Construction activities may have short-term workforce peaks of up to 500 people.
Capital Investment Value	Approximately $950 million.

Geological exploration activities would continue to be undertaken over the life of the Project to provide input to mine planning and engineering studies to refine the understanding of coal quality and local geological structures.

The Mount Pleasant Operation is located within the Hunter Coalfield, in the northern section of the Sydney Basin (Figure 1-1). The Mount Pleasant Operation coal resource is located in the Permian Wittingham Coal Measures within the Jerrys Plains Subgroup, the Archerfield Sandstone and the Vane Subgroup (Figure 3-2). Lithologies comprise mostly sandstones, siltstones and coal measures with minor conglomerates and tuffs. Coal seams amenable to open cut mining occur in eight correlated seams and include the Upper Piercefield (Warkworth) Seam to the lowermost Edderton Seam.

Open cut mining for the Project would optimise the recovery of coal from all eight seams (i.e. the Warkworth, Mt Arthur, Piercefield, Vaux, Broonie, Bayswater, Wynn and Edderton Seams) in South Pit, Central Pit and North Pit. Figure 3-3 presents the indicative stratigraphy of the Project mining areas, including these target seams. The target coal seams vary widely across the extent of the mine, with mineable units generally ranging from approximately 0.6 m to approximately 10 m in thickness.

ROM coal from the various seams would either be washed in the on-site CHPP or crushed and directed straight to product coal stockpiles (i.e. bypass coal).

Approximately 406 Mt of ROM coal would be mined as part of the Project, without significantly increasing the approved mine disturbance footprint. ROM coal generated at the Project would generally be processed to produce thermal coal products for domestic and export markets.

A description of the significance of the resource and other Project justification considerations is provided in Section 8.

Estimated Project export revenue and NSW Government royalties are described in Appendix O.

3.3 PROJECT GENERAL ARRANGEMENT

Provisional Project general arrangements for Years 4 (2026), 6 (2028), 9 (2031), 12 (2034), 19 (2041), 22 (2044) and 25 (2047) are shown on Figures 3-4 to 3-10.

These general arrangements are based on planned maximum production and mine progression. The mining sequence and rate of mining shown may vary to take into account localised geological features, coal market quality and volume requirements, mining economics and Project detailed engineering design.

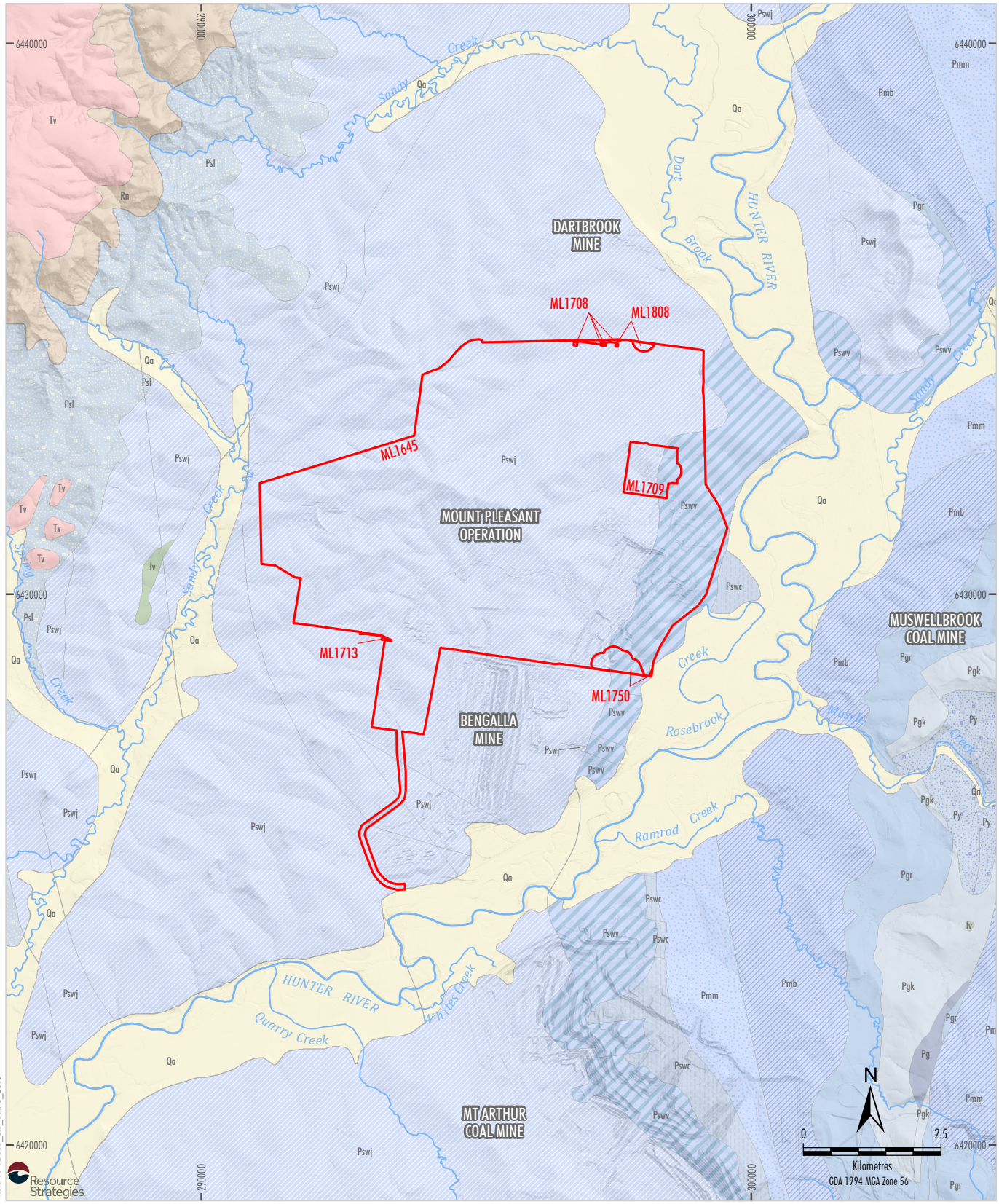
The sequence of mining and/or the general arrangement may also be modified throughout the life of the operation to maintain compliance with the applicable noise and air quality criteria specified in the Project Development Consent for sensitive receivers.

The detailed mining sequence for any given period would be documented in the relevant MOP.

The provisional final landform and rehabilitation strategy for the Project is presented in Attachment 8.

3.3.1 Project Biodiversity Assessment Footprint

The proposed Project extensions comprise additional disturbance areas that would be directly impacted by the Project (based on the current mine design), relative to the existing/approved surface development area of the Mount Pleasant Operation (Figure 3-1). These areas are primarily infill disturbance associated with optimising the Mount Pleasant Operation, and are herein referred to as the Additional Disturbance Area. Some flexibility in the Additional Disturbance Area is needed to allow for ongoing mine planning during the life of the Project, and for siting of ancillary infrastructure following completion of detailed engineering design. Any such changes are expected to be minor, and therefore would not have an increased impact on the biodiversity values identified in this EIS.



LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

GEOLOGY MAPPING

Quaternary
- Qa: Silt, Sand, Gravel

Tertiary
- Tv: Basalt

Jurassic
- Jv: Basalt

Triassic
- Rn: Hawkesbury Sandstone and Narrabeen Group

Permian
- Pswj: Denman Formation and Jerry Plains Subgroup
- Pswv: Archerfield Sandstone and Vane Subgroup
- Pswc: Saltwater Creek Formation
- Pmm: Mulbring Siltstone
- Pmb: Branxton Formation
- Pg: Greta Coal
- Pgr: Greta Coal Measures (coal seams, siltstone and sandstone)
- Pgk: Greta Coal Measures (pellet claystone, siltstone and chert)
- Psl: Wollombi Coal Measures
- Py: Gyarran Volcanics

Source: NSW Spatial Services (2020)

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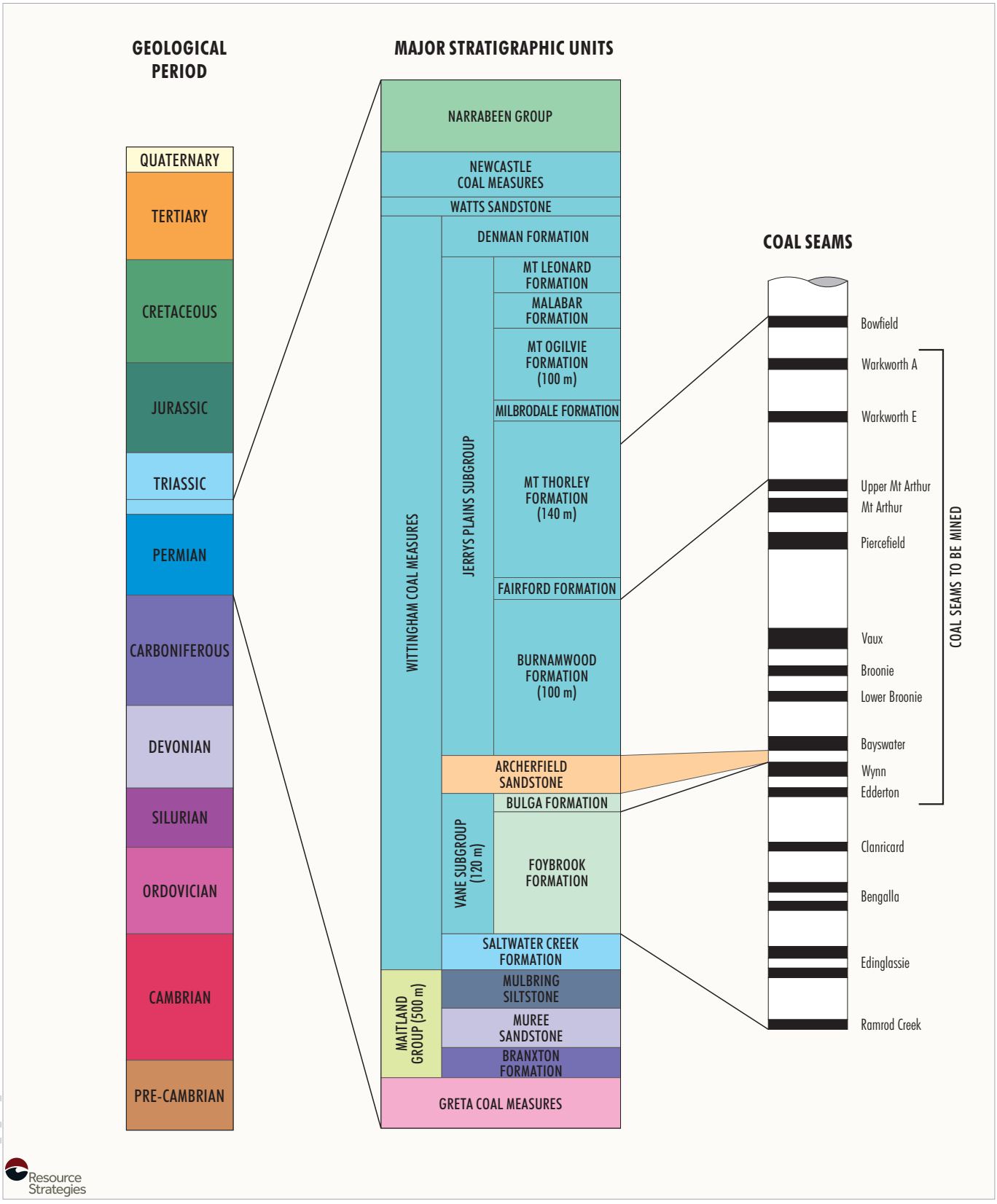
MOUNT PLEASANT OPTIMISATION PROJECT

Geology of the Mount Pleasant Operation and Surrounds

Figure 3-2



Source: NSW Spatial Services (2020); MACH (2020)

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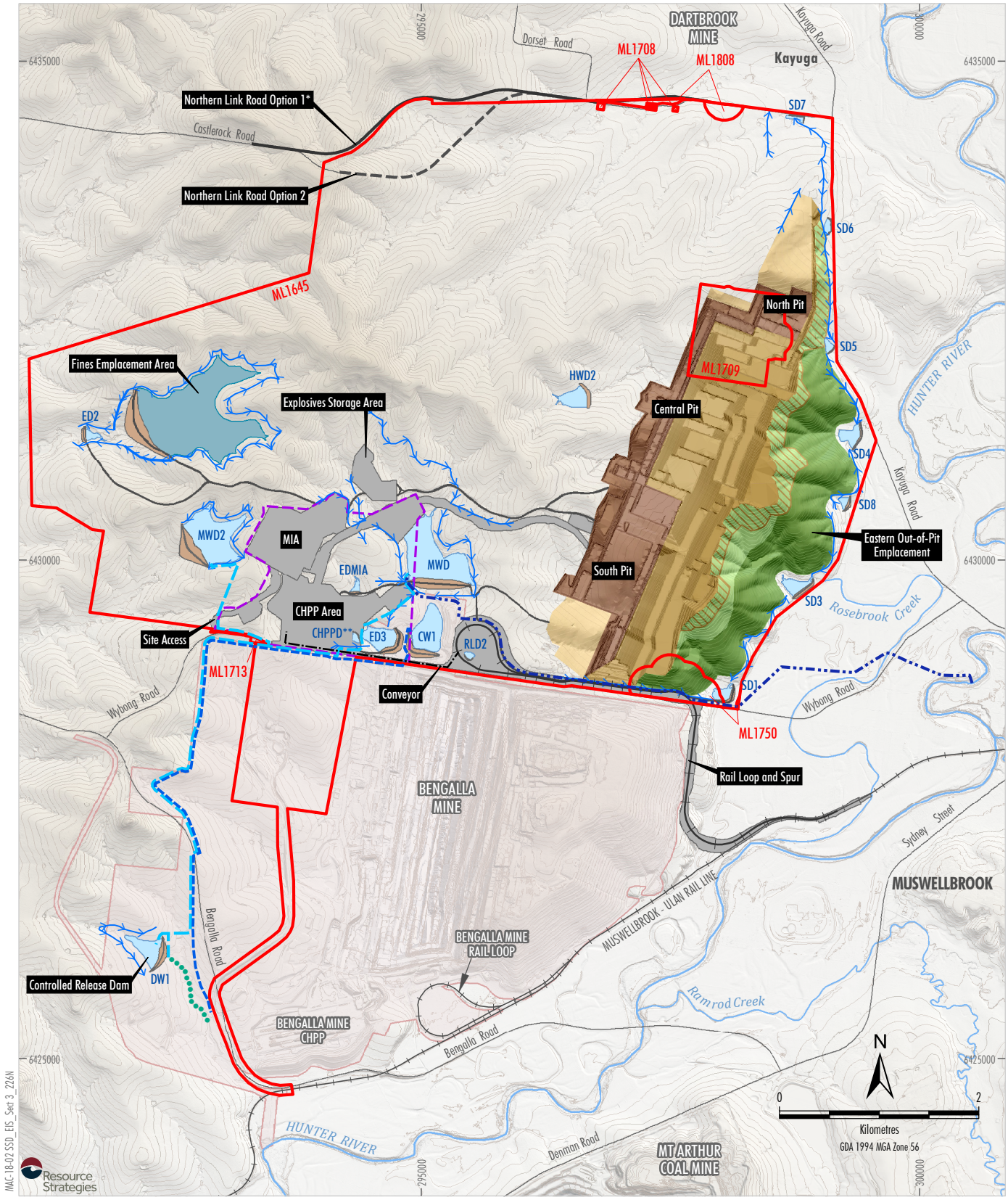
MOUNT PLEASANT OPTIMISATION PROJECT

Indicative Stratigraphy of the Mount Pleasant Operation

Figure 3-3



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
- Topsoil Stripping
- Active Mining
- Active Overburden Emplacement
- Initial Rehabilitation
- Established Rehabilitation
- Topsoil Stockpile
- Infrastructure and Borrow/Stockpile
- Key Surface Water Drain (Conceptual)
- Access Road
- Northern Link Road Option 1 Centreline*
- Northern Link Road Option 2 Centreline
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Fines Emplacement Area
- Water Dam
- Approximate Extent of Scour Protection

Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.
** Coal Handling and Preparation Plant Dam.

Source: MACH (2020); NSW Spatial Services (2020)

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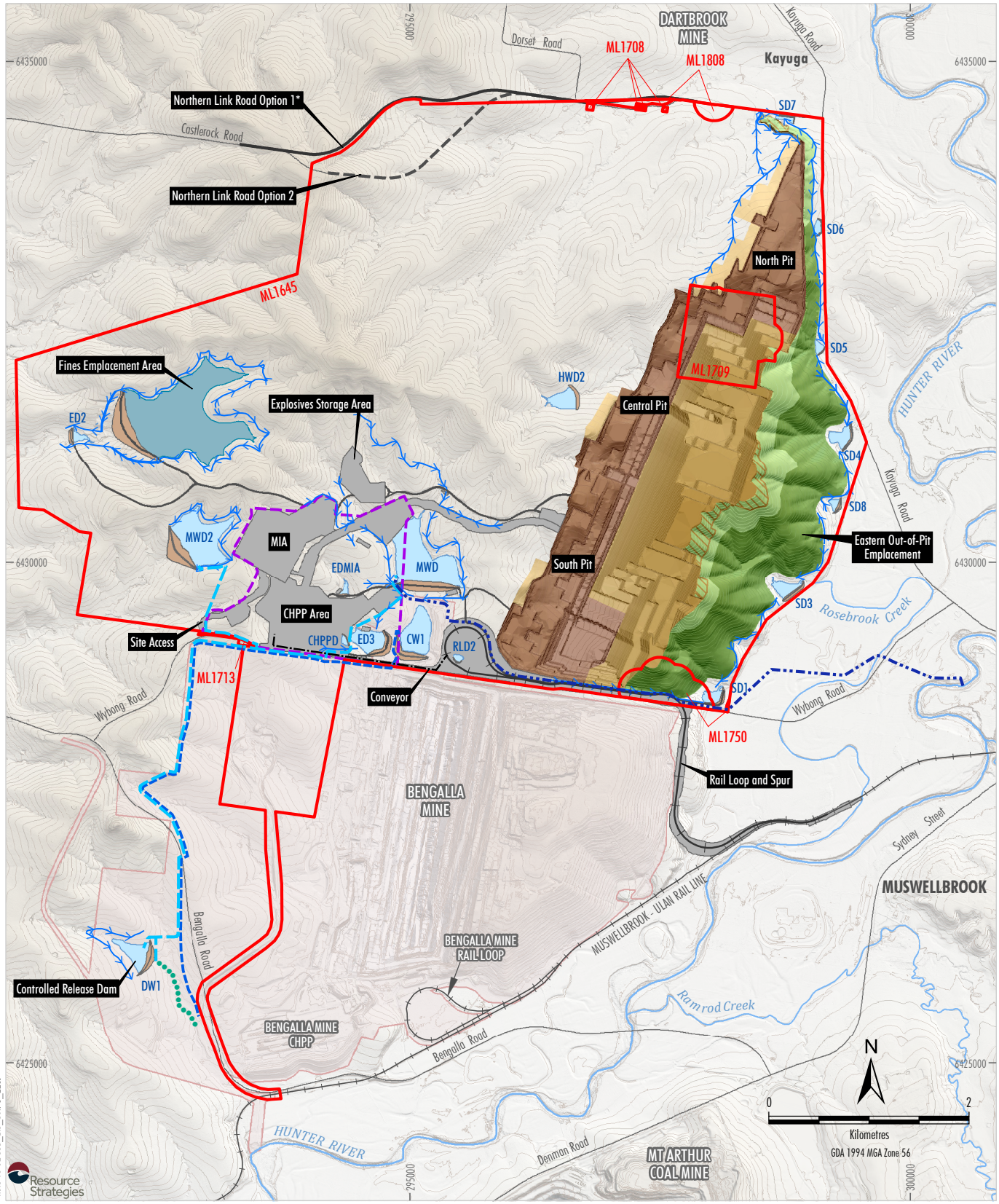
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2026

Figure 3-4



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- Water Dam
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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
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- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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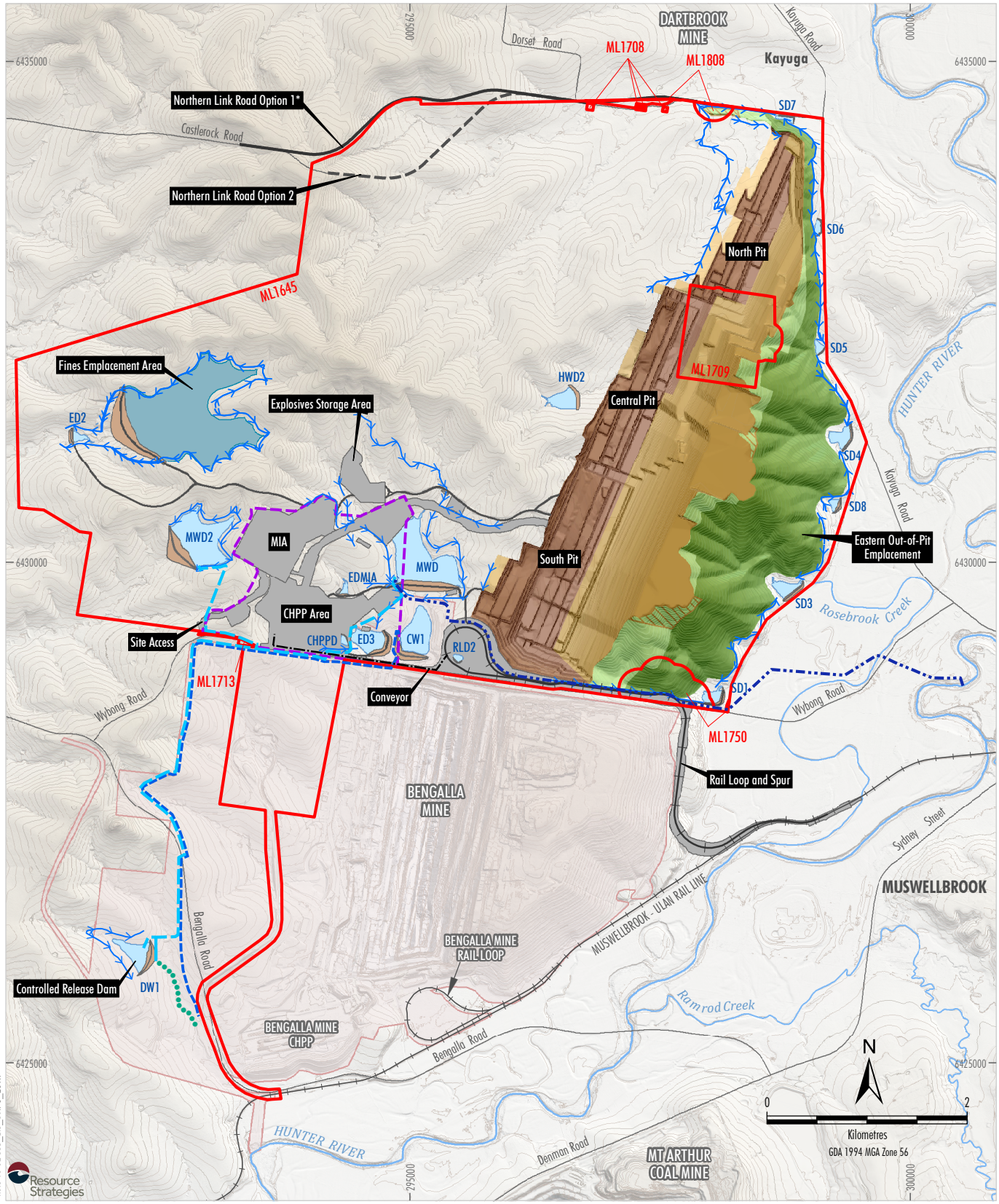
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5



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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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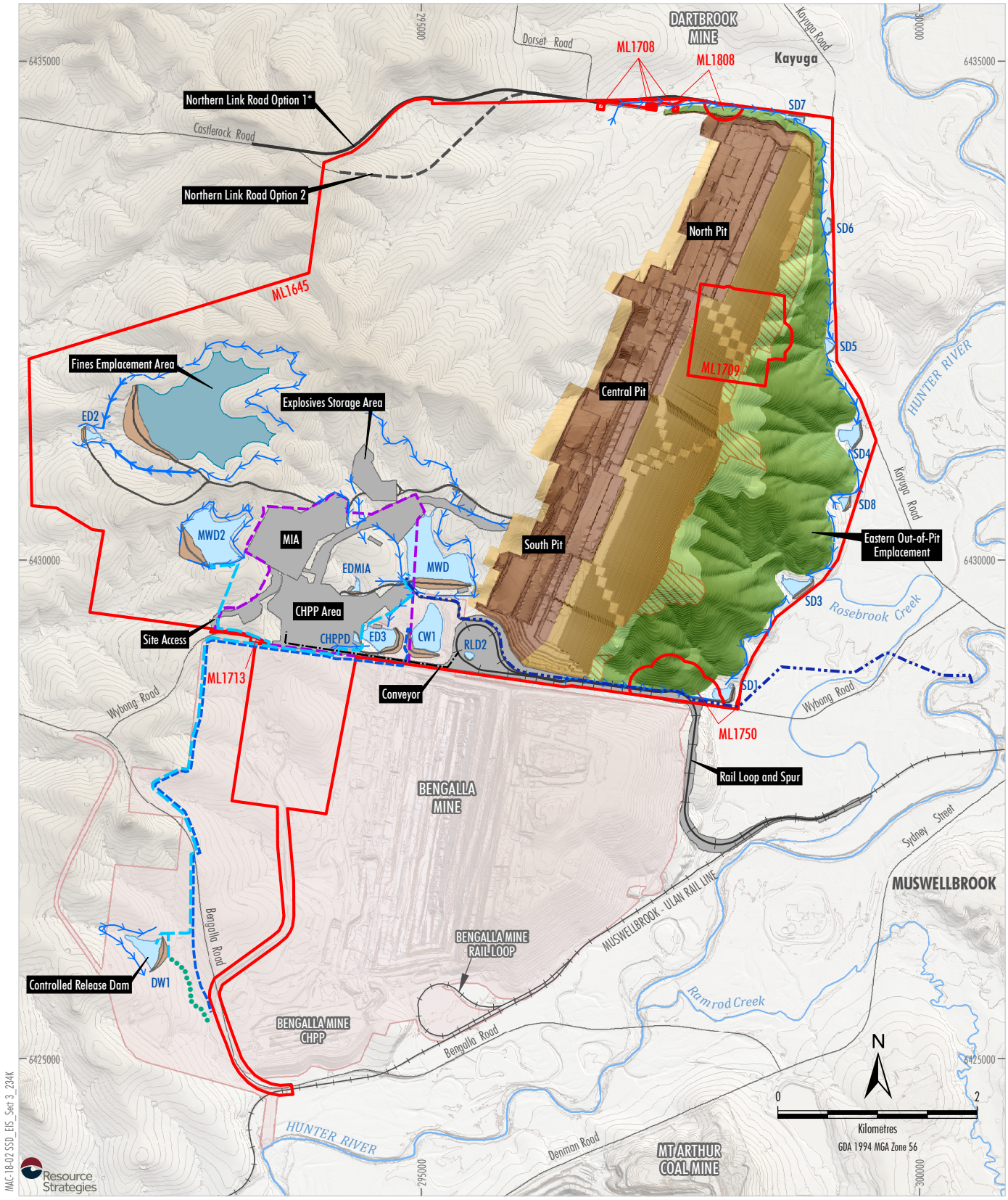
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2031

Figure 3-6



LEGEND

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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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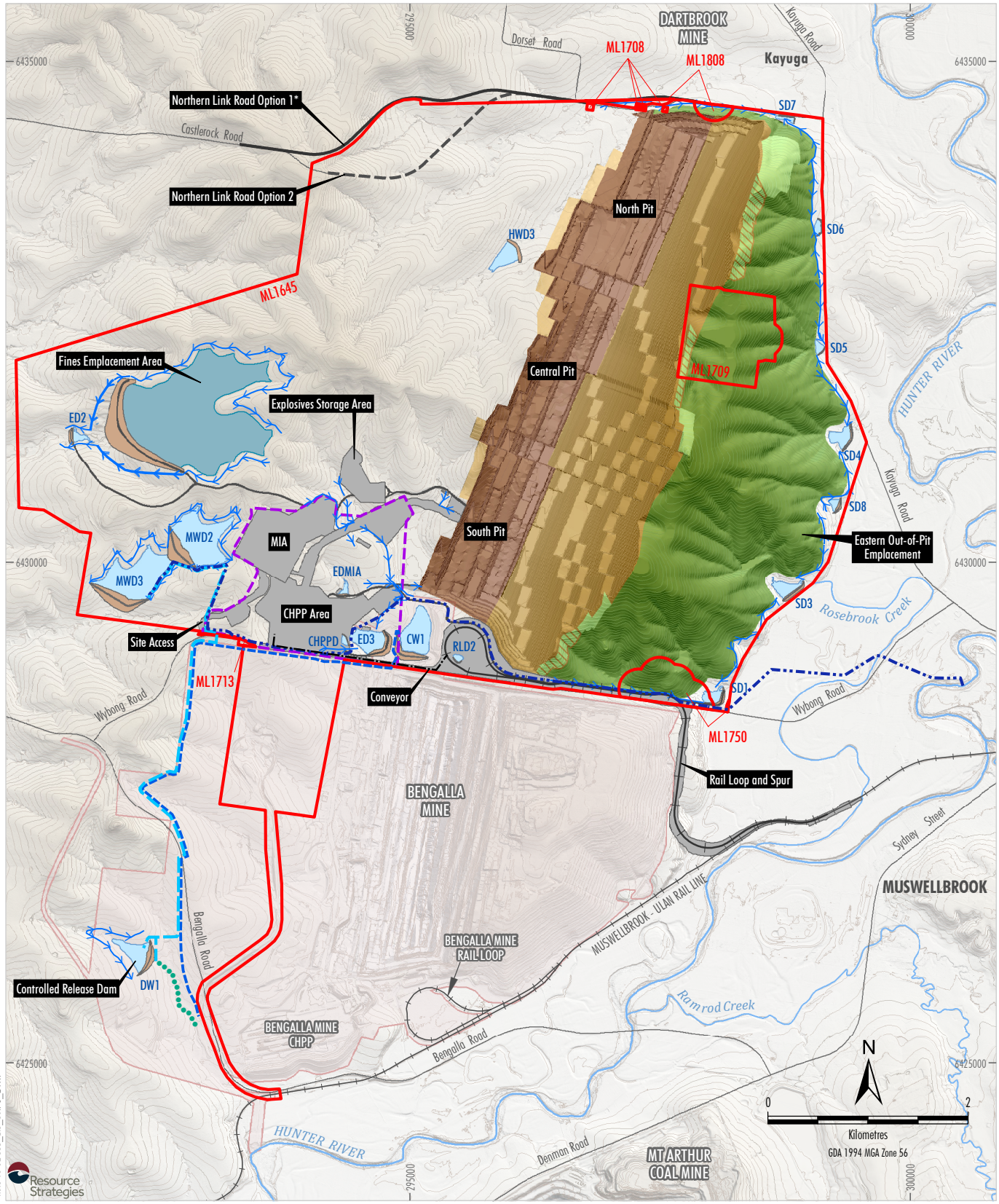
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2034

Figure 3-7



LEGEND

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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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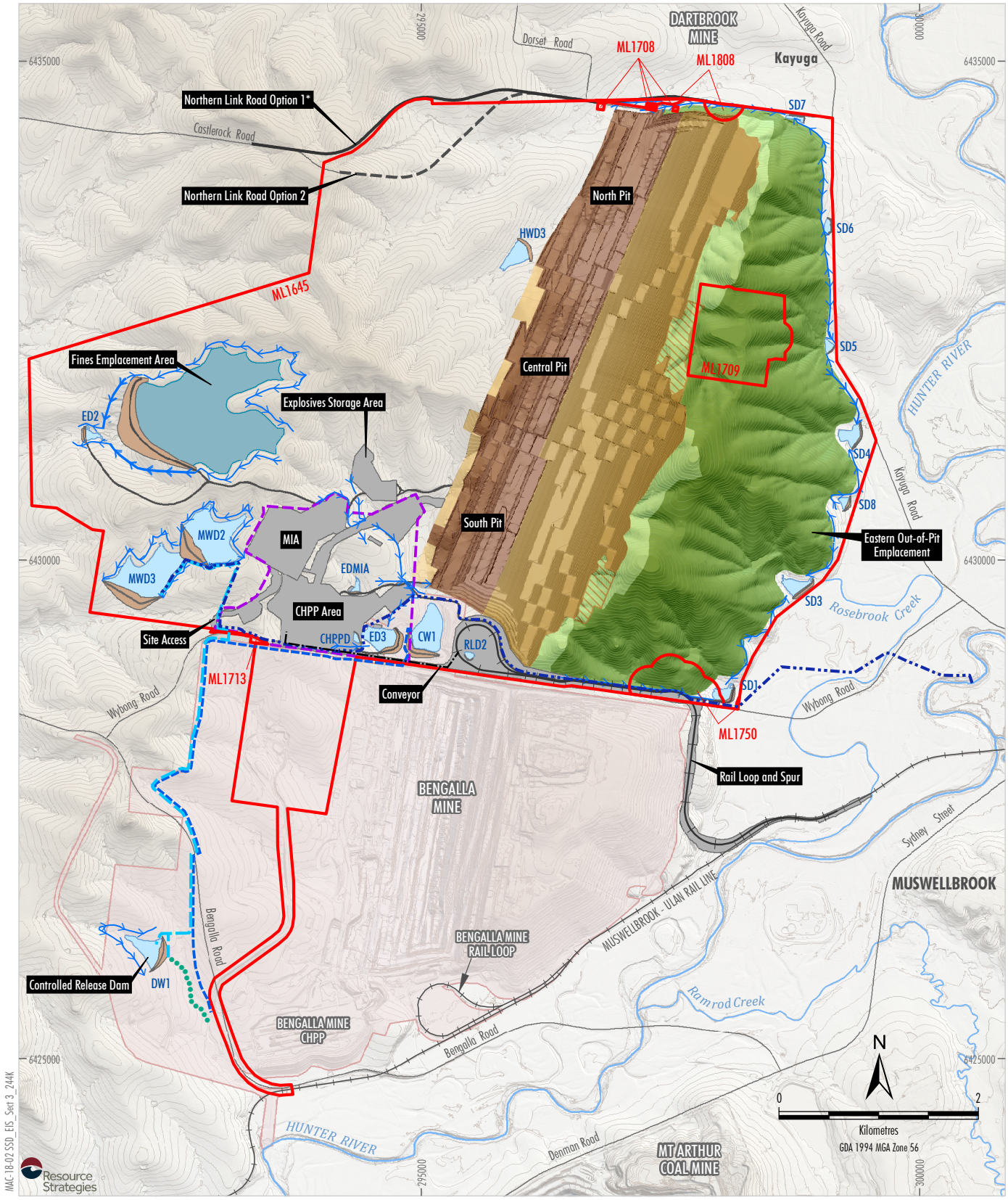
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2041

Figure 3-8



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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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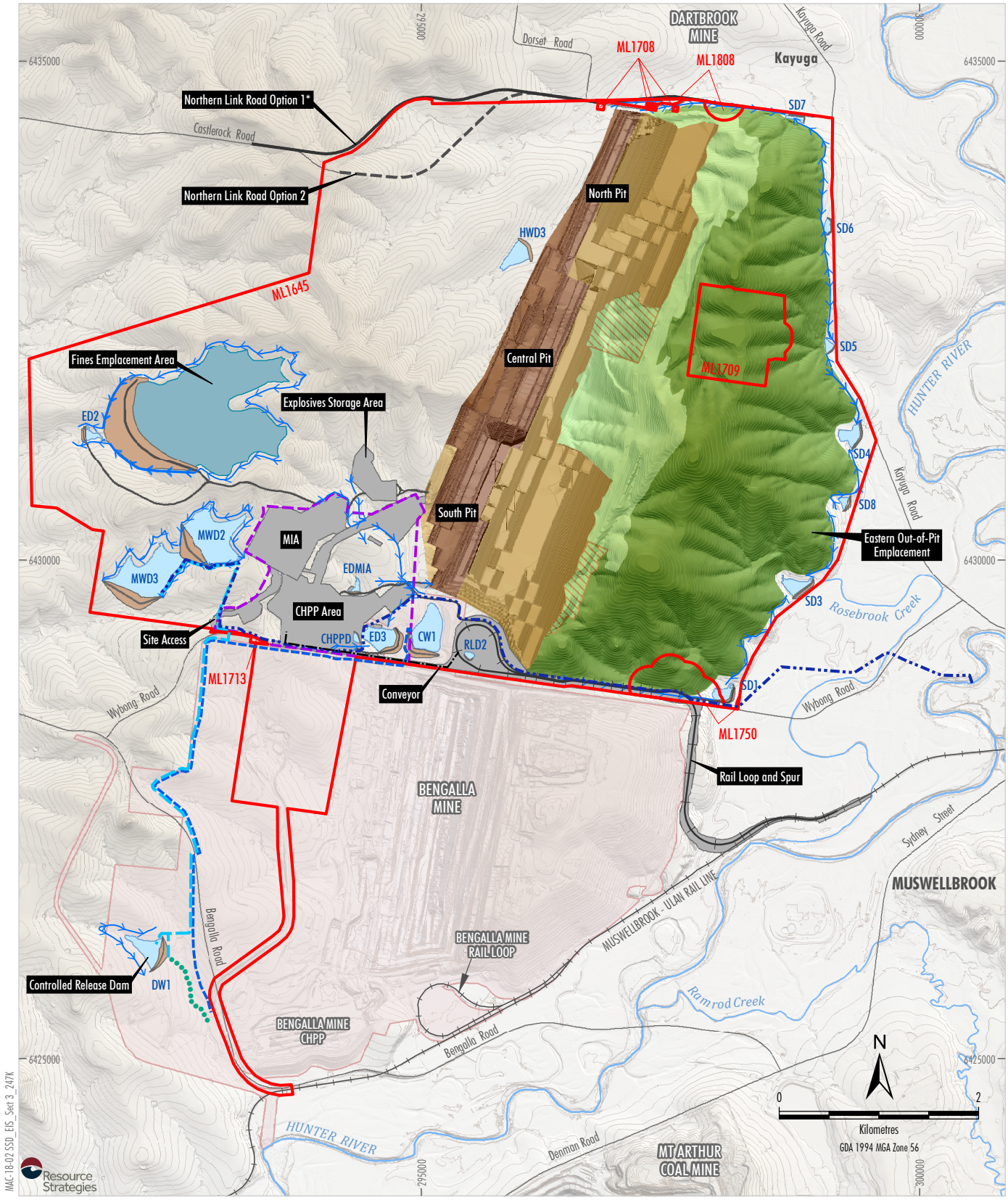
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
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Indicative Water Pipeline Alignment

- Hunter River Supply Pipeline
- DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline

* Preferred alignment subject to landholder access.

Source: MACH (2020); NSW Spatial Services (2020)

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MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2047

Figure 3-10

Throughout the life of the Project, MACH would continue to record native vegetation/habitat clearance against the disturbance area of the existing approved Mount Pleasant Operation and the Additional Disturbance Area adopted in this EIS.

Any planned native vegetation/habitat clearance outside of the Additional Disturbance Area (or beyond the estimated credits calculated for this area in the BDAR) would trigger a review of the proposed activities, the relevant Project approval documentation, MOP and potential impacts on associated biodiversity values. To facilitate this review, Plant Community Types (PCTs) and habitat for species credit species have been mapped in and surrounding the Additional Disturbance Area, and is provided in the BDAR (Appendix E).

3.3.2 Project Relinquishment Area

A portion of the approved surface development area of the Mount Pleasant Operation would be relinquished as part of the Project (i.e. not cleared) (Figure 3-1). These areas comprise a number of the components of the approved Mount Pleasant Operation that have not been constructed to date and would not be developed as part of the Project (i.e. primarily associated with part of the approved North Pit, North West Out-of-Pit Emplacement and portions of the South West Out-of-Pit Emplacement and Western Link Road). These areas were referred to as the 'land swap' option in the SEARs (Attachment 1), but are collectively referred to as the Relinquishment Area in this EIS main text and are further described in Section 8, Attachment 8 and the BDAR (Appendix E).

3.4 PROJECT CONSTRUCTION SCHEDULE

The Project would extract coal over a period of approximately 26 years.

A provisional Project construction schedule is provided on Figure 3-11 and includes planned major site infrastructure upgrade activities. Some construction activities, such as development of the Northern Link Road and the initial Fines Emplacement Area raises, are associated with the approved Mount Pleasant Operation and would occur with or without the Project. The actual timing and sequence of these development activities may vary to take into account detailed design, Project capital decisions, contractor availability and market conditions.

3.5 PROJECT CONSTRUCTION AND OTHER DEVELOPMENT ACTIVITIES

The Project would largely comprise open cut mining and the development of general facilities and infrastructure in support of mining, including staged upgrades to the CHPP. The open cut development would require the relocation of some existing public and private infrastructure.

Construction activities would occur throughout the life of the Project; however, key construction periods would be Year 3 (2025) (Northern Link Road development), Years 4 (2026) and 5 (2027) (CHPP Stage 2a upgrade) and Years 10 (2032) and 11 (2033) (CHPP Stage 2b upgrade) (Figures 3-11 and 3-12).

The following provides a summary of the main construction activities associated with the Project:

- development of additional key water management infrastructure (Section 3.5.1);
- development of the Northern Link Road (noting two options are evaluated) (Section 3.5.2);
- staged upgrades to the existing CHPP and coal handling infrastructure to facilitate the handling and processing of additional coal (Section 3.5.3); and
- progressive Fines Emplacement Area raises (Section 3.5.4).

An indicative list of mobile equipment (Plate 3-1) expected to be required for key Project construction activities is included in the Noise and Blasting Assessment (Appendix A).

Plate 3-1 Mobile Equipment at the Mount Pleasant Operation

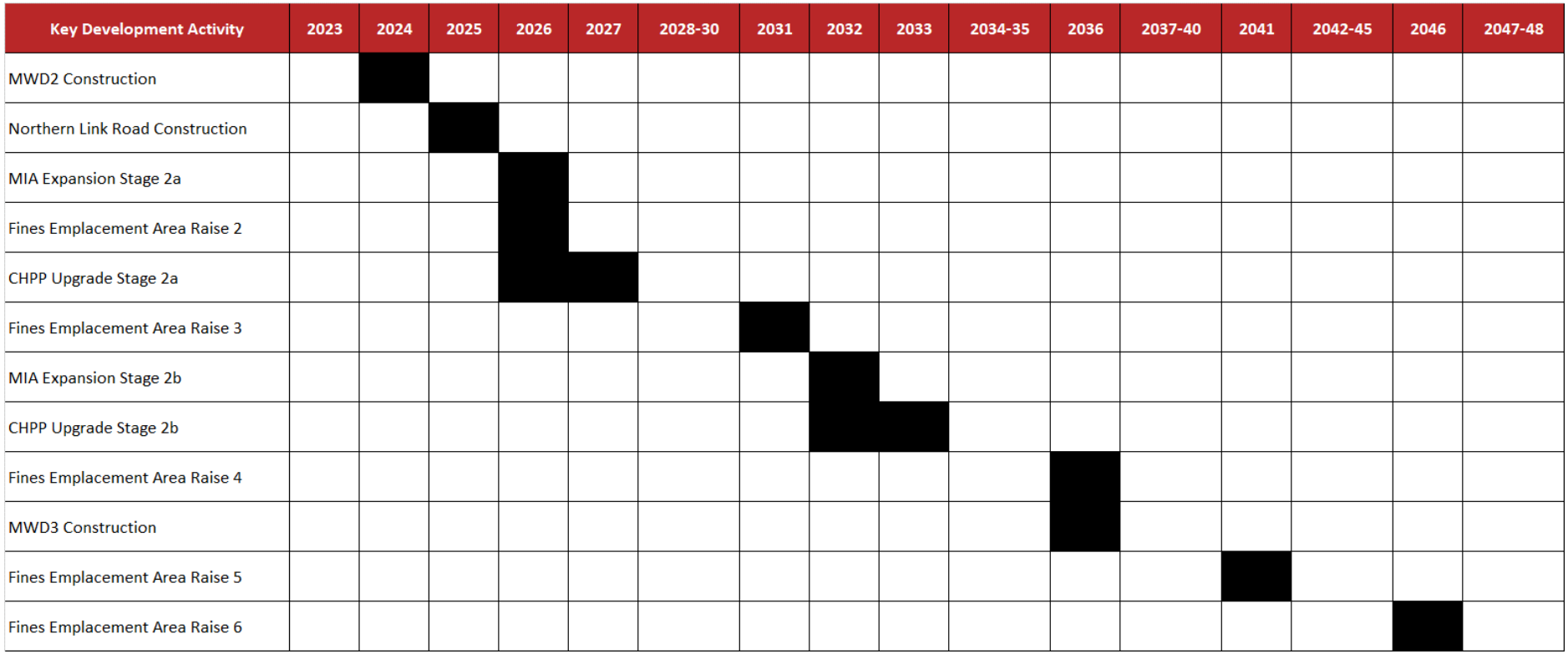
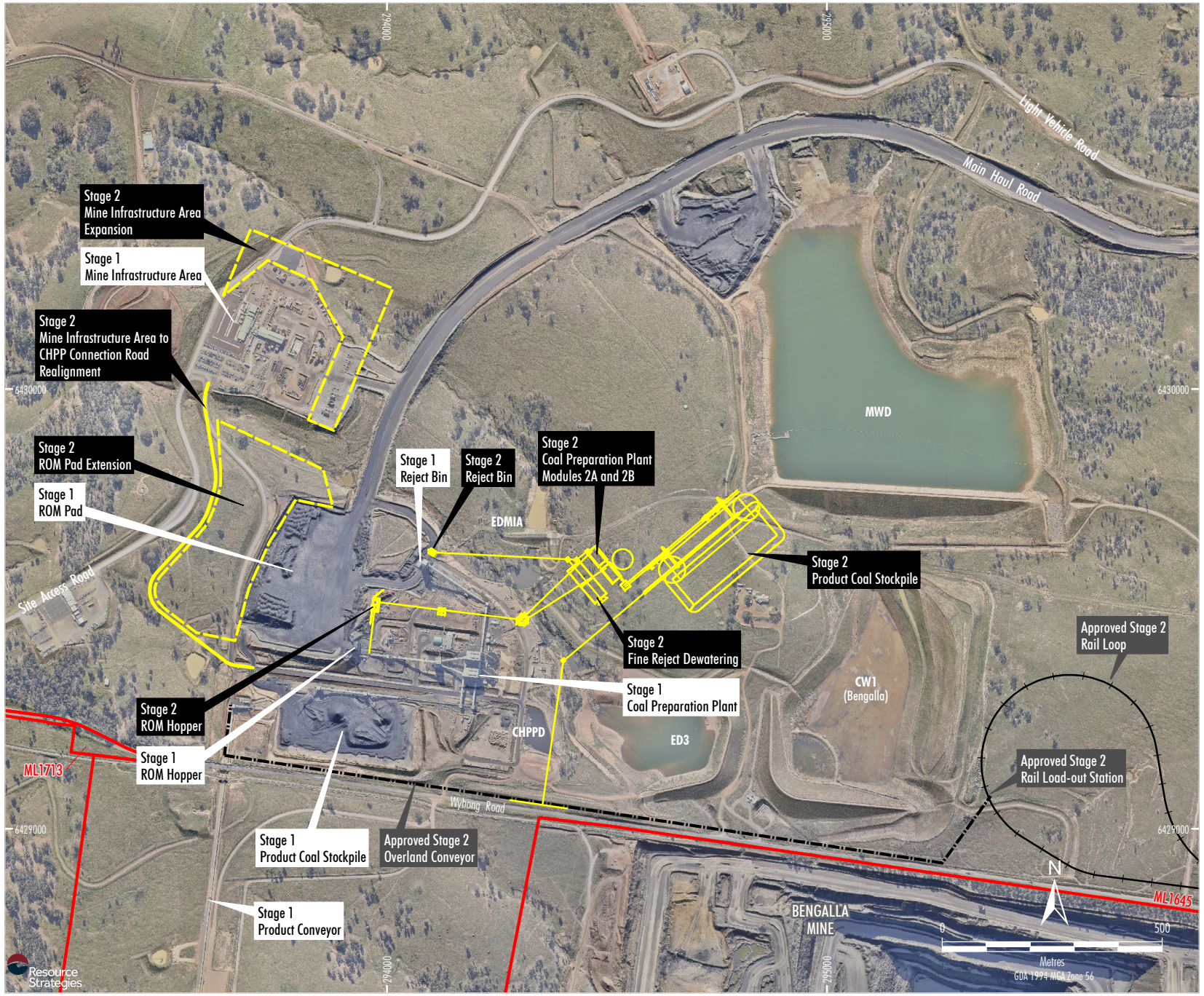
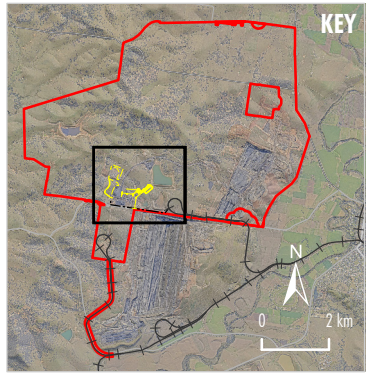


Figure 3-11 Provisional Project Construction Schedule





LEGEND
Mining Lease Boundary
(Mount Pleasant Operation)

Source: MACH (2020); NSW Spatial Services (2020)
Orthophoto: MACH (July 2020)

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MOUNT PLEASANT OPTIMISATION PROJECT

Indicative Materials Handling and Mine Infrastructure Area Layout

Figure 3-12

MAC-18-02 SSD_EIS_Sect 3_203E

Other construction activities undertaken as required over the life of the Project would include:

- progressive development and augmentation of dams, pumps, up-catchment diversions, pipelines, drains, storages, electrical supply and other water management equipment and structures;
- progressive development of haul roads, light vehicle access roads and services;
- progressive expansion of the MIA (e.g. expansion of existing workshops and fuel storage capacity);
- relocation of public infrastructure and services;
- construction of ancillary infrastructure (e.g. electricity distribution infrastructure, internal roads, potable water supply, sewage treatment facilities, site communications, remote crib huts, go-lines and security);
- replacement and/or upgrades to open cut mining and coal handling and processing machinery; and
- installation or replacement of environmental monitoring equipment.

Additional mobile equipment would be required for periods during these construction activities. The number and types of equipment would be expected to vary depending on the activity undertaken.

Construction activities located within the Mount Pleasant Operation MLs may be undertaken up to 24 hours per day, seven days per week. Development of the Northern Link Road would generally be limited to 7.00 am to 6.00 pm Monday to Sunday.

Consideration of construction activities and their potential for noise generation and air quality impacts are provided in the Noise and Blasting Assessment (Appendix A) and Air Quality Assessment (Appendix B).

Further detail on construction and other development activities is provided below.

3.5.1 Key Additional Water Management Infrastructure

Additional water storages would be developed west of the Infrastructure Area Envelope (Figure 3-1).

The additional water storages would be located where a second (southern) fines emplacement area was assessed and approved as part of the 1997 EIS (Figure 1-3). Mine Water Dam 2 (MWD2) would be developed early in the Project life to increase on-site water storage capacity (Figure 3-11), Mine Water Dam 3 (MWD3) would be developed later in the mine life if required when the mine intersects the existing MWD (Figures 3-4 to 3-10).

3.5.2 Northern Link Road

The approved Mount Pleasant Operation includes the closure of a section of Castlerock Road and development of the Northern Link Road to connect Dorset Road and Castlerock Road, to the west of the Mount Pleasant Operation MLs (Section 2.2.8 and Figure 3-1).

The alignment of the Northern Link Road would be revised for the Project to improve the safety of the intersection between the Northern Link Road and Castlerock Road. As shown on Figure 3-1, two options are evaluated in this EIS, with Option 1 being preferred (subject to landholder access).

3.5.3 Staged Upgrades to the Existing Coal Handling and Preparation Plant

The existing Mount Pleasant Operation CHPP and coal handling infrastructure, as described in Section 2.2 (hereafter referred to as the Stage 1 CHPP), would continue to be used for the Project.

To facilitate the handling and processing of additional coal, the following upgrades would be implemented (hereafter referred to as the Stage 2 CHPP components):

- the two existing Coal Preparation Plant modules would be augmented, with one additional module constructed in approximately Years 4 and 5 (Stage 2a) and the second additional module constructed in approximately Years 10 and 11 (Stage 2b);
- the existing ROM hopper would be augmented by constructing at least one additional ROM hopper;
- CHPP fine reject dewatering facilities would be constructed;
- additional product stockpiles would be developed; and
- the main ROM coal stockpile would be expanded.

The proposed integration of the planned Stage 2 CHPP components with the Stage 1 CHPP is shown on Figure 3-12.

While development of the Stage 2 CHPP components would generally be undertaken in two stages (i.e. approximately Years 4 and 5 for works associated with an increase in the mining rate to 15.75 Mtpa and approximately Years 10 and 11 for works associated with an increase in the mining rate to 21 Mtpa), various augmentations may be made to the CHPP over the life of the Project.

To provide future infrastructure flexibility and allow conservatism with respect to the ultimate area of Project land disturbance for assessment purposes it has been assumed that total land disturbance could occur within the revised infrastructure area envelope (Figure 3-1). In practice, it is anticipated that some significant undisturbed areas could remain between Project infrastructure elements as currently occurs at the Mount Pleasant Operation.

3.5.4 Fines Emplacement Area Raises

The existing Fines Emplacement Area (Section 2.2.5) would continue to be progressively raised, using the downstream construction methodology, to increase the site fine reject storage capacity throughout the life of the Project.

Six embankment raises would be required over the life of the Project (Figures 3-11 and 3-13), which would result in an ultimate crest height of approximately 299 m AHD.

At full capacity, the Project Fines Emplacement Area would have sufficient storage for approximately 36 Mm³ of fine reject slurry, with a total disturbance area of approximately 166 ha (including the environmental dam downstream).

This would maximise the available fine reject storage capacity in the existing Fines Emplacement Area catchment without increasing the total disturbance area associated with on-site fines emplacement (Section 2.2.5).

3.6 MINING OPERATIONS

3.6.1 Hours of Operation

Open cut mining activities and associated mobile equipment movements would continue to be undertaken 24 hours per day, seven days per week, subject to compliance with relevant environmental management criteria (e.g. real-time air quality and noise operational trigger levels).

3.6.2 Open Cut Mining Areas

The open cuts for the Project would comprise three named open cuts (South Pit, Central Pit and North Pit) (Figure 3-1).

The upper and middle coal seams of the Wittingham Coal Measures (i.e. the Warkworth, Mt Arthur, Piercefield, Vaux, Broonie, Bayswater, Wynn and Edderton Seams) would be recovered in each pit.

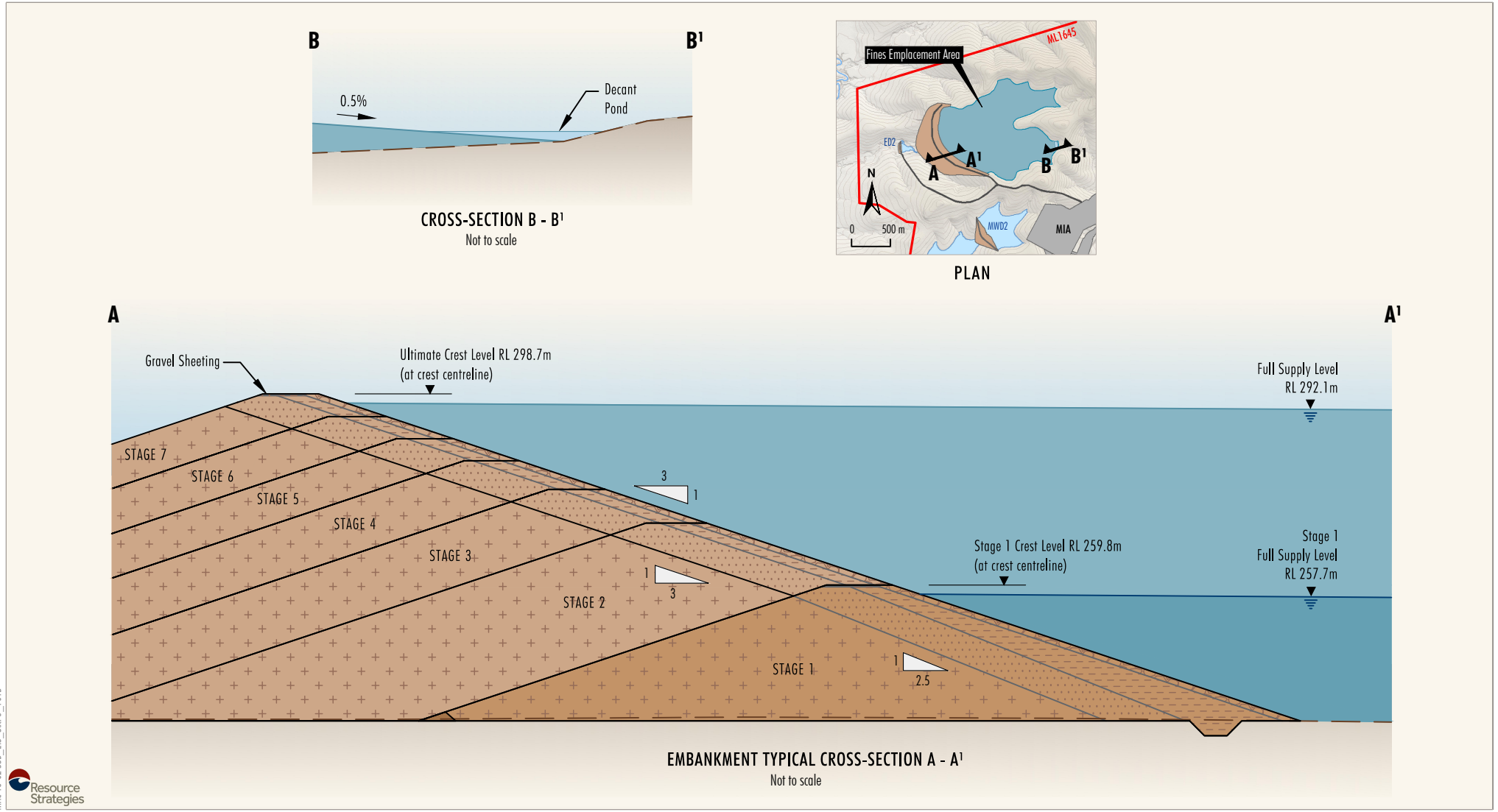
Various geotechnical assessments have been carried out over the life of the Mount Pleasant Operation. These past assessments have determined that adequate open cut factors of safety would be achieved in weathered strata excavated at 45 degrees (°) and in fresh strata with pre-split batters excavated at 75° (Attachment 13). These slope angles have been successfully applied to the existing Mount Pleasant Operation and have also been applied to the design of the Project open cut (Attachment 13).

MACH would continue to implement geotechnical monitoring and management measures over the life of the Project, including:

- groundwater pressure monitoring in the Wybong Road corridor;
- structural geological information would be gathered in exploration activities and used to carry out stability analyses and predict structural features; and
- a geotechnical principal hazards management plan would be prepared and implemented, including regular visual geotechnical inspections.

Key constraints on the potential extent of the Project open cuts comprise the subcrops of target seams in the east, Wybong Road and ML 1645 extent to the south, Dorset Road and the extent of ML 1645 in the north. Further discussion of open cut alternatives is provided in Section 8.

It is estimated that approximately 406 Mt of ROM coal would be mined over the life of the Project (including approximately 42 Mt of ROM coal that is approved to be extracted between 2023 and 2026 inclusive, in accordance with Development Consent DA 92/97).



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Resource Strategies

LEGEND

- Batter Protection Rock Fill Armouring
- Clay Fill
- Select Earth Fill
- Earth Fill
- Fines Emplacement Area

Source: ATC Williams (2017); Xenith Consulting (2020)

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Fines Emplacement Area
Indicative Cross-sections

Figure 3-13

3.6.3 Indicative Mining Schedule

Open cut staging would be determined by factors including coal market volume and blending requirements, localised geological features and mine economics. As these requirements would likely vary over the life of the Project, the development of the open cuts and ROM coal extraction rates may also vary.

An indicative mine schedule for the Mount Pleasant Operation incorporating the Project is provided in Table 3-2.

Increases in coal production would be staged to provide sufficient time to establish the Eastern Out-of-Pit Emplacement and allow the focus of mining to move westwards (away from Muswellbrook) prior to peak production occurring. This would also spread the projected operational employment growth of the Project over an extended period (Section 3.16).

In the Establishment Phase, the ROM coal extraction rate would continue at the currently approved rate of 10.5 Mtpa. Once the Eastern Out-of-Pit Emplacement has been sufficiently developed, the ROM coal extraction rate would increase to 15.75 Mtpa in the Intermediate Phase. When the Eastern Out-of-Pit Emplacement is further developed and the open cuts have moved farther west, the Peak Production Phase would commence, with the ROM coal extraction rate increasing to 21 Mtpa. Finally, the Project would enter the Ramp Down Phase, where the ROM coal extraction rate would decrease as the Project coal reserves are depleted and the Project final landform nears completion.

The mining schedule would continue to be reviewed and documented in the relevant MOP, as required by the Resources Regulator.

3.6.4 Open Cut Mining Activities

The open cuts at the Mount Pleasant Operation would continue to be mined using conventional open cut methods. The mining areas would include supporting infrastructure such as haul roads, hardstands, soil stockpiles and water management structures that would be designed to integrate with the existing Mount Pleasant Operation and minimise the amount of additional infrastructure and ground disturbance required.

A summary of the Project general mining activities and sequence is provided below.

Table 3-2
Indicative Mine Schedule

Phase	Project Year	Calendar Year	Waste Rock (Mbcm)	ROM Coal (Mt)
Project Establishment	1[1]	2023	34.2	10.5
	2	2024	36.7	10.5
	3	2025	36.1	10.5
	4	2026	46.4	10.5
	5	2027	46.5	10.5
Intermediate Phase	6	2028	47.9	15.8
	7	2029	48.1	15.8
	8	2030	48.3	15.8
	9	2031	45.9	15.8
	10	2032	53.4	15.8
	11	2033	65.4	15.8
Peak Production Phase	12	2034	66.0	21.0
	13	2035	75.7	21.0
	14	2036	75.9	21.0
	15	2037	75.3	21.0
	16	2038	80.9	20.4
	17	2039	83.9	20.6
	18	2040	86.5	20.6
	19	2041	89.2	21.0
	20	2042	85.5	21.0
	21	2043	85.7	20.8
Ramp Down Phase	22	2044	80.2	18.6
	23	2045	54.9	13.8
	24	2046	43.6	9.3
	25	2047	41.8	8.7
	26	2048	0.8	0.9
		Total[2]	**1,535**	**406**

[1] Assumed Project Year 1 is 2023.

[2] Totals do not equal the sum of each row due to rounding.

1. Vegetation Clearance

Progressive vegetation clearance and soil clearing would be undertaken ahead of the advancing open cuts. While the Project would optimise the recovery of coal reserves (Section 3.2), the total disturbance area would remain similar and this would be achieved in part by avoiding and minimising vegetation clearance by forgoing approved clearance in the Relinquishment Area (Figure 3-1). Specific vegetation clearance procedures implemented at the existing Mount Pleasant Operation are described in Attachment 8.

2. Topsoil Stripping

Soil stripping would continue to be undertaken progressively by scrapers or dozers and stripped topsoil would either be used directly in progressive rehabilitation, or placed in stockpiles for later re-use. Stockpiles would be managed to reduce the potential for soil degradation.

Soil management, stockpiling and re-application procedures that are generally consistent with existing procedures at the Mount Pleasant Operation would be implemented (Attachment 8).

Soil stockpile locations and volumes would vary over the life of the Project. Indicative locations of temporary soil stockpiles that would be used and then rehabilitated during the life of the Project are shown on Figures 3-4 to 3-10.

3. Drilling and Blasting

Overburden and interburden material that cannot be efficiently ripped and excavated by mobile equipment would be drilled and blasted.

A mixture of ammonium nitrate and fuel oil (ANFO) and emulsion blend explosives would continue to be used for the Project.

Consistent with Development Consent DA 92/97, blasting for the Project would only occur between the hours of 9.00 am to 5.00 pm Monday to Saturday, inclusive. Up to two blasts per day and up to eight blasts per week, averaged over any calendar year, would occur on-site (unless additional blasts are required following misfires or for mine safety).

For the Project, consistent with Development Consent DA 92/97, small blasts that generate vibration of 0.5 millimetres per second (mm/s) or less at any residence on privately-owned land would continue to be excluded from blasting limits.

Wybong Road, Kayuga Road and Castlerock Road would continue to be temporarily closed during blasts within 500 m of the road. Dorset Road/Northern Link Road would also be temporarily closed during blasts within 500 m of the road.

4. Overburden and Interburden Material Removal and Handling

Overburden and interburden material would continue to be removed with excavators, with haul trucks used to haul the material to in-pit and the out-of-pit emplacement. Draglines may also be used in the place of excavators to remove overburden and interburden material if further Project engineering studies indicate it would be reasonable and feasible to do so.

5. Coal Mining

Mining of exposed coal seams at the Mount Pleasant Operation typically involves excavators or front-end loaders ripping and pushing coal and parting material, and loading ROM coal into haul trucks for haulage directly to the ROM dump hopper or ROM pad.

Haulage of Project ROM coal would continue to use internal haul roads. The location of the key haul roads would be extended or relocated as required over the life of the Project.

6. Landform Profiling and Rehabilitation

Hauled overburden and interburden material, and coarse rejects from the CHPP, would continue to be strategically placed within mined out voids and the Eastern Out-of-Pit Emplacement to develop the final landform. Dewatered fine rejects from the new CHPP modules would also be co-disposed with coarse rejects for the Project.

Overburden material would also be placed along selected boundary areas of the open cuts (e.g. the northern boundary of North Pit) in advance of mining activities to act as a safety bund (i.e. to prevent accidental access), as well as assisting in reducing direct views of the open cut workings from publicly accessible locations and/or to act as a noise bund.

Landform profiling and rehabilitation of the integrated waste rock emplacement and Eastern Out-of-Pit Emplacement would continue to be undertaken progressively over the life of the Project.

Temporary rehabilitation would be undertaken where practical to stabilise landforms until further mining operations are carried out in the future and to minimise the potential for dust generation.

A description of the rehabilitation strategy, post-mine landform and post-mine land use at the Mount Pleasant Operation is provided in Section 3.17 and Attachment 8.

3.6.5 Mining Equipment

The mobile equipment used for the Project would vary according to the requirements of the advancing open cut mining operations.

Existing mobile equipment used at the Mount Pleasant Operation (Section 2.2.1) would continue to be used, with replacement and additional fleet items adopted as the production rate increases. Larger capacity (ultra class) haul trucks would be utilised to facilitate the increase in ROM coal extraction from approximately Year 5 (2027).

An indicative list of major mobile equipment used for impact assessment purposes for the Project is provided in the Noise and Blasting Assessment (Appendix A).

Throughout the life of the Project, MACH would evaluate available feasible and reasonable mining technologies, with a particular focus on improving mining efficiency and environmental performance at the Mount Pleasant Operation. There are currently no large-scale automation technologies (e.g. unmanned haul truck fleets) planned for the Project.

3.7 COAL PROCESSING

ROM coal from the open cuts at the Mount Pleasant Operation would continue to be transported via internal haul roads either directly to the Stage 1 or Stage 2 ROM dump hoppers, or rehandled from the ROM pad to the ROM dump hoppers.

Provisional coal processing and production rates for the Project are provided in Table 3-3.

The Project processing and production rates would be determined by the requirements of the coal market, product specifications and blending requirements.

As described in Section 3.5.3, the existing Stage 1 coal handling and processing infrastructure (Plate 3-2) would be augmented in Stages 2a and 2b to accommodate the corresponding planned increases in the Project coal extraction rate in 2028 and 2034 (Table 3-2).

A provisional description of the operation of the CHPP incorporating the Project is provided below, and is indicatively shown in schematic format on Figures 3-14 and 3-15. These provisional rates and systems may be amended or upgraded over the life of the Project.

3.7.1 ROM Coal Sizing and Screening

Stage 1

ROM coal would continue to be reclaimed at a rate of up to 1,800 tonnes per hour (tph) from the 650 tonne (t) Stage 1 ROM dump hopper via an apron feeder and sized through a three-stage sizing system.

The sized raw coal would continue to be conveyed to two 500 t surge bins. Raw coal reclaimed from the surge bins would continue to be transferred at a controlled rate to either the product stockpile (i.e. as bypass product coal) or to either or both of the two Stage 1 coal processing modules each with a capacity of 750 tph.

Stage 2

Following construction of the Stage 2a CHPP upgrade in Year 5, ROM coal would also be reclaimed at up to 1,800 tph from the 500 t Stage 2 ROM dump hopper via a feeder breaker to the Stage 2 Primary, Secondary and Tertiary sizing systems.

The sized raw coal would be conveyed to a single 1000 t Stage 2a surge bin. Stage 2b feed would also come off this bin at a later stage. Raw coal reclaimed from the surge bins would be transferred at a controlled rate to one of the Stage 2 coal processing modules at a rate of approximately 850 tph.

3.7.2 Coal Preparation Plant

Stage 1

In the Stage 1 coal processing modules, sized coal has fine size fractions and slimes removed via de-sliming screens, with fines and slimes fed to a spiral (fine coal) circuit and oversize coarse fractions fed to a dense medium separation circuit.

The fine coal circuit separates coal fines from fine rejects and comprises cyclones, spirals, centrifuges, a screen and a reject thickener. Fine rejects are pumped from the thickener to the Fines Emplacement Area (Section 3.10).

Table 3-3
Indicative Project Coal Processing and Production Schedule

Project Year	Calendar Year[1]	ROM Coal (Mt)	CHPP Processing Rate (Mt)	Bypass Coal (Mt)	CHPP Rejects (Mt)	Product Coal for Rail (Mt)
1	2023	10.5	10.2	0.4	2.7	7.8
2	2024	10.5	10.2	0.4	2.9	7.6
3	2025	10.5	10.2	0.4	2.8	7.7
4	2026	10.5	10.2	0.4	2.7	7.8
5	2027	10.5	10.2	0.4	2.6	7.9
6	2028	15.8	11.8	3.9	2.8	12.9
7	2029	15.8	11.8	3.9	3.3	12.5
8	2030	15.8	11.8	3.9	3.3	12.5
9	2031	15.8	11.8	3.9	3.2	12.5
10	2032	15.8	11.8	3.9	3.1	12.6
11	2033	15.8	11.8	3.9	3.2	12.6
12	2034	21.0	15.8	5.3	4.4	16.6
13	2035	21.0	15.8	5.3	4.4	16.6
14	2036	21.0	15.8	5.3	4.1	16.9
15	2037	21.0	15.8	5.3	4.3	16.7
16	2038	20.4	15.3	5.1	4.0	16.4
17	2039	20.6	15.4	5.2	4.0	16.6
18	2040	20.6	15.3	5.3	4.0	16.6
19	2041	21.0	15.8	5.3	4.2	16.8
20	2042	21.0	15.9	5.1	4.2	16.8
21	2043	20.8	15.5	5.3	4.4	16.4
22	2044	18.6	13.9	4.7	3.7	14.9
23	2045	13.8	10.3	3.6	2.9	10.9
24	2046	9.3	6.7	2.5	1.9	7.4
25	2047	8.7	6.6	2.1	1.7	7.0
26	2048	0.9	0.9	0.3	0.2	1.0
Total[2]		**406**	**316**	**91**	**85**	**322**

[1] Assumed Project Year 1 is 2023.

[2] Totals do not equal the sum of each row due to rounding.

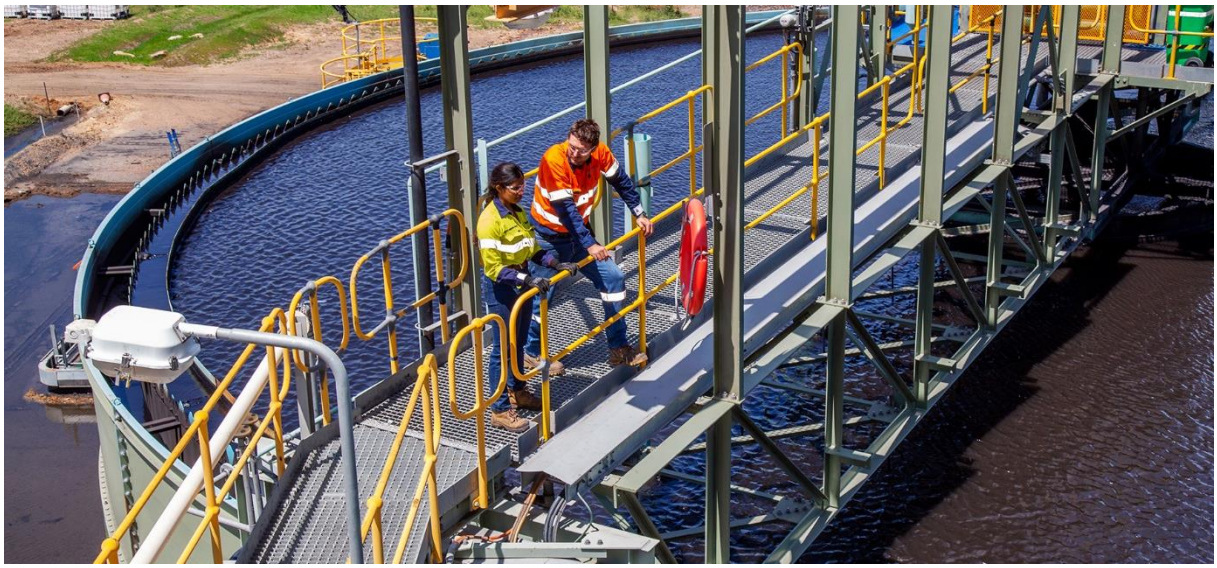
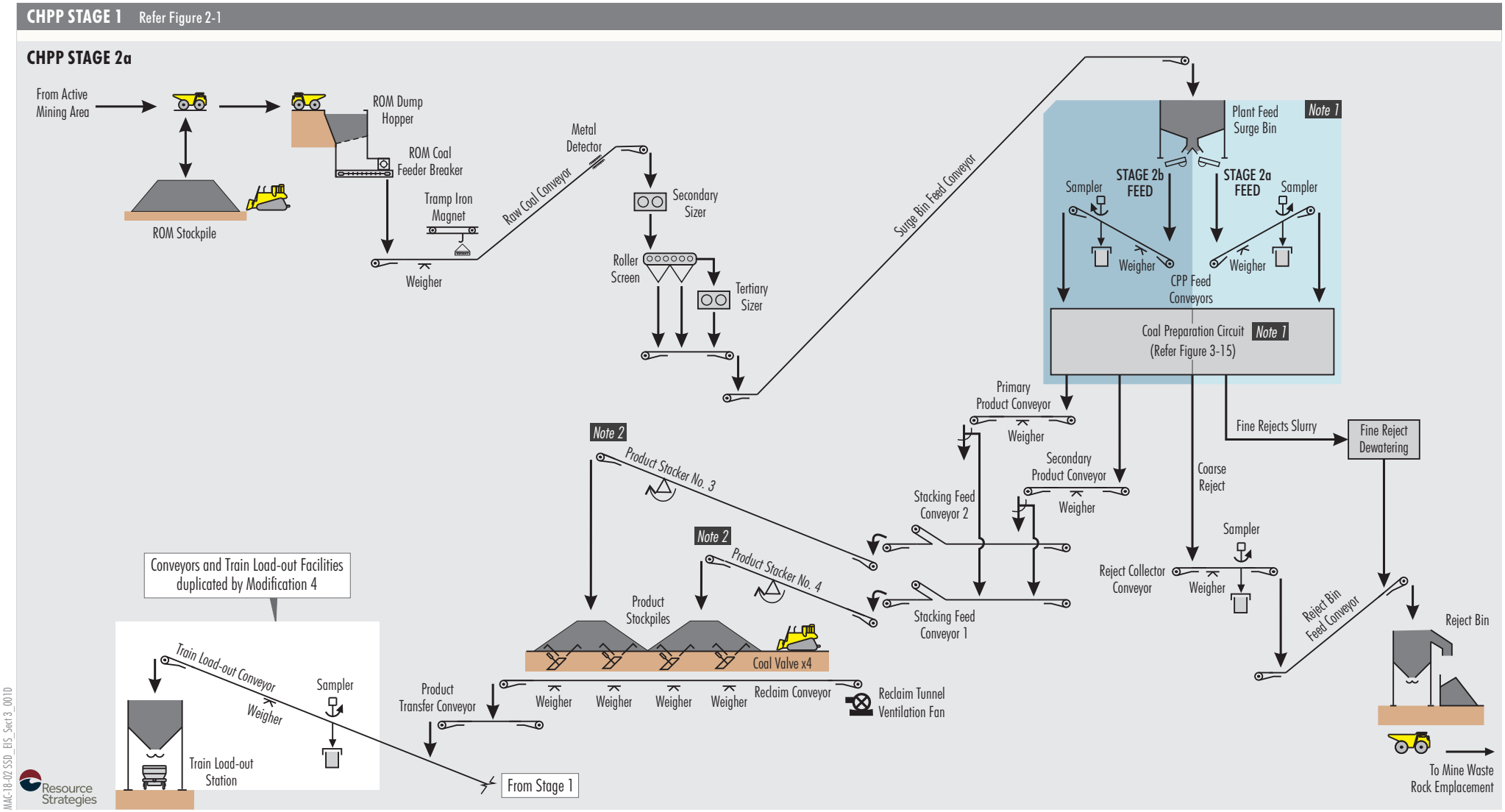


Plate 3-2 Mount Pleasant Operation Coal Processing Infrastructure



Source: MACH (2020); Sedgman (2019)

Notes
1. The Stage 2 Coal Processing Plant includes two additional modules that are expected to be commissioned in two stages, Stage 2a and Stage 2b.
2. Product Stacker No. 3 and No. 4 are travelling, luffing stackers.

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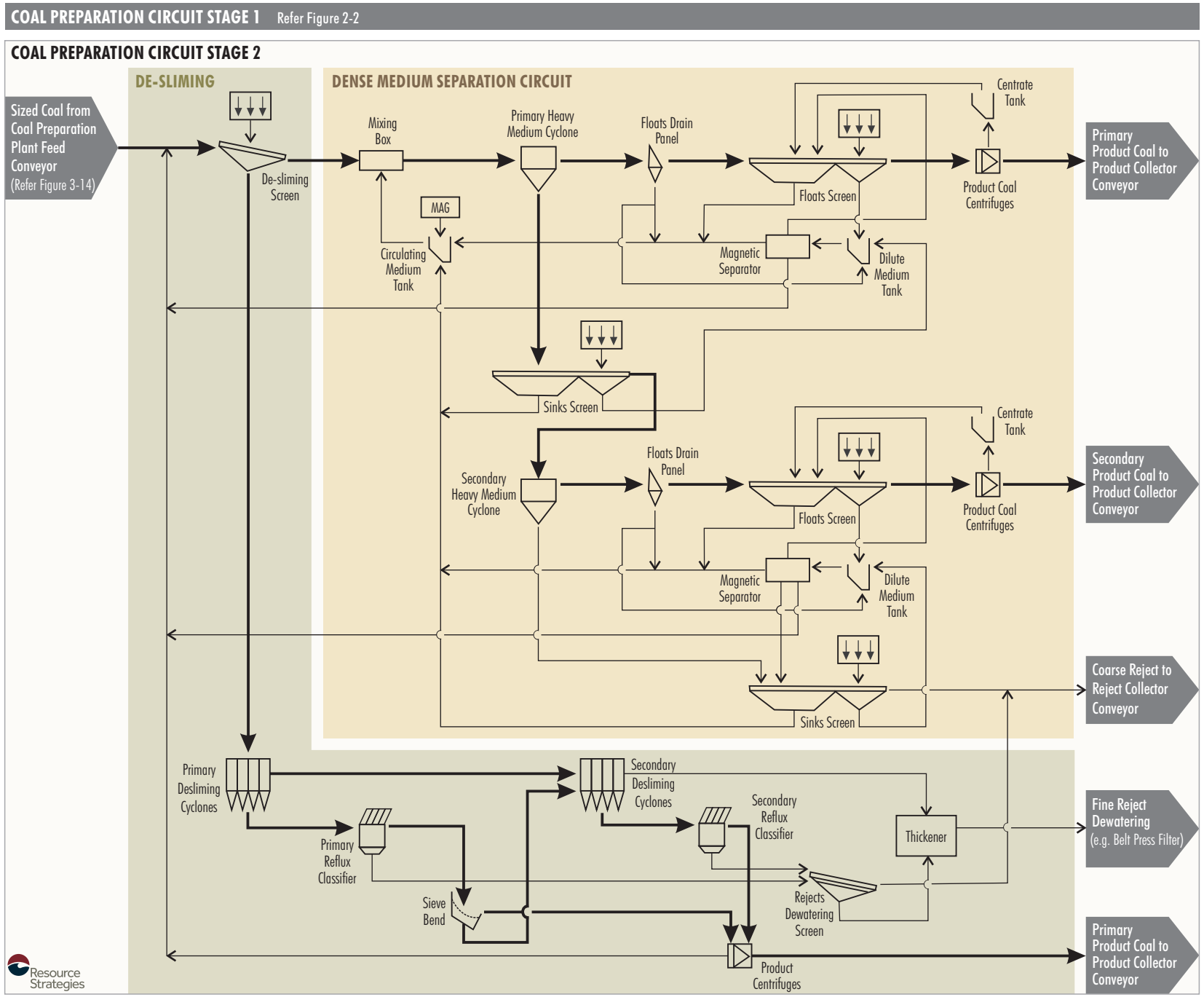
Indicative Materials Handling Schematic

Figure 3-14



LEGEND
- Coal Stream
- Non-coal Stream
- MAG — Magnetite Addition
- FLOC — Flocculant Addition
- High Pressure Water Sprays

Source: MACH (2020); Sedgman (2019)

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Indicative Coal Preparation Circuit Flowsheet

Figure 3-15

The dense medium separation circuit comprises a heavy media cyclone and screens to separate washed coal from coarse rejects. Coarse rejects from the CHPP are disposed as a component of general ROM waste emplacement operations.

Stage 2

The Stage 2 coal processing modules would be generally similar in design to the existing Stage 1 coal processing modules. The key differences are that the dense medium separation circuit is expected to include a second heavy media cyclone circuit, and reflux classifiers would be utilised instead of spirals.

In addition, reject dewatering facilities (such as belt press filters or alternative technologies) would be constructed for the Project Stage 2 infrastructure to improve water recovery and allow co-disposal of fine rejects with coarse rejects and waste rock as part of ROM waste emplacement operations.

The management of rejects at the Mount Pleasant Operation is described in Section 3.10.

Product coal from the CHPP would be conveyed to either the Stage 1 or Stage 2 product stockpiles for subsequent reclaim and loading to trains.

3.8 PRODUCT COAL AND RAIL TRANSPORTATION

Product coal produced from the CHPP and bypass coal would continue to be stockpiled prior to being reclaimed and loaded to trains at the approved Stage 2 rail load-out facility. Product coal would be transported on the Muswellbrook–Ulan Rail Line and Main Northern Railway to the Port of Newcastle for export, or to domestic customers for use in power generation.

The Stage 1 product coal stockpile currently has a capacity of approximately 280 kt, and the Stage 2 product stockpile would provide additional capacity of approximately 500 kt.

Product coal would be reclaimed from the product stockpiles using coal valves, which would feed onto reclaim conveyors in tunnels located beneath the product coal stockpiles. The reclaim conveyors would feed the approved Stage 2 train load-out conveyor and rail load-out bin.

Product coal would continue to be loaded onto trains 24 hours per day, seven days per week.

The estimated total product coal to be transported by rail over the life of the Project is provided in Table 3-3.

As a component of the Project, the increase in transport of product coal from approximately 8.5 Mtpa to up to 17 Mtpa would require a corresponding increase in the currently approved annual average daily train movements. The annual average daily train movements would increase from the currently approved three laden trains leaving the site per day to 6.5 laden trains leaving the site per day (at peak coal production). However, the peak daily maximum number of trains would increase only marginally, from the currently approved nine laden trains leaving the site per day to 10 laden trains leaving the site per day.

The approved Stage 2 rail load-out facility, loop and spur could accommodate the increased number of trains entering and leaving the Mount Pleasant Operation (i.e. the approved Stage 2 rail infrastructure would not be required to be duplicated for the Project).

No changes to the existing rail transport routes are proposed for the Project.

It is expected that the increased coal transport from the Mount Pleasant Operation, on both the rail network and from port facilities, could be accommodated without modifications to the existing infrastructure (Section 6).

3.9 WASTE ROCK MANAGEMENT

3.9.1 Waste Rock Quantities

Approximately 1,535 Mbcm of waste rock would be mined over the life of the Project (Table 3-2).

3.9.2 Waste Rock Emplacement Strategy

Waste rock (including overburden and interburden) mined during the development of the Project would continue to be hauled either out-of-pit (i.e. to the Eastern Out-of-Pit Emplacement) or progressively placed in the mine voids once the coal has been mined.

Overburden material would also be placed along selected boundary areas of the open cuts (e.g. the northern boundary of North Pit) in advance of mining activities to act as a safety bund (i.e. to prevent accidental access), as well as assisting in reducing direct views of the open cut workings from publicly accessible locations and/or act as a noise bund.

A conceptual cross-section of the final landform is provided in Section 3.17. The waste rock would be placed to conform, in lifts of 10 m height or less, to the approximate shape of the Project geomorphologically designed final landform to be progressively shaped by dozers for rehabilitation activities (e.g. re-contouring, topsoiling and revegetation).

Further discussion of the management of landform development activities is provided in Section 3.17 and Attachment 8.

3.9.3 Waste Rock Geochemistry

An assessment of the geochemical characteristics of the waste rock material associated with the development of the Project is provided in the Geochemistry Assessment (Appendix K) prepared by RGS Environmental. A summary of the assessment is provided below.

Geochemical tests were conducted on 83 samples to identify any geochemical implications for waste rock management. The test work included acidity, electrical conductivity (EC), sodicity, acid base accounting, and element enrichment and solubility test work (Appendix K).

Acidity, Salinity and Sodicity

The Geochemistry Assessment (Appendix K) concluded that the waste rock materials generated from the Project would typically be neutral to slightly alkaline and generally non-saline.

The waste rock is expected to be moderately sodic (Appendix K). The management of sodic waste rock material is described in Attachment 8.

Acid Base Accounting

The Geochemistry Assessment (Appendix K) concluded the waste rock materials generated from the Project would generally be expected to be non-acid forming (NAF).

The acid base accounting test work indicates, however, that a small portion of waste rock materials, namely the Archerfield sandstone interburden materials, would be potentially acid forming (PAF).

The management of PAF waste rock material is described in Section 3.9.4.

Metal Enrichment and Solubility

Multi-element analyses were conducted on 10 composite waste rock samples and compared to average crustal abundance values. Results of this test work indicated none of the samples were enriched compared to median crustal abundance (Appendix K).

The analysis of water extracts from selected waste rock samples indicated metals would be relatively insoluble under the prevailing neutral to slightly alkaline pH conditions (Appendix K).

The Archerfield sandstone interburden is classified as PAF and may have the potential to generate elevated concentrations of aluminium, arsenic, cadmium, cobalt, copper, iron, manganese, nickel, selenium and zinc (Appendix K).

Consideration of the potential for mobilisation of metals is provided in Appendices C and D.

3.9.4 Potentially Acid Forming Material Management Measures

As described in Section 3.9.3, the Geochemistry Assessment (Appendix K) indicated the presence of PAF materials at the Project associated with one geological unit.

PAF material would be either well-blended with NAF or acid-consuming waste rock, producing an overall NAF material, or encapsulated within NAF waste rock.

NAF material would be placed on the outer 5 m of the Eastern Out-of-Pit Emplacement and outer 2 m of the backfilled mine void.

If PAF material is exposed in the floor of the final void, it would be either:

- covered with NAF waste rock material to a minimum depth of 5 m;
- excavated and disposed of as PAF waste rock material (as described above); or
- flooded with water from the site water management system.

3.10 COAL REJECT MANAGEMENT

3.10.1 Coal Reject Quantities

Approximately 85 Mt of coal rejects would be produced from the processing of ROM coal over the life of the Project (Table 3-3).

3.10.2 Coal Reject Geochemistry

An assessment of the geochemical characteristics of the coal reject material produced at the Mount Pleasant Operation CHPP was undertaken for the Project Geochemistry Assessment (Appendix K) prepared by RGS Environmental. A summary of the assessment is provided below.

12 samples of CHPP rejects underwent the same geochemical test work as described in Section 3.9.3.

Acidity and Salinity

The Geochemistry Assessment (Appendix K) concluded that the CHPP rejects would typically be neutral and non-saline. CHPP rejects generated from processing of the Wynn Seam would be more saline (Appendix K).

Acid Base Accounting

The Geochemistry Assessment (Appendix K) concluded that the CHPP rejects would typically be NAF.

The acid base accounting test work indicates that rejects generated from processing of the Edderton and Wynn Seams would be PAF. Management of these materials is described in Section 3.10.3.

Metal Enrichment and Solubility

Multi-element analyses were conducted on nine composite samples and compared to average crustal abundance values. Results of this test work indicated none of the samples were enriched compared to median crustal abundance (Appendix K).

Metals/metalloids are sparingly soluble at the neutral to slightly alkaline pH of the leachate expected from bulk NAF reject materials. PAF reject materials associated with the Edderton and Wynn Seams have the potential to become acidic and mobilise some metals/metalloids over time if not managed appropriately (Appendix K).

Potential impacts of the Project on downstream water quality have been assessed in Appendices C and D.

3.10.3 Coal Reject Disposal Strategy

The disposal of coal reject material produced at the CHPP for the Project would continue to be managed in accordance with the Fines Emplacement Plan (within the Waste Management Plan) and the relevant MOP.

Coarse reject material would continue to be hauled from the CHPP to the Eastern Out-of-Pit Emplacement or in-pit for disposal as a component of general ROM waste emplacement operations.

Fine reject material would continue to be pumped as a slurry and deposited in the Fines Emplacement Area via spigot discharge along the embankment and valley abutments of the Fines Emplacement Area. Spigot discharge points are located approximately every 50 m and would continue to deposit fine rejects sub-aerially to facilitate segregation and deposition of fine rejects solids.

Decant water would continue to be recovered from a decant pond located on the edge of the Fines Emplacement Area and returned to the mine water management system for re-use on-site.

Secondary flocculation of fine rejects would also continue to occur in order to improve fine coal reject density at the Fines Emplacement Area.

The Fines Emplacement Area would continue to be constructed progressively in a series of lifts throughout the life of the Project (Section 3.5.4, Figures 3-4 to 3-10).

Rehabilitation of the Fines Emplacement Area is described in Attachment 8.

Following commissioning of the Stage 2 CHPP reject dewatering facilities, a portion of fine rejects would be dewatered and co-disposed with coarse rejects as part of ROM waste emplacement activities.

Any PAF coal reject material disposed as a component of general ROM waste emplacement operations (i.e. both coarse rejects and dewatered fine rejects) would be managed (Section 3.9.4).

3.11 WATER MANAGEMENT

The existing water management system at the Mount Pleasant Operation would be progressively augmented as water management requirements change over the life of the Project.

Figure 3-16 provides a schematic of the indicative Mount Pleasant Operation water management system incorporating the Project.

A detailed description of the Project water management system is provided in the Surface Water Assessment (Appendix D) prepared by HEC.

3.11.1 Project Water Management System

The objectives of the Project water management system would be generally consistent with the existing water management system at the Mount Pleasant Operation, which are to:

- protect the integrity of regional and local water resources;
- separate runoff from areas undisturbed by mining and water generated from active mining areas;
- design and manage the water management system to operate reliably in all seasonal conditions, including both extended wet and dry periods, throughout the life of the mine; and
- provide sufficient water for Project requirements (e.g. dust suppression).

To meet these objectives, the Project water management system would generally be based on the existing/approved water management system (Section 2.2.6), with augmentations (e.g. additional sediment dams and highwall dams) undertaken progressively over the life of the Project.

As described in Section 3.5.1, a key change to the water management system would be the development of additional mine water storages west of the Infrastructure Area Envelope (Figure 3-1). These mine water storages would be located where a second fines emplacement area was assessed and approved as part of the 1997 EIS, and the first dam (MWD2) would be developed early in the Project life to increase on-site water storage capacity.

The existing MWD would ultimately be mined-through as part of the Project and would be replaced by MWD3, when required.

The progressive development of water storages for the Project is described in Appendix D and provisionally shown on Figures 3-4 to 3-10.

The majority of Mount Pleasant Operation make-up water supply requirements to date have been met by dewatering the open cut mining areas, recycling water from the Fines Emplacement Area and from licensed extraction from the Hunter River. The installation of reject dewatering facilities for the Project Stage 2 CHPP is expected to significantly increase on-site water recycling.

Consistent with the approved Mount Pleasant Operation, MACH may also source excess mine water from the adjoining mines (i.e. Dartbrook and Bengalla Mines) for use on-site, subject to obtaining all necessary secondary approvals (e.g. EPL variations), in order to reduce the make-up water demand from the Hunter River over the life of the Project.

To facilitate water transfers from the Dartbrook Mine, an overland pipeline would be constructed to Dartbrook Mine water management infrastructure. Water transfers from the Bengalla Mine, if agreed by Bengalla Mining Company, would be via a temporary overland pipeline positioned to avoid any additional native vegetation clearance (e.g. by use of an existing road).

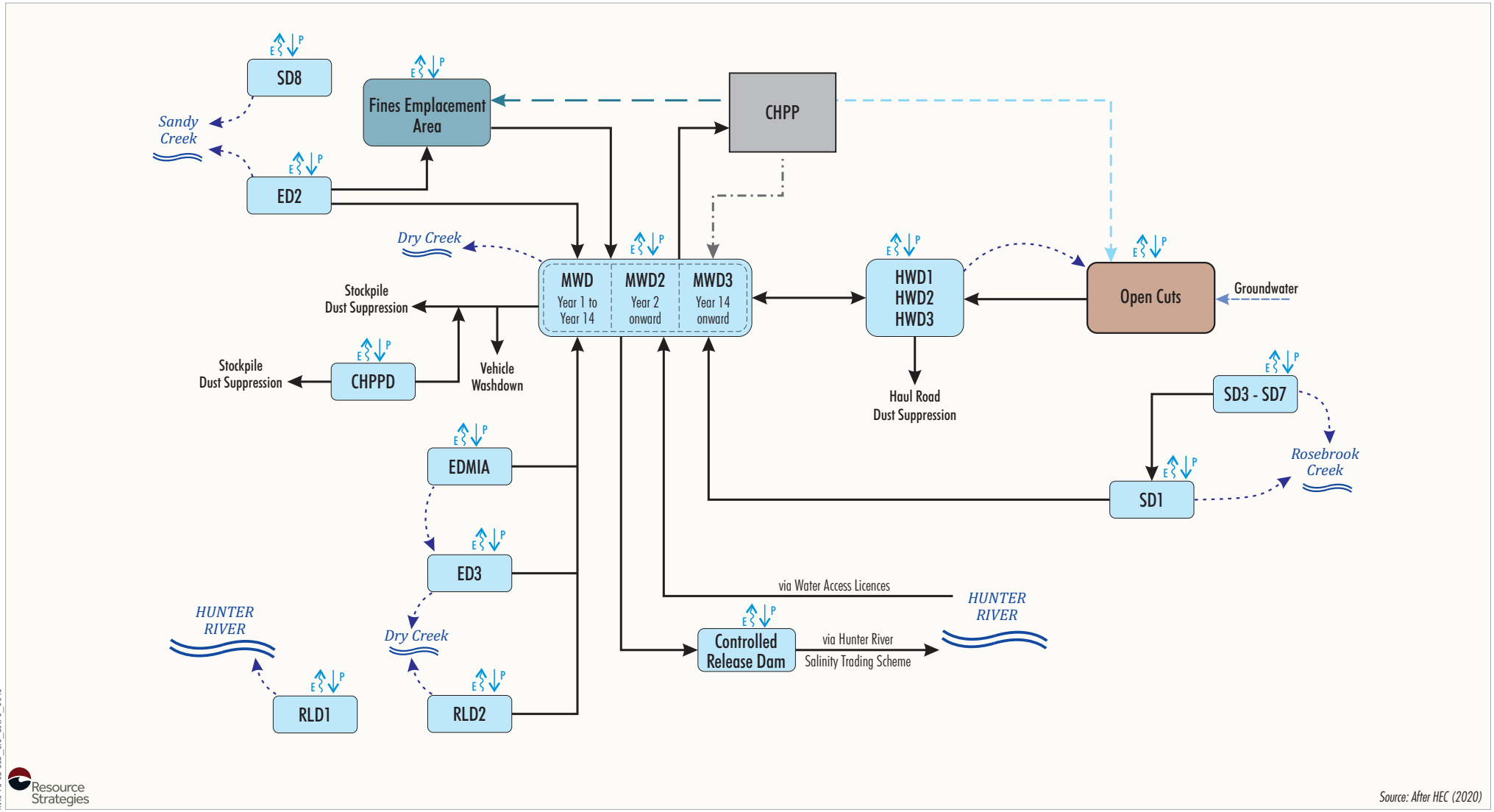
A predictive assessment of the performance of the Project water management system for a range of different climatic scenarios is presented in Appendix D.

Up-Catchment Runoff Control

The existing surface water runoff controls aimed at preventing up-catchment runoff water from entering the open cuts would be retained for the Project.

Temporary and permanent up-catchment diversion structures would be constructed where reasonable and feasible over the life of the Project to divert runoff from undisturbed areas around the open cuts and the Eastern Out-of-Pit Emplacement.

Diversion structures would also be developed to minimise the catchment reporting to the additional Project mine water dams, such that impacts to downstream water users are minimised.



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LEGEND
- Water Storage
- Fine Rejects Storage
- Pumped Flow
- Overflow Due to Rainfall in Excess of Design Criteria
- Seepage Flow
- Moisture in Fine and Coarse Rejects
- Fine Reject Slurry Flow
- Recovery from Fine Rejects
- Precipitation
- Evaporation

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Indicative Water Management System Schematic

Figure 3-16

Mine Water Dams

Mine water dams for the Project would include the existing/approved storages (Plate 3-3), as described in Section 2.2.6 and additional Project dams that would be developed progressively, as shown conceptually on Figures 3-4 to 3-10. Water captured in the open cuts would also be transferred to the mine water dams.

Periodic reviews of the site water balance would be conducted, which would enable the Project water management system to be adjusted as necessary.

The mine water dams would continue to be managed and operated to avoid uncontrolled release to downstream watercourses.

Sedimentation Control

Sedimentation control for the Project would continue to be implemented through the use of sediment dams. Sediment dams would contain runoff from the Eastern Out-of-Pit Emplacement. Sediment dams would allow for gravity settling of sediment prior to release off-site.

Sediment dams would be maintained until vegetation successfully establishes on topsoiled areas and runoff has similar water quality characteristics to areas that are undisturbed by mining activities.

Outlet structures from sediment dams would be designed in consideration of DPIE Water's *Guidelines for Outlet Structures* (NSW Office of Water [NOW], 2010).

3.11.2 Water Consumption

The main water requirements for the Project would continue to be for the CHPP make-up supply, moisture lost within product coal and coal rejects, and dust suppression. Some water would also continue to be used for washdown of mobile equipment and other minor non-potable water uses in MIAs.

The water consumption requirements and water balance of the system would fluctuate based on varying climatic conditions and as the extent of the mining operation changes over time. A summary of the estimated water demands of the Project are provided below.

Coal Handling and Preparation Plant Make-Up

The make-up water demand of the CHPP is related directly to the rate of ROM coal feed to the CHPP, and the rate of production and moisture content of CHPP reject material. The estimated make-up demand peaks at a rate of approximately 7.5 megalitres per day (ML/day) over the life of the Project (Appendix D).

Dust Suppression

The haul road dust suppression demand for the Project was calculated based on estimated future haul road lengths and widths, with daily dust suppression demand calculated as evaporation minus rainfall over the haul road areas (Appendix D).

The estimated haul road dust suppression demand for the Project is highly seasonal and averages approximately 2.1 ML/day.

3.11.3 Open Cut Dewatering

Predicted groundwater inflows to the open cuts over the life of the Project are predicted to be up to approximately 0.9 ML/day (Appendix C).

Sumps would be excavated in the floor of the open cuts to manage potential inflows. Water that accumulates in the open cut sumps would be used for dust suppression and/or transferred to mine water storages.

Licensing of the predicted groundwater inflows for the Project is assessed and described in Section 7.8 and Appendix C.

Plate 3-3 Mount Pleasant Operation Mine Water Dam

3.12 FINAL VOID

A final void is a depression below the natural ground level that remains at the completion of open cut mining and closure.

The originally approved Mount Pleasant Operation final landform includes two final voids associated with the North Pit and South Pit open cuts and a smaller third final void located in a low-lying area between the two larger final voids (Section 2.2.10).

However, for the Project, a single final void would remain in the western portion of the site at the cessation of mining (Section 3.17).

In accordance with Condition 53, Schedule 3 of Development Consent DA 92/97, MACH is currently required to design the approved final voids having regard for their function as long-term groundwater sinks and to minimise their size and depth, drainage catchment, risk of flood interaction and highwall instability risk. MACH would also apply these existing requirements to the Project final void, where they are relevant.

MACH has designed the final Project landform to (Attachment 8):

- backfill approximately 1.5 km of the northern part of the final void;
- reduce the depth of the final void in the North and Central Pit areas and decrease the slope of the internal batters;
- apply geomorphic design concepts to parts of the Project landform that drain to the final void; and
- push down the western highwall to an overall angle of approximately 18°.

As a result of the above, the final void is considered safe, geotechnically stable and minimises the catchment reporting to the void whilst still maintaining geomorphic design concepts (i.e. providing sufficient slope length to improve post-mining stability and reduce long-term erosion risk) (Attachment 8).

A water balance of the final void has been prepared for the end of the Project life and is presented in Appendix D. The water balance demonstrates that the water level in the final void would remain significantly below the crest of the final void (Attachment 8).

3.13 INFRASTRUCTURE AND SERVICES

The existing infrastructure and services at the Mount Pleasant Operation, and infrastructure and services to be constructed in support of the approved mine (e.g. the Stage 2 rail infrastructure) would continue to be utilised throughout the life of the Project. The existing and approved infrastructure would be augmented throughout the life of the Project.

3.13.1 Mine Infrastructure Areas

The existing administration offices, workshops, stores, buildings, washdown facilities, laydown and hardstand areas and ablution facilities at the Mount Pleasant Operation would continue to be used with upgrades throughout the life of the Project.

The Infrastructure Area Envelope would be revised for the Project to reflect approved disturbance areas that may be used for infrastructure, as well as removal of an area where no infrastructure is proposed to be developed for the Project (Figure 3-1). Consistent with the existing Mount Pleasant Operation, the Infrastructure Area Envelope denotes where infrastructure is preferentially to be located. Over the life of the Project, infrastructure would also be located outside the Infrastructure Area Envelope as needed.

The MIA would be expanded in stages from its current size of approximately 8 ha, to approximately 12 ha, to accommodate the additional mobile equipment and facilities that would be required as the mining rate increases (Section 3.5).

Expansion of the MIA would include, but not be limited to:

- expansion of concreted areas;
- expansion of the existing heavy vehicle maintenance workshop with additional bays for larger trucks;
- relocation of the tyre bay;
- expansion of existing and/or construction of additional administration buildings and ablution facilities;
- expansion of carpark capacity;
- an increase in the on-site fuel storage capacity;
- expansion of the warehouse and stores;
- expansion of the sewage system and treatment plant; and
- construction of additional vehicle wash bays.

The construction area developed adjacent to the main site access would continue to be used as a satellite infrastructure area over the life of the Project (Section 2.2.8).

A go-line area would be developed to service mining activities in the open cuts (Section 3.5). The go-line area may be progressively relocated as the open cuts progress to the west.

3.13.2 Access Roads and Internal Roads

MACH upgraded Wybong Road from Bengalla Road to the Mount Pleasant Operation access road at the commencement of construction. MACH will also resurface Wybong Road from the Mount Pleasant Operation access road to the Overton Road intersection in conjunction with the Stage 2 rail works.

The existing mine access road off Wybong Road would remain the primary site access.

Ancillary site accesses from local roads for environmental monitoring, general land management, exploration activities and local deliveries would continue to be used in consultation with the MSC.

Where practical, existing internal roads would continue to be used to service the Project. Temporary internal roads would, however, be constructed as required. The use of internal access roads would generally be restricted to mine personnel only.

3.13.3 Electricity Supply and Distribution

The maximum electricity demand for the Project when fully operational would be approximately 138,000 megawatt-hours per annum.

The existing electricity supply and distribution system at the Mount Pleasant Operation would continue to supply power to the Project with minor upgrades. Power would be transferred either by the use of overhead cables or underground cables, where required. Standard electrical safety practices and laws (including considerations of vehicle clearance) would continue to apply.

If Project engineering studies indicate it would be reasonable and feasible to use draglines in the place of excavators to remove overburden and interburden material (Section 3.6.4), additional electricity supply and distribution infrastructure would be constructed. The additional electricity distribution infrastructure would include a main 66 kV overhead line located to the west of the open cuts, with a number of spur lines supplying electricity to transportable substations that would directly supply electricity to the draglines.

Should draglines be adopted, it is possible that off-site upgrades to the site electricity supply may be required (e.g. augmentation of the electricity supply network to site). In the event this is required, the offset components of the upgrades would be subject to separate environmental assessment and approval (e.g. by Ausgrid).

3.13.4 Northern Link Road Development

The approved Northern Link Road would be constructed with a revised alignment to improve the intersection between the Northern Link Road and Castlerock Road, as shown on Figure 3-1. The Northern Link Road would facilitate continued public access around the Project once the approved closure of the eastern portion of Castlerock Road occurs.

The revised alignment of the Northern Link Road would be designed and constructed in accordance with the Austroad Guidelines in consultation with the MSC. This EIS assesses two alternative Northern Link Road alignments (Figure 3-1) with Option 1 being the currently preferred alignment.

Construction of the Northern Link Road would be undertaken prior to closure of the eastern portion of Castlerock Road.

During construction of the Northern Link Road, soil would be stripped and stockpiled adjacent to the road corridor, or other suitable previously cleared areas. Stockpiled soil would either be used for rehabilitation along the road corridor or transported to the Project mining area for use in rehabilitation activities.

3.13.5 Western Link Road

As described in Section 2.2.8, Condition 38, Schedule 3 of Development Consent DA 92/97 requires MACH to construct the Western Link Road (Figure 1-3) prior to the closure of Wybong Road.

Given that the approved Stage 2 rail infrastructure would be constructed adjacent to Wybong Road, the closure of Wybong Road to allow access to the underlying coal reserves would not form part of the Project. The approved Western Link Road, therefore, would also not form part of the Project. MACH has consulted with MSC on this aspect as part of participation with the Mine Affected Roads study (Section 6).

3.13.6 Site Security and Communications

The existing security and communication systems at the Mount Pleasant Operation would be retained and upgraded for the Project. The communication and security systems would be upgraded as required over the life of the Project and may comprise a selection of fixed and relocatable equipment.

3.13.7 Potable Water

The potable water supply for the Project would be sourced from the Hunter River via the approved Stage 2 water supply pipeline, stored in local potable water tanks and treated on-site, as required, to the required standards. Potable water may also continue to be delivered to site via trucks by a contractor. The existing potable water reticulation system would continue to be used to supply the various areas of the site (e.g. office buildings, maintenance areas and crib rooms) and would be augmented or extended as required to supply additional Project facilities.

3.14 WASTE MANAGEMENT

The Project would generate waste streams that would be similar in nature to the existing operations at the Mount Pleasant Operation. The key waste streams would continue to comprise:

- waste rock (as described in Section 3.9);
- CHPP reject material (as described in Section 3.10);
- sewage and wastewater;
- recyclable and non-recyclable wastes; and
- other wastes from mining and workshop activities (e.g. used tyres, scrap metal, oil filters and waste hydrocarbons).

In addition, MACH would continue to dispose of some inert waste material (e.g. concrete) in the Eastern Out-of-Pit Emplacement, and heavy mobile equipment tyres in the open cuts, in accordance with existing approvals and the Waste Management Plan.

The following actions/strategies would continue to be implemented to maximise efficient waste management for the Project:

- general waste minimisation principles (reduce, re-use and recycle), including during purchase of products and materials;
- separation of waste streams at the source to minimise contamination of waste streams; and
- education of personnel (both during inductions and annual refreshers) regarding waste management principles and procedures, and locations of bins for various waste streams (Plate 3-4).

All waste would continue to be classified in accordance with *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014), collected by an appropriately licensed contractor and disposed of at appropriately licensed disposal facilities. MACH would continue to maintain a register of waste collected by waste contractors.

Recyclable waste would continue to be deposited in designated containers (e.g. scrap metal bin), which would continue to be periodically removed from site for recycling.

Plate 3-4 Mount Pleasant Operation Waste Separation

Sewage and wastewater from on-site ablution facilities would continue to be collected and treated in the site sewage treatment plant, which would be progressively expanded to accommodate the increased workforce for the Project. The sewage treatment plant would continue to be serviced by a licensed waste disposal contractor.

3.15 MANAGEMENT OF DANGEROUS GOODS

The transportation, handling and storage of all dangerous goods at the Mount Pleasant Operation is currently conducted in accordance with the requirements of the *Storage and Handling of Dangerous Goods – Code of Practice 2005* (WorkCover NSW, 2005) and this practice would continue for the Project.

3.15.1 Transport

Consistent with the existing Mount Pleasant Operation, dangerous goods required for the Project would continue to be transported in accordance with the appropriate State legislation.

3.15.2 Hydrocarbon Storage

Hydrocarbons used at the Mount Pleasant Operation include fuels (diesel and petrol), greases, oils, paints and degreasers.

The existing hydrocarbon storage facilities at the Mount Pleasant Operation would continue to be operated in accordance with AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* and the NSW *Work Health and Safety Regulation, 2011*. The hydrocarbon storage facilities at the MIA currently include:

- two 12,000 litre (L) self-bunded hydrocarbon (oil) storage tanks;
- one 5,000 L self-bunded hydrocarbon (coolant) storage tank;
- three 110,000 L self-bunded diesel tanks;
- one 5,000 L self-bunded waste coolant tank;
- one 12,500 L self-bunded waste oil storage tank; and
- other flammable hydrocarbons, such as paints, are stored in a locked area inside the workshop.

As described in Sections 3.5 and 3.13.1, the existing hydrocarbon storage facilities would be expanded to accommodate the increased mobile equipment fleet for the Project. The volume of fuel storage in the MIA would be approximately doubled.

Other hydrocarbon storages at the Mount Pleasant Operation currently include:

- four additional self-bunded diesel storage tanks - one 110,000 L tank located at the go-line area, one 110,000 L tank located at the explosives reload facility, one 68,000 L tank located at the construction area and one 15,000 L tank located at the CHPP;
- two additional self-bunded oil storage tanks - one 12,000 L tank located at the CHPP and one 500 L tank located at the rail load-out facility;
- two additional self-bunded waste oil storage tanks – one 10,000 L tank located at the CHPP and one 1,000 L tank located at the rail load-out facility; and
- a 2,000 L self-bunded grease storage tank located at the CHPP.

Additional fuel storage would also be required in the mobile go-line for the Project.

Construction and operation of additional fuel storage facilities for the Project would be undertaken in accordance with:

- AS 1940:2004;
- the *NSW Work Health and Safety Act, 2011* and associated regulations; and
- the *NSW Work Health and Safety (Mines and Petroleum Sites) Act, 2013* and associated regulations.

3.15.3 Explosives Storage

Explosives required for the Project would include initiating products and detonators, ANFO and emulsion blend explosives. Explosives would be transported and used in accordance with the existing safety and operational procedures at the Mount Pleasant Operation, which are consistent with the relevant Australian Standards and legislation.

The existing explosives storage facility would continue to be used for the Project. The explosives reload facility would be expanded to reflect the increased use of explosives for the Project.

3.15.4 Chemicals Storage and Safety Data Sheets

The management and storage of chemicals at the Mount Pleasant Operation would continue to be conducted in accordance with the existing management procedures, Australian Standards and codes.

No chemicals or hazardous material would be permitted on-site unless a copy of the appropriate Safety Data Sheet (SDS) is available on-site, or in the case of a new product, the product is accompanied by an SDS.

3.16 WORKFORCE

The approved Mount Pleasant Operation has an estimated average workforce of approximately 330 people and an estimated peak of approximately 380 people[1] (Plate 3-5).

The workforce required for the Project would increase to an estimated average of approximately 600 people, with a peak of approximately 830 full-time equivalent operational personnel (including MACH staff and on-site contractor personnel) anticipated.

Employment growth for the Project would be spread through the life of the Project, generally consistent with the staged increases in coal production (Section 3.6.3).

Construction activities would be undertaken at various times over the life of the Project (Figure 3-11). The full-time equivalent workforce required for construction and development activities is anticipated to have monthly peaks of approximately:

- 100 people in Year 3 (e.g. for development of Northern Link Road) (annual average approximately 44 people);
- 400 people in Years 4 and 5 (e.g. construction of the Stage 2a CHPP infrastructure components) (annual average approximately 200 people); and
- 300 people in Years 10 and 11 (e.g. for construction of the Stage 2b CHPP infrastructure components) (annual average approximately 130 people).

The operational hours of the Project would generally continue to be 24 hours a day, seven days a week. Construction and development activities within MACH's existing MLs (e.g. construction of Stage 2 CHPP components) may be undertaken up to 24 hours a day, seven days a week.

Nominal shift start and finish times would continue to be as follows:

- Administration Personnel – 7.00 am to 5.00 pm weekdays.
- Mining Operations Personnel (Day) – 7.00 am to 7.30 pm.
- Mining Operations Personnel (Night) – 7.00 pm to 7.30 am.

These nominal shift times would be subject to periodic review throughout the life of the Project.

Consistent with Condition 44F, Schedule 3 of Development Consent DA 92/97 for construction works outside of MACH's existing MLs, development of the Northern Link Road would generally be undertaken between 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm on Saturdays. Construction activities associated with the Northern Link Road undertaken outside of these hours would include activities:

- required by NSW Police or a public authority for the delivery of vehicles, plant or materials;
- required in an emergency to avoid the loss of life, damage to property or to prevent material harm to the environment; or
- undertaken in accordance with an approved Out of Hours Work Protocol.

Plate 3-5 Example Mount Pleasant Operation Employees

[1] As at mid-2020, the full-time equivalent operational workforce of the Mount Pleasant Operation was approximately 440 people.

3.17 REHABILITATION AND REMEDIATION ACTIVITIES

3.17.1 Rehabilitation Strategy of the Mount Pleasant Operation

Rehabilitation at the Mount Pleasant Operation is undertaken in accordance with the approved MOP and the Rehabilitation Strategy (as updated from time to time).

The final land use goals for the Mount Pleasant Operation are based on the following:

- successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes; and
- post-mining land use compatible with surrounding land uses.

3.17.2 Project Rehabilitation Strategy

A Preliminary Rehabilitation and Mine Closure Strategy has been developed for the Project and is presented in Attachment 8.

MACH is aware of the level of local interest with respect to the shape and form of Mount Pleasant Operation final mine landforms. Accordingly, MACH has undertaken a comprehensive approach to landform design based on the following key design principles (Attachment 8):

- The emplacement landform has been designed to look less “engineered” when viewed from Muswellbrook (i.e. incorporation of macro-relief to avoid simple blocky forms).
- Surface water drainage from the waste emplacement landform would incorporate micro-relief to increase drainage stability, avoid major engineered drop structures and limit erosion.
- The final void (and associated drainage network) would be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment.
- The final void has been designed as a long-term groundwater sink to maximise groundwater flows from the Eastern Out-of-Pit Emplacement to the final void.
- MACH would continue to progressively develop and revegetate the final landform to reduce visual impacts in Muswellbrook, and continue to monitor the performance of rehabilitation and implement remediation as required.

The conceptual final landform and final land use plans for the Project are shown on Figures 3-17 and 3-18.

The conceptual final landform has been developed using geomorphic design principles to address these key design principles (Attachment 8).

The landform has been designed using the GeoFluv™ methodology, which uses characteristics of relevant stable natural landforms in the local environment (referred to as analogues) and applies these characteristics to the design of new landforms of similar materials. More detailed erosional based assessment and design methods are then used to refine parts of the landform that are steeper than alluvial analogues (Attachment 8).

MACH has undertaken a preliminary assessment of potential post-mining land uses (e.g. nature conservation, agriculture) taking into account relevant strategic land use objectives of the area in the vicinity of the Project and the potential benefits of the post-mining land use to the environment, future landholders and the community (Attachment 8).

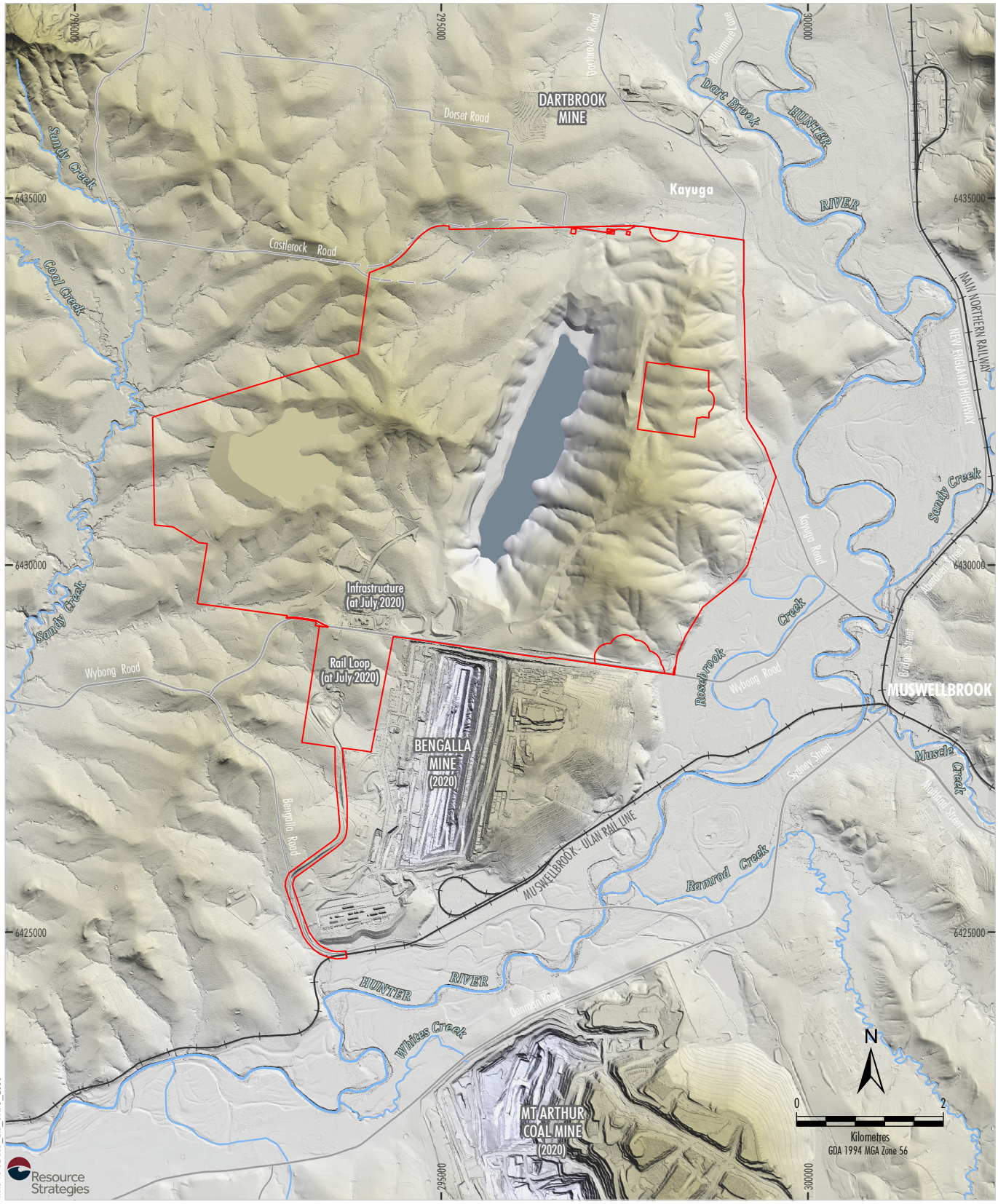
The identification of post-mining land uses has been undertaken in consultation with MSC, which indicated a preference for the inclusion of some intensive agricultural/industrial post-mining land uses that provide employment for the local community (Attachment 8).

Proposed final land uses for the Mount Pleasant Operation area include permanent water infrastructure and storage areas, agricultural land, native woodland and grassland areas and the final void (Figure 3-18).

MACH recognises that government and community stakeholders may identify final land uses that provide greater net benefits to the locality. MACH would encourage and be supportive of other community and government proposals or initiatives for the use of MACH land or infrastructure that can co-exist with the Project. These alternative final land uses would be subject to separate assessments and approval, and do not form part of the Project.

3.17.3 Project Mine Closure and Decommissioning

A Mine Closure Plan would be developed for the Project in consultation with relevant regulatory authorities and community stakeholders. The Mine Closure Plan would be developed over the Project life, with more detailed measures developed closer to Project completion.



LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

Source: MACH (2020); NSW Spatial Services (2020)

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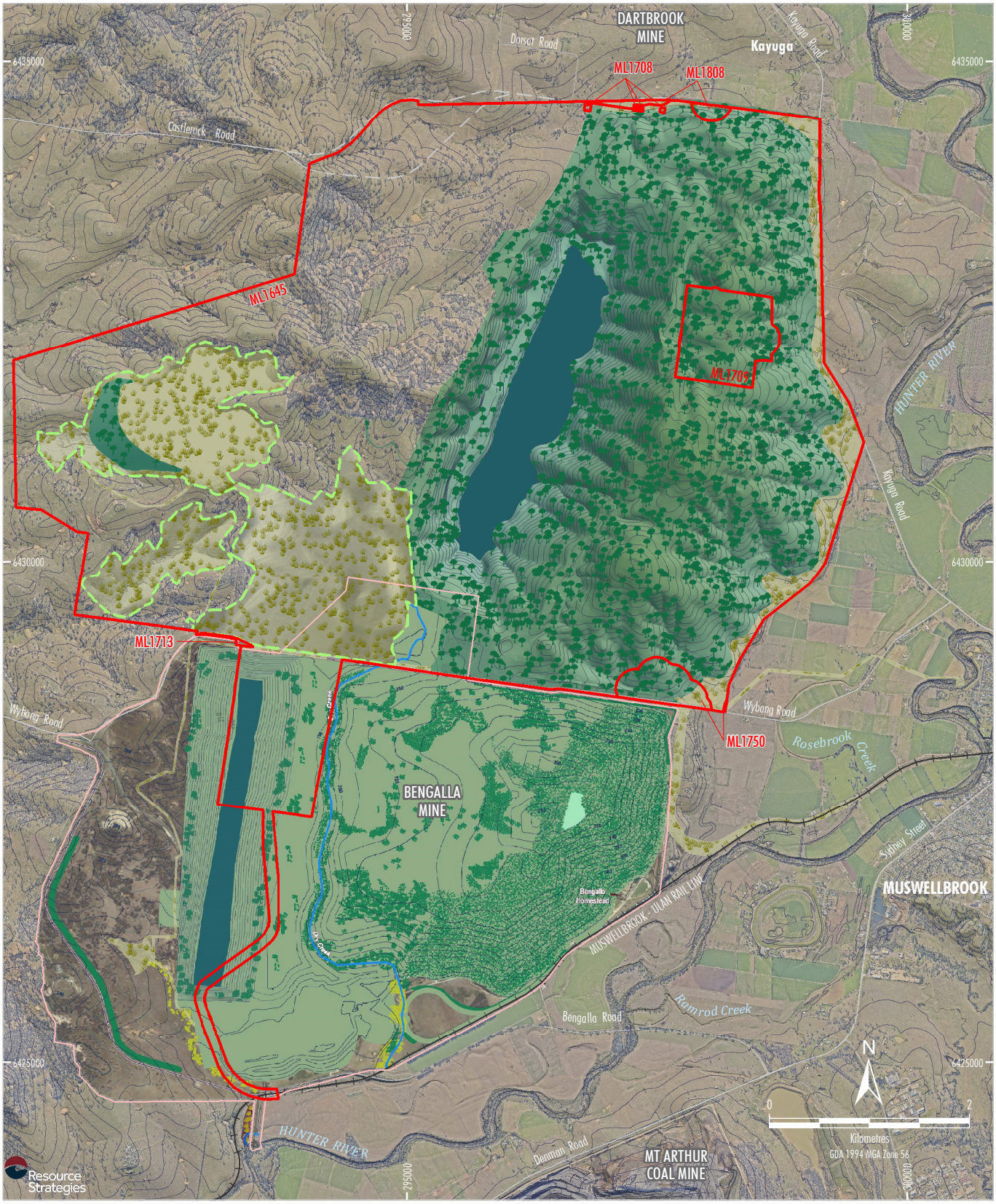
Conceptual Final Landform

Figure 3-17



LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

Final Landform Contour (10 m Interval)

Secondary/Post-mining Land Use Domains

Domain A - Final Void

Domain C - Agricultural Land

Domain D - Native Woodland/Grassland

Potential High Intensity Agriculture Area

Bengalla Mine Conceptual Final Landform *

Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)

** Digitised from Appendix 9 of Development Consent (SSD-5170) and amended in the Mount Pleasant Operation CHPP area.*

Note: Light vehicle access roads and upslope diversions associated with minimising the catchment of the final void and fines emplacement area are not shown.

Source: MACH (2020); Bengalla Mine (2016); NSW Spatial Services (2020); Department of Planning and Environment (2016)
Orthophoto: MACH (2020)

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MOUNT PLEASANT OPTIMISATION PROJECT

Conceptual Final Land Use Areas

Figure 3-18

The Mine Closure Plan would include consideration of amelioration of potential adverse socio-economic effects due to the reduction in employment at Project closure.

Upon cessation of mining operations, it would be expected that tenure of the MLs would be maintained by MACH until such time as ML and other statutory approval relinquishment criteria were satisfied. These criteria would be formulated and prescribed in consultation with relevant regulatory authorities and stakeholders. MACH would transfer to the relevant regulators any documents required to preserve the history of the site, once closed, to facilitate future land use planning.

MACH would decommission and remove all Project infrastructure unless a suitable post-mining use is identified for the infrastructure in consultation with the Resources Regulator and MSC.

3.17.4 Project Rehabilitation Practices and Measures

Rehabilitation activities for the Project would continue to be undertaken progressively according to the following phases defined in the MOP:

- Phase 1 – Decommissioning – removal of hardstand areas, buildings, contaminated materials, and hazardous materials.
- Phase 2 – Landform Establishment – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology.
- Phase 3 – Growing Media Development – incorporates physical, chemical and biological components of the growing media and ameliorants that are used to optimise the potential of the media in terms of the preferred vegetative cover.
- Phase 4 – Ecosystem and Land Use Establishment – incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control/management; and establishment of flora.
- Phase 5 – Ecosystem and Land Use Sustainability – incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function, which are the key elements of a sustainable landscape.
- Phase 6 – Relinquished Lands – land use and landscape is deemed as suitable to be relinquished from the ML.

A description of the progressive rehabilitation methods implemented at the Mount Pleasant Operation (Plate 3-6) in relation to these phases is provided in Attachment 8.

Attachment 8 also includes:

- a detailed description of the methodology used to develop geomorphic landforms,
- a summary of proposed rehabilitation monitoring; and
- an overview of the current trials and research projects underway at the Mount Pleasant Operation.

Plate 3-6 Mount Pleasant Operation Progressive Rehabilitation