Department of Planning, Housing & Infrastructure

Our ref: SSD-10418-PA-11

Mariah Lane
Environmental Advisor
Mach Energy Australia Pty Ltd
PO Box 407
Newcastle, NSW, 2300
2/08/2024

Mount Pleasant: Water Management Plan

Dear Ms Lane

Thank you for submitting the Water Management Plan in accordance with Condition B52, Schedule 2 of the consent for the Mount Pleasant (SSD-10418-PA-11). I also acknowledge your response to the Department's review comments and request for additional information.

I note the Water Management Plan has been prepared in consultation with DCCEEW, EPA; and contains the information required by the conditions of approval.

Accordingly, as nominee of the Planning Secretary, I approve the revised Water Management Plan (rev 02, August 2024).

You are reminded that if there are any inconsistencies between the Plan and the conditions of approval, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Charissa Pillay on Charissa Pillay.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

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MOUNT PLEASANT OPERATION

WATER MANAGEMENT PLAN

Document ID:	MP001-0000-ENV-PLN-0006		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	August 2024	**Status:**	Final
Approved By:	Andrew Reid	**Revision Number:**	02

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy Australia Pty Ltd (MACH Energy) purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Water Management Plan (WMP) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for operations 24 hours per day, seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

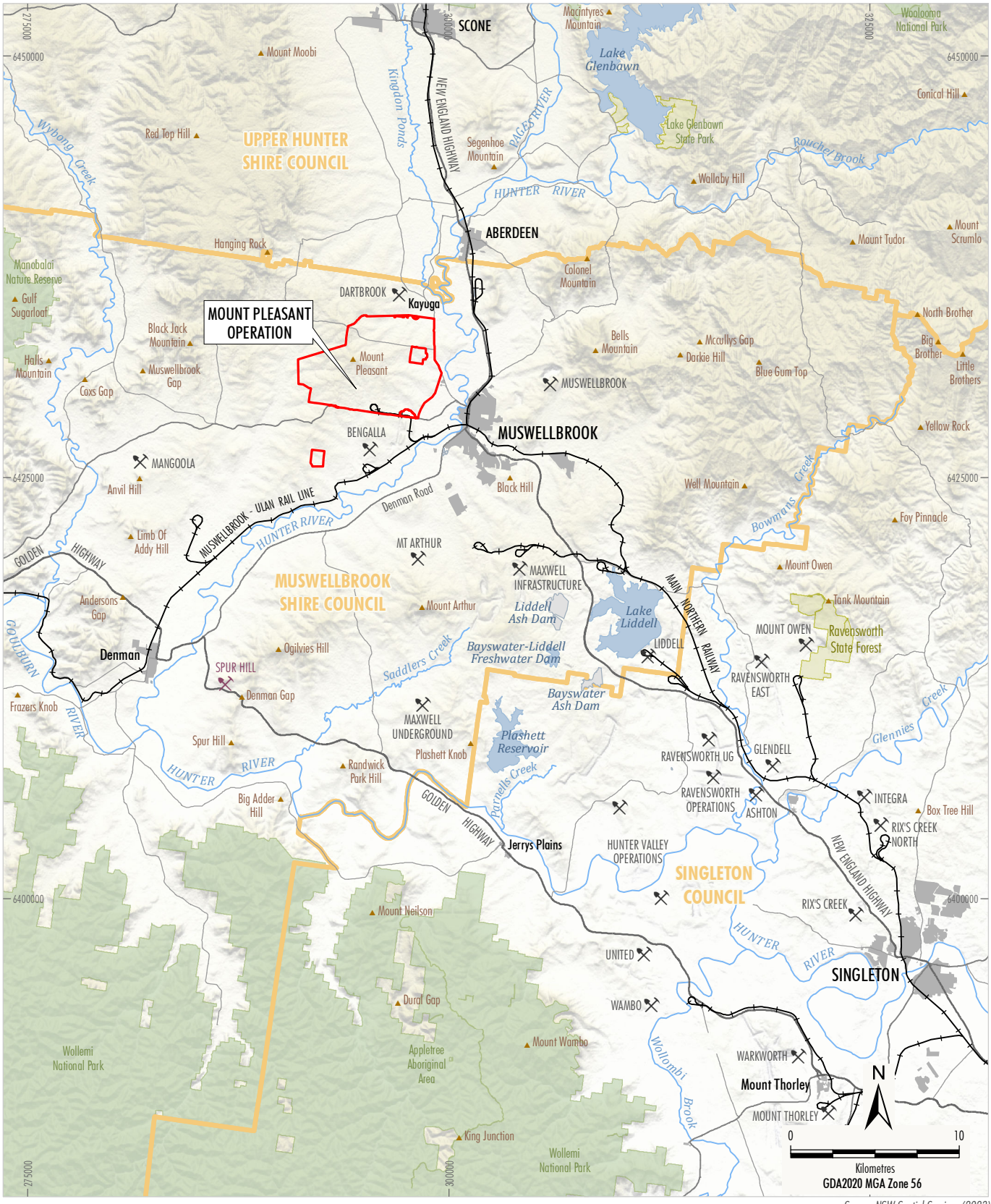
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

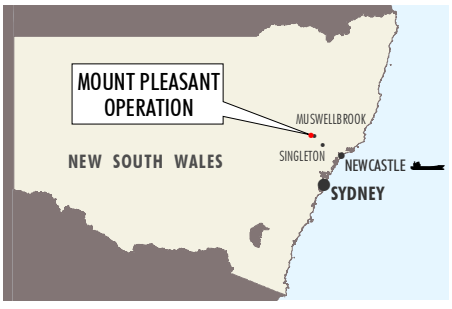
The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out of Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.



Source: NSW Spatial Services (2023)



LEGEND

- Mining Operation
- Proposed Mining Operation (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

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MOUNT PLEASANT OPERATION

Regional Location

Figure 1

MAC-18-03A MP2023_Figure 1_Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the NSW Department of Planning and Environment (DPE) (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

Modification 5 (MOD 5) was submitted to rectify an administrative error in Development Consent DA 92/97 and was approved by DPE on 29 June 2022.

Modification 6 (MOD 6) was submitted to modify Development Consent DA 92/97 and was approved on 6 November 2023. MOD 6 will allow for the construction and operation of a re-transmission facility including a tower or mast, shed and associated transmission infrastructure to re-transmit local digital television signals from the Broadcast Australia site at Rossgole Lookout. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Revised Approved Surface Disturbance Plan incorporating the MOD 6 infrastructure (Attachment 1).

On 22 January 2021, MACH Energy submitted the Mount Pleasant Optimisation Project (the Project) EIS in support of State Significant Development (SSD) 10418 under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Key aspects of the Mount Pleasant Optimisation Project generally involve (among other things):

- increased open cut extraction within the MPO's existing Mining Leases (MLs);
- a staged increase in extraction, handling and processing of ROM coal up to 21 million tonnes per annum (Mtpa);
- upgrades to existing infrastructure and new infrastructure to support mining of the proposed Project; and
- an extension to the time limit on mining operations to 22 December 2048.

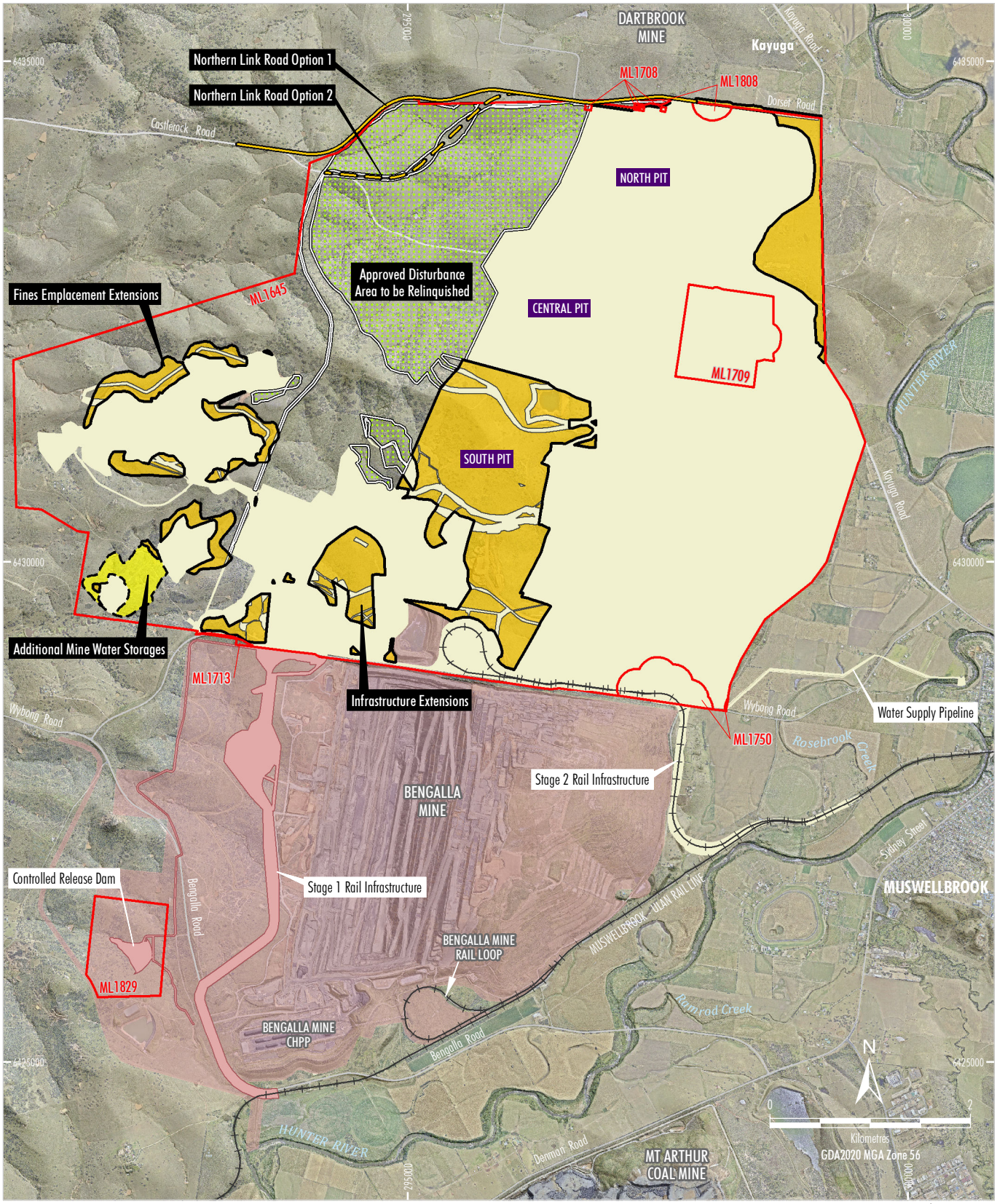
The Project was approved by the NSW Independent Planning Commission on 6 September 2022. Appendix 2 of Development Consent SSD 10418 illustrates the General Project Arrangement at 2026, 2028, 2031, 2034, 2041, 2044 and 2047, Staging of Project Disturbance Areas, and Indicative Mine infrastructure Area Layout (Attachment 2).

Part A, Condition A14 of Development Consent SSD 10418 requires the surrender of Development Consent DA 92/97 within 12 months of the date of commencement of development under Development Consent SSD 10418, or an alternative timeframe agreed with the Planning Secretary of the DPE (now Department of Planning, Housing and Infrastructure [DPHI]).

Following the commencement of development under Development Consent SSD 10418 and prior to the surrender of Development Consent DA 92/97, MACH Energy will comply with the requirements of both consents (Section 1.1).

This WMP has been prepared to satisfy the relevant conditions of both Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender). Where relevant, this WMP builds on the components of the existing/approved WMP, including previous feedback from government stakeholders and recommendations.

Figure 2 shows the indicative Project general arrangement and existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished.



MAC-18-03A MP2023_Figure 2_Rev C

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]
- Development Footprint 1 (Stage 1) - General Extension Areas [1]
- Development Footprint 1 (Stage 2) - Mine Water Dam 3 [1]
- Relinquishment Area
- Northern Link Road Option 1 Centreline
- Northern Link Road Option 2 Centreline

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.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016)
Orthophoto: MACH (Dec 2022)

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MOUNT PLEASANT OPERATION

General Arrangement of the Project

Figure 2

1.1 PURPOSE AND SCOPE

This WMP has been prepared by MACH Energy to satisfy the requirements under Development Consent SSD 10418, specifically Part B, Condition B52. It also satisfies the requirements of Development Consent DA 92/97 (prior to its surrender) and specifically Condition 28, Schedule 3.

The WMP applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The WMP applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent SSD 10418, which currently permits mining until 22 December 2048, and Development Consent DA 92/97 (prior to its surrender). As required by Part A, Condition A5 of Development Consent 10418, this WMP will continue to apply (excluding mining operations) beyond 22 December 2048, as required, until the rehabilitation and any additional undertakings (required by the Planning Secretary of the DPHI [previously DPE], or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

All conditions and statutory requirements under Development Consent DA 92/97 will become null and void after its surrender where the MPO will operate under Development Consent SSD 10418 and other relevant legislation.

In accordance with Part B, Condition B52(b) of Development Consent SSD 10418, the WMP must be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary. The groundwater related components of the WMP have been prepared by Bryce McKay, Principal – Hydrologist at Australasian Groundwater and Environmental Consultants Pty Ltd, and the surface water components have been prepared by Dr Camilla West, Associate Scientist at ATC Williams. A copy of the endorsements by the Planning Secretary are included in Attachment 3.

As required by Part B, Condition B53 of Development Consent 10418, MACH Energy will not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the WMP has been approved by the Planning Secretary.

Upon the commencement of development under Development Consent SSD 10418, and before the surrender of Development Consent DA 92/97, in accordance with Part A, Condition A15 of Development Consent SSD 10418, the conditions of Development Consent SSD 10418 prevail to the extent of any inconsistency with the conditions of those consents.

This WMP has been prepared to manage surface water and groundwater related impacts associated with construction and operation of the MPO, including for example, initial establishment and development works, open cut mining, operation of the coal handling and preparation plant (CHPP), rail spur/loop, and Fines Emplacement Area, and the supply of water to the MPO.

1.1.1 Previous Version

The WMP is updated as necessary to reflect various approvals and commitments. The most recent version of the WMP was prepared in October 2022 following the completion of the Independent Environmental Audit (IEA) undertaken by MACH Energy in accordance with Condition 9, Schedule 5 of Development Consent DA 92/97.

1.1.2 Current Version

The current version of the WMP has been prepared to include additional details regarding water management (including erosion and sediment control) relevant to the full life of mine following approval of the Project and associated Development Consent SSD 10418 conditions, in addition to variations to Environmental Protection Licence (EPL) 20850 (approved 28 February 2023).

1.2 STRUCTURE OF THE WMP

In accordance with Condition B52 of Development Consent 10418 and Condition 28, Schedule 3 of Development Consent DA 92/97 (prior to its surrender), the WMP includes the following five appendices:

- Site Water Balance (SWB) (Appendix 1);
- Erosion and Sediment Control Plan (ESCP) (Appendix 2);
- Surface Water Management and Monitoring Plan (SWMMP)[1] (incorporating relevant components of the Surface and Groundwater Response Plan (SGWMP) required under Development Consent DA 92/97) (Appendix 3); and
- Groundwater Management Plan (GWMP) (incorporating relevant components of the Surface and Groundwater Response Plan (SGWMP) required under Development Consent DA 92/97 (Appendix 4).

A brief overview of the documentation referred to above is provided in Table 1.

Table 1
Overview of WMP Documentation

#	Appendix / Document	Description / Scope
1	Site Water Balance	Describes the MPO water management system (including modelling results) detailing water supply, use, management, transfers, and measures to minimise water use.
2	Erosion and Sediment Control Plan	Describes the management of potential erosion impacts (including details of erosion and sediment control structures and their maintenance), as well as implementation of measures to minimise soil erosion, generation of sediment and transport of sediment to downstream waters. The document also identifies activities that could affect flooding and describes how flood risk is managed.
3	Surface Water Management and Monitoring Plan	Describes the baseline surface water data, surface water impact assessment criteria (including trigger levels for investigation), surface water monitoring program and reporting procedures. The document also describes the response protocols (including trigger action response plans) to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development.
4	Groundwater Management Plan	Describes the baseline groundwater data, groundwater impact assessment criteria (including trigger levels for investigation), groundwater monitoring program and reporting procedures. The document also describes the response protocols (including trigger action response plans) to respond to any exceedances of the relevant performance measures or groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development. The document also provides details of the design and management of the proposed final voids.

[1] Previously known as the Surface Water Management Plan under Development Consent DA 92/97.

The remainder of the WMP is structured as follows:

- Section 2: Outlines the statutory obligations applicable to the WMP.
- Section 3: Provides an overview of the MPO water management system.
- Section 4: Provides details for the review and improvement of environmental performance.
- Section 5: Describes the management and reporting of incidents, complaints and non-compliances.
- Section 6: Provides a list of references cited in this report.
- Appendix 5: Lists comments received from the relevant consultees during the previous consultation period.
- Appendix 6: Lists comments received from the relevant consultees during the current consultation period.

1.3 CONSULTATION

In accordance with Part A, Condition A22 of Development Consent SSD 10418, MACH Energy must consult with relevant parties prior to submitting the WMP and provide details of the consultation undertaken. A summary of the consultation undertaken is provided below.

1.3.1 NSW Government Agencies

Previous Version

On 15 October 2020 and 21 October 2020, the EPA indicated that their role is to set environmental management objectives rather than being involved in development strategies to meet the objectives (i.e. management plans). The EPA therefore did not provide any comments on the previously approved WMP (24/10/2022).

On 6 November 2020, MACH Energy contacted DPIE – Water to confirm whether DPIE – Water had any comments on the WMP. DPIE – Water provided comments on this WMP on 5 May 2021, regarding the MPO's groundwater licence entitlements, ground surface and screen interval for groundwater bores, flow in the Hunter Regulated River Alluvial Water Source and the privately-owned groundwater bores response protocol (refer to Appendix 5). Relevant sections of the SGWRP were revised to clarify the cumulative drawdown impact considerations (now incorporated into the GWMP). No material changes were made in relation to groundwater entitlement holdings and ground surface and screen intervals.

Current Version

This WMP has been provided to NSW Department of Climate Change, Energy, the Environment and Water – Water (DCCEEW Water) (previously NSW Department of Planning and Environment [DPE] – Water) and the NSW Environment Protection Authority (EPA) for the purposes of consultation in accordance with Condition B52 of Development Consent SSD 10418 and Condition 28, Schedule 3 of Development Consent DA 92/97.

1.3.2 Community Consultation

MACH Energy's approach to community relations is focused on building enduring relationships based on mutual respect, active partnerships and a long-term commitment. MACH Energy is committed to:

- Having robust relationships with our communities of interest – this requires understanding the issues and needs of different stakeholders, as well as active engagement.
- Effectively contributing to communities – this means understanding the socio-economic environment and the community's vision for the future, and providing contributions that are sustainable and build long-term community capacity.

These objectives also form the primary goals for the MPO community relation activities and are reflected in our Community and Stakeholder Engagement Plan for the MPO and the Muswellbrook community. There are a variety of communication channels available for community members to become engaged with the MPO's progress (e.g. the MPO's Community Hotline [1800 886 889)]. MACH Energy is an active and accessible member of the community in which we live and operate. The hotline number will be published in a variety of MACH Energy's public communication tools.

The community is also invited to find out more about the MPO by accessing MACH Energy's website (https://machenergyaustralia.com.au/). Details on the site will allow interested parties to become informed about the MPO's progress and it provides a platform for publishing key monitoring results and public reports alongside information such as minutes from the MPO's Community Consultative Committee (CCC).

MACH Energy's approach to community engagement and consultation involves providing information regarding its activities in a timely, clear, open and transparent manner, and seeking feedback from communities to understand the potential impacts of its activities. MACH Energy will engage in regular consultation and on-going communication with our community members and stakeholders. Feedback from neighbours and local communities is used to inform MPO decisions.

2 STATUTORY OBLIGATIONS

MACH Energy's statutory obligations are contained in:

- the conditions of Development Consent 10418;
- the conditions of Development Consent DA 92/97 (prior to its surrender);
- the conditions of the Commonwealth Approval EPBC 2020/8735 (once granted);
- the conditions of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850) and permits and mining leases (MLs) (ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829); and
- other relevant legislation.

Obligations relevant to this WMP are described below.

In addition to the above, activities associated with the MPO will be undertaken with the licences, permits and leases described in the MPO Environmental Management Strategy (EMS).

2.1 DEVELOPMENT CONSENT SSD 10418

The conditions of Development Consent SSD 10418 relevant to the content and structure of this WMP are described in Sections 2.1.1 and 2.1.2 below.

A comprehensive list of all conditions in Development Consent SSD 10418 relevant to water is provided in Attachment 4.

2.1.1 WMP Requirements

This WMP has been prepared by MACH Energy to satisfy the requirements of Part B, Condition B52 of the Development Consent SSD 10418 (Table 2) and Condition 28, Schedule 3 of Development Consent DA 92/97 (prior to its surrender) (Table 3). Additional conditions relevant to water under Development Consent DA 92/97 are detailed in Attachment 5.

Part B, Condition B52(c) of Development Consent SSD 10418 requires that a WMP be prepared in consultation with DPE Water (now DCCEEW Water) and the EPA. Details of the consultation undertaken, and the outcome of the consultation is detailed in Section 1.3 and Appendices 5 and 6.

Table 2
Water Management Plan Requirements in Development Consent SSD 10418

MPO Development Consent SSD 10418 Part B	Section where addressed in this WMP document
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This document
(a) be submitted for approval within six months of the commencement of development under this consent;	Noted
(b) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Section 1.1
(c) be prepared in consultation with DPE Water and the EPA	Section 1.3.1
(d) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 6);	Appendices 1–4

Table 2 (Continued)
Water Management Plan Requirements in Development Consent SSD 10418

MPO Development Consent SSD 10418 Part B	Section where addressed in this WMP document
(e) utilise existing data from nearby mines and build on existing monitoring programs, where practicable;	Appendices 3 (Sections 4 and 7) and 4 (Sections 4 and 8)
(f) include a:	
(i) Site Water Balance…	Appendix 1
(ii) Erosion and Sediment Control Plan…	Appendix 2
(iii) Surface Water Management and Monitoring Plan…	Appendix 3
(iv) Groundwater Management Plan that includes…	Appendix 4
(v) a protocol to report on the measures, monitoring results and performance criteria identified above, in the Annual Review referred to in condition D11.	Section 5
B54. The Applicant must implement the Water Management Plan as approved by the Planning Secretary.	Noted

2.1.2 Management Plan (General) Requirements

Part D, Condition D5 of Development Consent SSD 10418 outlines general management plan requirements. Table 3 presents these requirements and indicates where each is addressed within this WMP.

Table 3
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this WMP document
D5. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) summary of relevant background or baseline data;	Appendices 1–4
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Appendices 1–4 and Section 2
(ii) any relevant limits or performance measures and criteria; and	
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	
(c) any relevant commitments or recommendations identified in the document/s listed in Condition A2(c);	Appendices 1–4
(d) a description of the measures to be implemented to comply with the statutory requirements, limits, or performance measures and criteria;	Appendices 1–4
(e) a program to monitor and report on the:	Appendices 2–4 and Section 6
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to Condition D4(c);	
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Appendices 1–4 and Section 4

Table 3 (Continued)
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this WMP document
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Appendices 1–4 and Sections 5 and 6
(h) a protocol for managing and reporting any:	Sections 5 and 6
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements;	
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Sections 5 and 6
(j) a protocol for periodic review of the plan.	Section 5
***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	

2.2 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this WMP are described in Sections 2.2.1 and 2.2.2 below.

A comprehensive list of all conditions in Development Consent DA 92/97 relevant to water is provided in Attachment 5

2.2.1 WMP Requirements

Condition 28, Schedule 3 of Development Consent DA 92/97 requires the preparation of a WMP. Table 4 presents these requirements and indicates where they are addressed in this WMP.

Table 4
Water Management Plan Requirements in Development Consent DA 92/97

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this WMP document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary.	This document (and Section 1.3.1)
The plan must include:	
(a) a Site Water Balance, …	Appendix 1
(b) an Erosion and Sediment Control Plan, …	Appendix 2
(c) a Surface Water Management Plan, …	Appendix 3
(d) a Groundwater Management Plan, …	Appendix 4
(e) a Surface and Ground Water Response Plan, …	Appendices 3 and 4

2.2.2 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of the WMP.
Table 5 presents these requirements and indicates where each is addressed within this WMP.

Table 5
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this WMP document
2. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
(a) detailed baseline data;	Appendices 1–4
(b) a description of:	
• *the relevant statutory requirements (including any relevant consent, licence or lease conditions);*	Section 2
• *any relevant limits or performance measures/criteria;*	Appendices 1–4
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	Appendices 1–4
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Appendices 1–4
(d) a program to monitor and report on the:	Appendices 1–4
• *impacts and environmental performance of the development;*	
• *effectiveness of any management measures (see c above);*	
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 4
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Appendices 1–4 and Section 5
(g) a protocol for managing and reporting any:	Sections 5 and 6
• *incidents;*	
• *complaints;*	
• *non-compliances with statutory requirements; and*	
• *exceedances of the impact assessment criteria and/or performance criteria; and*	
(h) a protocol for periodic review of the plan.	Section 5
Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	

2.3 COMMONWEALTH GOVERNMENT APPROVALS

Commonwealth approval for the MPO (EPBC 2011/5795) was granted on 29 February 2012. EPBC 2011/5795 does not include any specific water-related conditions.

The EPBC 2020/8735 Action was determined to be a controlled action on 26 August 2020, and includes controlling provisions for:

a water resource, in relation to coal seam gas development and large coal mining development.

Approval of EPBC 2020/8735 is pending and is expected to include specific water-related conditions. This WMP will be updated in accordance with the procedure outlined in Section 5.2.

2.4 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences (WALs) issued under the *Water Management Act, 2000*.
- Discharge credits (51) held under the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation, 2002.*
- Environment Protection Licence (EPL) 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the EPA.
- ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources.
- Mining Operations Plan (MOP)[2].

2.4.1 Water Access Licences

Details of the WALs held by MACH Energy are summarised in Tables 6 and 7 below.

Table 6
Water Access Licences - Groundwater Sources

Water Access Licence	Water Source	Share (units)
18253	Hunter Regulated River Alluvial Water Source	74
18266	Hunter Regulated River Alluvial Water Source	68
18206	Hunter Regulated River Alluvial Water Source	24
18199	Hunter Regulated River Alluvial Water Source	5
18122	Hunter Regulated River Alluvial Water Source	33
18131	Hunter Regulated River Alluvial Water Source	60
21503	Hunter Regulated River Alluvial Water Source	21
18154	Hunter Regulated River Alluvial Water Source	5
18177	Hunter Regulated River Alluvial Water Source	5
23935	Muswellbrook Water Source	41
41437	Sydney Basin – North Coast Groundwater Source	640
40298	Sydney Basin – North Coast Groundwater Source	90
18336	Krui River Water Source	12
44101	Dart Brook Water Source	20

MACH Energy will obtain and hold volumetric licenses to account for maximum predicted groundwater inflows and surface water take associated with the development and operation of the MPO in accordance with the legislative requirements of the *Water Management Act, 2000*.

Relevant volumetric licences would remain to be held by MACH Energy (or retired to DoI Water) to account for predicted post-mining water take at the MPO.

[2] As of 1 August 2022, MPO operates under a Rehabilitation Management Plan (RMP) along with the supporting Annual Rehabilitation Report and Forward Program which has replaced the MOP (1 July 2021 – 30 June 2023).

Table 7
Water Access Licences – Surface Water Sources

Water Access Licence	Water Source	Share (units)
879	Hunter Regulated River Water Source	243
880	Hunter Regulated River Water Source	124
1113	Hunter Regulated River Water Source	366
973	Hunter Regulated River Water Source	3
638	Hunter Regulated River Water Source	225
639	Hunter Regulated River Water Source	134
974	Hunter Regulated River Water Source	210
988	Hunter Regulated River Water Source	156
1229	Hunter Regulated River Water Source	480
1227	Hunter Regulated River Water Source	99
992	Hunter Regulated River Water Source	75
7808	Hunter Regulated River Water Source	36
702	Hunter Regulated River Water Source	267
993	Hunter Regulated River Water Source	265
604	Hunter Regulated River Water Source	183
662	Hunter Regulated River Water Source	9
10775	Hunter Regulated River Water Source	243
41438	Hunter Regulated River Water Source	455
969	Hunter Regulated River Water Source	39
1074	Hunter Regulated River Water Source	5
8406	Hunter Regulated River Water Source	168
8598	Hunter Regulated River Water Source	3
8445	Hunter Regulated River Water Source	12.6
10531	Hunter Regulated River Water Source	120
975	Hunter Regulated River Water Source	8
989	Hunter Regulated River Water Source	8
1230	Hunter Regulated River Water Source	8
605	Hunter Regulated River Water Source	8
677	Hunter Regulated River Water Source	24
663	Hunter Regulated River Water Source	16
13785	Hunter Regulated River Water Source	1
1259	Hunter Regulated River Water Source	33.2
1258	Hunter Regulated River Water Source	5
1307	Hunter Regulated River Water Source	37.5
1260	Hunter Regulated River Water Source	4.8
1308	Hunter Regulated River Water Source	15.1
1338	Hunter Regulated River Water Source	17.5

2.5 OTHER LEGISLATION AND REQUIREMENTS

Obligations from relevant guidelines, protocols, Australian Standards, codes or policies will be addressed in this WMP, in accordance with Part A, Condition A34 of Development Consent SSD 10418 and Schedule 2, Condition 13 of Development Consent DA 92/97 (prior to its surrender). The legislation relevant to this WMP is outlined below.

2.5.1 Water Management Act, 2000

The *Water Management Act, 2000* incorporates the provisions of various prior Acts relating to the management of surface and groundwater in NSW and provides a single statute for regulation of water access, use and works (e.g. pumps or bores) that affect the licensing of surface water and alluvial and non-alluvial (i.e. porous rock) groundwater in the vicinity of the MPO.

Under the *Water Management Act, 2000*, the MPO is regulated under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2022* and the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources, 2016*.

A list of the water sources contained in these Water Sharing Plans, which are relevant to the MPO, is included in the GWMP (Appendix 4).

2.5.2 Water Act, 1912

As water sharing plans have been commenced under the *Water Management Act, 2000* for all groundwater and surface water systems that the MPO is predicted to extract water from, the *Water Act, 1912* is not relevant to licensing considerations for the MPO.

2.5.3 Dams Safety Act, 2015

The following existing dams at the MPO are declared dams under section 5 of the *Dams Safety Act, 2015*:

- Mount Pleasant ED3 (Environmental Dam 3)
- Mount Pleasant MWD (Mine Water Dam); and
- Mount Pleasant TD (Tailings Dam - Fines Emplacement Area).

Bengalla CW1 and the Bengalla Discharge Dam are Bengalla Mine dams located in the vicinity of the MPO. They are also declared dams under the *Dams Safety Act, 2015*.

Under section 48 of the *Dams Safety Act, 2015*, the area of land surrounding, or in the vicinity of, a declared dam can be deemed a notification area. Before granting development consent for any mining operations in a notification area, a consent authority must refer the application for development consent to Dams Safety NSW and take into consideration any matters that are raised by Dams Safety NSW in relation to the application.

The *Dams Safety Act, 2015* also requires a program for monitoring dam seepage (in consultation with Dams Safety NSW). The monitoring program is described in the SWMMP.

2.5.4 National Water Quality Management Strategy/ANZECC (2000) Guidelines

The National Water Quality Management Strategy is a joint national approach to improving water quality in Australian and New Zealand waterways. The Australian and New Zealand Environment and Conservation Council (ANZECC) *water quality guidelines* (ANZECC, 2000) have been considered where applicable in the SWMMP (Appendix 3) and GWMP (Appendix 4) for the MPO.

2.5.5 Aquifer Interference Policy

The *Aquifer Interference Policy* has been developed by the NSW Government as a component of the *NSW Government's Strategic Regional Land Use Policy*.

The Aquifer Interference Policy applies statewide and details water licence and impact assessment requirements. The *Aquifer Interference Policy* has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The *Aquifer Interference Policy* also enhances existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

2.5.6 Hunter-Central Rivers Catchment Action Plan 2013–2023

The *Hunter-Central Rivers Catchment Action Plan 2013–2023* has been developed by the Hunter-Central Rivers Catchment Management Authority (2013) to set strategic goals, targets and outcomes maintaining and improving the health and productivity of the Hunter-Central Rivers Catchment.

The 2013–2023 plan is a further development on the goals and targets of the previous (and first) catchment action plan. The plan provides direction for actions at all levels of government, industry and community to maintain or improve the long-term viability of healthy and productive natural systems within the catchment region.

The goals, targets and outcomes of the *Hunter-Central Rivers Catchment Action Plan 2013–2023* have been considered where relevant in the preparation of this WMP.

3 WATER MANAGEMENT OVERVIEW

3.1 WATER MANAGEMENT SYSTEM AND SITE WATER BALANCE

Key water demands at the MPO include:

- water used in the CHPP, including water retained in coal products and rejects and water for dust suppression (including stockpiles);
- haul road dust suppression; and
- miscellaneous water usage, such as vehicle wash down and stockpile water usage.

These water demands are met through a combination of the following water sources:

- groundwater inflows to the open cut;
- runoff captured from the footprint of the mining disturbance area by the water management system;
- fine rejects bleed water captured from the Fines Emplacement Area; and
- water pumped from the Hunter River.

Key water storages at the MPO include:

- Mine Water Dam 1 (MWD1);
- Mine Water Dam 2 (MWD2);
- Mine Water Dam 3 (MWD3);
- Discharge Dam (DW1)
- Environmental Dam 2 (ED2);
- Environmental Dam 3 (ED3);
- Environment Dam Mine Infrastructure Area (EDMIA);
- Sediment Dam 1 (SD1);
- Sediment Dam 3 (SD3);
- Sediment Dam 4 (SD4);
- Sediment Dam 5 (SD5);
- Sediment Dam 6 (SD6);
- Sediment Dam 7 (SD7);
- Sediment Dam 8 (SD8);
- Sediment Dam 9 (SD9);
- Sediment Dam 10 (SD10);
- High Wall Dam 1 (HWD1);
- High Wall Dam 2 (HWD2);
- High Wall Dam 3 (HWD3);
- Rail Loop Dam 2 (RLD2);
- CHPP Dam (CHPPD); and
- other small farm dams used periodically as available and required.

The Mine Water Dams (MWDs) are the main water storage on-site and supply makeup water to the CHPP. Fine rejects slurry produced by the CHPP is pumped to the Fines Emplacement Area and water recovered from the Fines Emplacement Area is pumped back to the MWDs. The mine water management system allows all dams to ultimately report to the MWDs. The MWDs can receive water from the Hunter River via WALs. The MWDs are connected to the Discharge Dam (DW1) which is located to the west of Bengalla Road and is intended to facilitate controlled releases to the Hunter River under the conditions of the HRSTS. DW1 and its associated pipeline are approved for construction under the development consent for the Bengalla Continuation Project (SSD 5170), with Development Consent DA 92/97 and Development Consent SSD 10418 authorising the use of the discharge system. EPL 20850 was varied on 28 February 2023 to incorporate a licensed discharged point at the outflow from DW1 and to incorporate the discharge point and the Interim Water Discharge Pipeline in the premises boundary.

ED2 is located downstream of the Fines Emplacement Area to serve as a sediment dam for the construction of the Fines Emplacement Area embankment.

Environmental Dam 3 (ED3) is a sediment dam located within the mine infrastructure area. ED3 is used to supplement site water supply via pumping to the MWDs during periods of low water inventory.

The existing and approved sediment dams manage runoff from the open cut pit and waste rock emplacement disturbance areas. An additional sediment dam (SD8) may be required north of the Fines Emplacement Area as part of the construction of the final lift that will occur in approximately 2040 (subject to actual emplaced fines volumes and detailed design).

In accordance with Schedule 3, Condition 28(b) of Development Consent DA 92/97 (prior to its surrender) and Part B, Condition B52(f)(i) of Development Consent SSD 10418, the preparation of an updated site water balance will be undertaken annually. This is discussed further in the SWB (Appendix 1).

A detailed description of the MPO water management system and an overview of the supporting site water balance modelling is provided in the SWB (Appendix 1).

3.2 EROSION AND SEDIMENT CONTROL OVERVIEW

Key activities that have the potential to cause or increase soil erosion at the MPO relate to the disturbance of land and soils, including clearing, stripping and stockpiling activities.

Erosion and sediment controls will be implemented at the MPO to mitigate the impacts of the proposed development on nearby watercourses and the surrounding environment.

Specific erosion and sediment controls to be implemented at the MPO include, but are not limited to, the following:

- clean water diversion drains and banks;
- silt fences (or equivalent control);
- vegetated buffer strips; and
- sediment dams/basins.

These erosion and sediment controls will be designed and operated in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2E - Mines and Quarries* (DECC, 2008).

Other *Blue Book* (Landcom, 2004) erosion and sediment control measures may be implemented at the MPO as required.

More detailed information regarding the erosion and sediment control scheme proposed at the site is provided in the ESCP (Appendix 2).

The Eastern Extent of Approved Surface Development (incorporating the MPO major landforms) are located outside the 1% AEP flood extent for the Hunter River. Therefore, no flood management structures are required.

3.3 SURFACE WATER OVERVIEW

The MPO is located within the Hunter Catchment, which has an overall size of 21,500 square km, encapsulating the major towns of Newcastle, Singleton and Muswellbrook (DPI Water, 2016). The Hunter River is the main drainage feature within the catchment. It begins in the Mount Royal Range and flows adjacent to Muswellbrook and Singleton, before draining to the ocean at Newcastle. The Hunter River contains a number of significant tributaries, including the Goulburn, Pages and Isis Rivers, as well as the Middle, Dart, Stewart, Moonan and Ormadale Brooks. Alluvial floodplains ranging in width from 1.5–2 km border the river over the majority of its length. The eastern extent of the MPO ML boundary is located directly adjacent to these floodplains.

The drainage network in the vicinity of the MPO is generally characterised by steep gullies which drain from the surrounding hills into the flat alluvial plains adjacent the Hunter River.

The main drainage feature is the Hunter River which flows in a southerly direction approximately 1 km to the east of the MPO ML boundary. There are a number of ephemeral drainage lines which traverse the MPO area and drain into the Hunter River. The eastern portion of the MPO area drains via Rosebrook Creek, as well as other unnamed drainages. Areas in the south and west of the MPO boundary drain to Dry Creek and Sandy Creek, respectively, both of which are tributaries of the Hunter River. All other areas drain into unnamed drainage lines, which flow directly into the Hunter River. A detailed description of the surface water management and monitoring, and the trigger action response protocols at the MPO are provided in the SWMMP (Appendix 3).

In accordance with Part B, Condition B52(v) of Development Consent SSD 10418, the measures, monitoring results and performance criteria will be reported in the MPO Annual Review.

3.4 GROUNDWATER OVERVIEW

The MPO is located in the vicinity of two predominant groundwater schemes:

- the Alluvial groundwater system – associated with the alluvial plains of the Hunter River and its tributaries; and
- the Hard (fractured and porous) rock groundwater system – including the Permian aged Wittingham Coal measures.

The MPO coal resource is located in the Permian Wittingham Coal measures of the Singleton Supergroup. 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.

Alluvial sediments associated with the Hunter River are located to the east of the MPO. The alluvial sediments offer increased groundwater storage when compared to the hard (fractured and porous) rock groundwater system due to their higher porosity. Gravel zones within the alluvium are capable of providing the highest storage and permeability when compared to clay, sand and silt zones.

A detailed description of groundwater management and monitoring, and the trigger action response protocols at the MPO are provided in the GWMP (Appendix 4).

In accordance with Part B, Condition B52(v) of Development Consent SSD 10418, the measures, monitoring results and performance criteria will be reported in the MPO Annual Review.

3.5 SURFACE AND GROUND WATER RESPONSE OVERVIEW

The SWMMP (Appendix 3) and GWMP (Appendix 4) include response protocols for exceedances of the surface water and groundwater trigger levels, respectively. The GWMP also includes measures to:

- offset the loss of any baseflow to watercourses caused by the MPO;
- minimise groundwater leakage from alluvial aquifers as a result of the MPO;
- compensate landowners of privately-owned land whose water supply is adversely affected by the MPO; and
- mitigate any adverse impacts on groundwater dependent ecosystems or riparian vegetation.

Consistent with Part B, Condition B52(f) of Development Consent SSD 10418, the surface water and groundwater trigger action response protocols are discussed under in the SWMMP (Appendix 3) and GWMP (Appendix 4), respectively. A Surface and Ground Water Response Plan is required under Development Consent DA 92/97 (prior to its surrender) and has been addressed in the SWMMP and GWMP.

3.6 ROLES AND RESPONSIBILITIES

The Environmental Superintendent is primarily responsible for implementing the suite of environmental management plans across the MPO, with assistance provided by the Managing Director and Department Managers/Supervisors.

A combination of MACH Energy employees and mining contractor staff are responsible for environmental management at the MPO. The roles and responsibilities of members of the site, including the environmental management team, are provided in MACH Energy's EMS.

It is the responsibility of MACH Energy to employ people that are appropriately trained, competent and have an appropriate level of experience and understanding to undertake their work in a manner that minimises impacts on the environment and community. In addition, a component of the site-specific induction is to promote and provide all employees and contractors with general environmental awareness training. In accordance with Part A, Condition A33 of Development Consent SSD 10418, MACH Energy will ensure that any of its employees or contractors are made aware of, and are instructed to comply with, the conditions of Development Consent SSD 10418 relevant to activities they carry out in respect of the development. A description of training requirements is provided in MACH Energy's EMS.

4 CONTINGENCY PLAN

4.1 POTENTIAL CONTINGENCY MEASURES

In the event that an exceedance of a water-related criterion is considered to have occurred, as per the compliance assessment protocols in the SWB, SWMMP and GWMP, MACH Energy will implement the following Contingency Plan:

- The Environmental Superintendent will report the incident in accordance with Section 6.
- MACH Energy will identify the appropriate course of action with respect to the identified impact(s), in consultation with technical specialists, DPHI and any other relevant agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 4.1.
- MACH Energy will, in the event there is a dispute over the proposed remedial course of action or if the actions conflict with current approvals, submit the appropriate course of action to the DPHI for approval.
- MACH Energy will implement the appropriate course of action to the satisfaction of the DPHI.

Potential contingency measures are described in the SWB, SWMMP and GWMP.

4.2 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418 and Schedule 5, Condition 1A of Development Consent DA 92/97 (prior to its surrender), MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in the SWB, ESCP, GWMP and SWMMP.

Where any non-compliance with the criteria and/or performance measures occurs, at the earliest opportunity, MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation and submit a report to the DPHI describing these options and preferred remediation measures; and
- implement remediation measures as directed by the Planning Secretary.

5 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

5.1 ANNUAL REVIEW

In accordance with Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the previous calendar year). The report will be submitted to the DPHI, to the satisfaction of the Planning Secretary.

In relation to water, the MPO Annual Review will:

- include a comprehensive review of the water monitoring data and site water balance relating to the MPO over the past year, which includes a comparison of the results to evaluate compliance against:
    - relevant statutory requirements, limits or performance measures/criteria (refer Section 2 and the ESCP, SWB, SWMMP and GWMP);
    - monitoring results of the previous years;
    - relevant predictions in the Mount Pleasant Operation EIS and MOD 1, MOD 2, MOD 3 and MOD 4 EAs (prior to the surrender of Development Consent DA 92/97); and
    - relevant predictions in the Project EIS.
- identify any water-related non-compliance over the past year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- identify any trends in the water monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual water impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what water-related measures will be implemented over the next year to improve the environmental performance of the MPO.

As mentioned in Part D, Condition D11 of Development Consent SSD 10418 (above) relating to MPO Annual Reviews, MACH Energy will include a comprehensive review of environmental performance at the MPO in accordance with Part A, Condition A2 of Development Consent SSD 10418 requires that:

A2. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) generally in accordance with the EIS and EAs;

(d) generally in accordance with the Development Layout in Appendix 2.

Copies of the MPO Annual Review will be submitted to Muswellbrook Shire Council and made available to the CCC and any interested person upon request, in accordance with Part D, Condition D12 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender). The MPO Annual Review will also be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/).

5.2 WATER MANAGEMENT PLAN REVISION

In accordance with Part D, Condition D7 of Development Consent SSD 10418 and Condition 4, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), this WMP will be reviewed, and if necessary revised (to the satisfaction of the Planning Secretary), within three months of submission of:

- an MPO Annual Review (Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97);
- an incident report (Part D, Condition D9 or D10 of Development Consent SSD 10418 and Condition 7, Schedule 5 of Development Consent DA 92/97);
- an IEA (Part D, Condition D13 of Development Consent SSD 10418 and Condition 9, Schedule 5 of Development Consent DA 92/97);
- the approval of any modification of the conditions of Development Consent SSD 10418;
- any modification to the conditions of Development Consent DA 92/97[3]; and
- notification of a change in development phase (Part A, Condition A12 of Development Consent SSD 10418).

Prior to the surrender of Development Consent DA 92/97, within four weeks of conducting any such review, the Secretary of the DPHI will be advised of the outcomes of the review and any revised documents submitted to the Secretary for approval. After the surrender of Development Consent DA 92/97, in accordance with Part D, Condition D8 of Development Consent SSD 10418, within six weeks of conducting such a review the revised documents will be submitted to the Planning Secretary for approval.

In accordance with Part D, Condition D8 of Development Consent SSD 10418, MACH Energy must, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, revise the GWMP to the satisfaction of the Planning Secretary.

In accordance with Development Consent DA 92/97 and Development Consent SSD 10418, MACH Energy may submit a revised GWMP for the approval of the Planning Secretary at any time, and may also submit any revision to this GWMP required under Development Consent DA 92/97 on a staged basis.

If agreed with the Secretary of the DPHI, a revision to this WMP required under Development Consent DA 92/97 or Development Consent SSD 10418 may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97 and/or Development Consent SSD 10418.

This WMP will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Part D, Condition D17(iii) of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender).

[3] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3 of Development Consent DA 92/97, the latter prevails.

5.3 INDEPENDENT ENVIRONMENTAL AUDIT

Within one year of commencement of development under Development Consent SSD 10418, and every three years after, an IEA will be undertaken and submitted as required, in accordance with Part D, Condition D13 of Development Consent SSD 10418.

In accordance with Part D, Condition D14 of Development Consent SSD 10418, within three months of commencing the IEA, MACH Energy will submit a copy of the audit report to the Planning Secretary, and other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. MACH Energy will ensure that the recommendations will be implemented and the findings and compliance with the IEA will be reported in the MPO Annual Reviews.

Once Development Consent DA 92/97 is surrendered, all subsequent IEAs commissioned by MACH Energy will be in accordance with Part D, Condition D13 and D14 of Development Consent SSD 10418.

Subsequent versions of the IEA will be provided to the Planning Secretary of the DPHI and made available on the MACH Energy website. The IEA will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary of the DPHI.

5.4 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418, MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in Development Consent SSD 10418.

Where any exceedance of the criteria and/or performance measures occurs, at the earliest opportunity MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to DPHI describing those options and any preferred remediation measures or other course of action; and
- implement reasonable remediation measures as directed by the Planning Secretary.

6 REPORTING PROCEDURES

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418 and Condition 2, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in detail in MACH Energy's EMS.

In accordance with Part D, Condition D17(vi) of Development Consent SSD 10418 and Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

In accordance with Part D, Conditions D15 and D16 of Development Consent SSD 10418, any conditions of Development Consent SSD 10418 that require the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the NSW EP&A Act. These conditions include incident notification (Part D, Condition D9 of Development Consent SSD 10418); non-compliance notification (Part D, Condition D10 of Development Consent SSD 10418); reporting and response; compliance reporting; and IEA (Part D, Condition D13 of Development Consent SSD 10418).

Protocols for managing and reporting exceedances of the impact assessment criteria specific to water management are described in the SWMMP (Appendix 3) and GWMP (Appendix 4).

Water monitoring and management will be reported as part of the MPO Annual Review described in Section 4.1 and in accordance with the reporting requirements of EPL 20850.

6.1 INCIDENT REPORTING

An incident is defined as an occurrence or a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent SSD 10418.

In the event that review of monitoring data or a complaint indicates an incident has occurred, the incident will be reported in accordance with Part D, Condition D9 of Development Consent SSD 10418. The Planning Secretary will be notified in writing via the Major Projects website immediately after MACH Energy becomes aware of an incident. The notification will identify the Project name and development application number, and set out the location and nature of the incident.

In accordance with Part D, Condition D10 of Development Consent SSD 10418, within seven days of becoming aware of a non-compliance MACH Energy will notify DPHI (previously DPE) of the non-compliance.

The notification must be made in writing via the Major Projects Website and will:

- identify the MPO (including the Development Application number and name);
- set out the condition of Development Consent SSD 10418 that the incident is non-compliant with;

- describe the location and nature of the incident, the reason for the non-compliance (if known); and
- what actions have been, or will be, undertaken to address the non-compliance.

Additionally, in accordance with Condition R4 of EPL 20850, MACH Energy will notify the EPA by telephoning the Environment Line service on 131555 immediately after becoming aware of any contravention or potential contravention of section 120 of the *Protection of the Environment Operations Act 1997*, except where expressively provided in a condition of EPL 20850. MACH Energy will provide written details of the notification to the EPA at info@epa.nsw.gov.au within seven days of the date of the notification.

6.2 COMPLAINTS

MACH Energy maintains a Community Hotline (1800 886 889), which is dedicated to the receipt of community complaints. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database.

MACH Energy has developed a procedure that outlines its commitment to receiving, responding to and maintaining a record of phone calls from the community. This procedure is supported by a Community and Stakeholder Engagement Register. This is described in MACH Energy's EMS.

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97, a complaints register will be made available on the MACH Energy website (https://machenergyaustralia.com.au/) and updated monthly.

6.3 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418, a protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of MACH Energy's EMS and is described below.

Compliance with all approval plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with MACH Energy and the Project. In accordance with Part A, Condition A2 of Development Consent SSD 10418 and Schedule 2, Condition 2 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will carry out the development in accordance with:

- the conditions of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender)[4];
- all written directions of the Planning Secretary;
- Statement of Commitments (Appendix 3 of Development Consent DA 92/97);
- the 1997 EIS, EA (MOD 1), EA (MOD 2), EA (MOD 3), EA (MOD 4), the Project EIS; and
- with the Development Layout in Appendix 2 of Development Consent SSD 10418 (Appendix D).

[4] In accordance with Part A, Condition A4 of Development Consent SSD 10418, the conditions in Development Consent SSD 10418 and directions of the Planning Secretary prevail to the extent of inconsistency, ambiguity or conflict between them and any document/s listed in condition A2(c). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition A2(c), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

MACH Energy will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 5.1, MACH Energy will report incidents in accordance with Part D, Condition D9 of Development Consent SSD 10418.

A review of compliance with all conditions in Development Consent SSD 10418 and relevant MLs will be undertaken prior to (and included within) each MPO Annual Review (Section 4.1).

Additionally, in accordance with Part D, Condition D13 of Development Consent SSD 10418, an IEA (Section 4.3) will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary to assess whether MACH Energy is complying with the requirements in Development Consent SSD 10418.

6.4 ACCESS TO INFORMATION

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Schedule 5, Condition 11 of Development Consent DA 92/97, the MACH Energy website will be maintained as a tool for the provision of information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information required by MACH Energy to be available on the website is outlined in MACH Energy's EMS.

7 REFERENCES

ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council/ Agriculture and Resource Management Council of Australia and New Zealand

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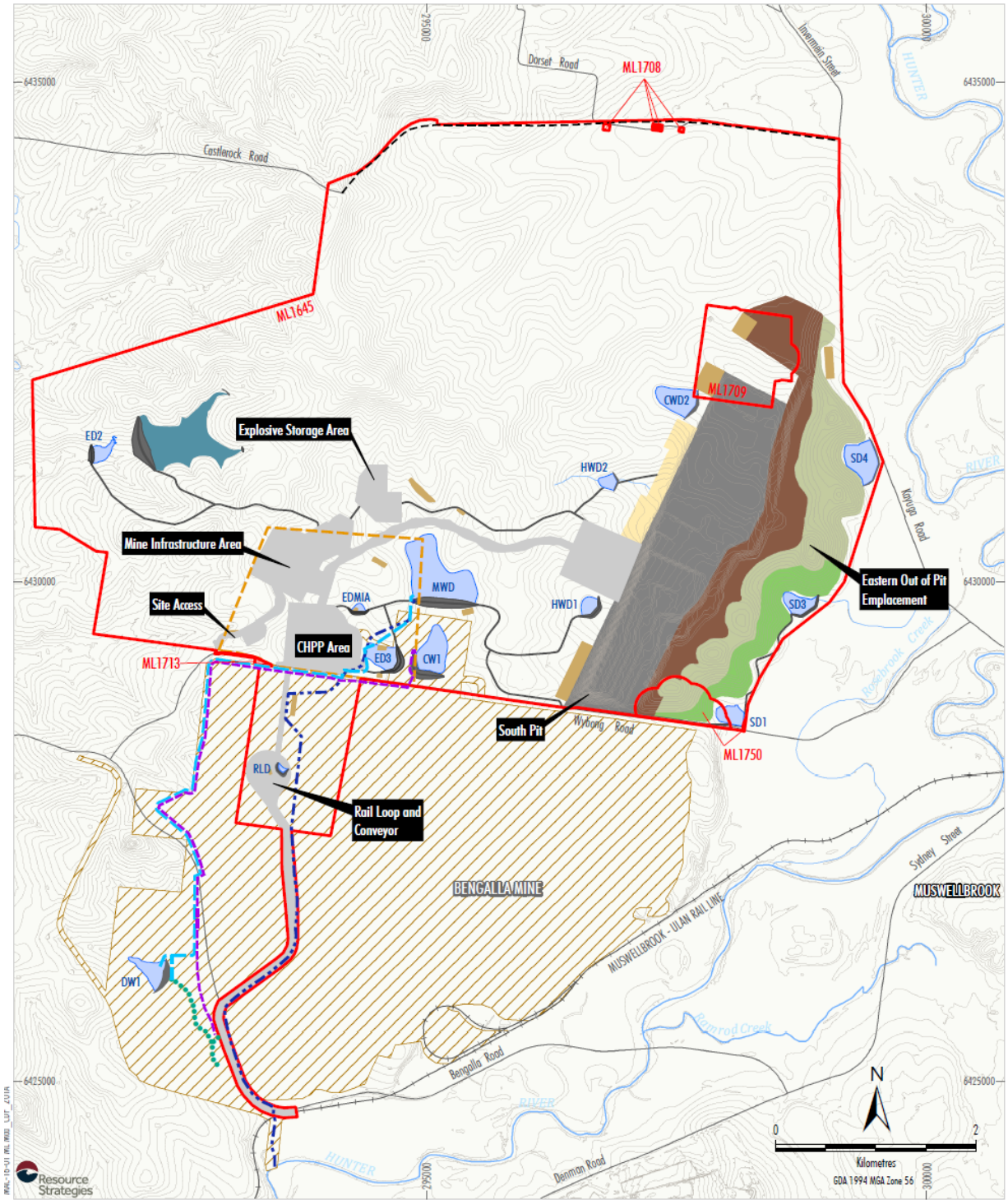
Accessed 9 December 2016.

ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

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MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025

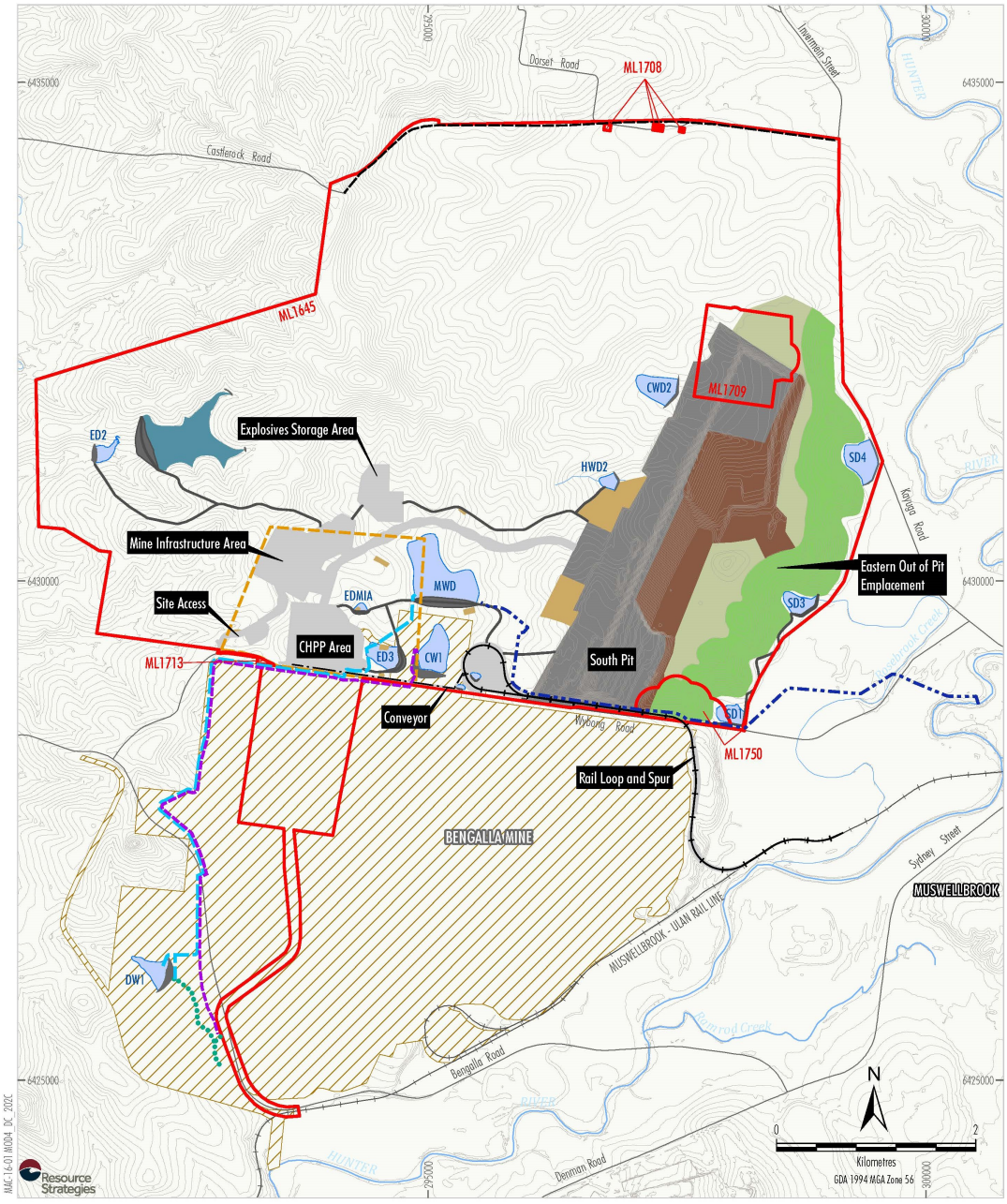
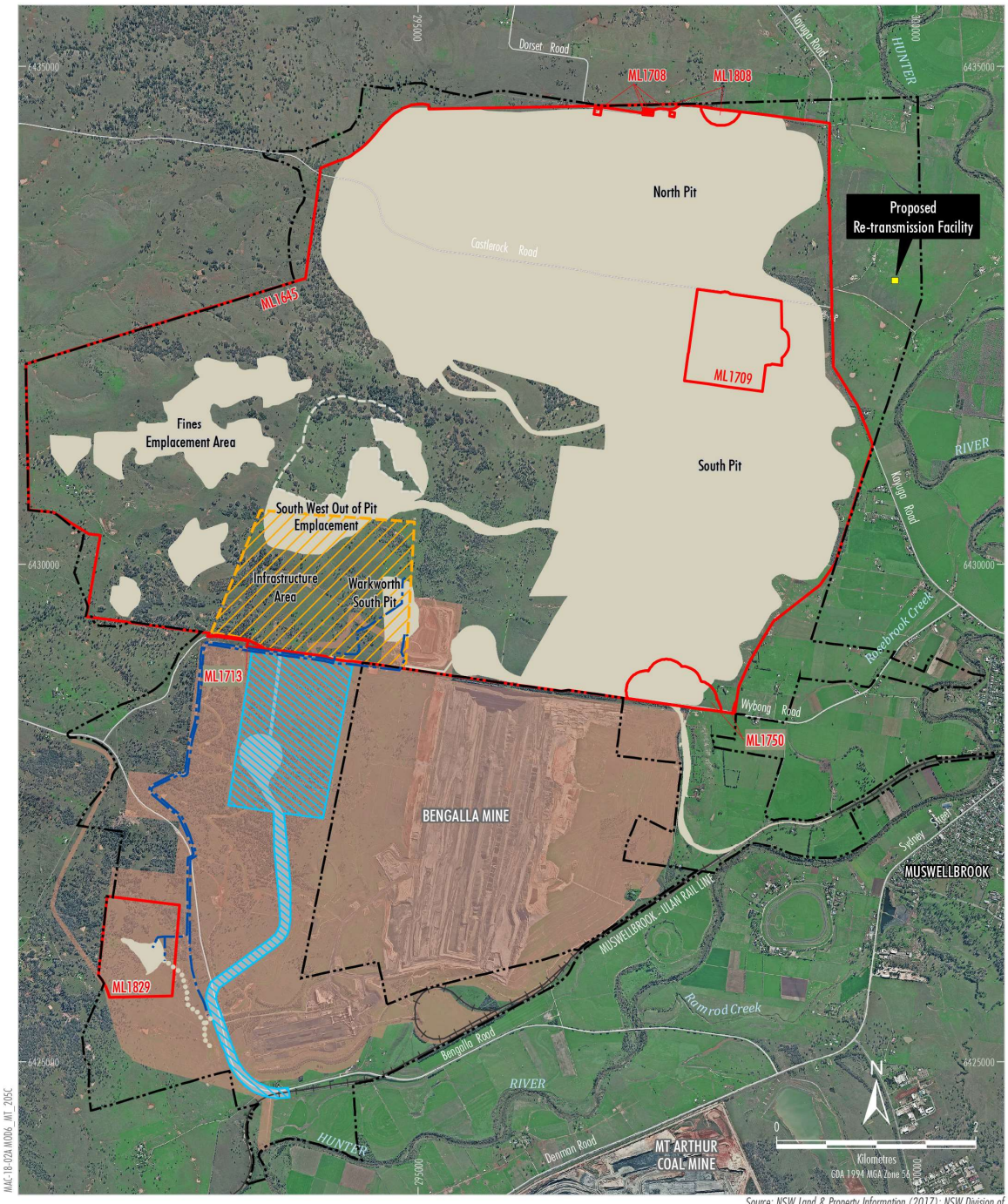


FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Development Consent Boundary (DA 92/97)
- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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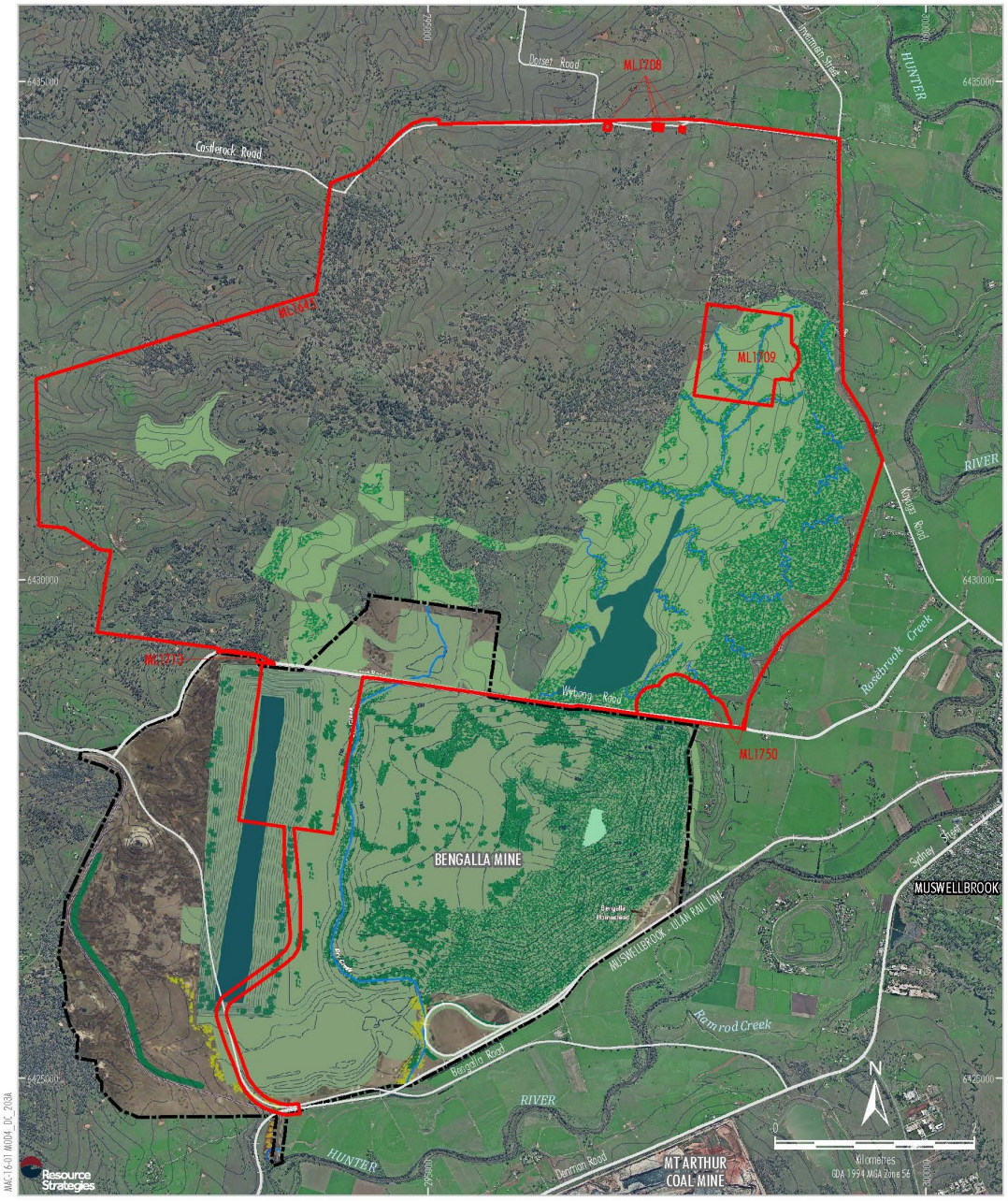
MOUNT PLEASANT OPERATION
Revised Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



LEGEND

- Mt Pleasant Mining Lease Boundary
- Final Void
- Final Rehabilitation

Bengalla Mine Conceptual Final Landform *

- Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
- Dry Creek
- Final Void Lake
- Rehabilitation
- Rehabilitation Class III
- Indicative Tree Screens (or equivalent)
- Treed Rehabilitation
- Indicative Restorative Area

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

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION
Conceptual Final Landform (2026)

ATTACHMENT 2

APPENDIX 2 OF DEVELOPMENT CONSENT SSD 10418

APPENDIX 2 DEVELOPMENT LAYOUT PLANS

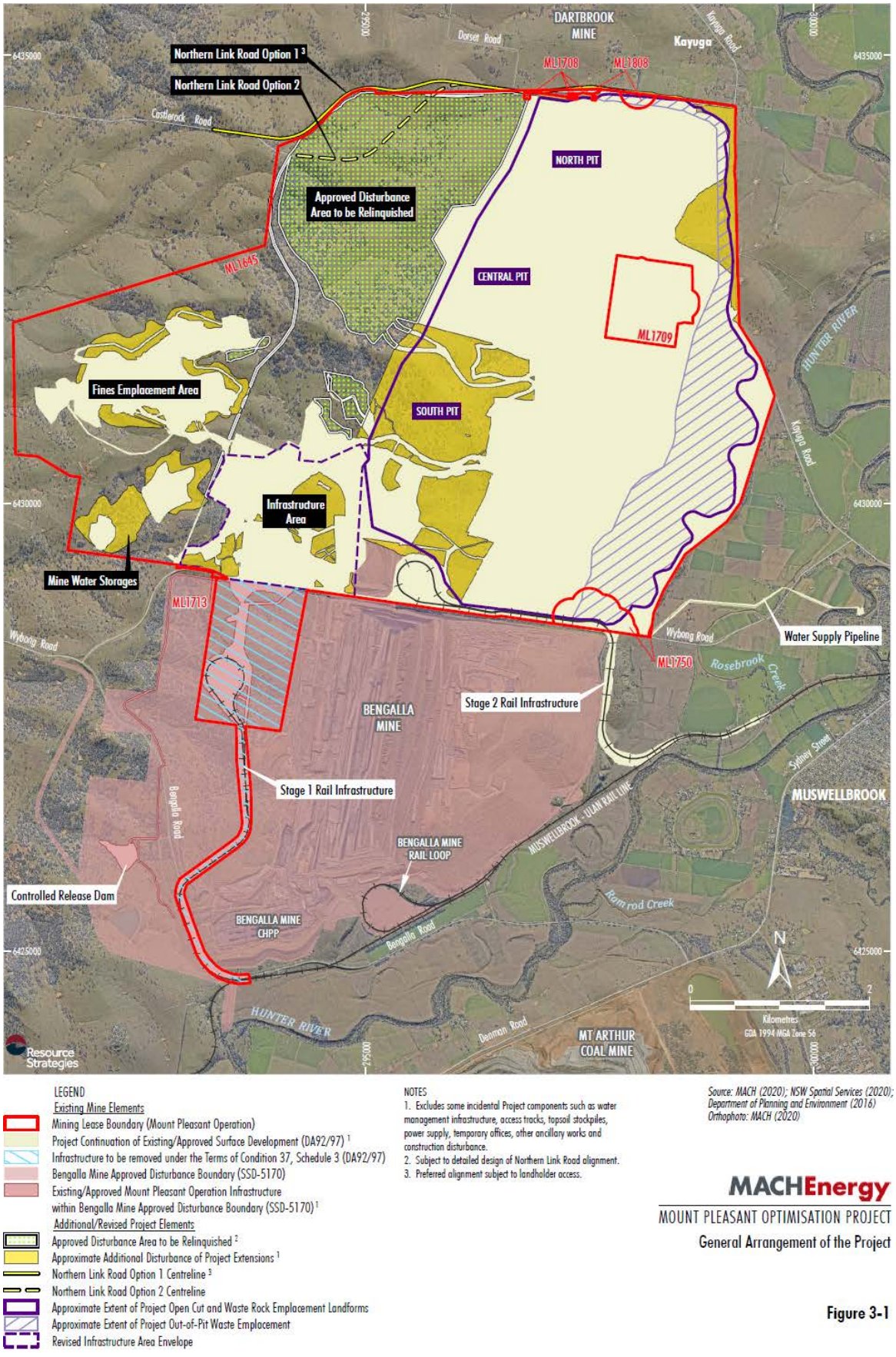


Figure 1: General Project Arrangement

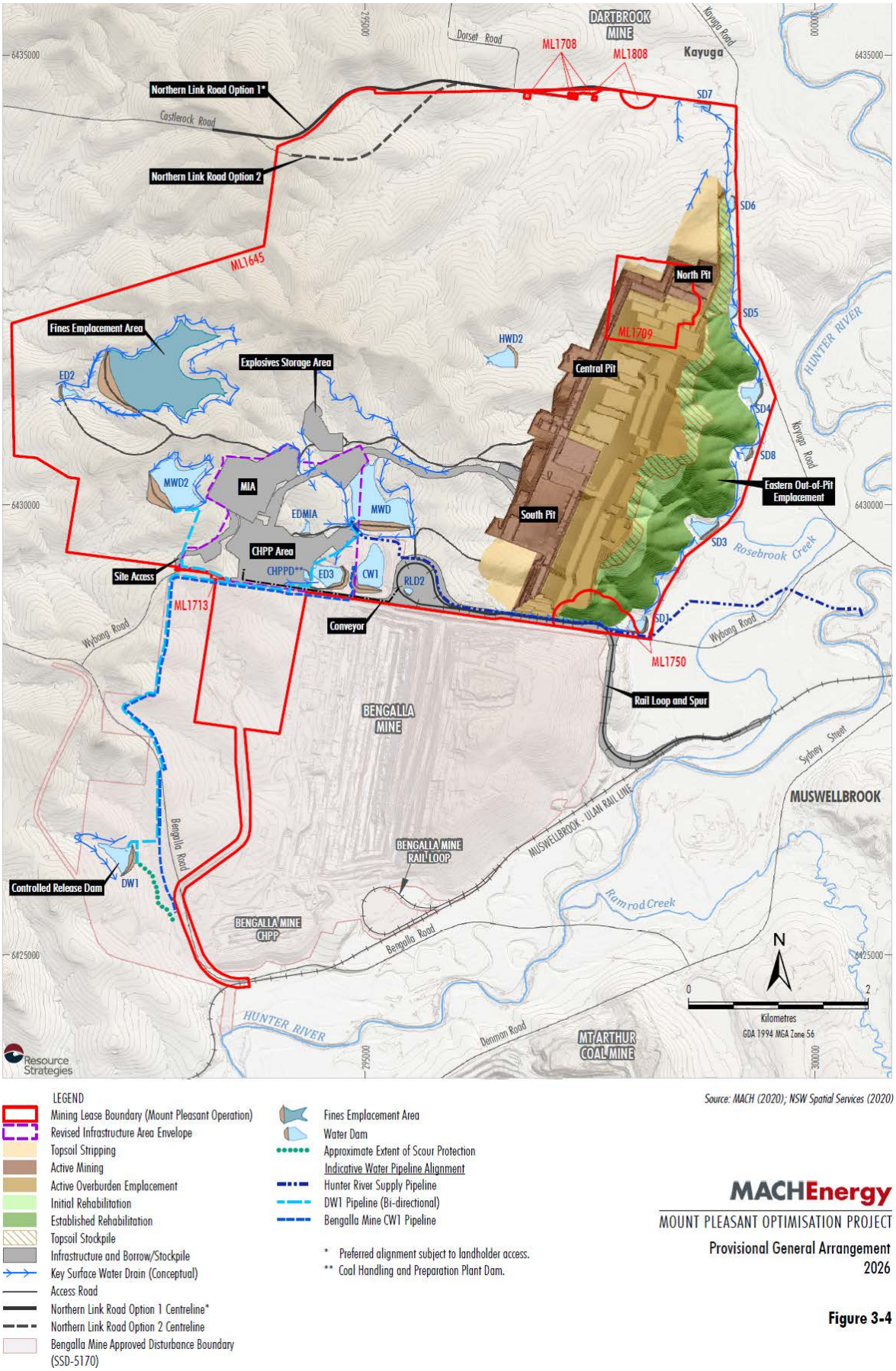
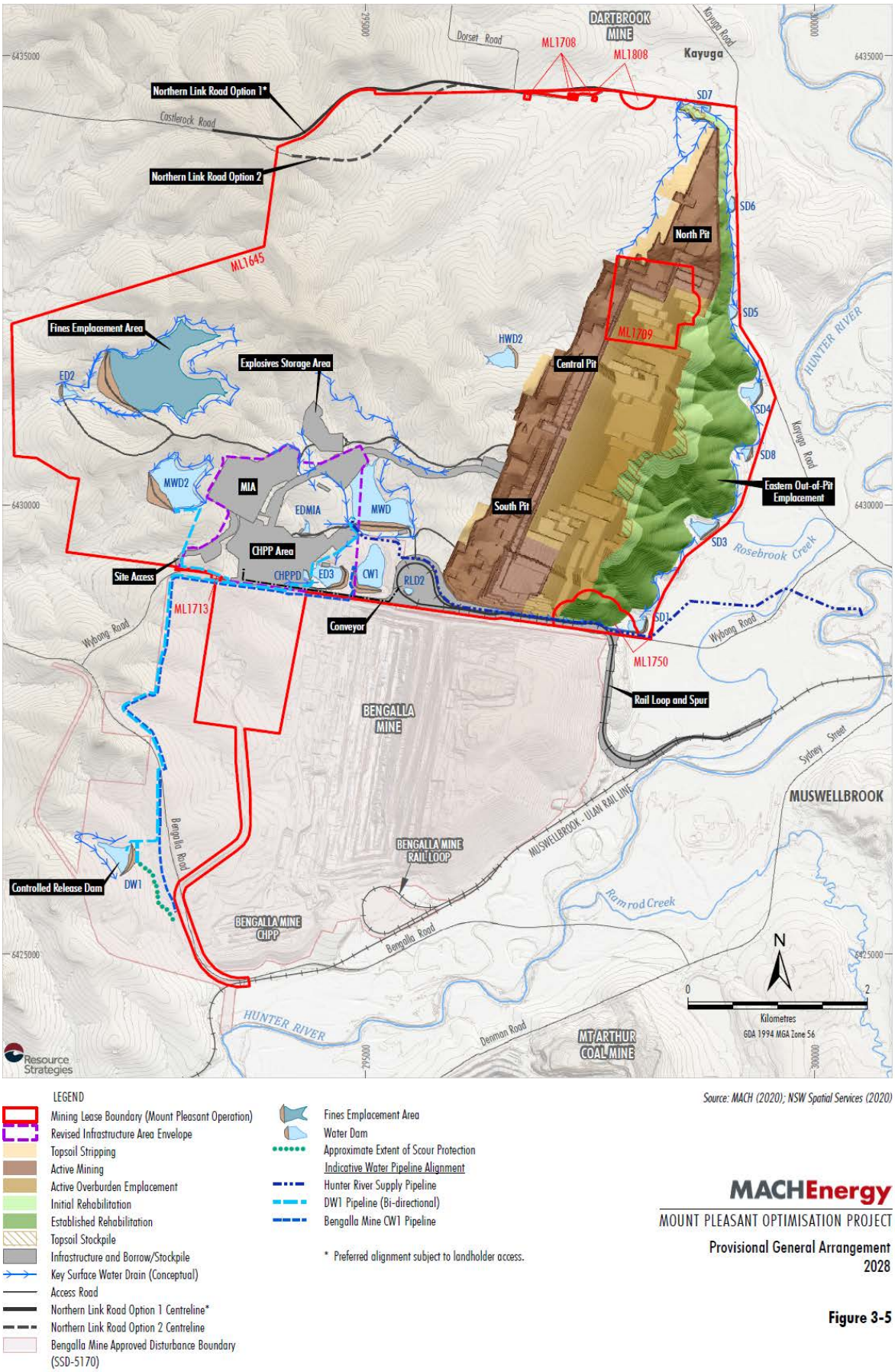


Figure 2: General Project Arrangement – 2026



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.

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

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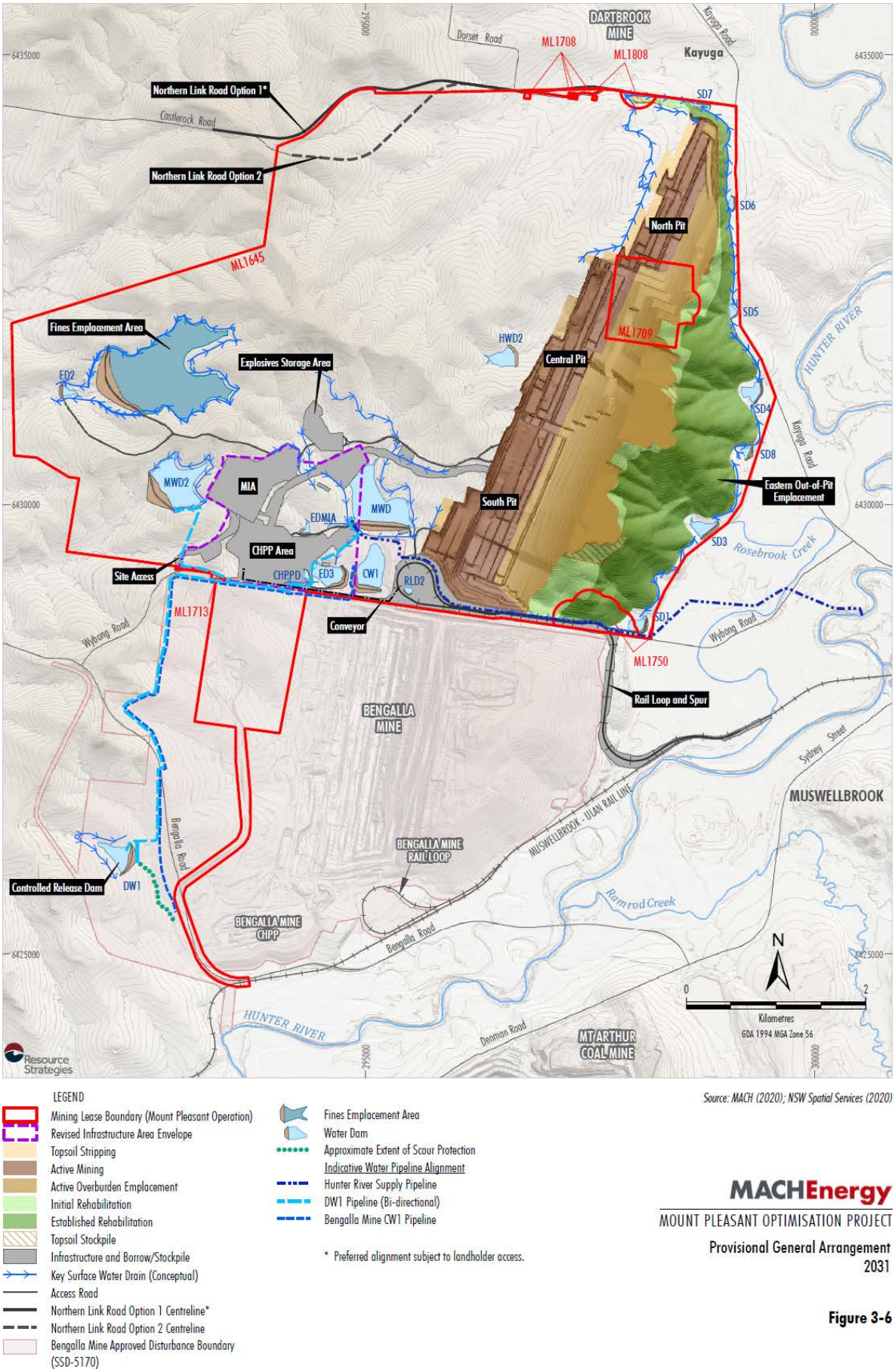
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5

Figure 3: General Project Arrangement – 2028



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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- 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

Figure 4: General Project Arrangement - 2031

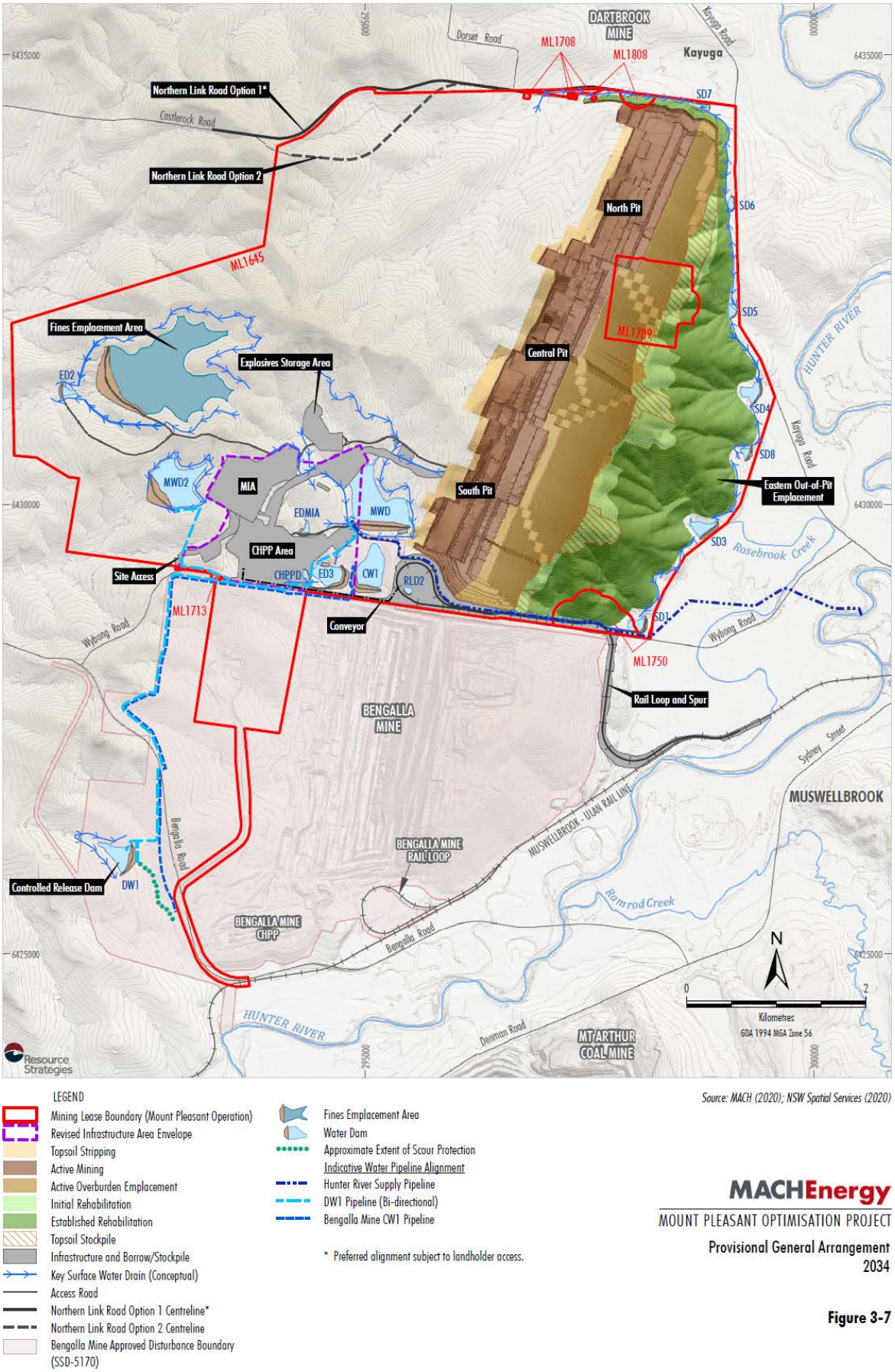


Figure 5: General Project Arrangement - 2034

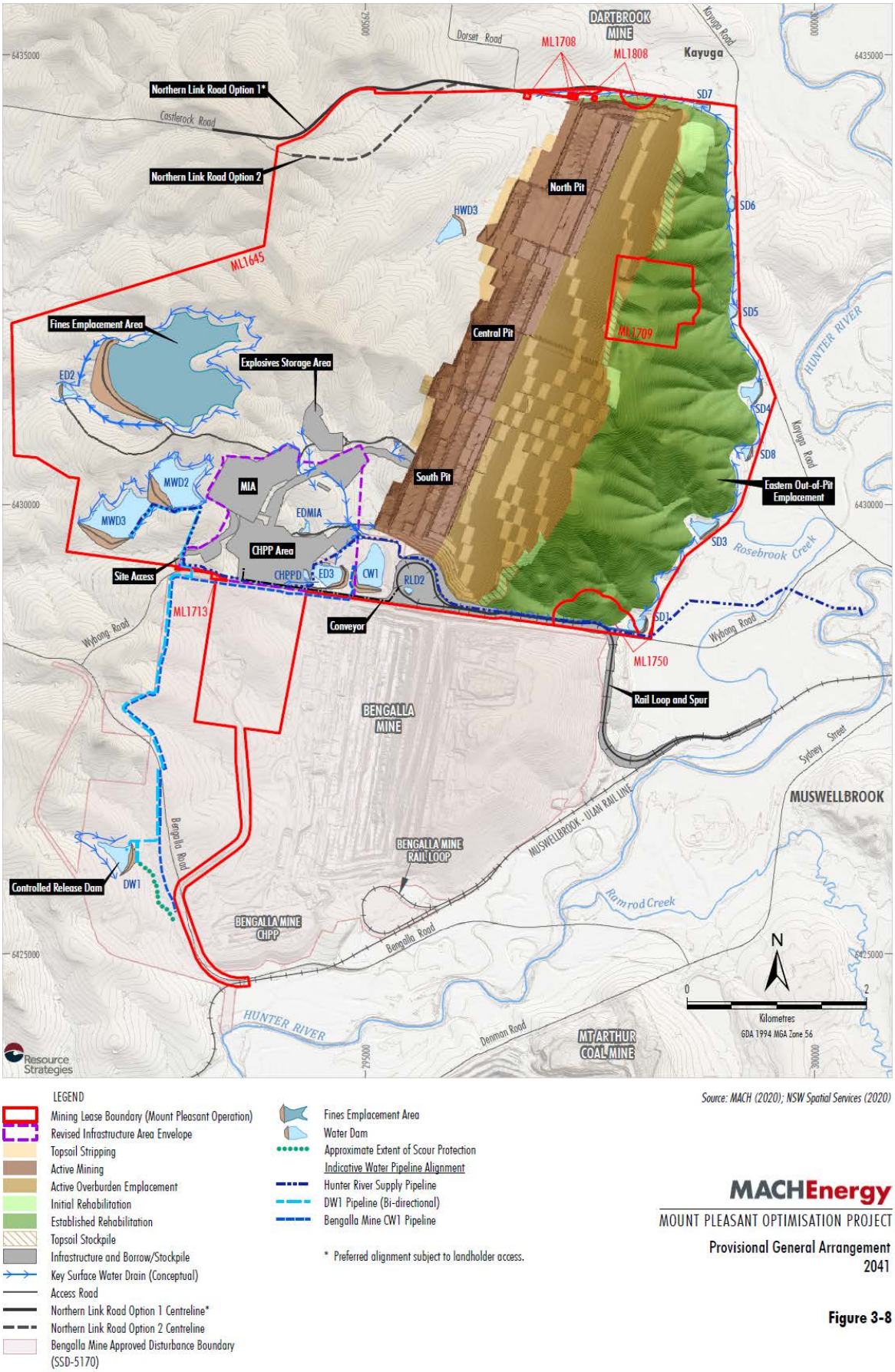
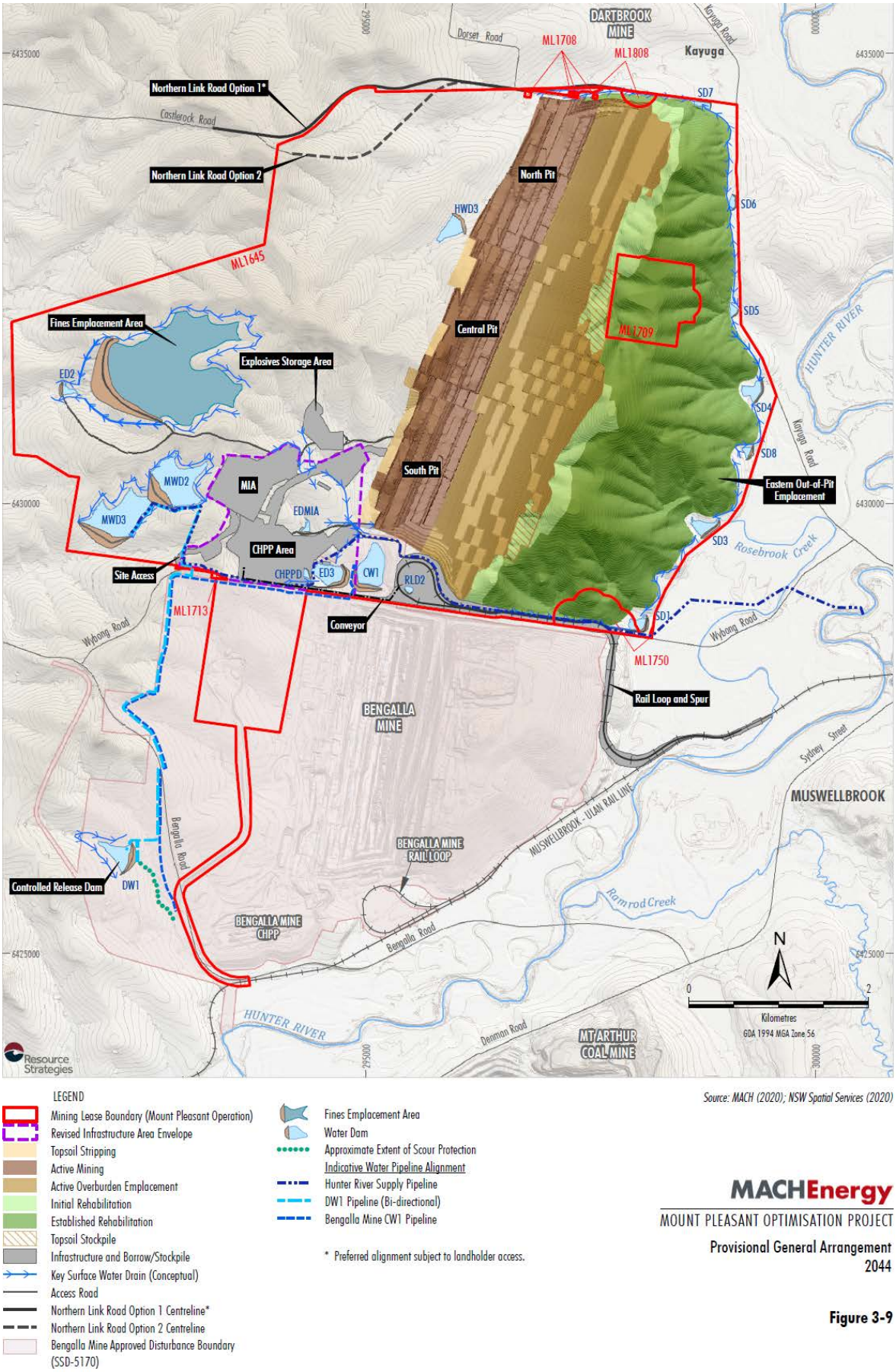


Figure 6: General Project Arrangement - 2041



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
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- Northern Link Road Option 1 Centreline*
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- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
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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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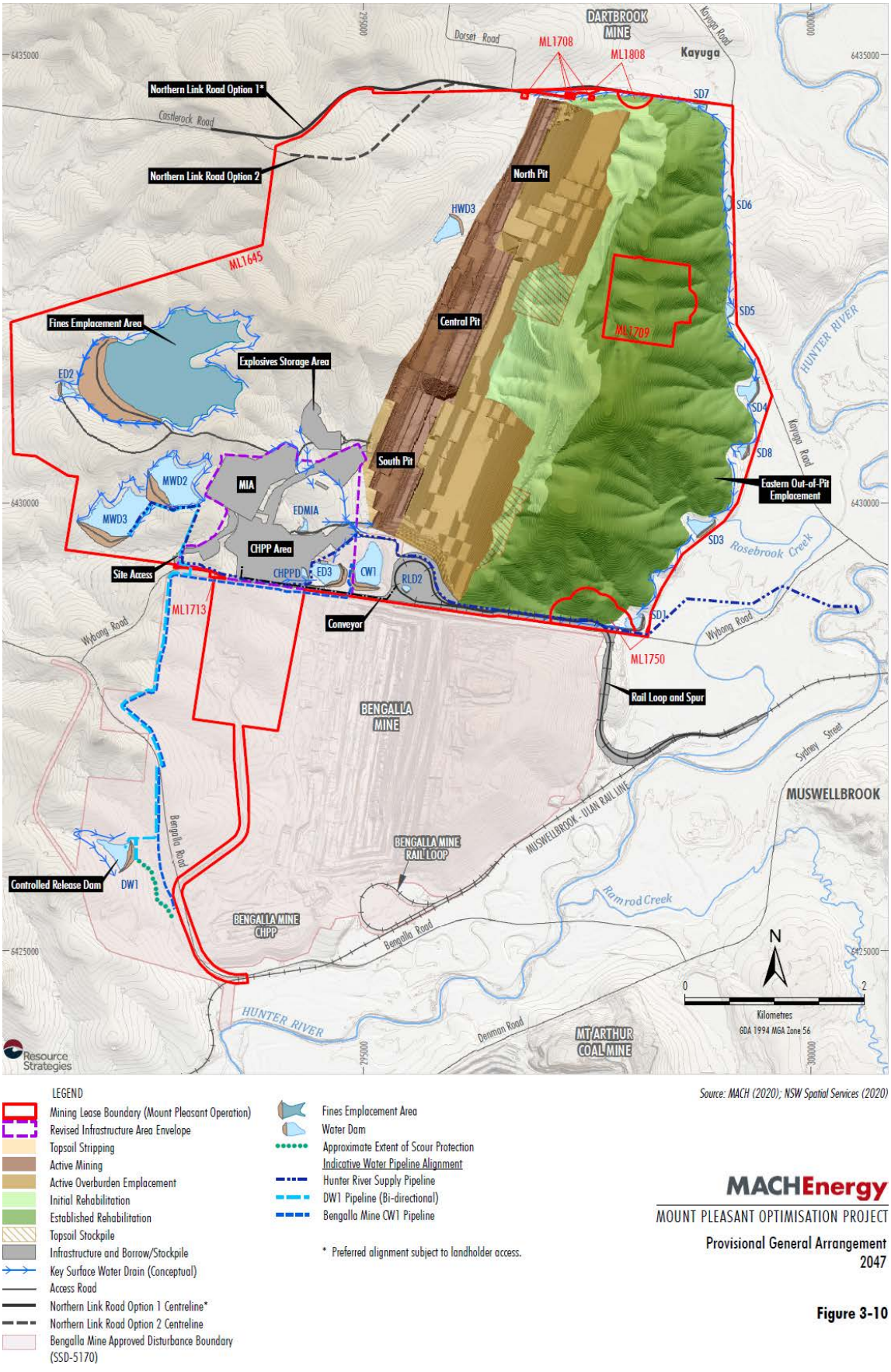
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9

Figure 7: General Project Arrangement - 2044



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)
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- Northern Link Road Option 1 Centreline*
- Northern Link Road Option 2 Centreline
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
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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

Figure 8: General Project Arrangement – 2047

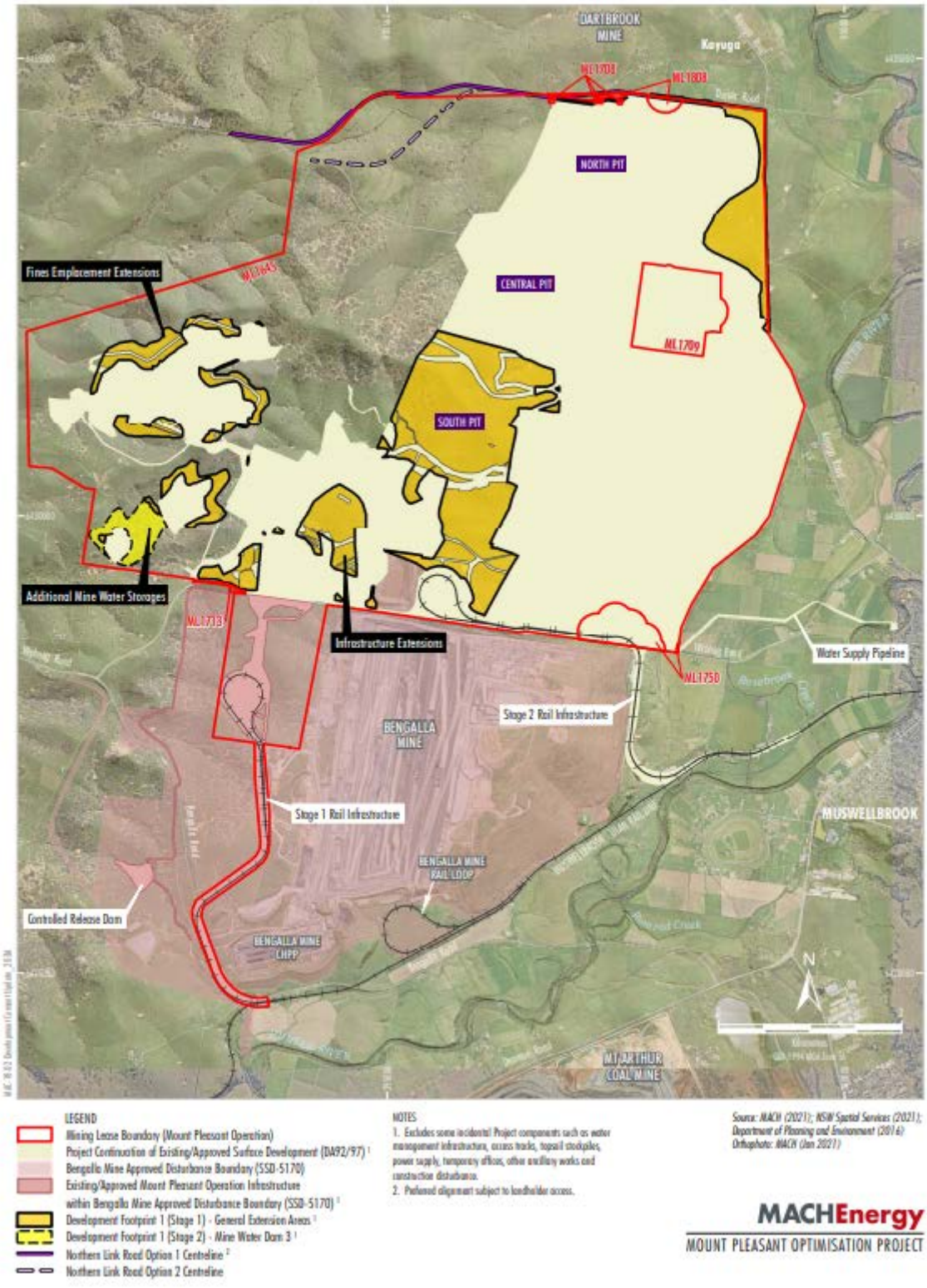

Figure 9: Staging of Project Disturbance Areas

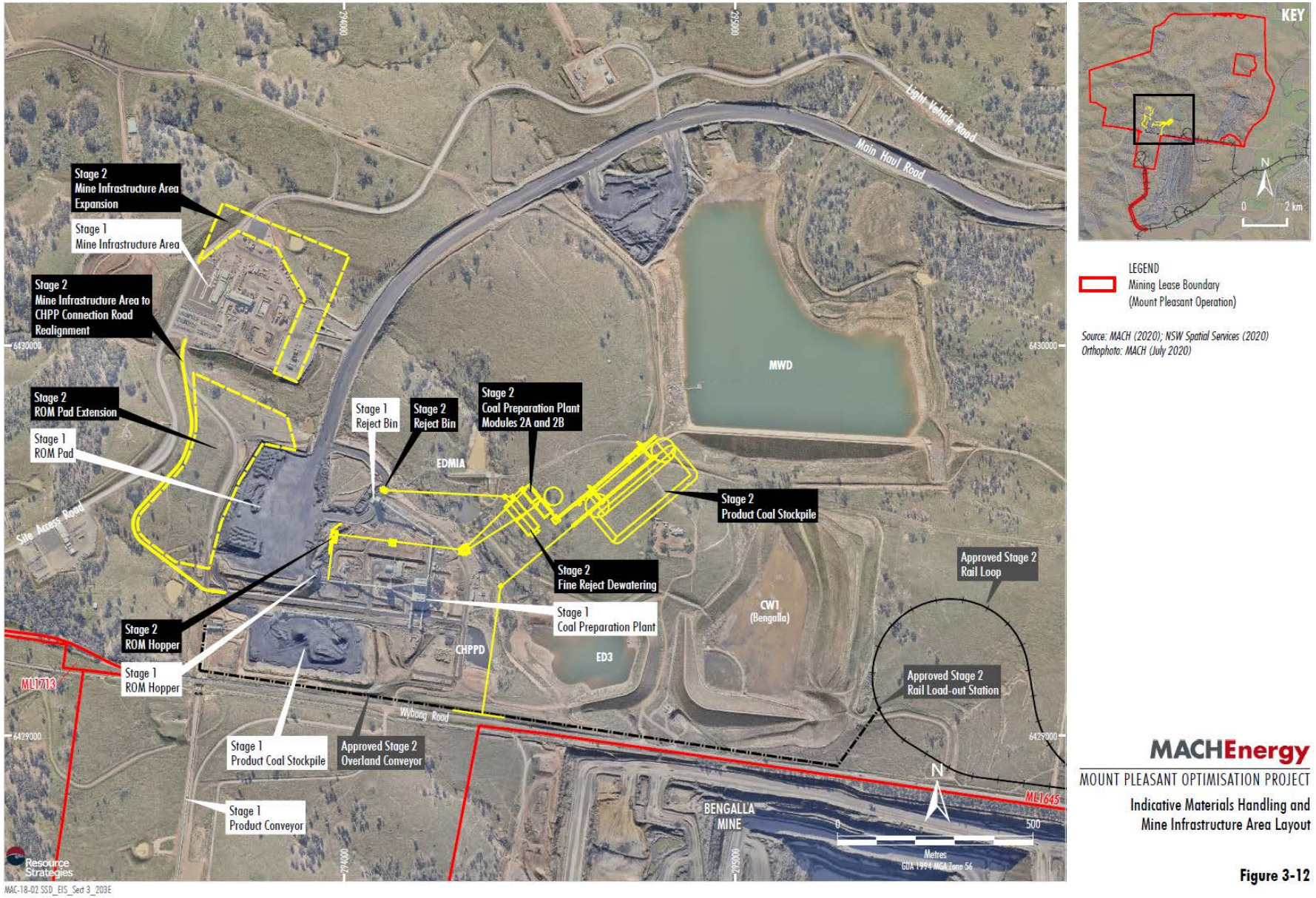

Figure 10: Indicative Mine Infrastructure Area Layout

ATTACHMENT 3

ENDORSEMENTS OF DR CAMILLA WEST AND BRYCE MCKAY

Department of Planning and Environment

Our ref: SSD-10418-PA-1

Mariah Lane
Environmental Advisor
Mach Energy Australia Pty Ltd
PO Box 407
Newcastle, NSW,2300

17/05/2023

Subject: Endorsement of Suitably Qualified and Experience Specialists for Mount Pleasant Optimisation Project

Dear Ms. Lane

I refer to your request for the Planning Secretary's endorsement of suitably qualified and experienced specialists to prepare management plans for the Mount Pleasant Optimisation Project (SSD-10418) and Mount Pleasant Coal Mine DA (92/97 until its surrender).

The Department has reviewed the nominations and information you have provided and is satisfied that the following specialists are suitably qualified and experienced. Accordingly, I can advise that the Planning Secretary approves/endorses the appointment of the following specialists:

- Dr Colin Driscoll of Hunter Eco for preparation of the Biodiversity Management Plan
- Chloe Annandale of Landroc for preparation of the Rehabilitation Strategy
- John Wassermann of RWDI for the preparation of the Blast Management Plan and Noise Management Plan
- Jamie Reeves of Niche Environment and Heritage for the preparation of the Aboriginal Cultural Heritage Management Plan
- Aleks Todoroski of Aleks Air Sciences for the preparation of the Air Quality and Greenhouse Gas Management Plan
- Dr Andrew Sneddon of Extent for the preparation of the Historic Heritage Management Plan
- Penny Dalton of TTPP for the preparation of the Traffic Management Plan
- Camilla West of ATC Williams and Bryce McKay of AGEC for the preparation of the Water Management Plan

If you wish to discuss the matter further, please contact Wayne Jones on (02) 6575 3406.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

ATTACHMENT 4

WATER-RELATED DEVELOPMENT CONSENT SSD 10418 CONDITIONS

Table 4-1
Water-Related Development Consent SSD 10418 Conditions

<table>
<tr><th>Development Consent SSD 10418</th><th>WMP Section</th></tr>
<tr><td colspan="2">Part B</td></tr>
<tr><td>WATER
Water supply
B39. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.</td><td>Appendix 1
(Section 7)</td></tr>
<tr><td>B40. The Applicant must report on water extracted from the site each year (direct and indirect) in the Annual Review (referred to in Condition D11), including water taken under each water licence.
Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development prior to water take occurring. Including during rehabilitation and post mine closure.</td><td>Appendix 1,
(Section 10.1)</td></tr>
<tr><td>Compensatory Water Supply
B41. Prior to commencing construction of development under this consent, the Applicant must notify the owner of the bore listed in Table 5 that they may request monitoring of the listed bore to determine the level of drawdown from the development. In the event that monitoring data records drawdown of more than 2 metres as a result of the development, the Applicant must provide compensatory water in accordance with conditions B42 to B47.

Table 5: Private bore monitoring
<table>
<tr><th>Bore ID</th><th>Receiver ID</th></tr>
<tr><td>Belgrave</td><td>143f</td></tr>
</table></td><td>Appendix 4
(Sections 6.6 and 9.3)</td></tr>
<tr><td>B42. Within three months of the commencement of development under this consent, the Applicant must notify owners of licensed privately-owned groundwater bores that are predicted to have a drawdown of greater than 2 metres as a result of the development.</td><td>Appendix 4
(Section 6.6)</td></tr>
<tr><td>B43. The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted (other than an impact that is minor or negligible) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Planning Secretary.</td><td>Appendix 4
(Section 9.3)</td></tr>
<tr><td>B44. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply should be provided (at least in an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.</td><td>Appendix 4
(Section 9.3)</td></tr>
<tr><td>B45. If the Applicant and the landowner cannot agree on whether the loss of water is attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.</td><td>Appendix 4
(Section 9.3)</td></tr>
<tr><td>B46. If the Applicant is unable to provide an alternative long-term supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary.
Notes:
• The Water Management Plan (see condition B52) is required to include trigger levels for investigating potentially adverse impacts on water supplies.
• The burden of proof that any loss of surface water or groundwater access is not due to mining impacts rests with the Applicant.</td><td>Appendix 4
(Section 9.3)</td></tr>
<tr><td>B47. In the event of any complaint relating to a privately-owned licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or the provision of an alternative long-term supply of water as required under condition B44, to the satisfaction of the Planning Secretary.</td><td>Appendix 4
(Section 9.3)</td></tr>
<tr><td>B48. Conditions B41 to B47 do not apply if the Applicant has a compensatory water agreement with the owner/s of the land and the Applicant has advised the Department in writing of the terms of this agreement.</td><td>Appendix 4
(Section 9.3)</td></tr>
</table>

Water Discharges *B49. The Applicant must ensure that all surface discharges from the site comply with:* *(a) discharge limits (both volume and quality) set for the development in any EPL; or* *(b) relevant provisions of the POEO Act or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.*	Appendix 1 (Section 6.2)
Water Management Performance Measures *B50. The Applicant must ensure that the development complies with the performance measures in Table 6.*	

Table 6: *Water management performance measures*

Feature	***Performance Measure***[a]	
Water management – General	• *Maintain separation between clean and dirty (i.e. sediment-laden) and mine water management systems* • *Minimise the use of clean and potable water on the site* • *Maximise water recycling, reuse and sharing opportunities* • *Minimise the use of make-up water from external sources, including extraction from the Hunter River* • *Minimise the need for discharges to the Hunter River Salinity Trading Scheme* • *Design, install, operate and maintain water management systems in a proper and efficient manner* • *Minimise risks to the receiving environment and downstream water users*	Appendix 1 (Section 4)
Alluvial aquifers	• *Negligible impacts to alluvial aquifers as a result of the development, beyond those predicted in the document/s listed in condition A2(c), including:* *- negligible change in groundwater levels;* *- negligible change in groundwater quality; and* *- negligible impact to other groundwater users,* • *Maintain appropriate setbacks in accordance with the Aquifer Interference Policy (DPI, 2012)* • *Protect GDEs surrounding the site by maintaining negligible impacts as a result of the development, beyond those predicted in the documents listed in condition A2(c)*	Appendix 4 (Sections 5 and 7)
Erosion and sediment control works	• *Design, install and maintain erosion and sediment controls in accordance with the guidance series Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2A: Installation of Services (DECC, 2008), Volume 2C: Unsealed Roads (DECC, 2008), Volume 2D: Main Road Construction (DECC, 2008) and Volume 2E: Mines and Quarries (DECC, 2008)* • *Design, install and maintain any creek crossings in accordance with the Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013) and Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)* • *Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012)*	Appendices 2 (Section 5) and 3 (Section 6) Appendix 3 (Section 6)
Clean water diversions and storage infrastructure	• *Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site*	Appendix 1 (Section 4) and 3 (Section 6)
Sediment dams	• *Design, install and maintain sediment dams in accordance with the guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008) and the requirements under the POEO Act*	Appendix 1 (Section 4)
Mine water storages	• *Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water* • *New mine water storages designed to contain the 1% AEP 24-hour storm event and minimise permeability* • *On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and maintained (including to minimise permeability)*	Appendix 1 (Section 4)

	• *Ensure adequate freeboards within all pit voids at all times to minimise the risk of discharge to surface waters*	
Chemical and hydrocarbon storage	• *Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard*	Appendix 3 (Section 6)
Tailings storages	• *Maximise dewatering and co-disposal of dewatered tailings from the Stage 2 CHPP within overburden emplacements* • *Design and maintain tailings storage areas to prevent the movement of tailings seepage/leachate offsite*	Appendices 1 (Section 4), 3 (Section 6) and 4 (Section 7)
Overburden emplacements	• *Design, install and maintain emplacements to prevent migration of acid forming and potentially acid forming materials, and saline and sodic materials* • *Design, install and maintain out-of-pit emplacements to prevent and/or manage long term saline seepage*	Appendices 3 (Section 6) and 4 (Section 7)
Aquatic and riparian ecosystems	• *Negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c)* • *Maintain or improve baseline channel stability* • *Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006) or its latest version*	Appendices 3 (Section 6) and 4 (Section 7)

a The performance measures in Table 6 do not apply to water management structures constructed under previous consents.

B51. The performance measures in Table 6 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.	Appendix 1 (Section 4), Appendix 2 (Section 5.1), Appendix 3 (Section 5) and Appendix 4 (Section 7).
Water Management Plan	
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary…	This document, Appendices 1-4
B53. The Applicant must not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the Water Management Plan is approved by the Planning Secretary.	Noted
B54. The Applicant must implement the Water Management Plan as approved by the Planning Secretary.	Noted

ATTACHMENT 5

WATER-RELATED DEVELOPMENT CONSENT DA 92/97 CONDITIONS

Table 5-1
Water-Related Development Consent DA 92/97 Conditions

Development Consent DA 92/97	WMP Section
Schedule 3	
Water Management Plan 28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary. The plan must include:	This document (and Section 1.3.1)
(a) a Site Water Balance, which must: • include details of: – sources and security of water supply; – water use on site – water management on site; – any off-site water transfers; and • investigate and implement all reasonable and feasible measures to minimise water use by the development;	Appendix 1
(b) an Erosion and Sediment Control Plan, which must: • identify activities that could cause soil erosion, generate sediment or affect flooding; • describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage any flood risk; • describe the location, function, and capacity of erosion and sediment control structures; • describe what measures would be implemented to maintain the structures over time;	Appendix 2
(c) a Surface Water Management Plan, which must include: • detailed baseline data on surface water flows and quality in creeks and other waterbodies that could potentially be affected by the development; • surface water and stream health impact assessment criteria including trigger levels for investigating any potentially adverse surface water impacts; • a program to monitor and maintain the bridge openings and culverts associated with the MOD 4 rail infrastructure and ensure that they remain clear of blockages; • a program to monitor surface water flows and quality in the watercourses that could be affected by the project; and • reporting procedures for the results of the monitoring program;	Appendix 3
(d) a Groundwater Management Plan, which must include: • detailed plans, including design objectives and performance criteria, for the design and management of the proposed final voids; • detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores, that could be affected by the development; • groundwater impact assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts; • a program to monitor and assess: – groundwater inflows to the mining operations; – impacts on regional and local (including alluvial) aquifers; – impacts on the groundwater supply of potentially affected landowners; – impacts on groundwater dependent ecosystems and riparian vegetation;	Appendix 4

Table 4-1 (Continued)
Water Related Development Consent DA 92/97 Conditions

Development Consent DA 92/97	WMP Section
Schedule 3	
(e) a Surface and Ground Water Response Plan, which must include: • a response protocol for any exceedances of the surface water and groundwater assessment criteria; • measures to offset the loss of any baseflow to watercourses caused by the development; • measures to prevent, minimise or offset groundwater leakage from alluvial aquifers caused by the development; • measures to compensate landowners of privately-owned land whose water supply is adversely affected by the development; and • measures to mitigate and/or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation. The Applicant must implement the approved management plan as approved by the Secretary.	Appendices 3 and 4
SOIL & WATER Note: Under the *Water Act 1912* and/or the *Water Management Act 2000*, the Applicant is required to obtain water licences for the development.	Section 2.5.1
Water Supply 25. The Applicant must ensure that it has sufficient water for all stages of development, and if necessary, adjust the scale of mining operations on site, to match its available water supply to the satisfaction of the Secretary.	Appendix 1
Water Discharges 26. The Applicant must ensure that any surface water discharges from the site comply with the: (a) discharge limits (both volume and quality) set for the development in any EPL; or (b) relevant provisions of the POEO Act or *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*.	Appendices 1, 2 and 3
Compensatory Water Supply 27. The Applicant must provide compensatory water supply to any landowner of privately-owned land whose water entitlements are adversely and directly impacted (other than an impact that is negligible) as a result of the development, in consultation with DoI Water, and to the satisfaction of the Secretary. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent, in quality and volume, to the loss attributed to the development. Equivalent water supply should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner. If the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution. If the Applicant is unable to provide an alternative long-term supply of water, then the Applicant must provide alternative compensation to the satisfaction of the Secretary.	Appendix 4

APPENDIX 1

SITE WATER BALANCE

MOUNT PLEASANT OPERATION

SITE WATER BALANCE

Document ID:	MP001-0000-ENV-PLN-0006		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	August 2024	**Status:**	Final
Approved By:	Andrew Reid	**Revision Number:**	02

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LIST OF ATTACHMENTS

1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy Australia Pty Ltd (MACH Energy) purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Site Water Balance (SWB) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for operations 24 hours per day seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

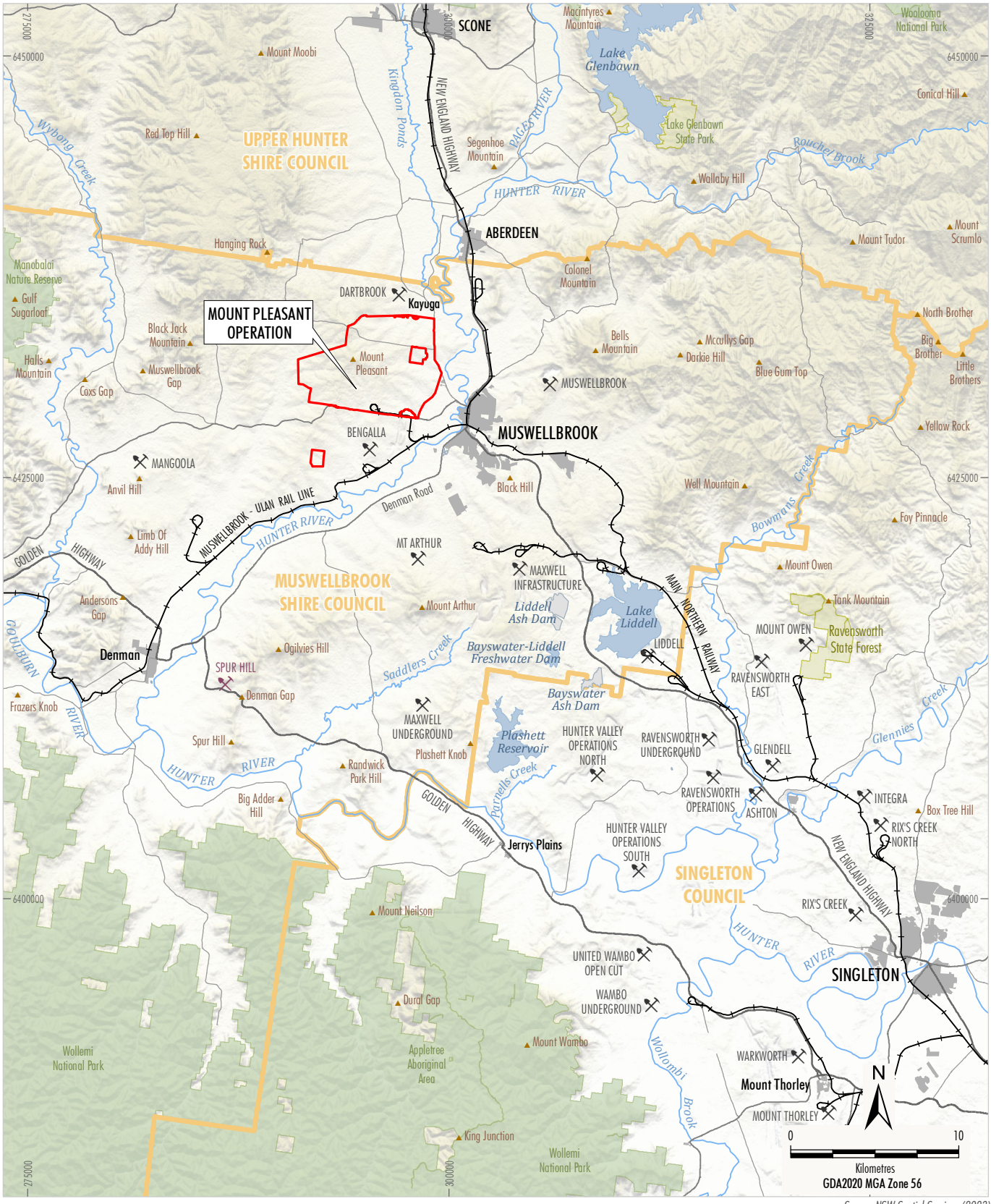
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

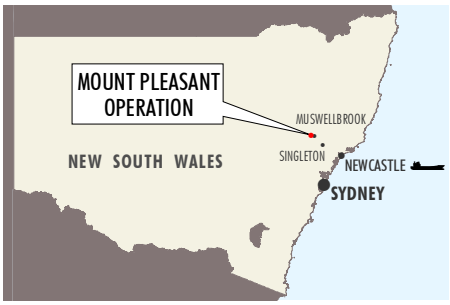
The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out-of-Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.



Source: NSW Spatial Services (2023)



LEGEND

- Mining Operation
- Proposed Mining Operation (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

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MOUNT PLEASANT OPERATION

Regional Location

Figure 1

MAC-18-03A MP2023_Figure 1_Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the Department of Planning and Environment (DPE) (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

Modification 5 (MOD 5) was submitted to rectify an administrative error in Development Consent DA 92/97 and was approved by DPE on 29 June 2022.

Modification 6 (MOD 6) was submitted to modify Development Consent DA 92/97 and was approved on 6 November 2023. MOD 6 will allow for the construction and operation of a re-transmission facility including a tower or mast, shed and associated transmission infrastructure to re-transmit local digital television signals from the Broadcast Australia site at Rossgole Lookout. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Revised Approved Surface Disturbance Plan incorporating the MOD 6 infrastructure (Attachment 1).

On 22 January 2021, MACH Energy submitted the Mount Pleasant Optimisation Project (the Project) EIS in support of State Significant Development (SSD) 10418 under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Key aspects of the Project generally involve (among other things):

- increased open cut extraction within the MPO's existing Mining Leases;
- a staged increase in extraction, handling and processing of ROM coal up to 21 million tonnes per annum (Mtpa);
- upgrades to existing infrastructure and new infrastructure to support mining of the proposed Project; and
- an extension to the time limit on mining operations to 22 December 2048.

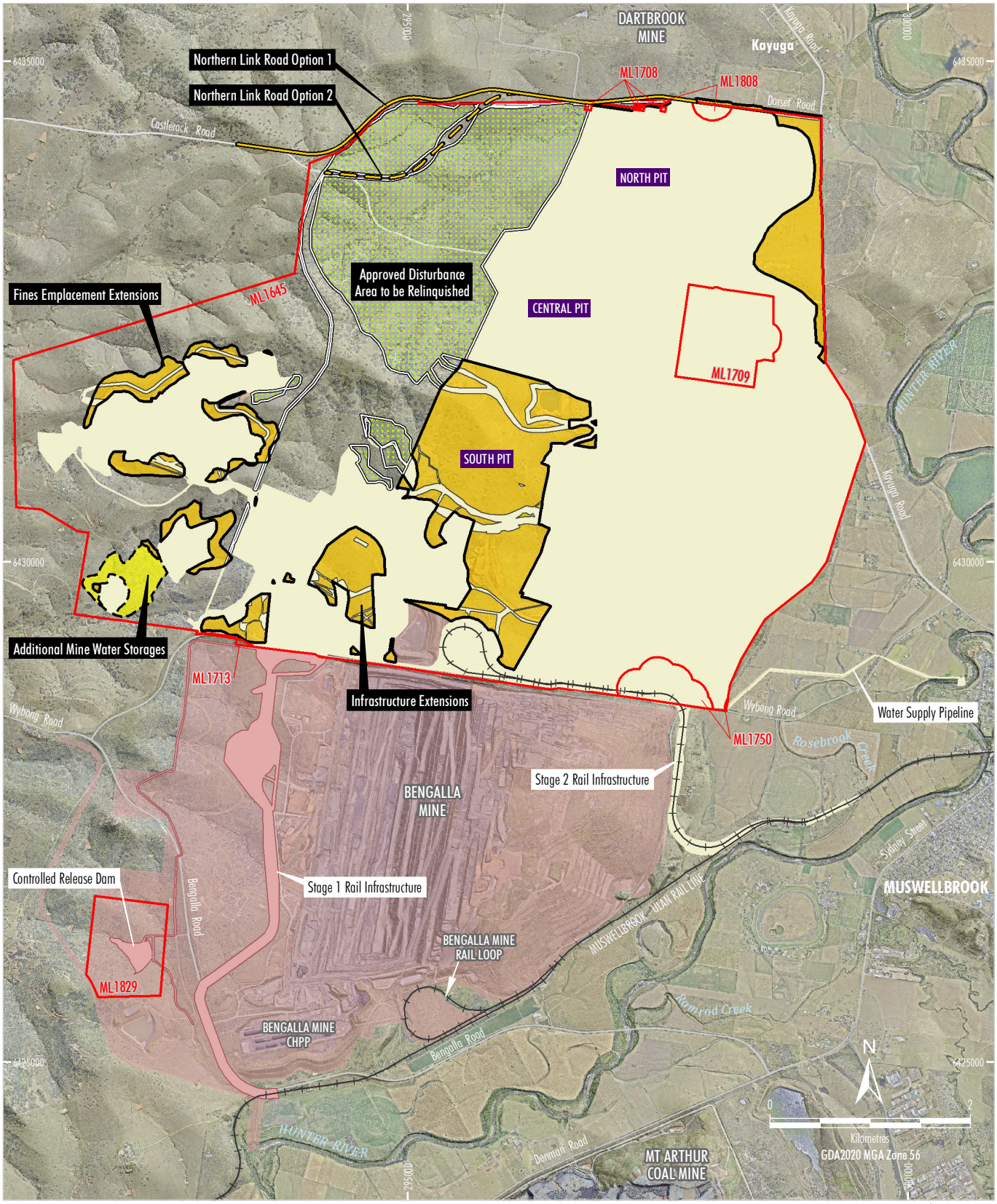
The Project was approved by the NSW Independent Planning Commission on 6 September 2022. Appendix 2 of Development Consent SSD 10418 illustrates the General Project Arrangement at 2026, 2028, 2031, 2034, 2041, 2044 and 2047, Staging of Project Disturbance Areas, and Indicative Mine infrastructure Area Layout (Attachment 2).

Part A, Condition A14 of Development Consent SSD 10418 requires the surrender of Development Consent DA 92/97 within 12 months of the date of commencement of development under Development Consent SSD 10418, or an alternative timeframe agreed with the Planning Secretary of the DPE (now Department of Planning, Housing and Infrastructure [DPHI]).

Following the commencement of development under Development Consent SSD 10418 and prior to the surrender of Development Consent DA 92/97, MACH Energy will comply with the requirements of both consents (Section 1.1).

This SWB has been prepared to satisfy the relevant conditions of both Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender). Where relevant, this SWB builds on the components of the existing/approved SWB, including previous feedback from government stakeholders and recommendations.

Figure 2 shows the indicative Project general arrangement and existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished.



MAC-18-03A MP2023_Figure 2_Rev C

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]
- Development Footprint 1 (Stage 1) - General Extension Areas [1]
- Development Footprint 1 (Stage 2) - Mine Water Dam 3 [1]
- Relinquishment Area
- Northern Link Road Option 1 Centreline
- Northern Link Road Option 2 Centreline

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.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016)
Orthophoto: MACH (Dec 2022)

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MOUNT PLEASANT OPERATION

General Arrangement of the Project

Figure 2

1.1 PURPOSE AND SCOPE

This SWB has been prepared by MACH Energy to satisfy the requirements under Development Consent SSD 10418, specifically Part B, Condition B52. It also satisfies the requirements of Development Consent DA 92/97 (prior to its surrender) and specifically Condition 28(a), Schedule 3.

This SWB has been prepared to present the predictions of water demand/supply associated with construction and operation of the MPO, including for example, open cut mining, operation of the coal handling and preparation plant (CHPP), rail spur/loop and Fines Emplacement Area, and the supply of water to the MPO.

The SWB applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The SWB applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent SSD 10418, which permits mining until 22 December 2048, and Development Consent DA 92/97 (prior to its surrender). As required by Part A, Condition A5 of Development Consent 10418, this SWB will continue to apply (excluding mining operations) beyond 22 December 2048, as required, until the rehabilitation and any additional undertakings (required by the Planning Secretary of the DPHI [previously DPE], or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

All conditions and statutory requirements under Development Consent DA 92/97 will become null and void after its surrender at which time the MPO will operate under Development Consent SSD 10418 and other relevant legislation.

In accordance with Part B, Condition B52(b) of Development Consent SSD 10418, this SWB has been prepared and reviewed by Dr Camilla West, of ATC Williams, who has been endorsed by the Planning Secretary as a suitably qualified and experienced person. A copy of the endorsement by the Planning Secretary is included in Attachment 3 of the Water Management Plan (WMP).

As required by Part B, Condition B53 of Development Consent SSD 10418, MACH Energy will not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the WMP (of which this SWB forms a part) is approved by the Planning Secretary.

Upon the commencement of development under Development Consent SSD 10418, and before the surrender of Development Consent DA 92/97, in accordance with Part A, Condition A15 of Development Consent SSD 10418, the conditions of Development Consent SSD 10418 prevail to the extent of any inconsistency with the conditions of those consents.

1.2 STRUCTURE OF THE SWB

This SWB consists of the following sections:

- Section 2: Outlines the statutory obligations relevant to this SWB.
- Section 3: Outlines the available data used in the modelling of the SWB.
- Section 4: Describes the water management system implemented at the MPO.
- Section 5: Outlines the predicted water demands present at the site.
- Section 6: Describes the controlled water releases proposed.
- Section 7: Outlines the site water sources.
- Section 8: Describes the water balance modelling undertaken as part of this SWB.
- Section 9: Outlines the Contingency Plan to be implemented if unpredicted impacts occur.
- Section 10: Outlines the review process for MPO documentation and for this SWB.
- Section 11: Describes the reporting procedures relevant for this SWB.
- Section 12: Lists the references cited in this report.

2 STATUTORY OBLIGATIONS

MACH Energy's statutory obligations are contained in:

- the conditions of Development Consent SSD 10418;
- the conditions of Development Consent DA 92/97 (prior to its surrender);
- the conditions of the Commonwealth Approval EPBC 2020/8735 (once granted);
- the conditions of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850), permits and mining leases (mining leases 1645, 1708, 1709,1713, 1750, 1808 and 1829); and
- other relevant legislation.

Obligations relevant to this SWB are described below.

In addition to the above, activities associated with the MPO will be undertaken with the licences, permits and leases described in the MPO Environmental Management Strategy (EMS).

2.1 DEVELOPMENT CONSENT SSD 10418

The conditions of Development Consent SSD 10418 relevant to the content and structure of this SWB are described below. A comprehensive list of all conditions in Development Consent SSD 10418 relevant to water is provided in the WMP.

2.1.1 Site Water Balance Requirements

Part B, Condition B52 of Development Consent SSD 10418 required the preparation of a SWB as part of the WMP for the Project (refer Table 1). Relevant conditions required for the preparation of the Surface Water Management and Monitoring Plan (SWMMP) and addressed in the SWB are also included.

Table 1
SWB Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWB document
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	
(f) include a:	
(i) ***Site Water Balance*** *that includes details of:*	
• *predicted annual inflows to and outflows from the site;*	Sections 7 and 8
• *sources and security of water supply for the life of the* ***development*** *(including authorised entitlements and licences);*	Sections 4.3, 4.4, 7, 8.3 and 8.6
• *water storage capacity;*	Section 4.2
• *water use and management on site, including any water transfers or sharing with neighbouring mines;*	Sections 4.3 and 5
• *licensed discharge points and limits;*	Section 6.2
• *reporting procedures, including the annual preparation of an updated site water balance; and*	Sections 10 and 11
• *a program to periodically validate the water balance for the development.*	Sections 9 and 10

Table 1 (Continued)
SWB Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWB document
(iii) Surface Water Management and Monitoring Plan that includes:…	
• *a detailed description of the water management system;…*	Section 4
• *detailed plans, design objectives and performance criteria for water management infrastructure, including:*	Section 4.1.3 and 4.2
○ *water run-off diversions and catch drains;*	
○ *water storages and sediment dams including mine water management systems;*	
○ *emplacement areas;*	
○ *backfilled pits and final voids for the development; and*	
○ *reinstated drainage networks on rehabilitated areas of the site;…*	

2.1.2 Management Plan (General) Requirements

Part D, Condition D5 of Development Consent SSD 10418 outlines the general management plan requirements that are applicable to the preparation of this SWB.

Table 2 presents these requirements and indicates where each is addressed within this SWB, or within the overarching WMP for the MPO.

Table 2
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWB document
D5. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) summary of relevant background or baseline data;	Section 3
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(ii) any relevant limits or performance measures and criteria; and	Section 4
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	SWMMP and Groundwater Management Plan (GWMP)
(c) any relevant commitments or recommendations identified in the document/s listed in Condition A2(c);	Sections 2.3, 8.6, 9, 10 and 11
(d) a description of the measures to be implemented to comply with the statutory requirements, limits, or performance measures and criteria;	SWMMP and GWMP
(e) a program to monitor and report on the:	SWMMP
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to Condition D4(c);	

Table 2 (Continued)
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWB document
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 9, SWMMP and GWMP
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 10 and 11
(h) a protocol for managing and reporting any:	Sections 10 and 11
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements;	
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Sections 10 and 11
(j) a protocol for periodic review of the plan.	Section 10
***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	

2.2 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this SWB are described below. A comprehensive list of all conditions in Development Consent DA 92/97 relevant to water is provided in the WMP.

2.2.1 Site Water Balance Requirements

Condition 28(a), Schedule 3 of Development Consent DA 92/97 requires the preparation of a SWB, as part of the WMP for the MPO (refer Table 3).

Table 3
SWB Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this SWB document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary.	
The plan must include:	
(a) a Site Water Balance, which must:	
• *include details of:*	
– *sources and security of water supply;*	Sections 4.3, 4.4, 7, 8.3 and 8.6
– *water use on site;*	Section 5
– *water management on site;*	Section 4
– *any off-site water transfers; and*	Section 6
• *investigate and implement all reasonable and feasible measures to minimise water use by the development;*	Section 4.3

2.2.2 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of this SWB.

Table 4 presents these requirements and indicates where each is addressed within this SWB, or within the overarching WMP for the MPO.

Table 4
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this SWB document
2. *The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:*	
(a) detailed baseline data;	Section 3
(b) a description of:	Section 2
• *the relevant statutory requirements (including any relevant consent, licence or lease conditions);*	
• *any relevant limits or performance measures/criteria;*	Section 4
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	SWMMP and GWMP
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	SWMMP and GWMP
(d) a program to monitor and report on the:	Section 10
• *impacts and environmental performance of the development;*	
• *effectiveness of any management measures (see c above);*	
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 10 and 11
(g) a protocol for managing and reporting any:	Sections 10 and 11
• *incidents;*	
• *complaints;*	
• *non-compliances with statutory requirements; and*	
• *exceedances of the impact assessment criteria and/or performance criteria; and*	
(h) a protocol for periodic review of the plan.	Section 10
Note: The Secretary may waive some of these requirements if they are unnecessary for particular management plans.	

2.3 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences (WALs) issued under the *Water Management Act, 2000* (Table 5).
- Discharge credits (51) held under the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation, 2002* (HRSTS).
- Mining Leases 1645, 1708, 1709, 1713, 1750, 1808 and 1829 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources.
- EPL 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the NSW Environment Protection Authority (EPA).
- The Rehabilitation Management Plan (RMP), as required by mining lease conditions issued under the *Mining Act, 1992* and approved by the MEG [1].

2.4 OTHER LEGISLATION

A description of other legislation relevant to water resources at the MPO is provided in the WMP, SWMMP and GWMP in addition to the MPO EMS.

[1] As of 1 August 2022, MPO operates under a RMP along with the supporting Annual Rehabilitation Report and Forward Program which has replaced the Mining Operations Plan (1 July 2021 – 30 June 2023).

Table 5
Surface Water Access Licences Held for the Mount Pleasant Operation

Water Access Licence	Water Source	Type	Share (units)
879	Hunter Regulated River Water Source	Regulated River (High Security)	243
880	Hunter Regulated River Water Source	Regulated River (High Security)	124
1113	Hunter Regulated River Water Source	Regulated River (High Security)	366
973	Hunter Regulated River Water Source	Regulated River (High Security)	3
638	Hunter Regulated River Water Source	Regulated River (High Security)	225
		High Security Subtotal	**961**
639	Hunter Regulated River Water Source	Regulated River (General Security)	134
974	Hunter Regulated River Water Source	Regulated River (General Security)	210
988	Hunter Regulated River Water Source	Regulated River (General Security)	156
1229	Hunter Regulated River Water Source	Regulated River (General Security)	480
1227	Hunter Regulated River Water Source	Regulated River (General Security)	99
992	Hunter Regulated River Water Source	Regulated River (General Security)	75
7808	Hunter Regulated River Water Source	Regulated River (General Security)	36
702	Hunter Regulated River Water Source	Regulated River (General Security)	267
993	Hunter Regulated River Water Source	Regulated River (General Security)	265
604	Hunter Regulated River Water Source	Regulated River (General Security)	183
662	Hunter Regulated River Water Source	Regulated River (General Security)	9
10775	Hunter Regulated River Water Source	Regulated River (General Security)	243
41438	Hunter Regulated River Water Source	Regulated River (General Security)	455
969	Hunter Regulated River Water Source	Regulated River (General Security)	39
1074	Hunter Regulated River Water Source	Regulated River (General Security)	5
8406	Hunter Regulated River Water Source	Regulated River (General Security)	168
8598	Hunter Regulated River Water Source	Regulated River (General Security)	3
10531	Hunter Regulated River Water Source	Regulated River (General Security)	120
		General Security Subtotal	**2,947**
975	Hunter Regulated River Water Source	Domestic and Stock	8
989	Hunter Regulated River Water Source	Domestic and Stock	8
1230	Hunter Regulated River Water Source	Domestic and Stock	8
605	Hunter Regulated River Water Source	Domestic and Stock	8
677	Hunter Regulated River Water Source	Domestic and Stock	24
663	Hunter Regulated River Water Source	Domestic and Stock	16
13785	Hunter Regulated River Water Source	Domestic and Stock	1
1259	Hunter Regulated River Water Source	Supplementary Water	33.2
1258	Hunter Regulated River Water Source	Supplementary Water	5
1307	Hunter Regulated River Water Source	Supplementary Water	37.5
1260	Hunter Regulated River Water Source	Supplementary Water	4.8
1308	Hunter Regulated River Water Source	Supplementary Water	15.1
1338	Hunter Regulated River Water Source	Supplementary Water	17.5
8445	Hunter Regulated River Water Source	Supplementary Water	12.6
		Other Subtotal	**198.7**

3 AVAILABLE DATA

The SWB model has been developed using historical climate data representative of the MPO area, as described below.

3.1 CLIMATE DATA

Climate data for the SWB model was sourced from the Queensland Government's SILO Point Data service (Queensland Department of Environment and Science, 2020). This database provides synthetic daily climate data sets for a specified point by interpolation between surrounding point records held by the Bureau of Meteorology. Daily evaporation and rainfall data from 1892 to 2012 was obtained for the mine location and used in the SWB model (Section 8). This period aligns with the Hunter River Integrated Quantity and Quality Model (IQQM) simulations which have been undertaken using climatic data from 1892 to 2012 to simulate available water determinations in the Hunter Valley.

3.2 HUNTER RIVER FLOW DATA

To simulate periods available for licensed release, a relationship between the Hunter River flow rate and River Registers for declared 'high' flow events was developed using information from the Denman Gauging Station (210055) downstream of the Project. This relationship was formulated using historical River Registers sourced online, correlated against recorded Hunter River daily flows. This correlation was extended to 'flood' flow events in the Hunter River (during which no daily discharge restriction applies). Hunter River flow rates at Denman were simulated by the IQQM for the same period of historical climate data as used in the water balance model and these flows used with the above correlation relationship to simulate River Registers.

4 WATER MANAGEMENT SYSTEM

The MPO water management system is designed to maintain separation of undisturbed area, disturbed area (i.e. sediment laden) and mine affected water, thereby preventing the contamination of undisturbed water resources, including downstream natural drainage systems, by mining activities.

The objectives of the water management system are to:

- protect the integrity of regional and local water resources;
- separate runoff from areas undisturbed by mining and water generated by mining activities;
- 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 MPO requirements (e.g. dust suppression).

A summary of the water management performance measures relevant to the water management system is provided in Table 6, in accordance with Table 6 of Development Consent SSD 10418.

Table 6
Water Management Performance Measures

Feature	Performance Measure
Water management - General	• *Maintain separation between clean and dirty (i.e. sediment-laden) and mine water management systems* • *Minimise the use of clean and potable water on the site* • *Maximise water recycling, reuse and sharing opportunities* • *Minimise the use of make-up water from external sources, including extraction from the Hunter River* • *Minimise the need for discharges to the Hunter River Salinity Trading Scheme* • *Design, install, operate and maintain water management systems in a proper and efficient manner* • *Minimise risks to the receiving environment and downstream water users*
Clean water diversions and storage infrastructure	• *Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site*
Sediment dams	• *Design, install and maintain sediment dams in accordance with the guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008) and the requirements under the POEO Act*
Mine water storages	• *Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water* • *New mine water storages designed to contain the 1% AEP 24-hour storm event and minimise permeability* • *On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and maintained (including to minimise permeability)* • *Ensure adequate freeboards within all pit voids at all times to minimise the risk of discharge to surface waters*
Tailings storages	• *Maximise dewatering and co-disposal of dewatered tailings from the Stage 2 CHPP within overburden emplacements* • *Design and maintain tailings storage areas to prevent the movement of tailings seepage/leachate offsite*

In accordance with Part B, Condition B51 of Development Consent SSD 10418, the performance measures in Table 6 of Development Consent SSD 10418 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.

The water management system comprises a number of dams, the open cut pits and the Fines Emplacement Area, together with a system of pumped transfers and drains. Additional storages will be constructed as necessary to manage runoff from mine disturbed areas and divert runoff away from open cut pit areas. The water management system schematic is shown in Figure 3 and described in detail below. The general arrangement of the water management system at the MPO is shown in Figure 4.

The Conceptual Project Layout Plans under Development Consent DA 92/97 for the MPO showing the location of existing water management system infrastructure are shown in Attachment 1. General Project Arrangement stage plans under Development Consent SSD 10418 for the MPO showing the proposed location of key water management system infrastructure are shown in Attachment 2.

4.1 WATER MANAGEMENT SCHEME

4.1.1 Mine Water Dams

The Mine Water Dams (MWDs) are the main water storage on-site and supply makeup water to the CHPP. Fine rejects slurry produced by the CHPP is pumped to the Fines Emplacement Area and water recovered from the Fines Emplacement Area is pumped back to the MWDs. Mine Water Dam 1 (MWD1) is currently in use. Mine Water Dam 2 (MWD2) will be constructed to the south of the Fines Emplacement Area to provide for additional water storage and supply requirements from 2026. As the south open cut pit progresses to the west, MWD1 will be decommissioned and replaced by Mine Water Dam 3 (MWD3) by 2041. The mine water management system allows all dams to ultimately report to the MWDs. The mine water dams can receive water from the Hunter River via WALs.

The MWDs are connected to the Discharge Dam (DW1) which is located to the west of Bengalla Road and is intended to facilitate controlled releases to the Hunter River under the conditions of the HRSTS. DW1 and its associated pipeline are approved for construction under the development consent for the Bengalla Continuation Project (SSD-5170), with Development Consent DA 92/97 and Development Consent SSD 10418 authorising the use of the discharge system. EPL 20850 was varied on 28 February 2023 to incorporate a licensed discharged point at the outflow from DW1 and to incorporate the discharge point and the Interim Water Discharge Pipeline in the premises boundary.

4.1.2 Highwall Dams

Groundwater inflow to the operational open cut pits is dewatered and directed to the High Wall Dam 2 (HWD2), which is used to supply water for haul road dust suppression. HWD2 has replaced High Wall Dam 1 (HWD1) and will eventually be replaced by High Wall Dam 3 (HWD3) further to the north.

4.1.3 Emplacement Areas

Thickened fine reject slurry produced by the CHPP is pumped to the Fines Emplacement Area. Fine reject bleed water and Fines Emplacement Area rainfall runoff are recovered via pumping to the MWDs and recycled for reuse in the CHPP. Any seepage from the Fines Emplacement Area is captured in a subsurface seepage collection system located at the toe of the Fines Emplacement Area embankment and pumped back to the storage area.

During mining operations, overburden and interburden material, and coarse rejects from the CHPP, will be strategically placed in mined out voids and the Eastern Out-of-Pit Emplacement. Dewatered fine rejects from the Stage 2 CHPP modules will be co-disposed with the coarse rejects.

Based on geochemical assessment undertaken by RGS (2020), initial and ongoing surface runoff and seepage from non-acid forming (NAF) overburden, interburden and coal reject material is expected to be pH neutral to slightly alkaline, have low dissolved metals/metalloid concentrations, and have a low to moderate level of salinity. All runoff and seepage from emplacement areas will be managed within the mine water system until suitably rehabilitated.

4.1.4 Environmental Dams

Environmental Dam 2 (ED2) is located downstream of the Fines Emplacement Area and served as a sediment dam during the construction of the Fines Emplacement Area embankment.

Environmental Dam 3 (ED3) is a sediment dam located within the mine infrastructure area. ED3 is used to supplement site water supply via pumping to the MWDs during periods of low water inventory.

The Environmental Dam Mine Infrastructure Area (EDMIA) is a sediment dam with a partly disturbed catchment and can supplement site water supply via pumping to the MWDs during periods of low water inventory.

The Rail Loop Dam 2 (RLD2) forms part of the Stage 2 rail infrastructure and captures runoff from the relocated rail loop. The Stage 1 rail infrastructure, including Rail Loop Dam 1 (RLD1), was decommissioned in 2022.

4.1.5 Sediment Dams

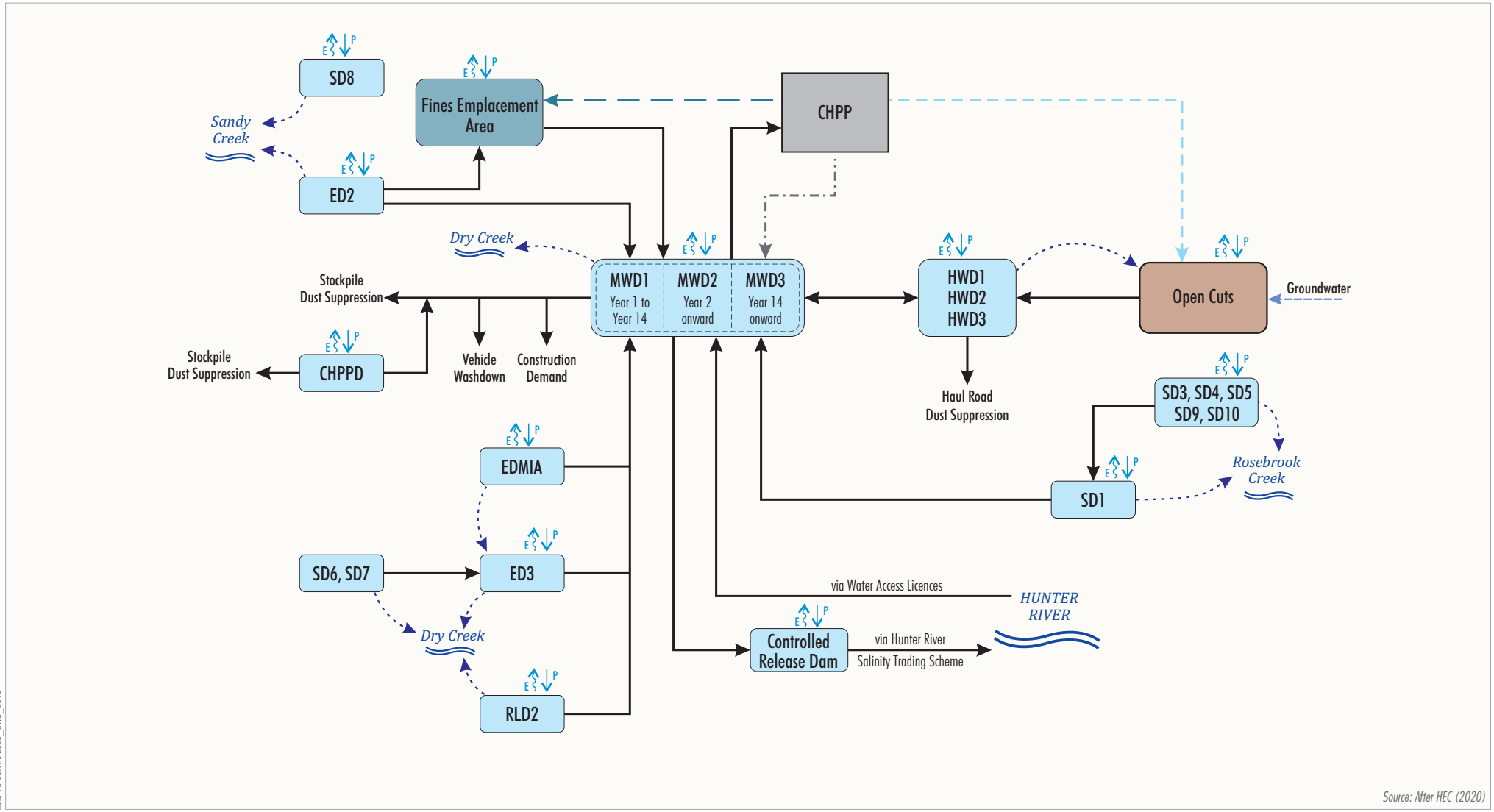
In addition to the existing sediment dams, additional sediment dams will be constructed at intervals along the eastern Project boundary to manage runoff from the expanded open cut pit and waste rock emplacement disturbance areas. The catchment area directed to the existing Sediment Dam 4 (SD4) will increase, and SD4 will be upgraded to increase the storage capacity. An additional sediment dam (SD8) may be required north of the Fines Emplacement Area as part of the construction of the final lift that will occur in approximately 2040 (subject to actual emplaced fines volumes and detailed design).

4.1.6 Other Site Water Storages

Other site water storages include:

- CHPP Dam (CHPPD); and
- Other small farm dams used periodically as available and required under MACH Energy's harvestable rights.

Table 7 lists the existing and proposed operational water management system storages and their primary functions.



MAC-18-03A MP2023_SWB_001E

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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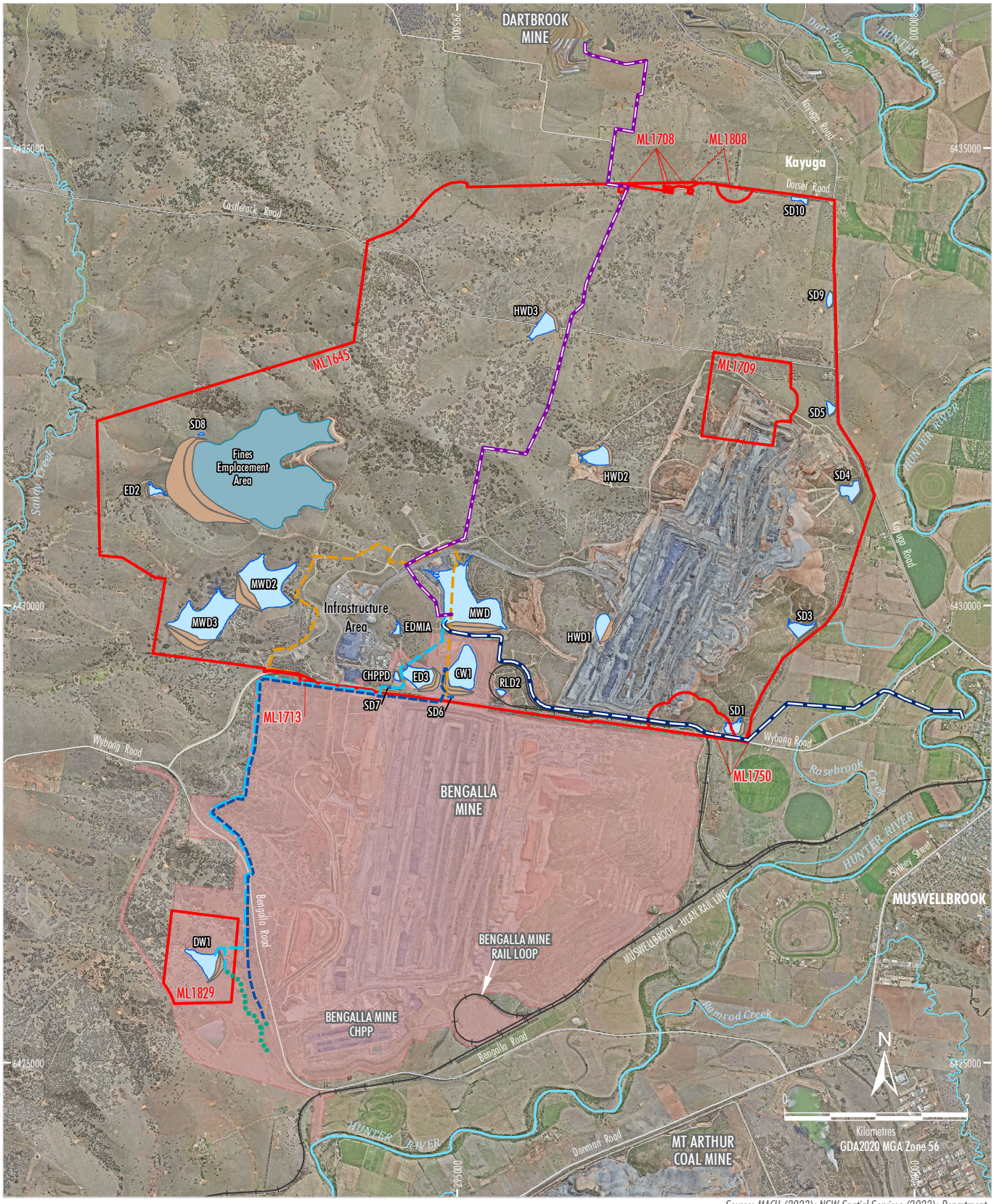
MOUNT PLEASANT OPERATION

Water Management System Schematic

Figure 3



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LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Infrastructure Area Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Water Dam
- Fines Emplacement Area

Indicative Water Pipeline Alignments

- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Hunter River Supply Pipeline
- Dartbrook Water Sharing Pipeline

Figure excludes some incidental Project components such as water management infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016); Royal Haskoning DHV (2018) Orthophoto: MACH Energy (Dec 2023, 2022)

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MOUNT PLEASANT OPERATION

Water Management System General Arrangement

Figure 4

Table 7
Operational Water Management System Water Storages

Storage[1]	Status	Classification	Primary function
ED2	Existing	Sediment dam	Management of site runoff
ED3	Existing	Sediment dam	Management of site runoff
EDMIA	Existing	Sediment dam	Management of site runoff
CHPPSD	Existing	Sediment dam	Management of site runoff
HWD1	Existing	Highwall Dam	Management of site runoff
HWD2	Existing	Highwall Dam	Management of site runoff
HWD3	Approved	Highwall Dam	Management of site runoff
MWD1	Existing	Mine water storage	Primary storage of operational water (including recirculated mine water and licensed river water)
MWD2	Approved	Mine water storage	Primary storage of operational water (including recirculated mine water and licensed river water)
MWD3	Approved	Mine water storage	Primary storage of operational water (including recirculated mine water and licensed river water)
SD1	Existing	Sediment dam	Management of site runoff
SD3	Existing	Sediment dam	Management of site runoff
SD4	Existing	Sediment dam	Management of site runoff
SD5	Approved	Sediment dam	Management of site runoff
SD6	Existing	Sediment dam	Management of site runoff
SD7	Existing	Sediment dam	Management of site runoff
SD8	Approved	Sediment dam	Management of site runoff
SD9[2]	Approved	Sediment dam	Management of site runoff
SD10[2]	Approved	Sediment dam	Management of site runoff
DW1	Existing	Discharge dam	Storage and management of operational water for controlled release
RLD1	Decommissioned	Sediment dam	Management of site runoff
RLD2	Existing	Sediment dam	Management of site runoff
Train Load Out (TLO) dam	Existing	Sediment dam	Management of site runoff
Temporary Sediment Basin 1	Decommissioned and rehabilitated	Sediment basin	Management of site runoff
Temporary Sediment Basin 2	Decommissioned and rehabilitated	Sediment basin	Management of site runoff
Temporary Sediment Basin 3	Decommissioned and rehabilitated	Sediment basin	Management of site runoff

1 In addition to these operational water storages, operational water will also be managed within the open cut pit(s) and within the Fines Emplacement Area.

2 SD9 and SD10 are named SD6 and SD7, respectively, in Development Consent SSD 10418 and the MPO EIS and related documents.

4.1.7 Drains

A number of drains have been developed and/or are planned as part of the operational water management system, these include:

- a series of downslope (toe) drains at the perimeter of the Eastern Out-of-Pit Emplacement, directing runoff to SD1, SD3 and SD4;
- a drain downslope of the CHPP area directing runoff to ED3;
- clean water diversion drains around the perimeter of the Fines Emplacement Area and ED2;
- drains around the out-of-Pit Emplacement areas to the north and west of the open cut areas;
- additional clean water diversion drains upslope of the MWDs to reduce the catchment reporting to the MWDs and associated impacts to downstream users; and
- collection drains to convey runoff from upstream areas disturbed by mining to the sediment dams and from the sediment dams offsite.

In the final landform, permanent diversion drains will be constructed adjacent to the south-eastern, south-western and north-western edges of the final void catchment to convey runoff from upstream areas away from the final void and divert runoff to existing surface water drainages.

4.2 WATER STORAGE AND DRAIN DESIGN

4.2.1 Storage Dams

The storage dams and their associated design capacities are outlined in Table 8 below. Actual water storage and sediment dam design capacities may vary from those described in Table 8 based on progressive water balance modelling reviews.

The open cut pits have been excluded from Table 8 because their capacity was not based on design criteria. For modelling purposes, the open cut storages were assumed to comprise an excavated sump throughout the MPO life and the volume of water stored was tracked within the model and reported to assess potential risk of disruption to mining.

The Fines Emplacement Area was also excluded from Table 8 because its capacity varies with time. Storage characteristics for the Fines Emplacement Area were developed at different times over the Project life based on the fine rejects beach profile generated from the indicative mine schedule for the Project and an assumed 2% sloping fine rejects beach. A minimum capacity of 400 megalitres (ML) was simulated in early 2023 (before a planned dam wall raise). The Fines Emplacement Area reclaim pumping rate was set so that no spills were simulated (HEC, 2020).

Table 8
Modelled Dam Storage Capacities and Design Criteria

Name of Dam	Initial Estimated Required Capacity (ML)	Design Criterion	Capacity (ML)
ED2	6.9	Sized to mitigate spill risk	25.5*
ED3[#]	289.7	1% AEP spill risk	331.7*
RLD2	9.5	1% AEP spill risk	9.5
EDMIA	-	Nominal size – spills to ED3	17.1*
CHPPSD	-	Nominal size – spills to ED3	8.2*
HWD1	106.5	Nominal size – spills to South open cut pit	110^
HWD2	110	Nominal size – spills to Central open cut pit	110^
HWD3	110	Nominal size – spills to North open cut pit	165.3
MWD1	2,018.2	Allow for buffer to supply site demands	2,077*
MWD2	1,850.6	Allow for buffer to supply site demands – simulated as commencing Jan 2039	1,850.6
MWD3	1,799	Allow for buffer to supply site demands	1,799
SD1	23.1	Landcom (2004) & DECC (2008)	51.6*
SD3	32.3	Landcom (2004) & DECC (2008)	40.2*
SD4	22.5	Landcom (2004) & DECC (2008) – storage will expand from Sep 2027	34.7
SD5	28.7	Landcom (2004) & DECC (2008)	28.7
SD6	0.3	Landcom (2004) & DECC (2008)	0.3
SD7	0.75	Landcom (2004) & DECC (2008)	0.75
SD8**	0.9	Landcom (2004) & DECC (2008)	0.9
SD9	22.3	Landcom (2004) & DECC (2008)	22.3
SD10	19.6	Landcom (2004) & DECC (2008)	19.6
DW1	363	1% AEP spill risk	300
TLO dam	1.5	Landcom (2004) & DECC (2008)	1.5
Temporary Sediment Basin 1	1.3	Removed and successfully rehabilitated in 2022	1.3
Temporary Sediment Basin 2	2.3	Removed and successfully rehabilitated in 2022	2.3
Temporary Sediment Basin 3	1.2	Removed and successfully rehabilitated in 2022	1.2

Note:

ML = Megalitres, AEP = Annual Exceedance Probability and DECC = NSW Department of Environment and Climate Change.

[#] MACH Energy has installed a pump and pipeline system at ED3 to dewater the storage to MWD to reduce the potential for overtopping. This would provide additional capacity above the design criterion listed above and further reduce spill risks. Capacity to be increased prior to 2026.

* Based on as-built survey.

^ Design capacity.

** Not explicitly modelled, included in ED2 catchment.

The new mine water storages are designed, constructed and maintained to avoid unlicensed or uncontrolled discharge. All new mine water storages are designed to contain the 1% Annual Exceedance Probability (AEP) 24-hour rainfall event and to reduce permeability. All pit voids are managed to ensure adequate freeboard to reduce the risk of discharge to surface waters.

Sediment dams are designed in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction including Volume 1* (Landcom, 2004), *Volume 2E: Mines and Quarries* (DECC 2008) and the POEO Act or HRSTS. Outlet structures from new sediment dams will be designed in consideration of DCCEEW Water's *Guidelines for Outlet Structures* (NSW Office of Water, 2010).

MACH Energy notes the EPA's advice to DPE on the Hunter Valley Operations South MOD 5 proposal, which provided guidance regarding sediment dam design in the context of the HRSTS (EPA letter dated 17 March 2017). In accordance with the EPA's recommendations, MACH Energy monitors the quality of water in sediment dams in order to regularly evaluate whether the salinity of controlled discharges/managed overflows from the sediment dams complies with the provisions of the HRSTS.

Recent (2022) data for SD1 and SD3 have indicated electrical conductivity (EC) values greater than 400 microsiemens per cm (µS/cm), however this data was collected during a dry period at the MPO and correspondingly low water levels in SD1 and SD3 (i.e. due to evapoconcentration of salts). MACH Energy therefore considers that these results would not be indicative of a managed overflow event at SD1 (e.g. in the event of rainfall in excess of design criteria).

MACH Energy will continue to monitor the MPO sediment dams to ensure any controlled discharges occur in accordance with the HRSTS.

To date, there have been no licensed discharges from the MPO sediment dams.

Notwithstanding, in the event that monitoring of the water quality in sediment dams after a significant rainfall event indicates that water would not meet the HRSTS maximum for non-regulated discharge, MACH Energy would identify and implement additional management measures in consultation with EPA. These may include:

- Licensing of sediment dams in an EPL and acquisition of additional salinity credits under the HRSTS.
- Increasing the capacity of relevant sediment dams.
- Implementing additional pumping arrangements to return water from the sediment dams to the mine water management system.

The capacities and operating levels of the MPO storages were developed based on as-built surveys or iterative simulations to achieve specific design criteria (as summarised in Table 8). For the DW1, ED3 and RLD2, which spill externally, a spill risk assessment identified the AEP rainfall event design criterion for each dam and iterative simulations were carried out to identify the required capacity to achieve the design criterion. As noted in Table 8, MACH Energy has installed a pump and pipeline system at ED3 to dewater the storage to the MWD1. This would provide additional capacity above the design criterion and further reduce spill risks.

4.2.2 Drain Design

The collection and diversion drains are designed in accordance with Landcom (2004) and NSW DECC (2008) guidelines. To reduce the potential for erosion and scouring, the drains are typically grass or rip-rap lined.

4.2.3 Backfilled Pits and Final Voids

Post cessation of mining, the final landform will comprise one void that is predicted to partially fill with water and remain as a long-term groundwater sink. The final landform plan will comprise:

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

As a result of the above, the final void will be safe and geotechnically stable, and the catchment reporting to the void will be reduced. The water balance predictions indicate that the water level would remain well below the crest of the final void.

4.2.4 Reinstated Drainage Networks on Rehabilitated Areas

The conceptual final landform has been developed using geomorphic design principles to address key design principles. The key design principles include surface water drainage from the waste emplacement landform incorporating micro-relief to increase drainage stability, avoid major engineered drop structures and limit erosion potential.

The final 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.

4.3 MINIMISATION OF WATER USE

MACH Energy's water management strategy includes preferential use of mine water, thereby reducing the need to import raw water from external sources for operational purposes. The water management system has been designed to recycle runoff, fine rejects bleed water and groundwater inflow wherever practicable. This water is reused for haul road and stockpile dust suppression, vehicle wash down, and in the CHPP.

General water management measures include, but are not limited to:

- finalising construction of proposed water storages as early as possible to increase site yield;
- limiting the extent of disturbance to reduce dust suppression requirements; and
- regular review of site water use, identification of opportunities for improvement, and implementation of best practice technologies.

Surface and groundwater extraction is undertaken in accordance with MACH Energy's WALs.

Site water use is reviewed every year as part of the Annual Review process (Section 10.1).

During construction activities, water may be sourced externally, e.g. taken from commercial water fill points in the light industrial area.

In addition, in order to reduce make-up water demand from the Hunter River over the life of the MPO, MACH Energy may also source excess mine water from the adjoining mines (i.e. Dartbrook and Bengalla Mines) should it be available, to reduce extraction from the Hunter River. The frequency, quality and quantity of water to be sourced from the Dartbrook or Bengalla Mines would depend on:

- availability of surplus water on the other mine sites coinciding with a water deficit at the MPO;
- suitability of Dartbrook/Bengalla water quality for the intended use at the MPO; and
- MACH Energy and the other mining operator obtaining all necessary approvals.

MACH Energy would also consider the feasibility of other potential alternative water supply sources over the life of the mine in consultation with DPHI and EPA.

MACH Energy has obtained in-principle agreement with Australian Pacific Coal for Dartbrook Mine to supply some excess mine water to the MPO for its beneficial reuse (Figure 3).

4.4 POTABLE WATER

Treated potable water for all facilities is trucked to site and stored in on-site storage tanks with sufficient capacity to store a 7-day supply. Potable water will also 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. The existing potable water reticulation system will continue to be used to supply the various areas of the site (e.g. office buildings, maintenance areas and crib rooms) and will be augmented or extended as required to supply additional mine facilities. All potable water supplied on-site will meet the requirements of the *Australian Drinking Water Guidelines* (Australian Government National Health and Medical Research Council, 2011).

5 WATER DEMANDS

5.1 OVERVIEW

Key water demands on-site include the following:

- water used in the CHPP, including water retained in coal products and rejects;
- haul road dust suppression; and
- miscellaneous water usage such as vehicle wash down, construction water and stockpile water usage.

A description of these water demands and the assumptions adopted in the SWB model are provided in the sections below.

5.2 CHPP

The CHPP accounts for the largest use of water at the MPO. Water lost from the coal handling and preparation process is either entrained within product coal or reject materials. Various CHPP upgrades will be implemented, including two additional coal processing modules. Reject dewatering facilities will be constructed to improve water recovery and allow co-disposal of fine rejects with coarse rejects and waste rock as part of ROM waste rock management emplacement operations.

The CHPP demand was calculated by simulating the moisture balance[2] of the CHPP inputs and outputs. With the proposed implementation of water recovery measures, the resulting forecast CHPP make-up demand rate equates to approximately 196 megalitres per million tonnes (ML/Mt) over the life of the Project.

The CHPP water demand was assumed to increase over time, corresponding with the increase of ROM coal production over the mine life. At maximum production under Development Consent DA 92/97, the MPO is licensed to mine up to 10.5 Mtpa, with an assumed estimated make-up water demand of up to 8 ML/day prior to the implementation of water recovery measures. At maximum production under Development Consent SSD 10418, the Project is licensed to mine up to 21 Mtpa, with an estimated make-up water demand of up to 10 ML/day with the implementation of water recovery measures.

5.3 DUST SUPPRESSION

MPO haul road dust suppression demand was calculated based on haul road lengths derived using mine stage plans. Calculated haul road dust suppression demand averaged approximately 2.1 ML/day.

5.4 CONSTRUCTION DEMAND

Construction water will be required for the upgrades to the CHPP and for construction of additional water storages. Construction demand was estimated at up to 1.2 ML/day.

5.5 MISCELLANEOUS (VEHICLE WASHDOWN AND STOCKPILE USAGE)

Vehicle wash down demand was estimated to be 58 megalitres per year (ML/year) while dust suppression of stockpiles was estimated to be 86 ML/year.

[2] The amount of external water required to process coal through the CHPP (i.e. the difference between the moisture content in the ROM coal [input] and the moisture content in the product coal, coarse rejects and tailings [output]).

5.6 OTHER LOSSES

For the purposes of calculating evaporation losses, storage volume surface areas were derived using storage level-volume-area relationships for each water storage.

Evaporation losses were calculated using the following pan factors over the various water storages at the site:

- the Fines Emplacement Area = 1.1 – due to the darker fine rejects surface;
- the open cut = 0.8 – due to shading effects and lower wind speed at depth; and
- all other storages – monthly values varying from 0.84 to 0.95 on the basis of values in McMahon *et al.* (2013) for Scone.

6 CONTROLLED WATER RELEASE

6.1 TREATED EFFLUENT DISPOSAL

Wastewater from offices, workshop and bath houses is collected and treated in an on-site effluent treatment system located within the Mine Infrastructure Area. Effluent is treated to meet the *Australian Guidelines for Water Recycling* (Environment Protection and Heritage Council, 2006), as well as NSW Health Department and local council requirements. Any additional effluent sites installed for expanded operations will be appropriately licensed. Effluent is removed from site by a suitably qualified contractor. Additionally, on-site treated effluent may be pumped to the MWD to supplement CHPP usage, vehicle wash down and stockpile dust suppression.

Any treated effluent released from the MWD1 to the Hunter River via the HRSTS will comply with the discharge conditions specified in EPL 20850.

6.2 LICENSED DISCHARGE

MACH Energy has approval under EPL 20850 for the discharge of water from site to the Hunter River under the HRSTS. In accordance with Condition E1.1, saline water discharge into the Hunter River Catchment will only occur from the authorised discharge point. The authorised water discharge/monitoring point is MWD1, and is referred to as 'Point 16' in EPL 20850. The hourly volume discharge limit would be calculated in accordance with Condition E1.2 and E1.3 of EPL 20850. The hourly volume discharge limit is dependent on several factors including the total allowable salt discharge at the start of the discharge, the salt concentration of the water to be discharged and the start and end times of each discharge period. The total allowable salt discharge depends on the flow conditions of the river and the ambient salinity in the river and therefore may change daily (DEC, 2003). The River Register specifies the total allowable discharge and the start and end times of each discharge period.

EPL 20850 defines water quality limits for pH and total suspended solids of water discharged to the Hunter River under the HRSTS (Table 9).

Table 9
Pollutant Concentration Limits Authorised Under EPL 20850, Condition L2

Pollutant	Units of Measure	100 Percentile Concentration Limit
pH	pH	6.5 – 9.5
Total suspended solids	Milligrams per litre	120

The HRSTS regulates the amount and salinity of water which can be discharged into the Hunter River.

7 WATER SOURCES

Sources of water supply to the MPO are summarised below:

- groundwater inflows to the open cut pits;
- runoff captured from the footprint of the mining disturbance area by the water management system;
- fine rejects bleed water returned from the Fines Emplacement Area; and
- water pumped from the Hunter River and/or groundwater supply bores.

In future, additional water supply will include water reclaimed from the belt press filters on new coal processing modules.

Operational water supply is reviewed regularly, collating all groundwater extractions, in-pit rainfall accumulation and runoff, as well as imported water to inform on-site water management.

MACH Energy will manage the available water sources and, if necessary, adjust the scale of operations to match the available water supply (in accordance with Part B, Condition B39 of Development Consent SSD 10418 and Condition 25, Schedule 3 of Development Consent DA 92/97 [prior to its surrender]).

MACH Energy would also seek opportunities to source excess mine water from the adjoining mines (i.e. Dartbrook and Bengalla Mines) should it be available (Section 4.3). However, potential access to excess water from other mining operations has not been currently assumed for this SWB model.

7.1 GROUNDWATER INFLOWS

Groundwater inflow rates were apportioned to each open cut pit based on the coal seam strike length. The maximum predicted inflow is approximately 303 ML in the 2034-35 water year. These inflow rates were reduced to allow for evaporation from the exposed coal seam (recognising that the coal seam is the principal aquifer). The evaporation rates were calculated based upon coal seam thickness and strike length, using a pan factor of 0.8. The simulated annual groundwater inflow rate net of evaporation is shown in Figure 5.

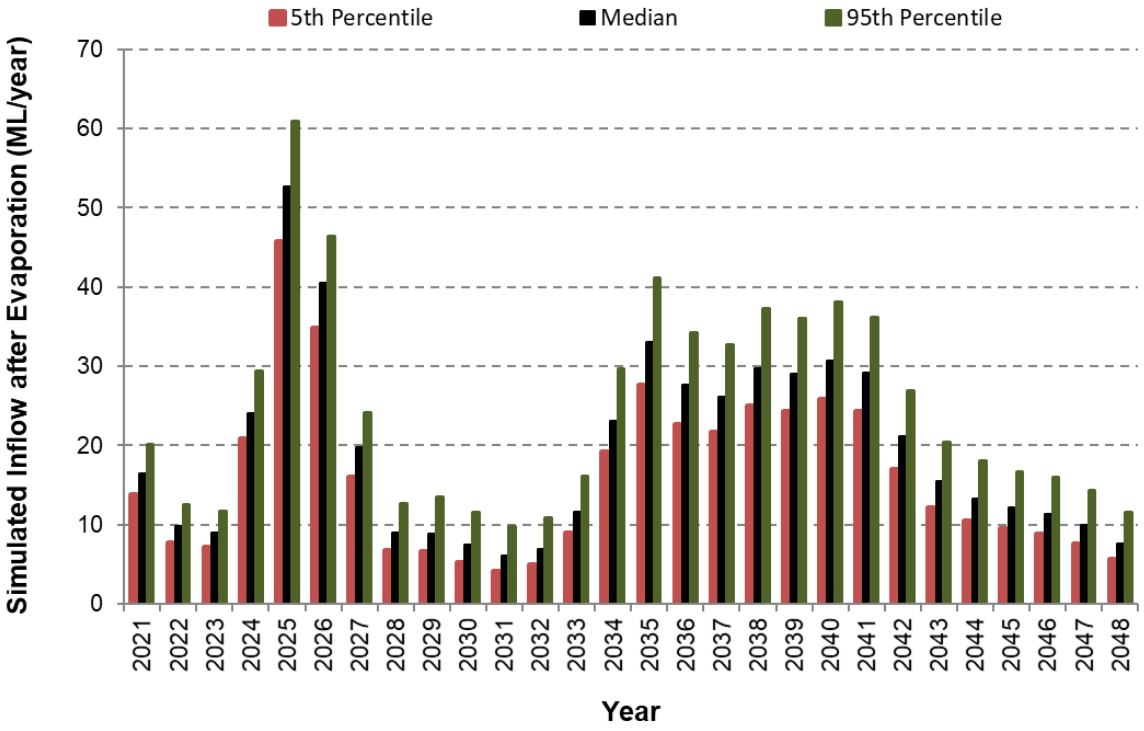

Figure 5 Groundwater Inflow After Evaporation

7.2 CATCHMENT RUNOFF

As far as practical, undisturbed area runoff from upstream catchment areas is diverted around active mining and other disturbance areas. Diversion design will consider catchment extent, required disturbance and safety. Water that accumulates within mining pits is pumped to surface storages for reuse in the mining operations and CHPP, as described in Section 4.1.

Catchment areas were derived using mine stage plans, with sub-catchment areas defined according to land use type and associated runoff behaviour. This is described in detail in Section 8.2.

7.3 FINE REJECTS BLEED WATER

As described in Section 4.1.3, fine rejects slurry will be pumped from the CHPP to the Fines Emplacement Area. Fine rejects bleed water is water liberated from fine rejects slurry as it settles. This water ponds at the fine rejects surface and is available for reclamation. Fine rejects bleed water recovered from the Fines Emplacement Area is pumped to the MWDs.

The fine rejects bleed rate is assumed to increase through to 2024, then decrease through to 2028, then remain relatively stable until decreasing from 2044.

7.4 PUMPING FROM THE HUNTER RIVER/GROUNDWATER SUPPLY BORES

A total of 858 ML/year Hunter River High Security WALs and 2,577 ML/year Hunter River General Security WALs were modelled for the Project (noting that MACH Engergy has subsequently purchased additional entitlement), as summarised in Section 2.3.

The IQQM is the model used by DCCEEW Water to set licence allocation limits in the Hunter Valley, in accordance and in conjunction with the *Water Sharing Plan for the Hunter Regulated River Water Source 2016*.

IQQM simulations have previously been undertaken using climatic data from 1892 to 2012 (the same period of data as used in the water balance model) to generate predictions of WALs available water determinations, periods of off-allocation flow and volume of water stored in Glenbawn Dam and Glennies Creek Dam (the two Hunter River major regulating storages).

MACH Energy may also obtain make-up water from groundwater supply bores. Any water taken from groundwater bores would be in accordance with WALs issued under the relevant water sharing plan (i.e. depending on the relevant groundwater source).

8 WATER BALANCE MODELLING

8.1 OVERVIEW

The water balance model for the life of mine has been developed for the Project, beginning on 1 July 2020 and simulating until the end of 2048 (HEC, 2020).

The model has been developed using the GoldSim simulation package. The model simulates the behaviour of water held in and pumped between all simulated water storages shown in Figure 3. For each storage, the model simulates:

Change in Storage = Inflow – Outflow

Where:

- *Inflow* includes rainfall runoff, groundwater inflow (to the open cut pits), fine rejects bleed water (for the Fines Emplacement Area), water pumped from the Hunter River (for the WMDs), and all pumped inflows from other storages.
- *Outflow* includes evaporation, spill, controlled release via the HRSTS (for DW1), and all pumped outflows to other storages or to a demand sink (e.g. the CHPP).

The model operates on an 8-hourly time step. The model simulates 121 ‘realisations’, derived using the historical daily climatic record from 1892 to 2012. The results from all realisations were used to generate estimates of supply reliability, spill and open cut water inventory. The period of climatic data from 1892 to 2012 comprises a wide range of climatic events including high, low and median rainfall periods.

8.2 SIMULATION OF CATCHMENT RUNOFF

Rainfall runoff in the water balance model was simulated using the Australian Water Balance Model (AWBM) (Boughton, 2004). The AWBM is a nationally-recognised catchment-scale water balance model that estimates catchment yield (flow) from rainfall and evaporation.

The MPO site was split into six different sub-catchment types for AWBM simulation, these were:

- undisturbed (natural) areas;
- hardstand (for example, roads and infrastructure areas);
- open cut pits;
- active waste rock emplacements;
- rehabilitated areas; and
- fine reject emplacement.

AWBM simulation of rainfall runoff from each of the sub-catchment types was undertaken. The fine rejects sub-catchment was split into two classifications: wet beach (20% of the area), and dry beach (80% of the area), to allow for the different runoff properties expected.

Direct rainfall to and from evaporation from the storage water surface area was modelled.

Each modelled storage catchment area was divided into sub-catchment areas corresponding with the sub-catchment types listed above. Catchment and sub-catchment areas for the modelled storages were calculated from the MPO stage plans.

The total catchment area was approximately 1,415 hectares (ha) as of July 2020 and is expected to increase to approximately 2,700 ha over the life of the MPO.

8.3 OVERALL WATER BALANCE

Model predicted average (mean) inflows and outflows, averaged over all 121 realizations and the simulation period, are shown in Table 10. Rainfall runoff provides the largest input of average modelled system inflow, accounting for 44% of total inflows, followed by licensed extraction (via WALs) at 28% and water entrained in ROM coal at 28%. The volume of water entrained in ROM coal is related to the moisture content of the ROM Coal (9%). Average outflows are dominated by water in the product coal (27%), followed by evaporation (23%) and haul road supply (15%).

Table 10
Average Annual Water Balance

Water Inflows		
Inflow	**Volume (ML/year)**	**Approximate Percentage of Total Inflow (%)**
Runoff	2,157	44
Groundwater	20	0
Water in ROM Coal (Fine Rejects Bleed Water)	1,366	28
Hunter River Pumping (via WALs)	1,376	28
Water Outflows		
Outflows	**Volume (ML/year)**	**Approximate Percentage of Total Inflow (%)**
Evaporation	1,102	23
Haul Road Supply	725	15
Stockpile Supply	86	2
Vehicle Wash Supply	58	1
HRSTS Discharge	506	10
Dam Overflows	74	1.5
Construction Demand Supply	6	0.1
Water Entrained in Fine Rejects	546	11
Water in Product	1,319	27
Water in Coarse Rejects	463	9

As part of the water balance output, graphs of modelled outputs for the simulated extraction and release of water to/from the Hunter River were produced. These graphs showed the 5th and 95th percentile, as well as the median extraction/discharge values over the life of mine simulation period, and are presented in the sections below.

8.4 SIMULATED HUNTER RIVER EXTRACTION

Figure 6 presents the predicted extraction from the Hunter River simulated over the life of mine period.

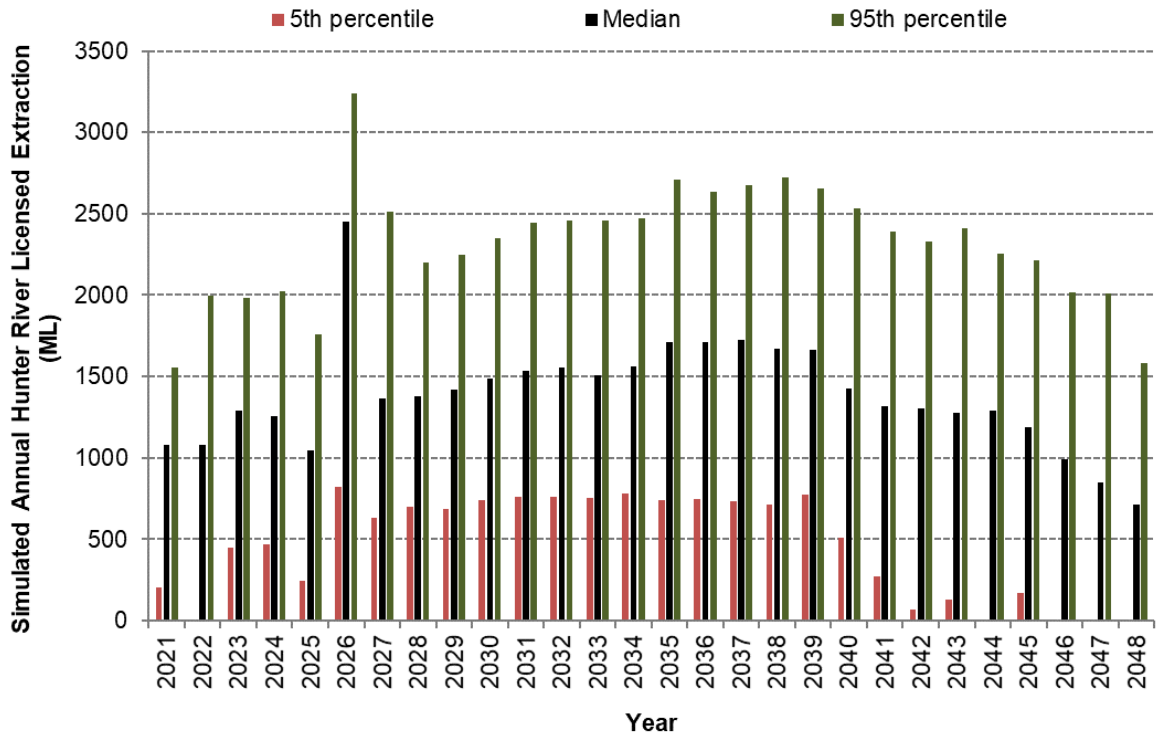

Figure 6 Annual Hunter River Licensed Extraction Volume

8.5 EXTERNAL RELEASE AND OVERFLOWS

External release and overflow were simulated as occurring in accordance with the design criteria listed in Table 8. Figure 7 below presents the simulated average annual release from DW1 to the Hunter River under EPL 20850, as well as the overflow volume from ED2 to Sandy Creek, ED3 to Dry Creek, and sediment dams SD1 to SD5, SD9 and SD10 to Rosebrook Creek.

The average Hunter River release volume from DW1 is predicted to be 469 ML based on the median model results and 909 ML based on the 95th percentile model results.

A low risk of overflow from ED3 to Dry Creek is predicted based on all model results. The percentage of annual overflow days from ED3 to Dry Creek is estimated at 1.6% based on all model realizations, which is slightly higher than the 1% AEP spill risk design criterion (i.e. in any simulated year, ED3 has a predicted spill risk of less than 1.6%). In order to achieve the 1% AEP spill risk criterion, the capacity of ED3 will be increased prior to the increase in ED3 catchment area, expected to occur by 2026. The impacts of overflow from ED3 on downstream water quality are expected to be negligible (see SWMMP).

On average, an annual volume of 66 ML will overflow to Rosebrook Creek from sediment dams SD1 to SD5, SD9 and SD10 based on the median model results, and 125 ML based on the 95th percentile model results.

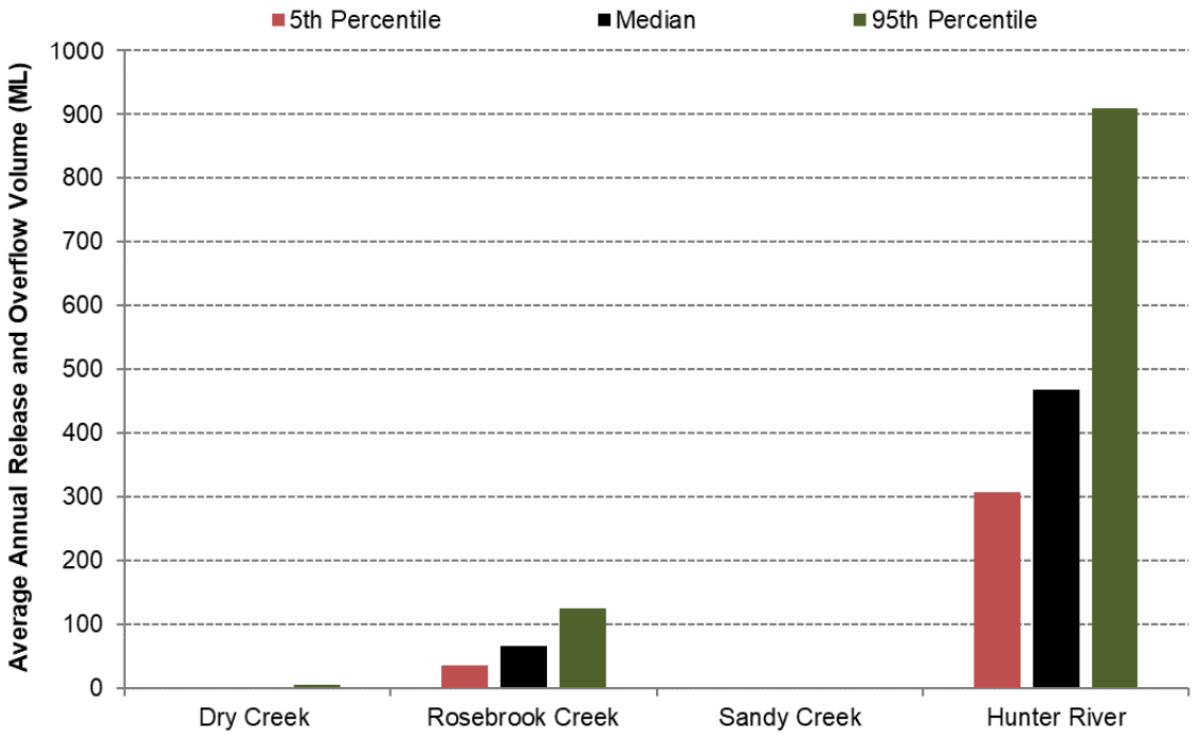

Figure 7: Annual Hunter River Release and Overflow Volume

8.6 WATER SUPPLY RELIABILITY

Predicted average supply reliability is expressed as total water supplied divided by total demand (i.e. a volumetric reliability) over the simulation period. Average supply reliability over all climatic realizations, as well as the lowest single realization reliability (representing a simulated 'worst case' 28.5-year period), for CHPP supply, haul road dust suppression, stockpile dust suppression, vehicle wash, and construction demand are summarised in Table 11.

Table 11
Summary of Average Modelled Water Supply Reliability

Demand	Average Volumetric Supply Reliability	
	Average	Lowest
CHPP	99.0%	93.2%
Haul Road Dust Suppression	97.2%	85.2%
Stockpile Dust Suppression	99.4%	91.2%
Vehicle Wash	99.6%	92.6%
Construction	99.8%	94.2%

An average 99% CHPP supply reliability is equivalent to 102 days of lost operation over the 28.5-year simulation period, while 93.2% lowest reliability equates to 711 days of lost operation over that period.

Supplementary water management measures will be adaptively applied during low rainfall periods to maintain water supply. These may include:

- acquiring additional WALs;
- use of chemical dust suppressants to reduce haul road dust suppression water requirements;
- adding or relocating pumps to provide additional supply to truckfill points and/or installing additional truckfill points on the MWD or other available water storages;
- increasing the available water storage capacity on-site (e.g. providing additional in pit storage capacity) to provide additional buffer capacity; and/or
- adjusting coal washing rates in the CHPP (and potentially producing additional bypass coal) as necessary in particularly dry periods to maintain continuity of dust suppression activities.

As discussed in Section 4.3, MACH Energy may also source water from other external sources, such as excess mine water from nearby mines (i.e. Dartbrook and Bengalla Mines). Should this water sharing be undertaken, it would be subject to MACH Energy and other relevant parties obtaining all necessary secondary approvals.

9 CONTINGENCY PLAN

In the event that any unpredicted impacts occur, MACH Energy will implement the following general Contingency Plan:

- The Environmental Superintendent will report the incident in accordance with Section 11.
- MACH Energy will identify the appropriate course of action with respect to the identified impact(s), in consultation with technical specialists, DCCEEW Water, EPA and any other relevant agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 9.1.
- MACH Energy will, in the event there is a dispute over the proposed remedial course of action or if the actions conflict with current approvals, submit the appropriate course of action to the DCCEEW Water and EPA for approval.
- MACH Energy will implement the appropriate course of action to the satisfaction of the DPHI.

Potential unpredicted impacts related to the site water balance and salt balance, and contingency plans to address them are summarised in Table 12.

Table 12
Unpredicted Impacts and Contingency Plans

Unpredicted Impacts	Contingency Plan
Insufficient data to support water balance and/or salt balance updated.	Review site water metering and monitoring and amend update as required.
Use of clean and potable water on the site higher than predicted.	Review clean water use and determine if recycled water can be used instead.
Site water balance review indicates capture and reuse of mine water and dirty water to meet operational demands for water is not being maximised.	Review site operating rules and amend rules or infrastructure as required.

9.1 POTENTIAL CONTINGENCY MEASURES

Potential contingency measures will be reviewed during revisions of the SWB. Key potential contingency measures to be implemented may include the following:

- MACH Energy will investigate further water quality controls if monitoring results indicate that this is required.
- MACH Energy will increase monitoring as required to measure the effectiveness of remediation measures.
- MACH Energy will review the relevant procedures to prevent a reoccurrence of the exceedance, incident or non-compliance.
- MACH Energy will upgrade infrastructure if investigations following unpredicted impacts indicate that this is required.
- MACH Energy will source excess water from the adjoining mines (i.e. Dartbrook and Bengalla Mines), should it be available.
- MACH Energy will review site water metering and monitoring and amend update as required.
- MACH Energy will review clean water use and determine if recycled water can be used instead.
- MACH Energy will review site operating rules and amend rules or infrastructure as required.

10 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

10.1 ANNUAL REVIEW

In accordance with Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the previous calendar year). The report will be submitted to the DPHI, to the satisfaction of the Planning Secretary.

In relation to water, the MPO Annual Review will:

- include a comprehensive review of the SWB relating to the MPO over the past year, which includes a comparison of these results to evaluate compliance against the:
  - relevant statutory requirements, limits or performance measures/criteria (refer Section 2.1 and Section 2.2);
  - monitoring results of the previous years;
  - relevant predictions in the MPO EIS and MOD 1, MOD 2, MOD 3 and MOD 4 EAs (prior to the surrender of Development Consent DA 92/97); and
  - relevant predictions in the Project EIS.
- identify any water-related non-compliance over the past year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- identify any trends in the water monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual water impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what water-related measures will be implemented over the next year to improve the environmental performance of the MPO.

As mentioned in Part D, Condition D11 of Development Consent SSD 10418 (above) relating to MPO Annual Reviews, MACH Energy will include a comprehensive review of environmental performance at the MPO in accordance with Part A, Condition A2 of Development Consent SSD 10418 requires that:

A2. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) generally in accordance with the EIS and EAs;

(d) generally in accordance with the Development Layout in Appendix 2.

In accordance with Part B, Condition B40 of Development Consent SSD 10418, the MPO Annual Review will also include reporting of the water extracted from the site during the relevant period (direct and indirect), including water taken under each water licence.

Copies of the MPO Annual Review will be submitted to Muswellbrook Shire Council and made available to the CCC and any interested person upon request, in accordance with Part D, Condition D12 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender). The MPO Annual Review will also be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/).

10.2 SITE WATER BALANCE REVISION

An updated site water balance will be prepared annually and provided in the MPO Annual Review, and the SWB revised as necessary to incorporate any changes to the site water balance. Additionally, review and progressive refinement of the site water balance will be undertaken periodically to record the status of inflows (water capture), storage and consumption (e.g. CHPP usage, Fines Emplacement Area return water, dust suppression and discharges) and to optimise water management performance.

In accordance with Part D, Condition D7 of Development Consent SSD 10418 and Condition 4, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), this SWB will be reviewed, and if necessary revised to the satisfaction of the Planning Secretary of the DPHI, within three months of the submission of:

- an MPO Annual Review (Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97);
- an incident report (Part D, Condition D9 or D10 of Development Consent SSD 10418 and Condition 7, Schedule 5 of Development Consent DA 92/97);
- an IEA (Part D, Condition D13 of Development Consent SSD 10418 and Condition 9, Schedule 5 of Development Consent DA 92/97);
- the approval of any modification of the conditions of Development Consent SSD 10418;
- any modification to the conditions of Development Consent DA 92/97[3]; and
- notification of a change in development phase (Part A, Condition A12 of Development Consent SSD 10418).

Prior to the surrender of Development Consent DA 92/97, within four weeks of conducting any such review, the Planning Secretary of the DPHI will be advised of the outcomes of the review and any revised documents submitted to the Planning Secretary for approval. After the surrender of Development Consent DA 92/97, in accordance with Part D, Condition D8 of Development Consent SSD 10418, within six weeks of conducting such a review the revised documents will be submitted to the Planning Secretary for approval.

In accordance with Condition 4A, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy may submit a revised SWB for the approval of the Planning Secretary at any time, and may also submit any revision to this SWB required under Development Consent DA 92/97 on a staged basis.

In accordance with Part D, Condition D8 of Development Consent SSD 10418, MACH Energy must, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, revise the SWB to the satisfaction of the Planning Secretary.

If agreed with the Planning Secretary of the DPHI, a revision to this SWB required under Development Consent DA 92/97 (prior to its surrender) may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97.

This SWB will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Part D, Condition D17(iii) of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender).

[3] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3 of Development Consent DA 92/97, the latter prevails.

10.3 INDEPENDENT ENVIRONMENTAL AUDIT

Within one year of commencement of development under Development Consent SSD 10418, and every three years after, an Independent Environmental Audit (IEA) will be undertaken and submitted as required, in accordance with Part D, Condition D13 of Development Consent SSD 10418.

In accordance with Part D, Condition D14 of Development Consent SSD 10418, within three months of commencing the IEA, MACH Energy will submit a copy of the audit report to the Planning Secretary, and other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. MACH Energy will ensure that the recommendations will be implemented and the findings and compliance with the IEA will be reported in the MPO Annual Reviews.

Once Development Consent DA 92/97 is surrendered, all subsequent IEAs commissioned by MACH Energy will be in accordance with Part D, Condition D13 and D14 of Development Consent SSD 10418.

Subsequent versions of the IEA will be provided to the Planning Secretary of the DPHI and made available on the MACH Energy website. The IEA will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary of the DPHI.

10.4 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418, MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in Development Consent SSD 10418.

Where any exceedance of the criteria and/or performance measures occurs, at the earliest opportunity MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to DPHI describing those options and any preferred remediation measures or other course of action; and
- implement reasonable remediation measures as directed by the Planning Secretary.

11 REPORTING PROCEDURES

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418 and Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in the MPO's EMS.

In accordance with Part D, Condition D17(vi) of Development Consent SSD 10418 and Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

11.1 INCIDENT REPORTING

An incident is defined as an occurrence or a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent SSD 10418.

In the event that review of monitoring data or a complaint indicates an incident has occurred, the incident will be reported in accordance with Part D, Condition D9 of Development Consent SSD 10418. The Planning Secretary will be notified in writing via the Major Projects website immediately after MACH Energy becomes aware of an incident. The notification will identify the Project name and development application number, and set out the location and nature of the incident.

In accordance with Part D, Condition D10 of Development Consent SSD 10418, within seven days of becoming aware of a non-compliance MACH Energy will notify DPHI (previously DPE) of the non-compliance.

The notification must be made in writing via the Major Projects Website and will:

- identify the MPO (including the Development Application number and name);
- set out the condition of Development Consent SSD 10418 that the incident is non-compliant with; and
- describe the location and nature of the incident, the reason for the non-compliance (if known); and what actions have been, or will be, undertaken to address the non-compliance.

Additionally, in accordance with Condition R4 of EPL 20850, MACH Energy will notify the EPA by telephoning the Environment Line service on 131555 immediately after becoming aware of any contravention or potential contravention of section 120 of the *Protection of the Environment Operations Act 1997*, except where expressively provided in a condition of EPL 20850. MACH Energy will provide written details of the notification to the EPA at info@epa.nsw.gov.au within seven days of the date of the notification.

11.2 COMPLAINTS

MACH Energy maintains a Community Hotline (1800 886 889), which is dedicated to the receipt of community complaints. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database.

MACH Energy has developed a procedure that outlines its commitment to receiving, responding to and maintaining a record of phone calls from the community. This procedure is supported by a Community and Stakeholder Engagement Register. This is described in MACH Energy's EMS.

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), a complaints register will be made available on the MACH Energy website (https://machenergyaustralia.com.au/) and updated monthly.

11.3 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of MACH Energy's EMS and is described below.

Compliance with all approval plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with MACH Energy and the Project. In accordance with Part A, Condition A2 of Development Consent SSD 10418 and Schedule 2, Condition 2 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will carry out the development in accordance with:

- the conditions of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender)[4];
- all written directions of the Planning Secretary;
- Statement of Commitments (Appendix 3 of Development Consent DA 92/97);
- the 1997 EIS, EA (MOD 1), EA (MOD 2), EA (MOD 3), EA (MOD 4), EA (MOD 5), the Project EIS; and
- with the Development Layout in Appendix 2 of Development Consent SSD 10418 (Appendix D).

MACH Energy will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 11.1, MACH Energy will report incidents in accordance with Part D, Condition D9 of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender).

A review of compliance with all conditions in Development Consent SSD 10418 and relevant mining leases will be undertaken prior to (and included within) each Annual Review (Section 10.1).

[4] In accordance with Part A, Condition A4 of Development Consent SSD 10418, the conditions in Development Consent SSD 10418 and directions of the Planning Secretary prevail to the extent of inconsistency, ambiguity or conflict between them and any document/s listed in condition A2(c). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition A2(c), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

Additionally, in accordance with Part D, Condition D13 of Development Consent SSD 10418 and Schedule 5, Condition 9 of Development Consent DA 92/97 (prior to its surrender), an IEA (Section 10.3) will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary to assess whether MACH Energy is complying with the requirements in Development Consent SSD 10418 and Development Consent DA 92/97.

11.4 ACCESS TO INFORMATION

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Schedule 5, Condition 11 of Development Consent DA 92/97, the MACH Energy website will be maintained as a tool for the provision of information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information required by MACH Energy to be available on the website is outlined in MACH Energy's EMS.

11.5 HRSTS REPORTING

In accordance with Condition R5.7 of EPL 20850, MACH Energy will compile a written report of the activities under the HRSTS for each scheme year. The scheme year runs from 1 July to 30 June each year. The written report will be submitted to the EPA's regional office within 60 days after the end of each scheme year and be in a form and manner approved by the EPA. The information will be used by the EPA to compile an annual scheme report.

12 REFERENCES

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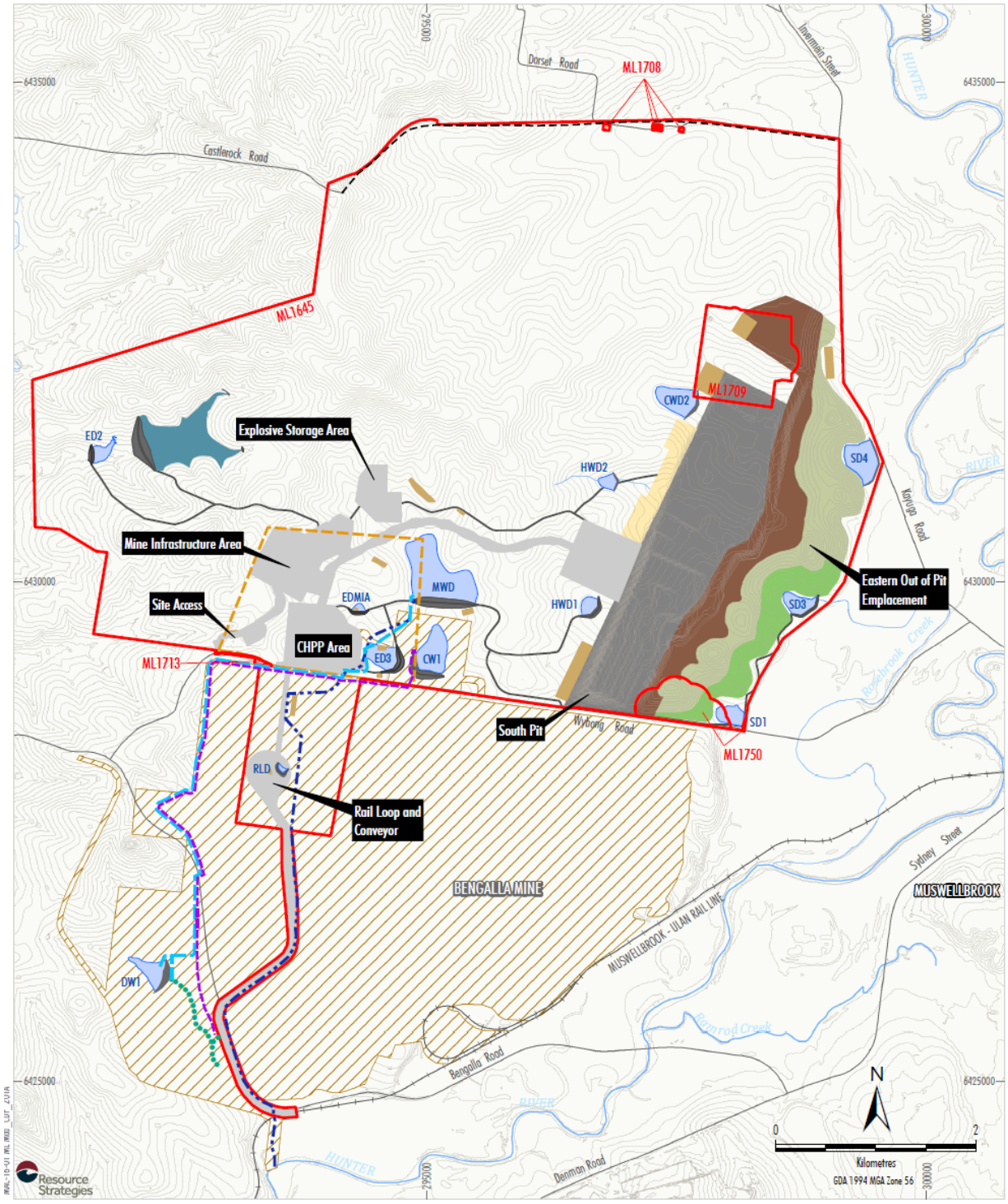
ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

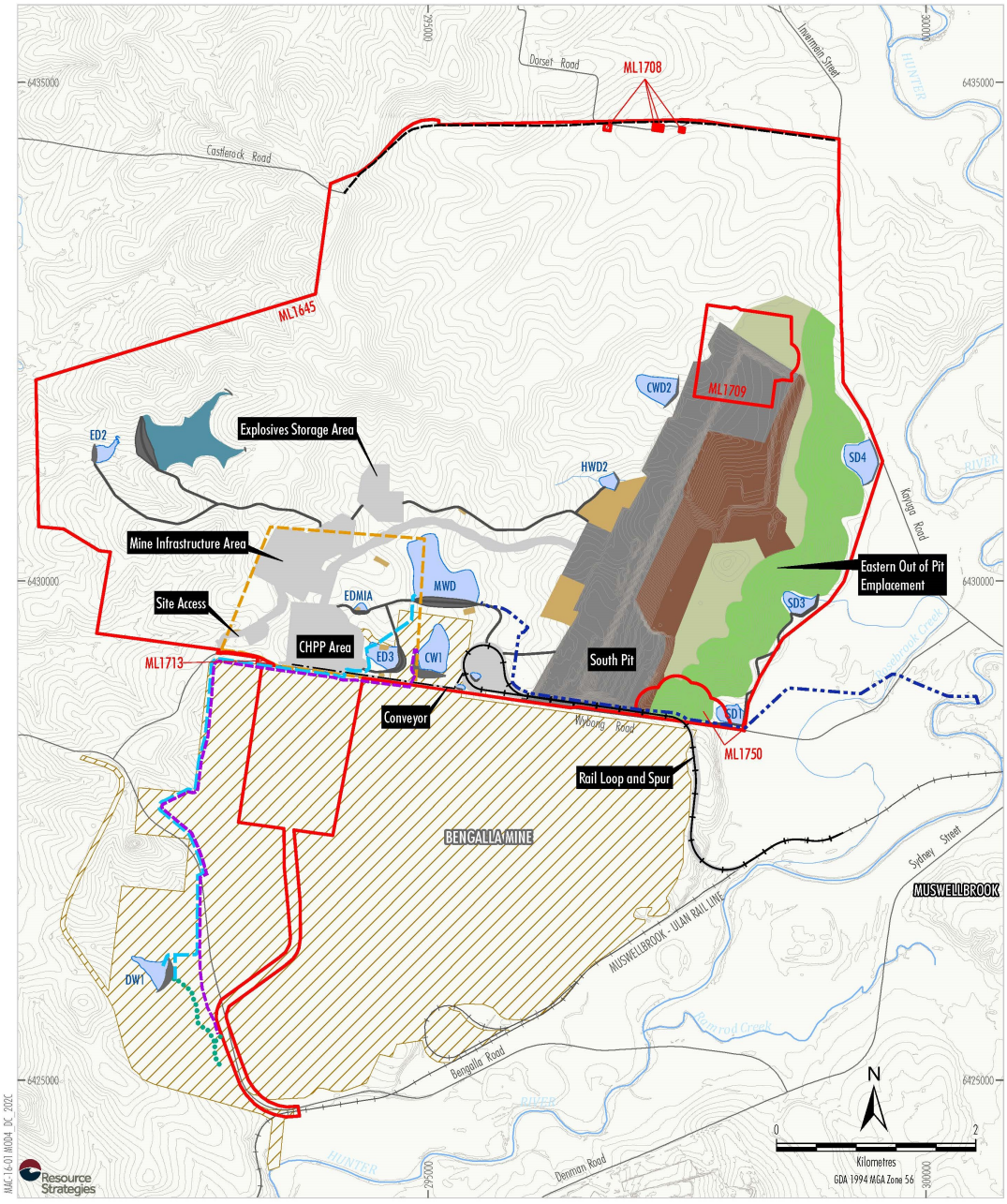
Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

MACHEnergy
MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2018)

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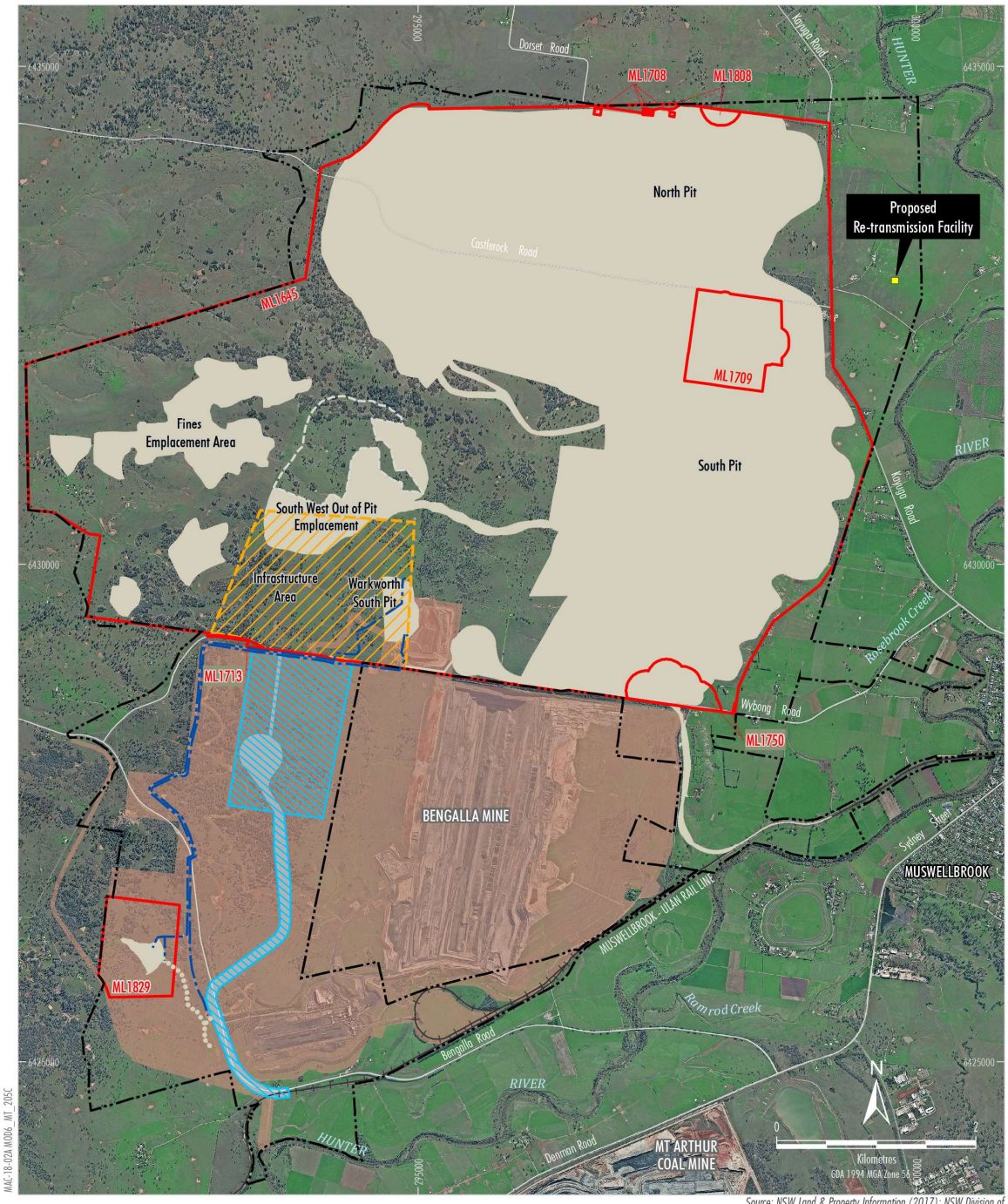
MOUNT PLEASANT OPERATION

FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Development Consent Boundary (DA 92/97)
- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

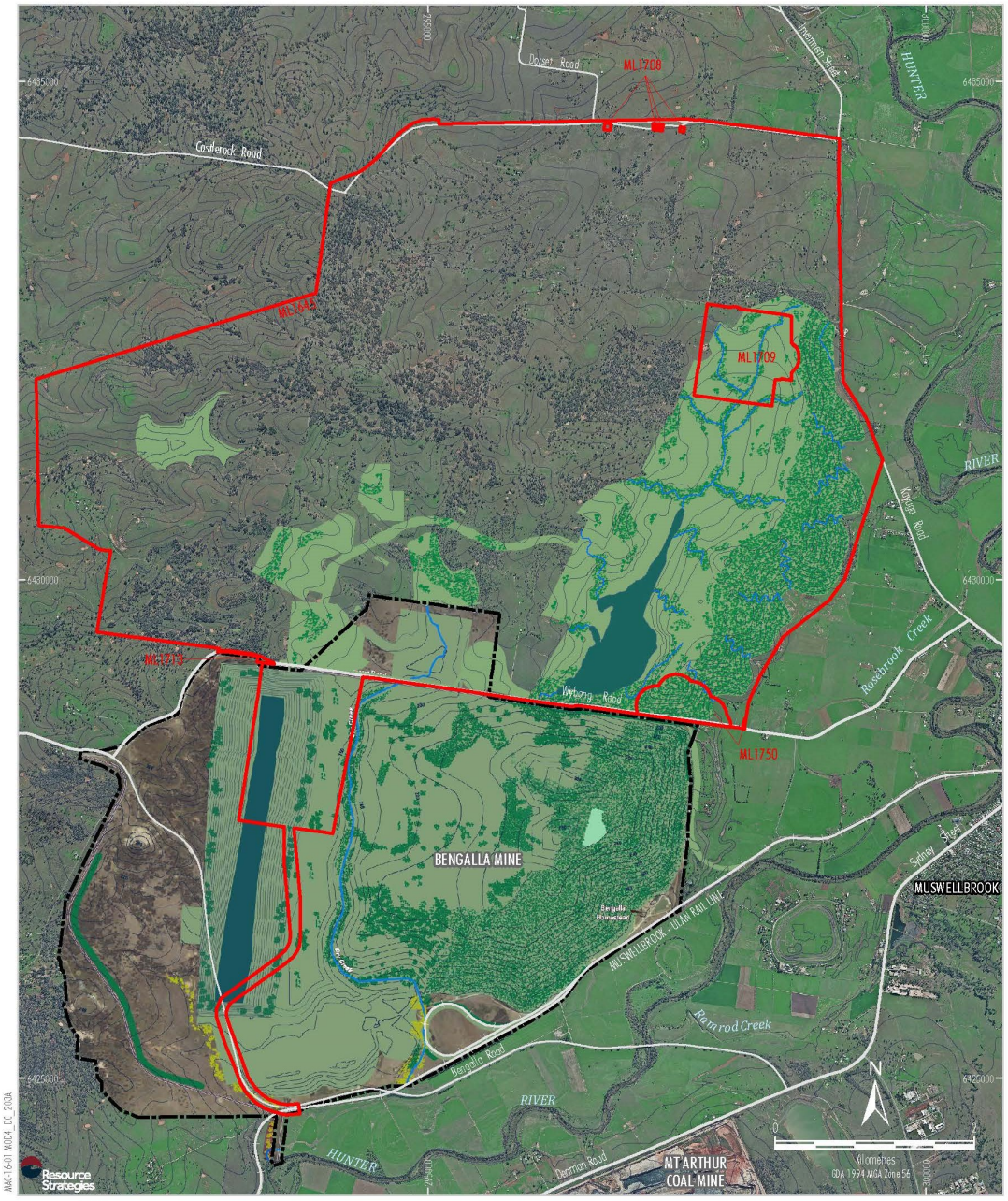
NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Revised Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



LEGEND

- Mt Pleasant Mining Lease Boundary
- Final Void
- Final Rehabilitation

Bengalla Mine Conceptual Final Landform *

- Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
- Dry Creek
- Final Void Lake
- Rehabilitation
- Rehabilitation Class III
- Indicative Tree Screens (or equivalent)
- Treed Rehabilitation
- Indicative Restorative Area

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

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Conceptual Final Landform (2026)

ATTACHMENT 2

APPENDIX 2 OF DEVELOPMENT CONSENT SSD 10418

APPENDIX 2 DEVELOPMENT LAYOUT PLANS

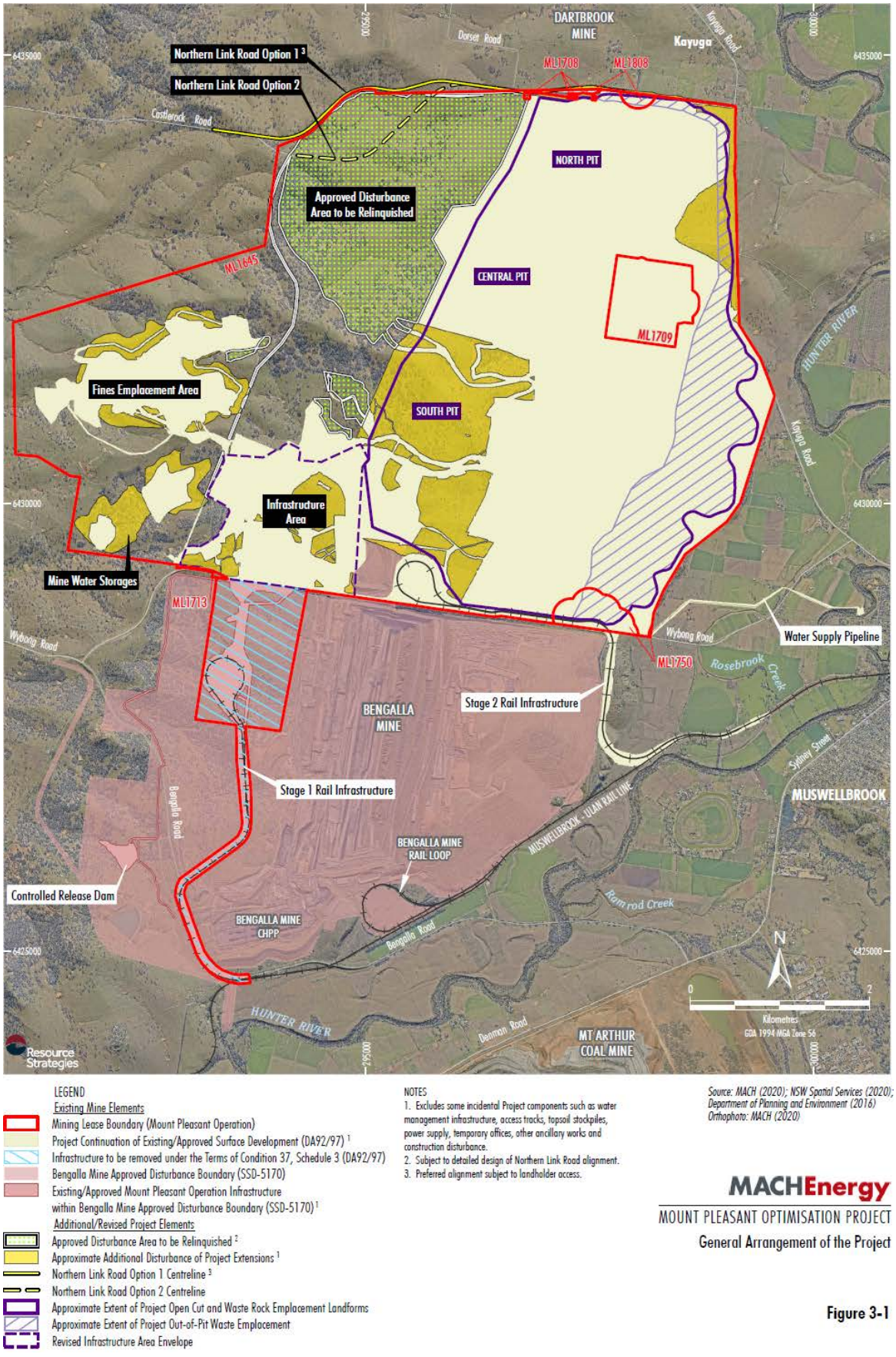


Figure 1: General Project Arrangement

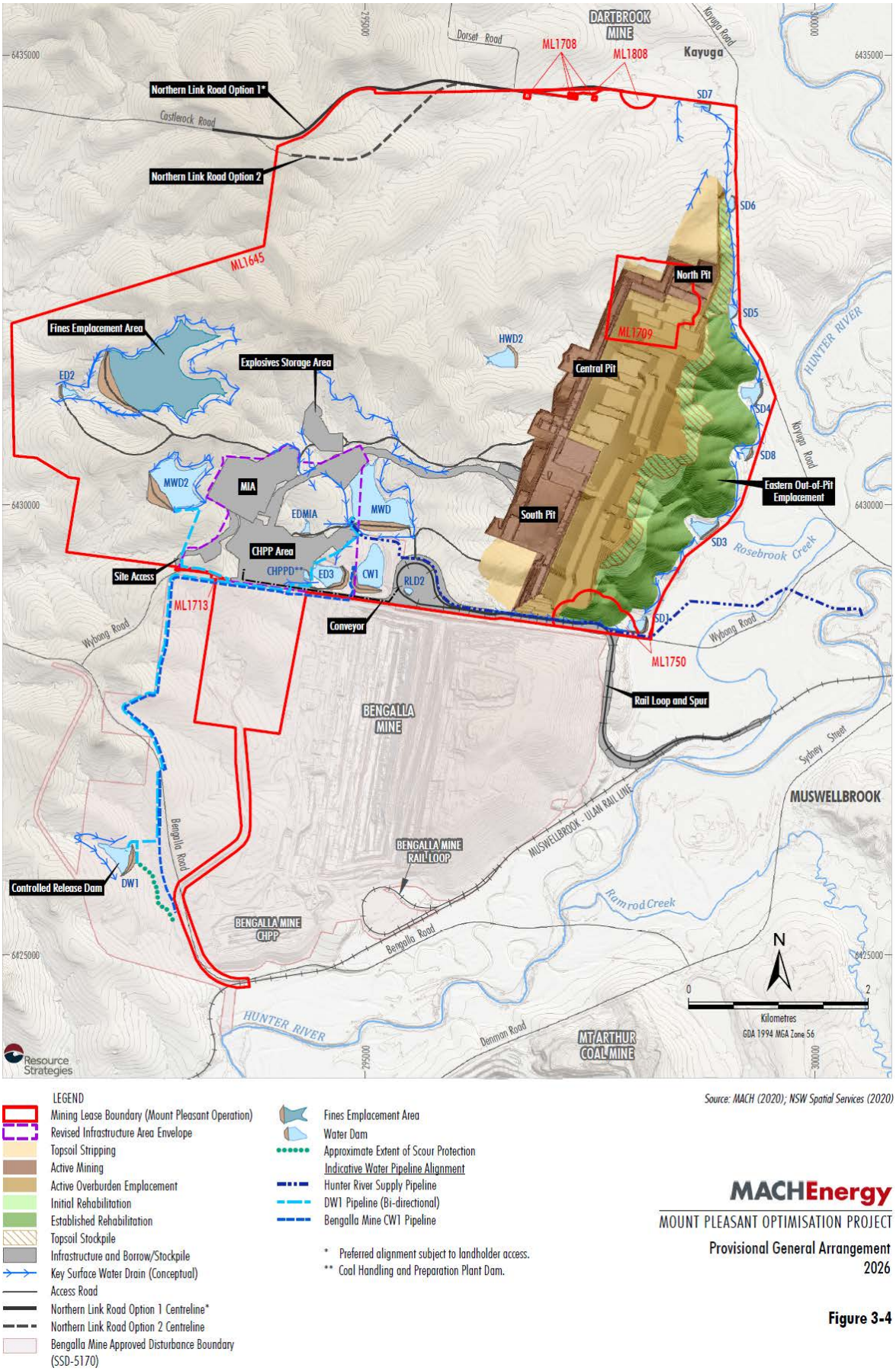
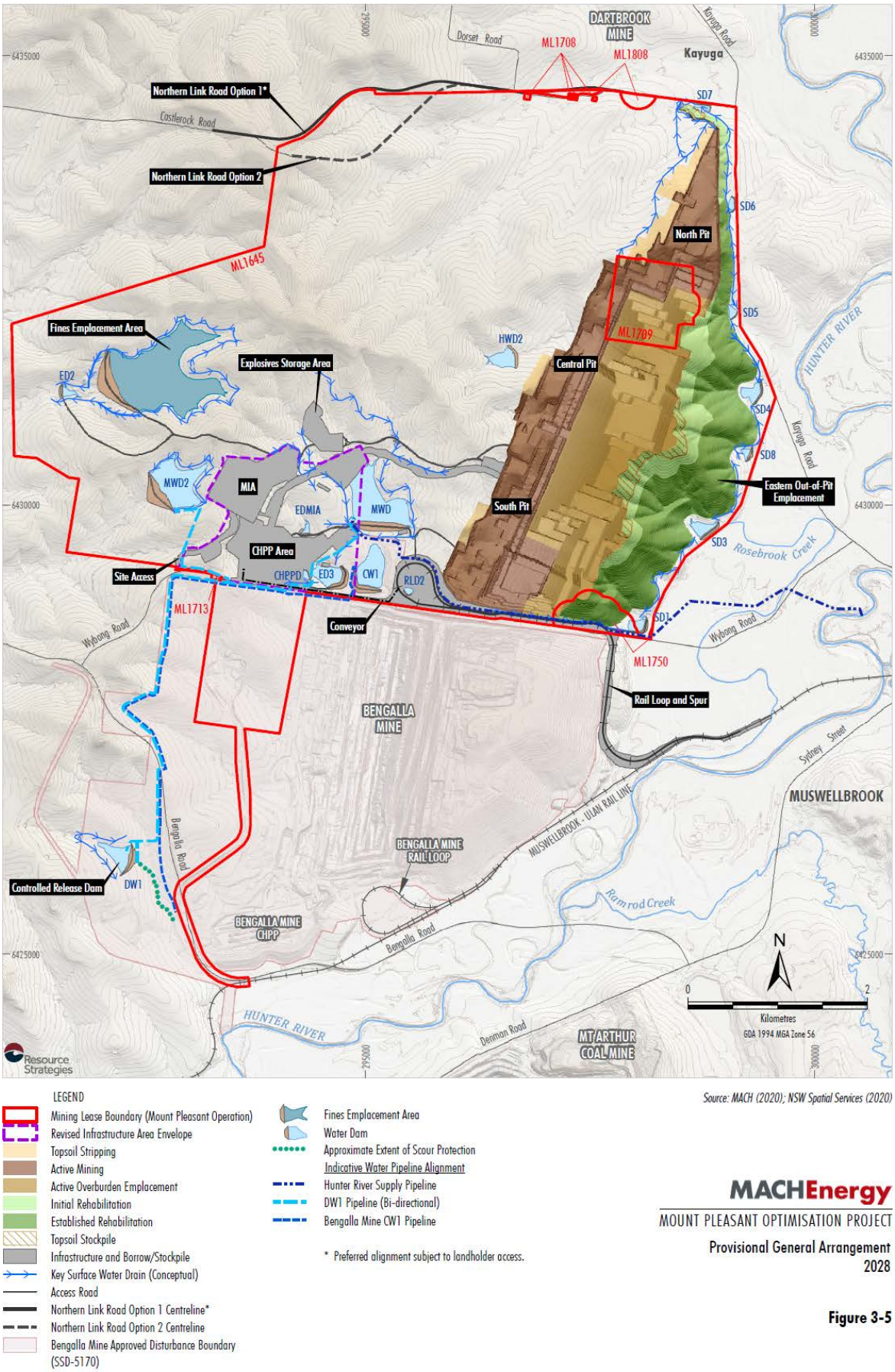


Figure 2: General Project Arrangement – 2026



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.

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

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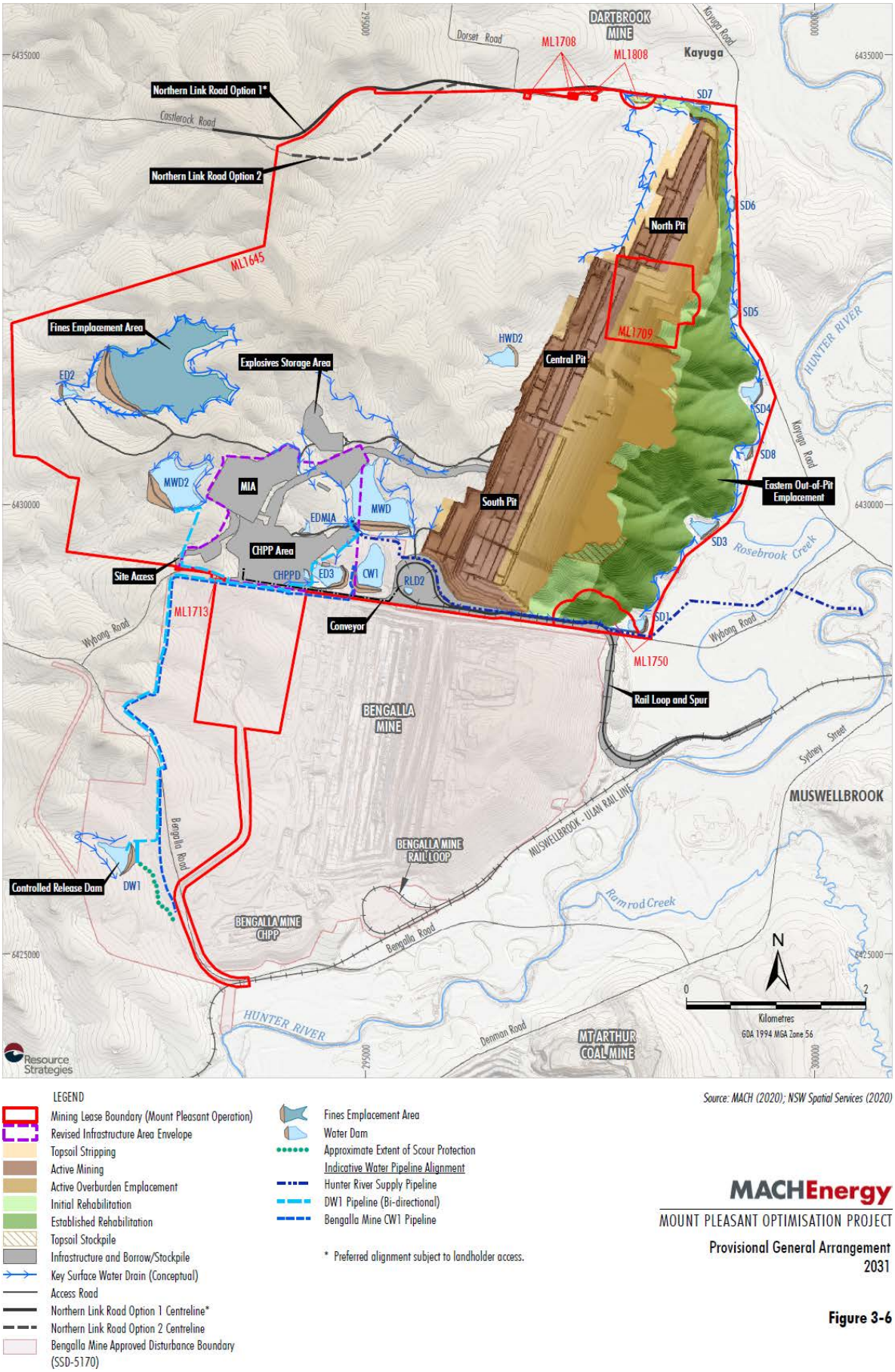
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5

Figure 3: General Project Arrangement – 2028



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.

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

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MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2031

Figure 3-6

Figure 4: General Project Arrangement - 2031

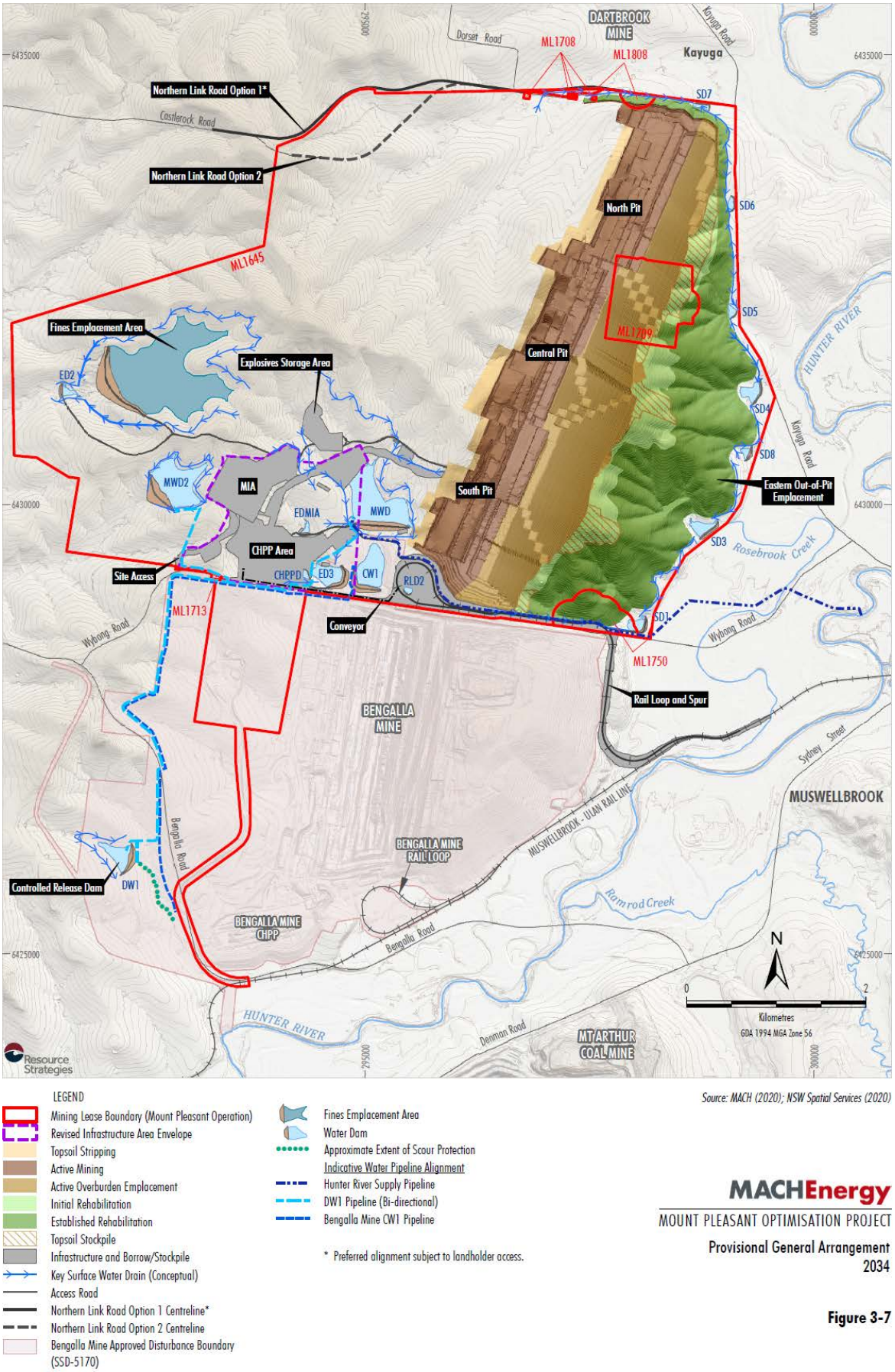


Figure 5: General Project Arrangement - 2034

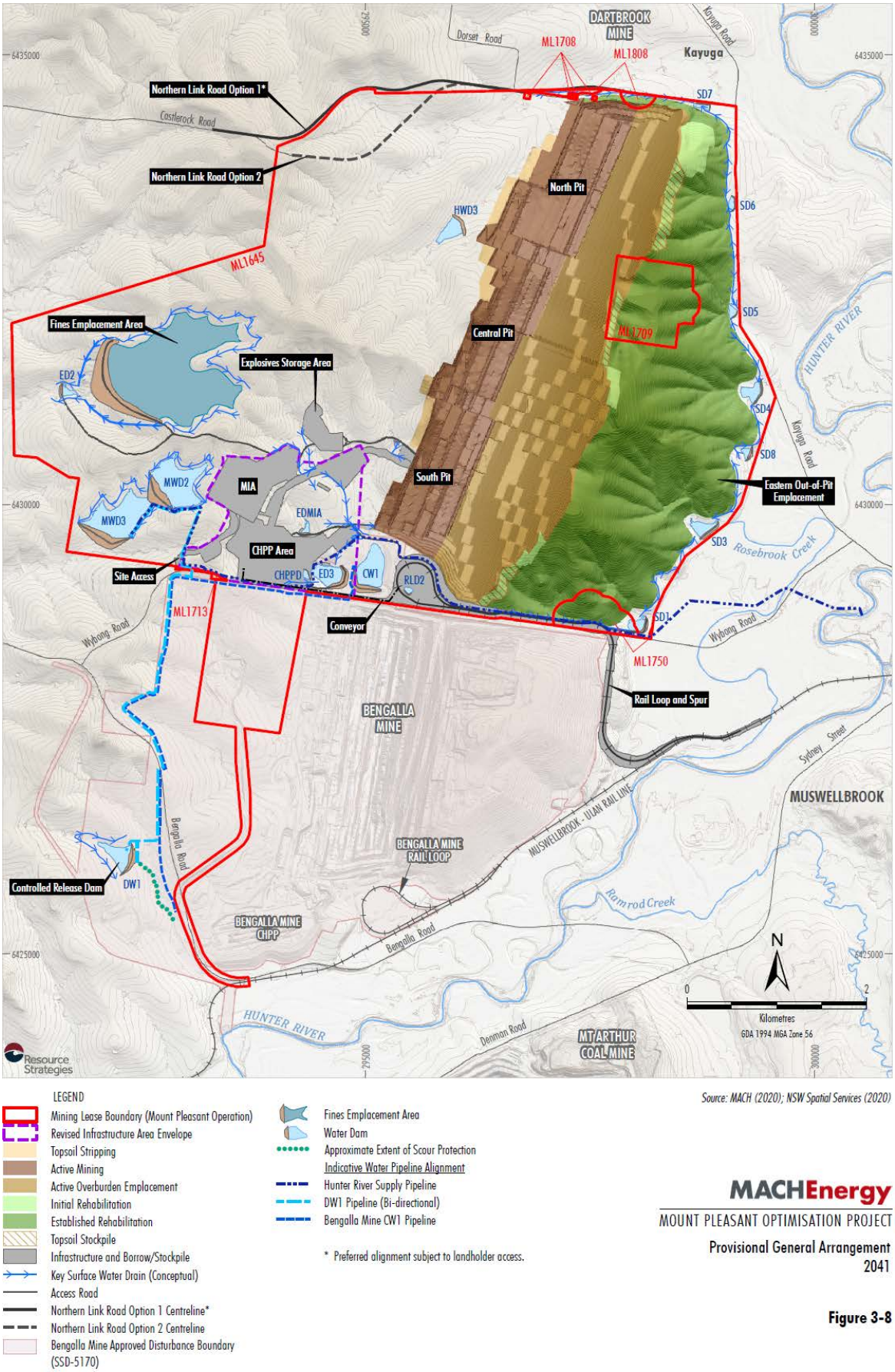
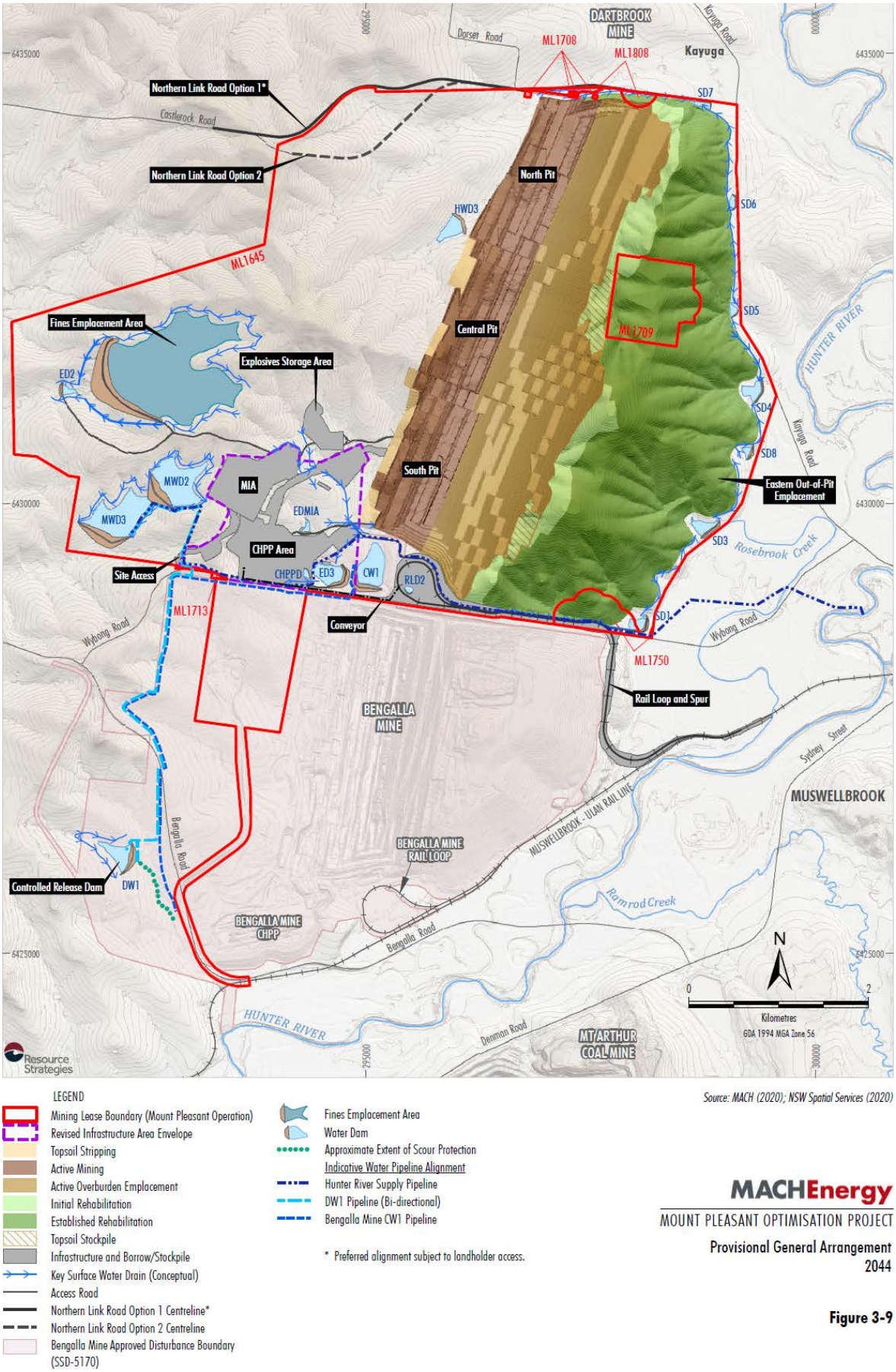


Figure 6: General Project Arrangement - 2041



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.

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

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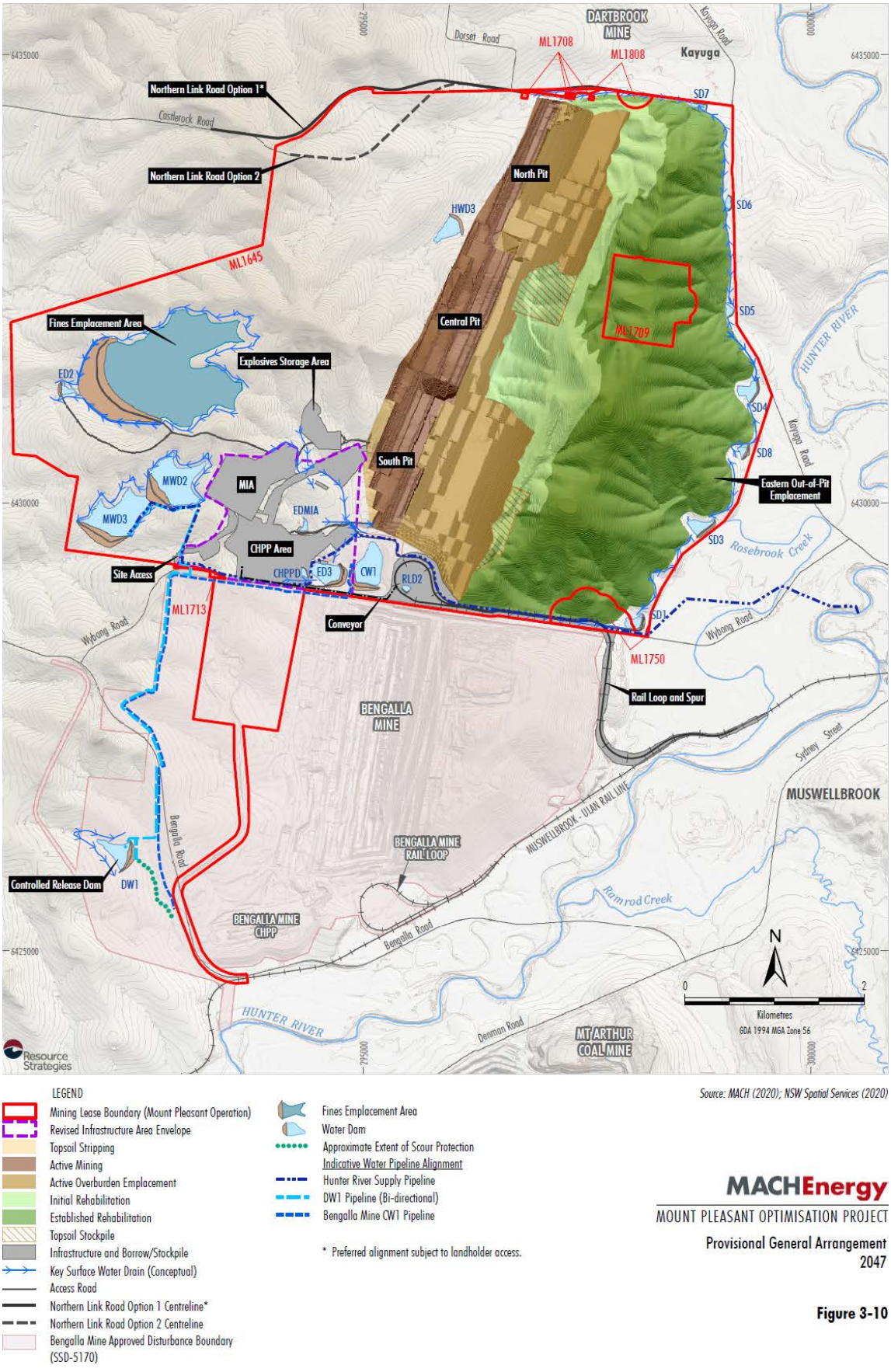
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9

Figure 7: General Project Arrangement - 2044



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.

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

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MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2047

Figure 3-10

Figure 8: General Project Arrangement – 2047

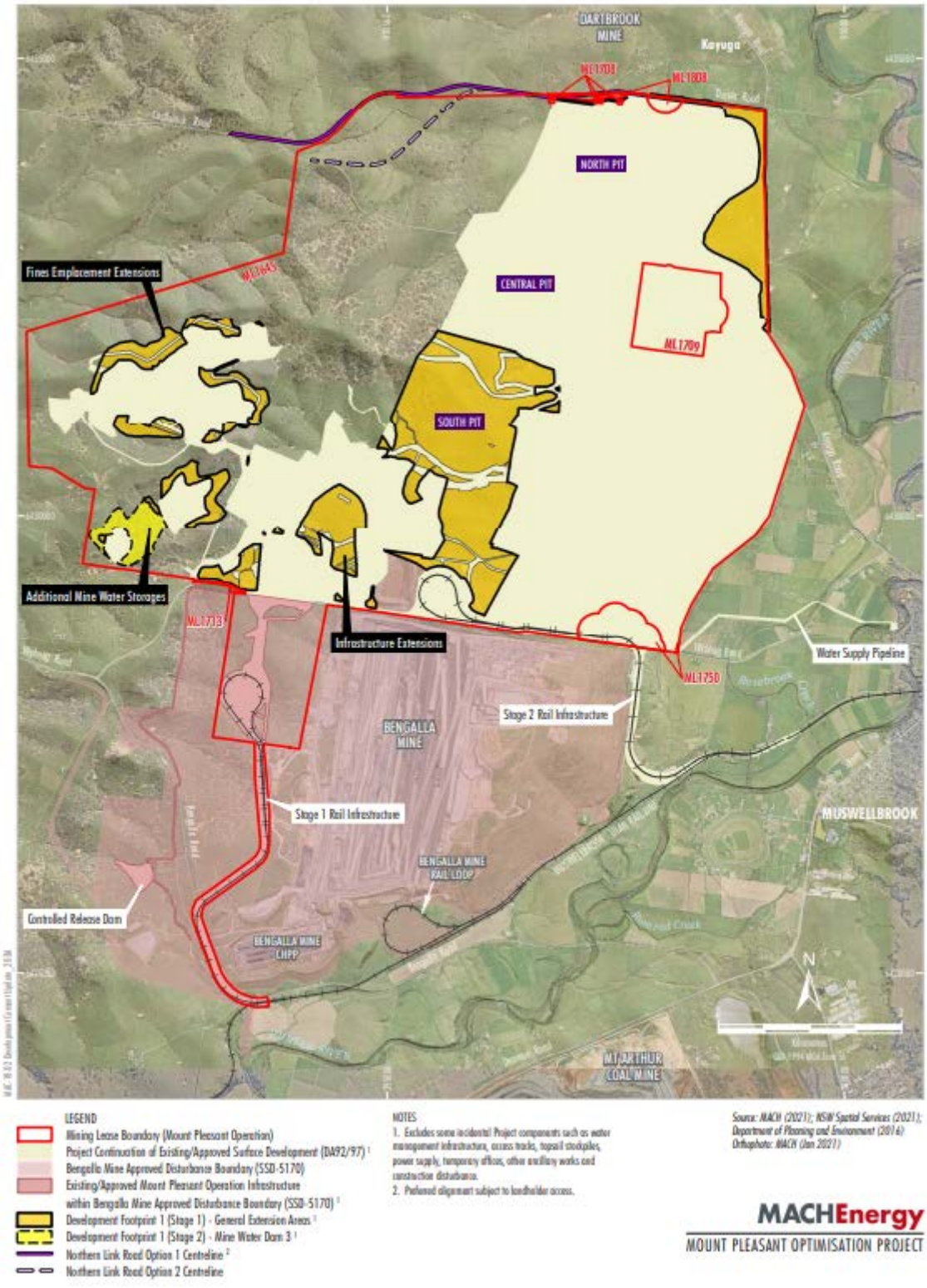

Figure 9: Staging of Project Disturbance Areas

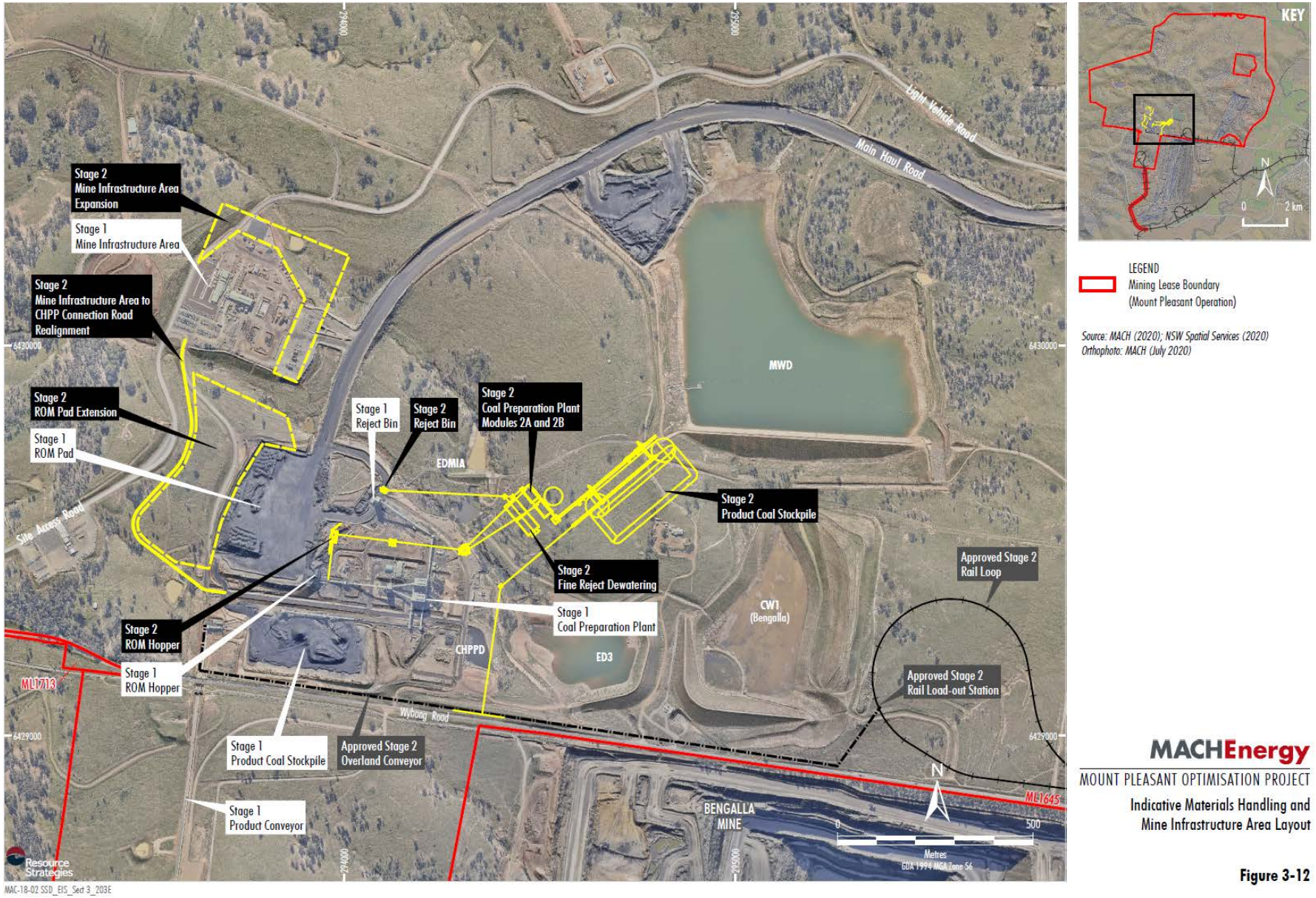

Figure 10: Indicative Mine Infrastructure Area Layout

APPENDIX 2

EROSION AND SEDIMENT CONTROL PLAN

MOUNT PLEASANT OPERATION

EROSION AND SEDIMENT CONTROL PLAN

Document ID:	MP001-0000-ENV-PLN-0006		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	August 2024	**Status:**	Final
Approved By:	Andrew Reid	**Revision Number:**	02

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy Australia Pty Ltd (MACH Energy) purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Erosion and Sediment Control Plan (ESCP) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent Development Approval (DA) 92/97 to Coal & Allied. This allowed for the “Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities” at the MPO. The consent allowed for operations 24 hours per day seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

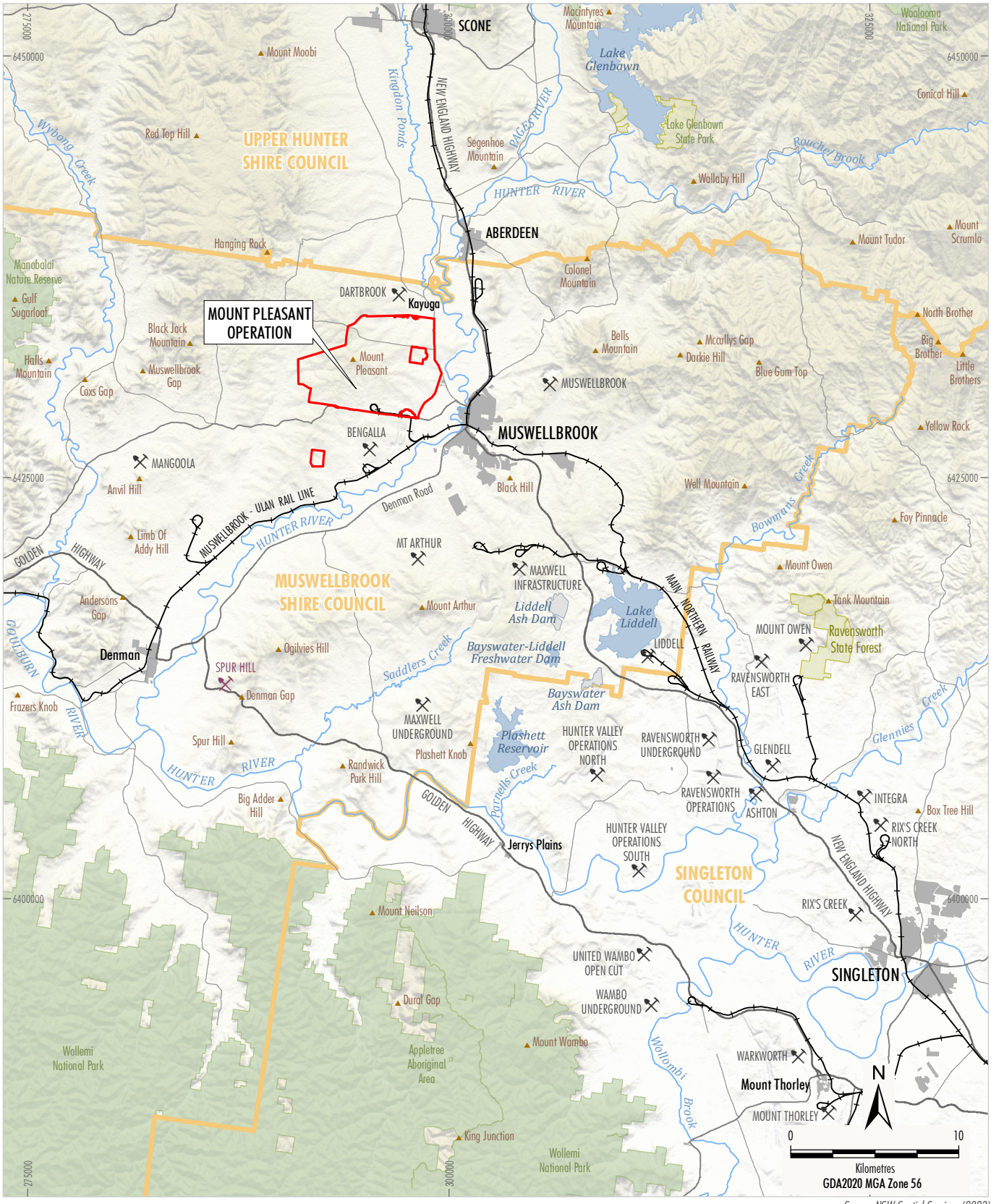
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

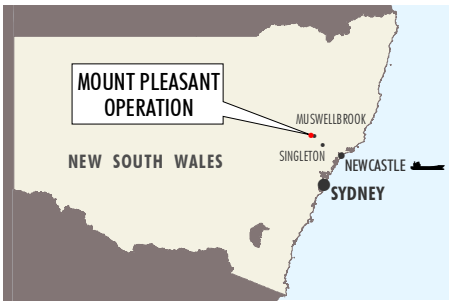
The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out of Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.



Source: NSW Spatial Services (2023)



LEGEND

- Mining Operation
- Proposed Mining Operation (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

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MOUNT PLEASANT OPERATION

Regional Location

Figure 1

MAC-18-03A MP2023_Figure 1_Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the Department of Planning and Environment (DPE) (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

Modification 5 (MOD 5) was submitted to rectify an administrative error in Development Consent DA 92/97 and was approved by DPE on 29 June 2022.

Modification 6 (MOD 6) was submitted to modify Development Consent DA 92/97 and was approved on 6 November 2023. MOD 6 will allow for the construction and operation of a re-transmission facility including a tower or mast, shed and associated transmission infrastructure to re-transmit local digital television signals from the Broadcast Australia site at Rossgole Lookout. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Revised Approved Surface Disturbance Plan incorporating the MOD 6 infrastructure (Attachment 1).

On 22 January 2021, MACH Energy submitted the Mount Pleasant Optimisation Project (the Project) EIS in support of a State Significant Development (SSD) Application under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Key aspects of the Project generally involve (among other things):

- increased open cut extraction within the MPO's existing Mining Leases (MLs);
- a staged increase in extraction, handling and processing of ROM coal up to 21 million tonnes per annum (Mtpa);
- upgrades to existing infrastructure and new infrastructure to support mining of the proposed Project; and
- an extension to the time limit on mining operations to 22 December 2048.

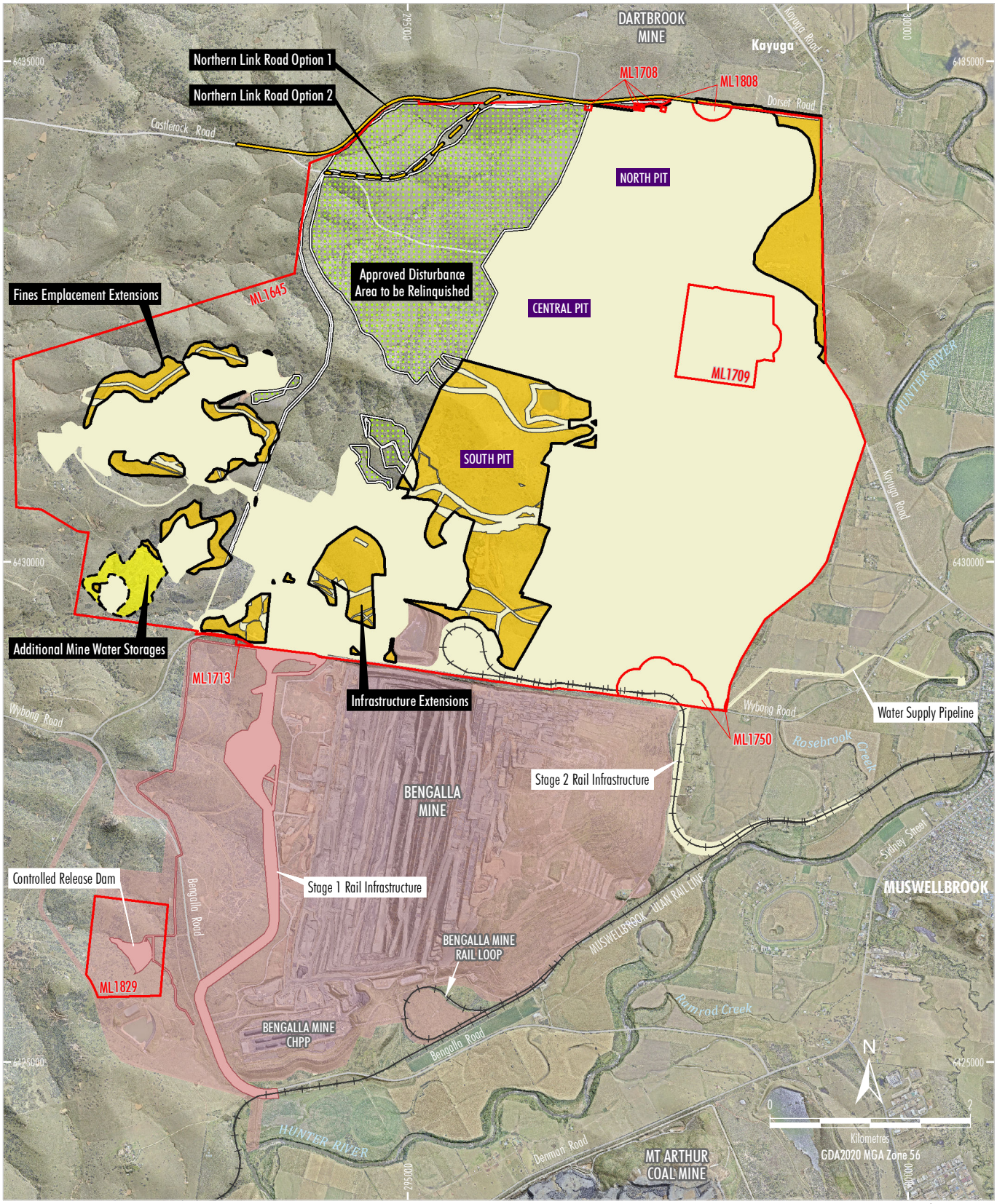
The Project was approved by the NSW Independent Planning Commission on 6 September 2022. Appendix 2 of Development Consent SSD 10418 illustrates the General Project Arrangement at 2026, 2028, 2031, 2034, 2041, 2044 and 2047, Staging of Project Disturbance Areas, and Indicative Mine infrastructure Area Layout (Attachment 2).

Part A, Condition A14 of Development Consent SSD 10418 requires the surrender of Development Consent DA 92/97 within 12 months of the date of commencement of development under Development Consent SSD 10418, or an alternative timeframe agreed with the Planning Secretary of the DPE (now Department of Planning, Housing and Infrastructure [DPHI]).

Following the commencement of development under Development Consent SSD 10418 and prior to the surrender of Development Consent DA 92/97, MACH Energy will comply with the requirements of both consents (Section 1.1).

This ESCP has been prepared to satisfy the relevant conditions of both Development Consent SSD 10418 and Development Consent DA 92/97. Where relevant, this ESCP builds on the components of the existing/approved ESCP, including previous feedback from government stakeholders and recommendations.

Figure 2 shows the indicative Project general arrangement and existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished.



MAC-18-03A MP2023_Figure 2_Rev C

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]
- Development Footprint 1 (Stage 1) - General Extension Areas [1]
- Development Footprint 1 (Stage 2) - Mine Water Dam 3 [1]
- Relinquishment Area
- Northern Link Road Option 1 Centreline
- Northern Link Road Option 2 Centreline

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.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016)
Orthophoto: MACH (Dec 2022)

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MOUNT PLEASANT OPERATION

General Arrangement of the Project

Figure 2

1.1 PURPOSE AND SCOPE

This ESCP has been prepared by MACH Energy to satisfy the requirements under Development Consent SSD 10418, specifically Part B, Condition B52. It also satisfies the requirements of Development Consent DA 92/97 (prior to its surrender) and specifically Condition 28(b), Schedule 3.

This ESCP describes the management measures proposed to control potential erosion impacts associated with construction and operation of the MPO, including for example, initial establishment and development works, open cut mining, operation of the coal handling and preparation plant, rail spur/loop and Fines Emplacement Area, and the supply of water to the MPO.

The ESCP applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The ESCP applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent SSD 10418, which permits mining until 22 December 2048, and Development Consent DA 92/97 (prior to its surrender). As required by Part A, Condition A5 of Development Consent 10418, this ESCP will continue to apply (excluding mining operations) beyond 22 December 2048, as required, until the rehabilitation and any additional undertakings (required by the Planning Secretary of the DPHI (previously DPE), or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

All conditions and statutory requirements under Development Consent DA 92/97 will become null and void after its surrender at which time the MPO will operate under Development Consent SSD 10418 and other relevant legislation.

In accordance with Part B, Condition B52(b) of Development Consent SSD 10418, this ESCP has been prepared and reviewed by Dr Camilla West, Associate Scientist at ATC Williams, who has been endorsed by the Planning Secretary as a suitably qualified and experienced person. A copy of the endorsement by the Planning Secretary is included in Attachment 3 of the Water Management Plan (WMP).

As required by Part B, Condition B53 of Development Consent SSD 10418, MACH Energy will not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the WMP (of which this ESCP forms a part) is approved by the Planning Secretary.

Upon the commencement of development under Development Consent SSD 10418, and before the surrender of Development Consent DA 92/97, in accordance with Part A, Condition A15 of Development Consent SSD 10418, the conditions of Development Consent SSD 10418 prevail to the extent of any inconsistency with the conditions of those consents.

This ESCP has been developed in-line with best practice erosion and sediment control measures listed in Managing Urban Stormwater Soils and Construction Volume 1 (Landcom, 2004), Managing Urban Stormwater Soils and Construction Volume 2E – Mines and quarries (NSW Department of Environment and Climate Change [DECC], 2008), and the International Erosion Control Association (IECA) Australasian document, Best Practice Erosion and Sediment Control (IECA, 2008).

1.2 STRUCTURE OF THE EROSION AND SEDIMENT CONTROL PLAN

This ESCP consists of the following sections:

- Section 2: Outlines the statutory obligations relevant to this ESCP.
- Section 3: Describes the baseline data available for the MPO which relates to this ESCP.
- Section 4: Outlines the potential causes of erosion, sedimentation and flooding at the MPO.
- Section 5: Describes the MPO erosion and sediment control strategy.
- Section 6: Outlines the review process for MPO documentation and for this ESCP.
- Section 7: Outlines the reporting procedures proposed for the MPO.
- Section 8: Lists the references cited in this report.

2 STATUTORY OBLIGATIONS

The statutory obligations relevant to the MPO are contained in:

- the conditions of Development Consent SSD 10418;
- the conditions of Development Consent DA 92/97 (prior to its surrender);
- the conditions of the Commonwealth Approval EPBC 2020/8735 (once granted);
- the condition of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850), permits and MLs (ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829); and
- other relevant legislation.

Obligations relevant to this ESCP are described below.

2.1 DEVELOPMENT CONSENT SSD 10418

The conditions of Development Consent SSD 10418 relevant to the content and structure of this ESCP are described below. A comprehensive list of all conditions in Development Consent SSD 10418 relevant to water is provided in the WMP.

2.1.1 Erosion and Sediment Control Plan Requirements

Part B, Condition B52 of Development Consent SSD 10418 required the preparation of an ESCP as part of the WMP for the Project (refer Table 1).

Table 1
ESCP Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this ESCP document
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:…	
(f) include a:	
ii) Erosion and Sediment Control Plan that:	
• *is consistent with the requirements of Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008);*	Section 5
• *identifies activities that could cause soil erosion, generate sediment or affect flooding;*	Section 4
• *describes measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;*	Section 5
• *describes the location, function, and capacity of erosion and sediment control structures and flood management structures; and*	Section 5
• *describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;*	Section 5

2.1.2 Management Plan General Requirements

Part D, Condition D5 of Development Consent SSD 10418 outlines the general management plan requirements that are applicable to the preparation of this ESCP.

Table 2 presents these requirements and indicates where each is addressed within this ESCP, or within the overarching WMP for the MPO.

Table 2
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this ESCP document
D5. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) summary of relevant background or baseline data;	Section 3
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(ii) any relevant limits or performance measures and criteria; and	Section 5.1
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Surface Water Management Plan (SWMP) and Groundwater Management Plan (GWMP)
(c) any relevant commitments or recommendations identified in the document/s listed in Condition A2(c);	Section 4
(d) a description of the measures to be implemented to comply with the statutory requirements, limits, or performance measures and criteria;	Section 5
(e) a program to monitor and report on the:	Section 6
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to Condition D4(c);	
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	SWMP and GWMP
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6
(h) a protocol for managing and reporting any:	Section 7
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements;	
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Sections 6 and 7
(j) a protocol for periodic review of the plan.	Section 6
***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	

2.2 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this ESCP are described below. A comprehensive list of all conditions in Development Consent DA 92/97 relevant to water is provided in the WMP.

2.2.1 Erosion and Sediment Control Plan Requirements

Condition 28(b), Schedule 3 of Development Consent DA 92/97 requires the preparation of an ESCP as part of the WMP for the MPO (refer Table 3).

Table 3
ESCP Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this ESCP document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary...The plan must include: *... (b) an Erosion and Sediment Control Plan, which must:*	
• *identify activities that could cause soil erosion, generate sediment or affect flooding;*	Section 4
• *describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage any flood risk;*	Section 5
• *describe the location, function, and capacity of erosion and sediment control structures;*	Section 5
• *describe what measures would be implemented to maintain the structures over time;*	Section 5

2.2.2 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of the ESCP.

Table 4 presents these requirements and indicates where each is addressed within this ESCP.

Table 4
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this ESCP Document
2. *The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:*	
(a) detailed baseline data;	Section 3
(b) a description of:	Section 2
• *the relevant statutory requirements (including any relevant consent, licence or lease conditions);* • *any relevant limits or performance measures/criteria;* • *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	SWMP and GWMP
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 5
(d) a program to monitor and report on the: • *impacts and environmental performance of the development;* • *effectiveness of any management measures (see c above);*	Section 6
(e) a contingency plan to manage any unpredicted impacts and their consequences;	SWMP and GWMP
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6
(g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 7
(h) a protocol for periodic review of the plan.	Section 6
Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	

2.3 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences issued under the *Water Management Act, 2000*.
- Discharge credits (50) held under the NSW Protection of the Environment Operations (*Hunter River Salinity Trading Scheme*) Regulation, 2002.
- ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources.
- EPL 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the NSW Environment Protection Authority (EPA).
- The Rehabilitation Management Plan (RMP), as required by ML conditions issued under the *Mining Act, 1992* and approved by the MEG[1].

2.4 OTHER LEGISLATION

A description of other legislation relevant to MPO water management is provided in the WMP, SWMP and GWMP.

[1] As of 1 August 2022, MPO operates under a RMP along with the supporting Annual Rehabilitation Report and Forward Program which has replaced the Mining Operations Plan (1 July 2021 – 30 June 2023).

3 BASELINE DATA

3.1 SOIL TYPES

Seven soil locations and five soil types located in and adjacent to the Project site were reviewed and included as part of the Soil Resource Assessment for the Mount Pleasant Optimisation Project (GT Environmental, 2020). The five soil types are summarised in Table 3 below.

Table 3
Summary of Soil Types

Australian Soil Class and Soil Types	Characteristics
GSS/1, Brown Chromosol	Brown Chromosol, moderate. Very gently to gently undulating plains. Cattle grazing, isolated ironbark, grasses. Neutral to acid to alkaline pH, non-saline, high cation exchange capacity (CEC), non-sodic to sodic B22 horizon. Slight to high moderate Emerson Aggregate Test.
GSS/2, Red Chromosol	Red Chromosol. Upper slope, gently and moderately inclined. Grazing with red ironbark and native grasses. Neutral to alkaline pH. non-saline, moderate to high CEC, non-sodic to sodic B22 horizon. Slight to negligible Emerson Aggregate Test.
GSS/3, Brown Vertoso	Brown Vertosol. Flat areas on mid to lower slopes. Grazing with isolated white box. Neutral to alkaline pH. non-saline, high CEC, non-sodic to moderately sodic B2 horizon. Negligible to slight back to negligible Emerson Aggregate Test.
GSS/5, Brown Kurosol	Brown Kurosol. Lower slope to level and gently inclined. Grazing with native grasses. Moderately acidic to strongly acidic pH, non-saline, now to moderate CEC, non-sodic to moderately sodic A2 horizons, strongly sodic B2 horizon. Negligible to high/moderate at depth Emerson Aggregate Test.
GSS/7, Rudosol	Rudosol. Upper slopes and crests. Light grazing with native trees and grasses.

Source: GT Environmental, 2020.
CEC = the maximum positive charge required to balance the negative charge on colloids (clays and other charged particles). The units are milli-equivalents per 100 grams of material or centimoles of charge per kilogram of exchanger. CEC is often used as a measure of soil fertility and nutrient retention capacity.

Golder Associates (2016) compiled a Geotechnical Investigation Report on the MPO area. This investigation described the typical soil conditions found at the site as follows:

1. Vegetation cover throughout the site varies with grass cover in lower areas including gullies and flood plains.
2. Topsoil depth generally ranges from 0.2 metres (m) to 0.4 m depth. Topsoils generally comprise sandy and/or silty clays.
3. Alluvial soils underlying the topsoil generally comprise cohesive soils and granular soils.
    i. Alluvial soils are predominately cohesive, comprising clay with varying quantities of silt and sand.
    ii. Granular soils were only encountered on the lower slopes, towards the south-eastern portion of the site. Granular soils comprise a mixture of sand and gravel with up to 30% silts and clays.
4. Residual soils generally comprise clays derived from the weathering of the underlying sandstone and siltstone materials. Residual soils are generally less than 1 m in depth.
5. Bedrock encountered in the shallow excavations generally comprise sandstone or siltstone.

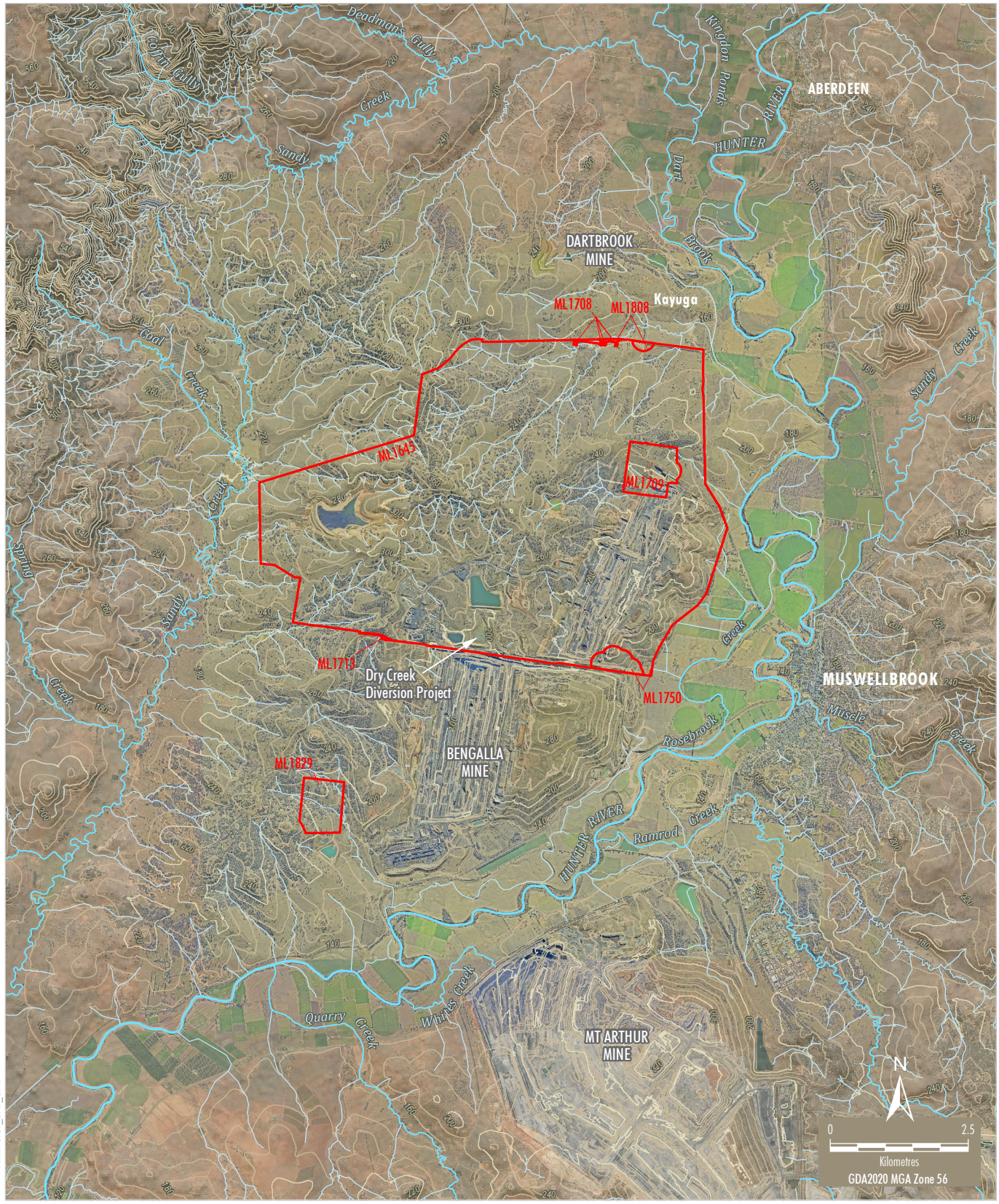
In the southern portion of the MPO area, deep alluvial soil deposits associated with the Hunter River system exist.

3.2 FLOOD EVENTS

The main drainage feature within the vicinity of the MPO is the Hunter River which flows in a southerly direction approximately 1 km to the east of the MPO ML boundary. There are a number of ephemeral drainage lines which traverse the MPO area and drain into the Hunter River. The eastern portion of the MPO area drains via Rosebrook Creek, as well as other unnamed drainages. Areas in the south and west of the MPO area drain via an unnamed drainage line (sometimes referred to as Dry Creek) and Sandy Creek respectively, both of which are tributaries of the Hunter River. All other areas drain into unnamed drainage lines, which flow directly into the Hunter River. Figure 3 shows the drainage network and topography in the vicinity of the MPO.

In 2018, Royal HaskoningDHV (2018) completed a Muswellbrook Floodplain Risk Management Study on behalf of the Muswellbrook Shire Council and determined the 1% Annual Exceedance Probability (AEP) flood extent for the Hunter River.

The 1% AEP flood extent, in conjunction with the Approximate Eastern Extent of Approved Surface Development of the MPO, and the approved MOD 4 rail spur, are shown on Figure 4.



MAC-18-03A MP2023_ESCP_201B

Source: MACH (2023); NSW Spatial Services (2023)
Orthophoto: MACH (Jun 2023, 2020)

LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

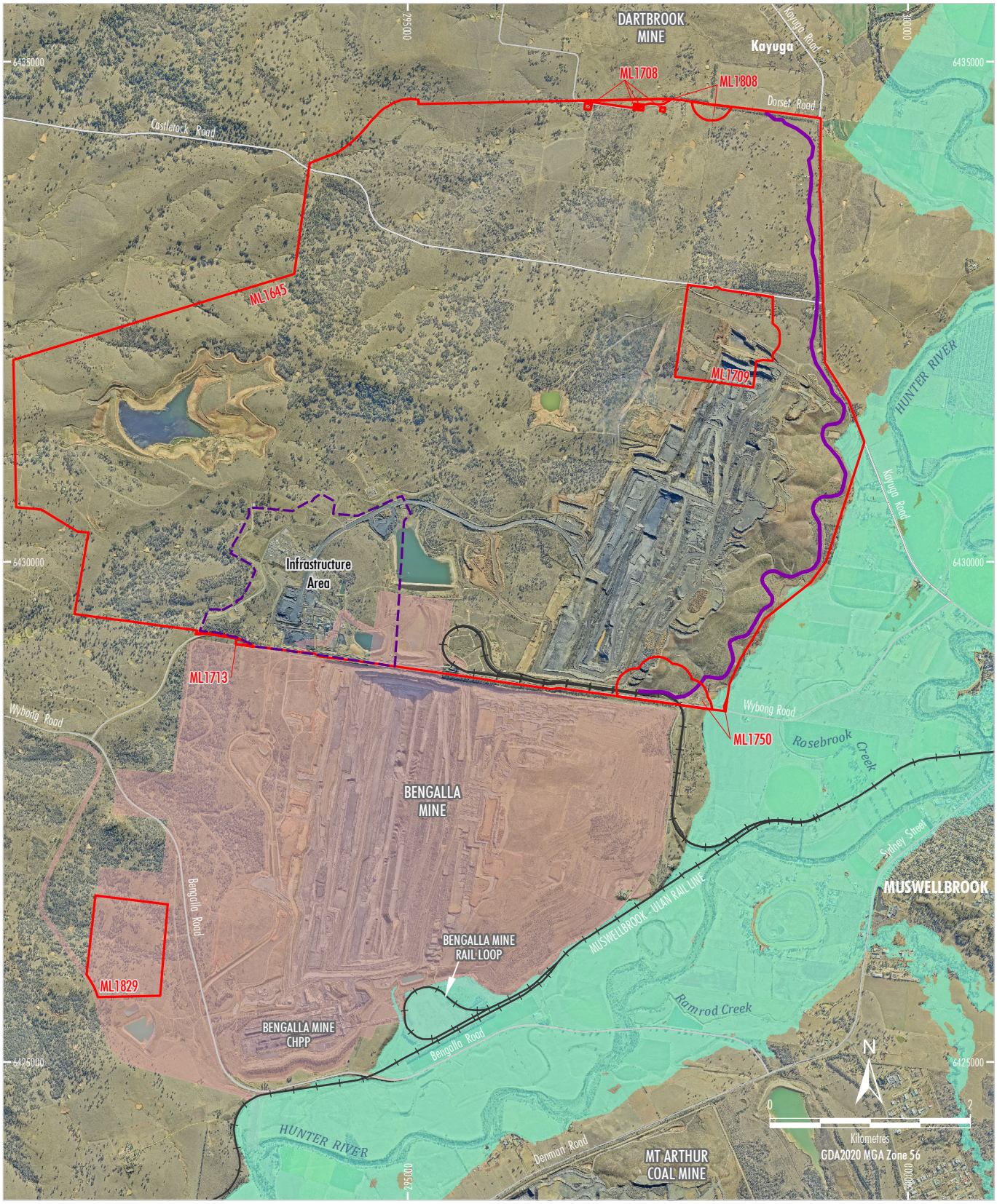
Contour (20 m Interval)

MACHEnergy

MOUNT PLEASANT OPERATION

Local Drainage Network and Topography

Figure 3



MAC-18-03A MP2023_ESCP_202B

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016); Royal Haskoning DHV (2018) Orthophoto: MACH (Jun 2023)

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Infrastructure Area Envelope
- Approximate Eastern Extent of Project Open Cut and Waste Rock Emplacement
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- 1% AEP Flood Extent #

The 1% AEP Flood Extent has been digitised from Royal Haskoning DHV (2018).

MACHEnergy

MOUNT PLEASANT OPERATION

Hunter River - 1% AEP Flood Extent

Figure 4

4 POTENTIAL CAUSES OF SOIL EROSION, SEDIMENTATION AND FLOODING EFFECTS

4.1 SOIL EROSION AND SEDIMENTATION

Key activities that have the potential to cause or increase soil erosion and sedimentation at the MPO are disturbance of land and soils in relation to mining activities involving clearing, stripping and stockpiling activities. These activities include:

- clearing and stripping of land prior to mining, or for other mining related activities such as construction of infrastructure;
- clearing of land for some Aboriginal archaeological surveys (i.e. scrapes);
- open cut mining activities including the placement of overburden and topsoil stockpiling;
- exploration activities;
- relocation of existing infrastructure (e.g. Castlerock Road, powerlines and water pipelines);
- installation of services and infrastructure, including mine water dams, sumps and drains;
- changes to drainage lines and/or catchments, including upslope diversions;
- excavation of borrow areas and quarries for obtaining material for construction;
- management and rehabilitation of the Fines Emplacement Area;
- use of coal stockpiles and coal handling equipment including mobile equipment, coal crushing equipment, train loading infrastructure and conveyors;
- runoff from haul roads and access roads;
- vehicle and equipment movements; and
- earthworks associated with mine site rehabilitation.

4.2 FLOODING

As shown on Figure 4, the Eastern Extent of Approved Surface Development (incorporating the MPO major landforms) are located outside the 1% AEP flood extent for the Hunter River. Accordingly, the potential for the MPO major landforms to result in changes to flood depth, extent or velocity in the vicinity of the MPO is considered to be negligible.

Notwithstanding, as the MPO MOD 4 rail spur crosses the Hunter River floodplain, as defined by the 1% AEP flood extent (Figure 4), it has been designed to meet a range of flood risk management performance criteria. MACH Energy's proposed management of flood risks associated with the MOD 4 rail infrastructure (including the rail spur) is described in Section 5.7.

5 EROSION AND SEDIMENT CONTROL STRATEGY

Erosion and sediment controls are implemented at the MPO to mitigate the impacts of the planned development on nearby watercourses and the surrounding environment.

The erosion and sediment control performance measures are outlined in Section 5.1. A summary of the general erosion and sediment control principles employed by MACH Energy to limit erosion on site are outlined in Section 5.2. Site specific erosion and sediment control strategies are described in Section 5.3, and design criteria associated with the ESCP are described in Section 5.4.

5.1 PERFORMANCE MEASURES

Part B, Condition B50 of Development Consent SSD 10418 defines the water management performance measures for the Project.

A summary of the water management performance measures relevant to erosion and sediment control is provided in Table 6, in accordance with Table 6 of Development Consent SSD 10418.

Table 6
Relevant Water Management Performance Measures

Feature	Performance Measure
Erosion and sediment control works	• *Design, install and maintain erosion and sediment controls in accordance with the guidance series Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2A: Installation of Services (DECC, 2008), Volume 2C: Unsealed Roads (DECC, 2008), Volume 2D: Main Road Construction (DECC, 2008) and Volume 2E: Mines and Quarries (DECC, 2008)* • *Design, install and maintain any creek crossings in accordance with the Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013) and Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)* • *Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012)*
Sediment dams	• *Design, install and maintain sediment dams in accordance with the guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008) and the requirements under the POEO Act*

In accordance with Part B, Condition B51 of Development Consent SSD 10418, the performance measures in Table 6 of Development Consent SSD 10418 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.

5.2 GENERAL PRINCIPLES

The following general principles underpin MACH Energy's approach to erosion and sediment control at the site:

- Minimising surface disturbance and restricting access to undisturbed areas.
- Progressive rehabilitation/stabilisation of mining and infrastructure areas.
- Separation of runoff from disturbed and undisturbed areas, where practicable.
- Management of runoff from mining and infrastructure areas through the mine water management system.
- Construction of suitable erosion and sediment controls such as drains and sediment dams to control, contain and manage sediment laden surface runoff.

Development activities will generally occur in the following order:

1. Installation of a stabilised site access route.
2. Selective stripping and stockpiling of available topsoil.
3. Construction of diversion drains (typically upslope of disturbance areas) – these are only constructed where they significantly reduce the catchment reporting to disturbance areas.
4. Construction of appropriately sized sediment dams/sumps where required to provide for temporary retention of runoff from disturbance areas. Where practicable, existing farm dams, mine water dams and open cut pits will be preferentially utilised for this purpose.
5. Construction of collection drains (downslope of or within disturbance areas) where required, to convey runoff to sediment dams or other mine water storages.
6. Construction of sediment controls (e.g. sediment fences) downslope of disturbance and stockpile areas, where required.

Construction/development works and mining activities will only take place once appropriate erosion and sediment control measures are in place.

5.3 EROSION AND SEDIMENT CONTROL MEASURES

Typical erosion and sedimentation control strategies that will be implemented for construction, operation and rehabilitation activities at the MPO are described in the sections below. Specific erosion and sediment controls will be designed in conjunction with the design of water management systems.

The function and capacity of key erosion and sediment control structures (e.g. environmental and sediment dams) are described in Sections 4.1 and 4.2 of the Site Water Balance. The location of these features is shown on the General Project Arrangement figures in Attachment 2.

5.3.1 Erosion and Sediment Control

The following erosion and sediment control measures will be implemented in all areas of the site where disturbance from construction/development and mining activities occurs:

- relevant internal approvals and permits will be obtained before commencement of surface disturbance in the construction stage and mining phase (e.g. Ground Disturbance Permits [GDPs]);
- the extent of disturbance (including trafficable areas) will be minimised and identified using appropriate pegging, barriers or signage;
- appropriate erosion and sediment controls will be approved and established prior to land disturbance and will remain in place until exposed areas are stabilised;
- runoff from undisturbed catchments will be diverted around the disturbance areas via diversion drains and banks to discharge into natural watercourses, where practical;
- runoff from disturbed areas will be diverted into sediment dams;
- drains, diversion banks and channels will be stabilised and scour protection will be provided as necessary;
- temporary erosion and sediment control measures will be used on-site and may include silt fences, hay bales, stacked timber with geotextile, jute mesh, check dams, cross banks, contour banks, armouring and straw mulching; and
- topsoil will be stockpiled for reuse and all stockpiles will be managed as described in Section 5.3.2.

Drainage considerations will be incorporated into the landform design plan to slow and direct water flow and minimise erosion. Diversion drains will be constructed as per MACH Energy design plans.

5.3.2 Soil Management

Topsoil management strategies are described in the RMP for the MPO and summarised below.

Topsoil Stripping

Topsoil stripping activities will be undertaken in a manner that minimises impacts to air quality, flora and fauna, and water quality due to erosion. Measures to reduce potential impacts of topsoil stripping on air quality and flora and fauna are described in the Air Quality and Greenhouse Gas Management Plan and Biodiversity Management Plan, respectively.

Examples of these measures include:

- Minimising the re-handling of topsoil material.
- Avoiding or postponing stripping activities if excessive dust lift off occurs.
- Spraying low moisture content material with water prior to and/or during handling if necessary and practicable to control dust.
- Minimising vegetation clearance where practical.

Erosion and sediment control measures that would be implemented to minimise potential impacts to downstream water quality are described in Section 5.3.1.

Topsoil will be stripped and salvaged to maximise its value for re-use in rehabilitation and will be guided by soil mapping and the suitable soil stripping depths as described in the RMP.

Topsoil Management

Where possible, topsoil will be transported directly to rehabilitation areas. Where this is not possible, topsoil stockpiles will be established away from active transport corridors and on level or gently sloping areas, where available, to minimise erosion and potential soil loss. Topsoil and subsoil (including alluvial soil) will be stockpiled separately where possible.

Topsoil stockpiles will be limited to a height of 3 m (except for two trial stockpiles, described in the RMP, which will be limited to a height of 5 m). Subsoil stockpiles (including alluvial soil stockpiles) will be limited to 5 m in height. Indicative locations of existing and planned topsoil and subsoil stockpiles are shown in the RMP. Both short-term and long-term topsoil and subsoil stockpiles will be managed to maintain seed reserves and microbial soil associations as described in the RMP.

Topsoil stockpiles will be established with sediment control measures such as those listed in Section 5.3.1, including installation of silt fences around stockpiles to control potential loss of stockpiled soil through erosion prior to vegetative stabilisation and construction of stockpiles with a “rough” surface condition to reduce erosion hazard.

5.3.3 Specific Erosion and Sediment Control Plans

Specific erosion and sediment control plans (Specific ESCPs) may be required to be developed to accompany a GDP. A GDP is required for all proposed land disturbance works at the MPO. The GDP application process requires the person/s seeking the disturbance (‘the applicant’), provide a plan which adequately illustrates the location and type of all proposed erosion and sediment control measures.

Specific ESCPs will be developed in accordance with this ESCP and in consultation with the MPO Environmental Superintendent.

5.4 DESIGN CRITERIA

Specific erosion and sediment control measures to be implemented at the MPO include, but are not limited to:

- clean water diversion drains and banks;
- silt fences (or equivalent control);
- vegetated buffer strips; and
- sediment dams/basins.

Other *Blue Book* (Landcom, 2004) erosion and sediment control measures may be implemented at the MPO as required.

5.4.1 Clean Water Diversion Drains and Banks

Clean water runoff from undisturbed areas will be preferentially diverted around disturbed areas, where practical. Appropriate scour and erosion protection will be established at the down slope end of diversion drains, including level spreaders and other energy dissipation devices.

Additional planting of grass, small shrubs and riparian species will be implemented as necessary to maintain channel stability.

5.4.2 Silt Fences

Where necessary, silt fences will be constructed immediately down slope of areas to be disturbed to minimise the potential for sediment transport into receiving catchments and waterways. Silt fences will be constructed along site contours where practicable. The catchment areas of silt fences are to be limited by constructing the fences with small returns at 20 m intervals to create smaller contributing sub-catchments (refer Figure SD 6 – 8 [Landcom, 2004] [Attachment 3]), unless otherwise approved in the GDP.

The requirement and location for silt fences will be assessed by the applicant of the GDP, in consultation with the MACH Environmental Superintendent as part of the GDP process.

Silt fences are considered a temporary control measure and would only be utilised until they are no longer required, or a more permanent control measure is installed.

5.4.3 Vegetated Buffer Strips

A vegetated buffer strip is a vegetated area (generally grass covered), provided around the perimeter of an earthworks footprint. The primary purpose of a vegetated buffer strip is to reduce sediment transportation by acting as a ‘sediment trap’.

A vegetated buffer strip shall generally be located adjacent to the earthworks clearance footprint. A visible structure, such as a fence, markers, or road, will generally be constructed around the buffer zone to clearly identify the area and prevent vehicle disturbance.

The vegetation within a vegetated buffer strip shall be maintained such that it remains effective in controlling bed load sediment runoff.

The requirement and utilisation of any proposed vegetative buffer strip will be assessed by the applicant of the GDP, in consultation with the MACH Environmental Superintendent as part of the GDP process.

5.4.4 Sediment Dams

A number of sediment dams are already in use, and additional sediment dams will be constructed at intervals along the eastern Project boundary to manage runoff from the expanded open cut pit and waste rock emplacement disturbance areas as mining progresses (refer to Site Water Balance).

Sediment dams will be installed as required to capture and treat sediment laden runoff from disturbed areas prior to release off-site. The use of flocculants or other ameliorants to reduce suspended sediment content will be considered on a case-by-case basis.

Sediment dams will be designed with consideration given to soil and overburden characteristics and the planned contributing area of disturbance. The sediment dams will be sized in accordance with current recommended design standards in the following guidelines:

- Managing Urban Stormwater, Soils and Construction Volume 1 (Landcom, 2004); and
- Managing Urban Stormwater, Soils and Construction, Volume 2E – Mines and Quarries (DECC, 2008).

The sediment dam volumes will be designed to comply with Table 6.1 of *Managing Urban Stormwater, Soils and Construction, Volume 2E – Mines and Quarries* (DECC, 2008) based on the following design standards and methodology:

- "Type D and F" sediment basins consistent with Figure SD 6 – 4 from Landcom (2004) (Attachment 4).
- Embankment and spillway design standard will vary based on the duration of the disturbance of the sediment dam catchment, however, it is anticipated that most sediment dam catchments will be disturbed for greater than three years (including time for rehabilitation to adequately establish). Therefore, assuming a 'standard' receiving environment, the dam capacity must be designed to capture a 90th percentile 5-day duration rainfall event (39.35 millimetres [mm] for the MPO), with a spillway that is structurally sound for a 1 in 50 AEP rainfall event.
- Total sediment basin volume = settling zone volume + sediment storage volume. The sediment storage volume is the portion of the basin storage volume that progressively fills with sediment until the basin is de-silted. The settling zone is the minimum required free storage capacity that must be restored within 5 days after a runoff event.
- Sediment storage volume = 50% of settling zone volume.

The adopted design standard does not provide 100% containment for runoff from disturbed areas. Hence, it is possible and expected that overflows will occur from sediment dams if rainfall exceeds the design standard. The final design, type, location, function and capacity of all proposed sediment dams will be assessed by the applicant of the GDP, in consultation with the MACH Environment Superintendent, as part of the GDP process.

Sediment dams will be constructed prior to any land disturbance activities occurring, in accordance with the GDP and will be maintained for the duration of catchment disturbance. Sediment dams will be maintained in a drawn down state as far as practicable by transferring water to the mine water dams, with water to be used for dust suppression or other mine related purposes.

Level markers will be installed in sediment dams that are in place for longer durations (i.e. three years or more) to identify the required storage volumes. Dams will be dewatered as required, and in some cases, dams may be enlarged to provide additional storage capacity if catchment areas or catchment disturbance changes.

Runoff from rehabilitated areas will be diverted to sediment dams for treatment until the water quality of surface runoff is suitable for release from the site, at which time the sediment dams may be decommissioned or active management (by dewatering and periodic de-silting) ceased. In the latter case, the sediment dams would remain in place in the longer term and become an asset for future land use.

5.5 MANAGEMENT OF EROSION AND SEDIMENT CONTROL STRUCTURES

MACH Energy will implement the following management measures in relation to environmental and sediment dams:

- Within 5 days following a rainfall event, sediment dams will be dewatered to the mine water system or to well-grassed areas where sufficient grassed buffer exists to prevent the migration of sediments to watercourses.
- Environmental and sediment dams will be maintained in between rainfall events to ensure sufficient capacity is available to manage the required rainfall intensity.
- Environmental and sediment dam batters will be appropriately stabilised to assist with minimising the potential for erosion of dam batters.
- Environmental and sediment dams that have the potential to spill to the environment will be inspected monthly and immediately after rainfall events with more than 20 mm in 24 hours. Dams will be inspected for capacity, structural integrity and effectiveness. Where inspections indicate substantial accumulation of sediment in a sediment dam, clean-out will be undertaken as soon as practicable so as to reinstate the minimum required volumes.

Each inspection will be documented with a summary of the identified maintenance requirements for each inspected dam.

5.5.1 Monitoring And Maintenance Of Erosion And Sediment Control Structures

Erosion and sediment control structures will be inspected at regular intervals (monthly) and also following significant rainfall events (i.e. more than 20 mm in a 24 hour period), using both drone surveys and on the ground visual inspections. Structures will be inspected for integrity/function, water level and sediment build up. In particular:

- Erosion drains and banks will be inspected for evidence of damage to lining, rill gully or tunnel erosion that may require repair or the accumulation of sediment that requires removal to maintain functionality of the structure.
- Silt fences will be inspected to ensure that they pond water and checked for blow-outs in the anchor trench.

Inspections will be carried out by Environmental Staff, Mining or Processing Staff, or the suitably qualified dam inspector at the site. These inspections provide for early detection of potential issues and monitor the effectiveness of the controls installed. These inspections will then inform any maintenance works to be carried out. For example, silt fences will be re-anchored as necessary, and ripped or damaged silt fences will be replaced.

MACH Energy will also undertake periodic internal erosion and sediment control audits at the MPO via an independent/third-party specialist with the appropriate qualifications/experience (i.e. Certified Professional in Erosion & Sediment Control [CPESC]).

Erosion and sediment controls may be decommissioned, or active management ceased, as rehabilitated land establishes sufficient groundcover and meets the relevant completion criteria set out in the RMP.

5.6 MANAGEMENT OF FLOOD RISK

As described in Section 4.2, the MPO major landforms are not located within the Hunter River 1% AEP flood extent and are therefore predicted to have a negligible impact on flood depth, extent and velocity in the vicinity of the MPO.

As the MPO MOD 4 rail spur crosses the Hunter River floodplain, it has been designed to meet a range of flood risk management performance criteria. A conceptual design for the MOD 4 rail spur was modelled by WRM Water and Environment as part of the MOD 4 EA (WRM Water and Environment, 2017).

In accordance with Condition 44C, Schedule 3 of Development Consent DA 92/97, MACH Energy has designed the final MOD 4 rail infrastructure to meet the following performance criteria during a 1% AEP flood event (WRM Water and Environment, 2020):

a) no more than 0.1 m increase in flood levels on any privately-owned land;

b) no more than 0.01 m increase in flood levels at any privately-owned residence or commercial spaces;

c) no more than 0.01 m increase in flood levels at any public roads servicing privately-owned properties; and

d) no more than 0.1 m per second increase in flood velocities at privately-owned residences or commercial spaces.

An independent review of the proposed final design of the MOD 4 rail infrastructure was undertaken by Royal HaskoningDHV (2020) in accordance with Condition 44D, Schedule 3 of Development Consent DA 92/97. The final design of the MOD 4 rail infrastructure meets the performance criteria specified in Condition 44C, Schedule 3 of Development Consent DA 92/97 (Royal HaskoningDHV, 2020) and was approved by the NSW Department of Planning, Industry and Environment (DPIE) on 5 August 2020.

6 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

6.1 ANNUAL REVIEW

In accordance with Part D Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97 (prior to its surrender) MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the previous calendar year). The report will be submitted to the DPHI, to the satisfaction of the Planning Secretary.

In relation to water, the MPO Annual Review will:

- include a review of the performance of erosion and sediment controls relating to the MPO over the past year, which includes a comparison of these results to evaluate compliance against the:
  - relevant statutory requirements, limits or performance measures/criteria (refer Section 2 and Section 5.1);
  - monitoring results of the previous years;
  - relevant predictions in the MPO EIS and MOD1, MOD2, MOD3 and MOD4 EAs (prior to the surrender of Development Consent DA 92/94);
  - relevant predictions in the Project EIS;
- identify any water-related non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the water monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual water impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what water-related measures will be implemented over the next year to improve the environmental performance of the MPO.

As mentioned in Part D, Condition D11 of Development Consent SSD 10418 (above) relating to MPO Annual Reviews, MACH Energy will include a comprehensive review of environmental performance at the MPO in accordance with Part A, Condition A2 of Development Consent SSD 10418 requires that:

A2. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) generally in accordance with the EIS and EAs;

(d) generally in accordance with the Development Layout in Appendix 2.

Copies of the MPO Annual Review will be submitted to Muswellbrook Shire Council and made available to the Community Consultation Committee (CCC) and any interested person upon request, in accordance with Part D, Condition D12 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97. The MPO Annual Review will also be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/).

6.2 EROSION AND SEDIMENT CONTROL PLAN REVISION

In accordance with Part D, Condition D7 of Development Consent SSD 10418 and Condition 4, Schedule 5 of Development Consent DA 92/97, this ESCP will be reviewed, and if necessary revised to the satisfaction of the Secretary of the DPHI, within three months of the submission of:

- an MPO Annual Review (Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5);
- an incident report (Part D, Condition D9 or D10 of Development Consent SSD 10418 and Condition 7, Schedule 5);
- an IEA (Part D, Condition D13 of Development Consent SSD 10418 and Condition 9, Schedule 5);
- the approval of any modification of the conditions of Development Consent SSD 10418;
- any modification to the conditions of Development Consent DA 92/97[2]; and
- notification of a change in development phase (Part A, Condition A12 of Development Consent SSD 10418).

Prior to the surrender of Development Consent DA 92/97, within four weeks of conducting a review of this ESCP, MACH Energy will advise the Secretary of the DPHI of the outcomes of the review, and submit any revised documents for the approval of the Secretary. After the surrender of Development Consent DA 92/97, in accordance with Part D, Condition D8 of Development Consent SSD 10418, within six weeks of conducting such a review the revised documents will be submitted to the Secretary for approval.

In accordance with Part D, Condition D8 of Development Consent SSD 10418, MACH Energy must, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, revise the ESCP to the satisfaction of the Planning Secretary.

In accordance with Development Consent DA 92/97 and Development Consent SSD 10418, MACH Energy may submit a revised ESCP for the approval of the Secretary at any time, and may also submit any revision to this ESCP required under Development Consent DA 92/97 on a staged basis.

If agreed with the Secretary of the DPHI, a revision to this ESCP required under Development Consent DA 92/97 or Development Consent SSD 10418 may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97 and/or Development Consent SSD 10418.

This ESCP will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Part D, Condition D17(iii) of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender).

6.3 INDEPENDENT ENVIRONMENTAL AUDIT

Within one year of commencement of development under Development Consent SSD 10418, and every three years after, an Independent Environmental Audit (IEA) will be undertaken and submitted as required, in accordance with Part D, Condition D13 of Development Consent SSD 10418.

[2] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3, the latter prevails.

In accordance with Part D, Condition D14 of Development Consent SSD 10418, within three months of commencing the IEA, MACH Energy will submit a copy of the audit report to the Planning Secretary, and other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. MACH Energy will ensure that the recommendations will be implemented and the findings and compliance with the IEA will be reported in the MPO Annual Reviews.

Once Development Consent DA 92/97 is surrendered, all subsequent IEAs commissioned by MACH Energy will be in accordance with Part D, Condition D13 and D14 of Development Consent SSD 10418.

Subsequent versions of the IEA will be provided to the Planning Secretary of the DPHI and made available on the MACH Energy website. The IEA will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary of the DPHI.

6.4 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418, MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in Development Consent SSD 10418.

Where any exceedance of the criteria and/or performance measures occurs, at the earliest opportunity MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to DPHI describing those options and any preferred remediation measures or other course of action; and
- implement reasonable remediation measures as directed by the Planning Secretary.

7 REPORTING PROCEDURES

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418 and Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in MACH Energy's Environmental Management Strategy (EMS).

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

7.1 INCIDENT REPORTING

An incident is defined as an occurrence or a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent SSD 10418.

In the event that review of monitoring data or a complaint indicates an incident has occurred, the incident will be reported in accordance with Part D, Condition D9 of Development Consent SSD 10418. The Planning Secretary will be notified in writing via the Major Projects website immediately after MACH Energy becomes aware of an incident. The notification will identify the Project name and development application number, and set out the location and nature of the incident.

In accordance with Part D, Condition D10 of Development Consent SSD 10418, within seven days of becoming aware of a non-compliance MACH Energy will notify DPHI (previously DPE) of the non-compliance.

The notification must be made in writing via the Major Projects Website and will:

- identify the MPO (including the Development Application number and name);
- set out the condition of Development Consent SSD 10418 that the incident is non-compliant with; and
- describe the location and nature of the incident, the reason for the non-compliance (if known); and what actions have been, or will be, undertaken to address the non-compliance.

Additionally, in accordance with Condition R4 of EPL 20850, MACH Energy will notify the EPA by telephoning the Environment Line service on 131555 immediately after becoming aware of any contravention or potential contravention of section 120 of the *Protection of the Environment Operations Act 1997*, except where expressively provided in a condition of EPL 20850. MACH Energy will provide written details of the notification to the EPA at info@epa.nsw.gov.au within seven days of the date of the notification.

7.2 COMPLAINTS

MACH Energy maintains a Community Hotline (1800 886 889), which is dedicated to the receipt of community complaints. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database.

MACH Energy has developed a procedure that outlines its commitment to receiving, responding to and maintaining a record of phone calls from the community. This procedure is supported by a Community and Stakeholder Engagement Register. This is described in MACH Energy's EMS.

In accordance with Part D, Condition D17 of Development Consent SSD 10418, a complaints register will be made available on the MACH Energy website (https://machenergyaustralia.com.au/) and updated monthly.

7.3 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of MACH Energy's EMS and is described below.

Compliance with all approval plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with MACH Energy and the Project. In accordance with Part A, Condition A2 of Development Consent SSD 10418 and Schedule 2, Condition 2 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will carry out the development in accordance with:

- the conditions of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender)[3];
- all written directions of the Planning Secretary;
- Statement of Commitments (Appendix 3 of Development Consent DA 92/97);
- the 1997 EIS, EA (MOD 1), EA (MOD 2), EA (MOD 3), EA (MOD 4), the Project EIS; and
- with the Development Layout in Appendix 2 of Development Consent SSD 10418 (Appendix D).

MACH Energy will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 7.1, MACH Energy will report incidents in accordance with Part D, Condition D9 of Development Consent SSD 10418.

A review of compliance with all conditions in Development Consent SSD 10418 and relevant MLs will be undertaken prior to (and included within) each Annual Review (Section 6.1).

[3] In accordance with Part A, Condition A4 of Development Consent SSD 10418, the conditions in Development Consent SSD 10418 and directions of the Planning Secretary prevail to the extent of inconsistency, ambiguity or conflict between them and any document/s listed in condition A2(c). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition A2(c), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

Additionally, in accordance with Part D, Condition D13 of Development Consent SSD 10418, an IEA (Section 6.3) will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary to assess whether MACH Energy is complying with the requirements in Development Consent SSD 10418.

7.4 ACCESS TO INFORMATION

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Schedule 5, Condition 11 of Development Consent DA 92/97, the MACH Energy website will be maintained as a tool for the provision of information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information required by MACH Energy to be available on the website is outlined in MACH Energy's EMS.

8 REFERENCES

EMGA Mitchell McLennan (2010) *Mount Pleasant Project Modification, Environmental Assessment*.

Environmental Resources Management (ERM) Mitchell McCotter (1997) *Mount Pleasant Operation Environmental Impact Statement.*

Golder Associates (2016) *Mount Pleasant Mine – Geotechnical Investigation Report*.

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MACH Energy (2017c) *Mount Pleasant Operation – Rail Modification Environmental Assessment*.

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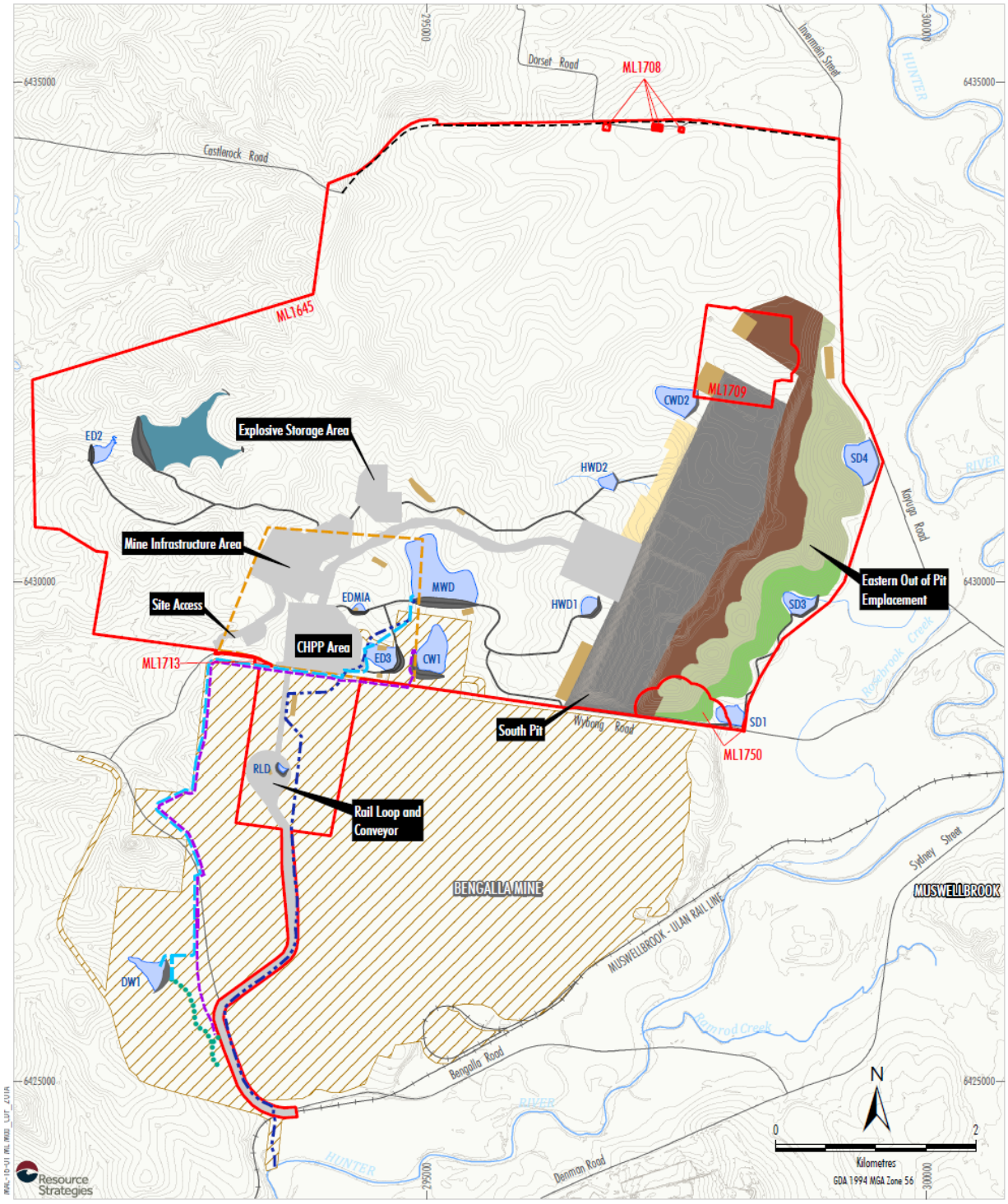
WRM Water and Environment (2020) *Mount Pleasant Operation Rail Loop Stage 2 Rail Modification Flood Impact Assessment*.

ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

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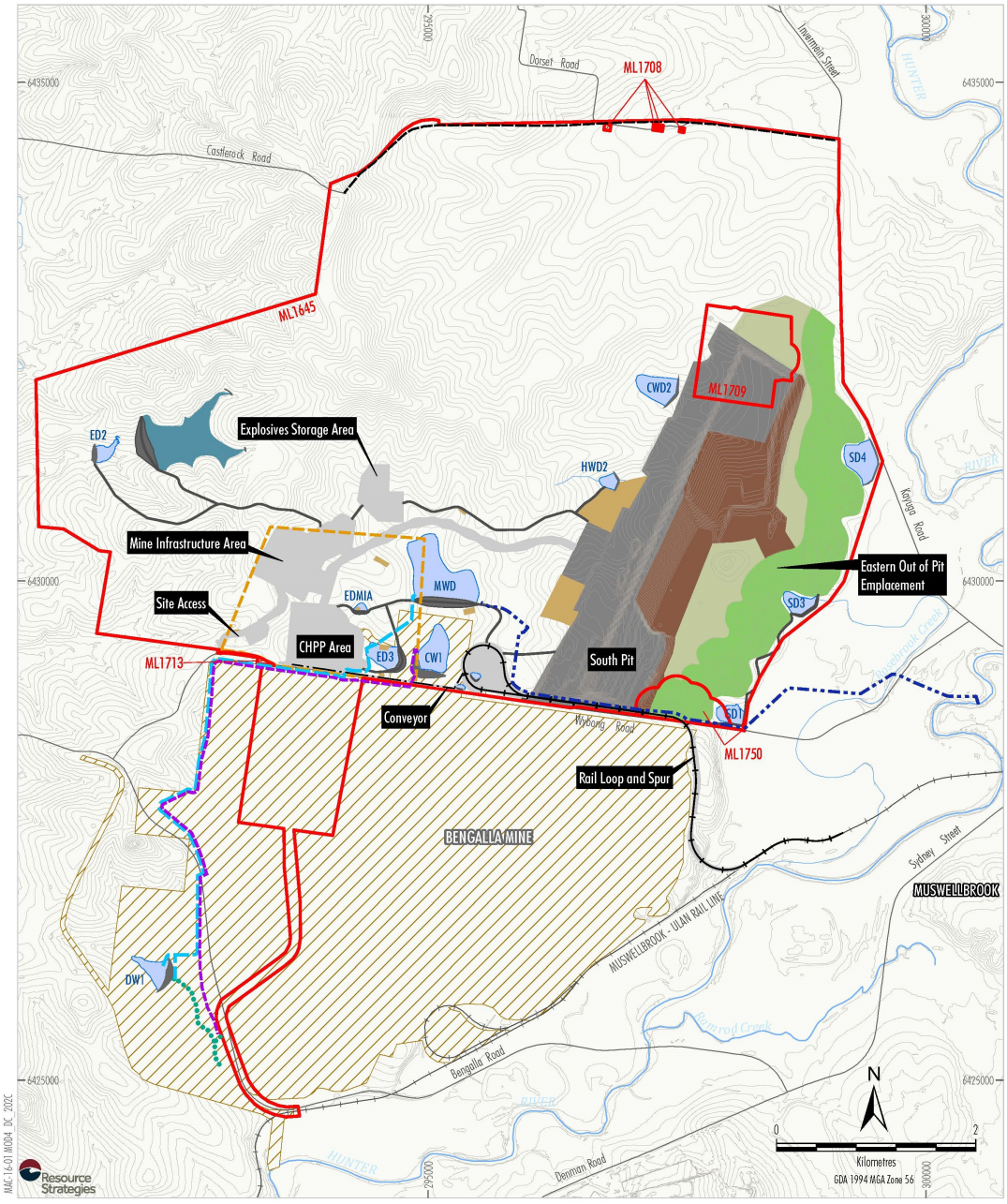
MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2018)

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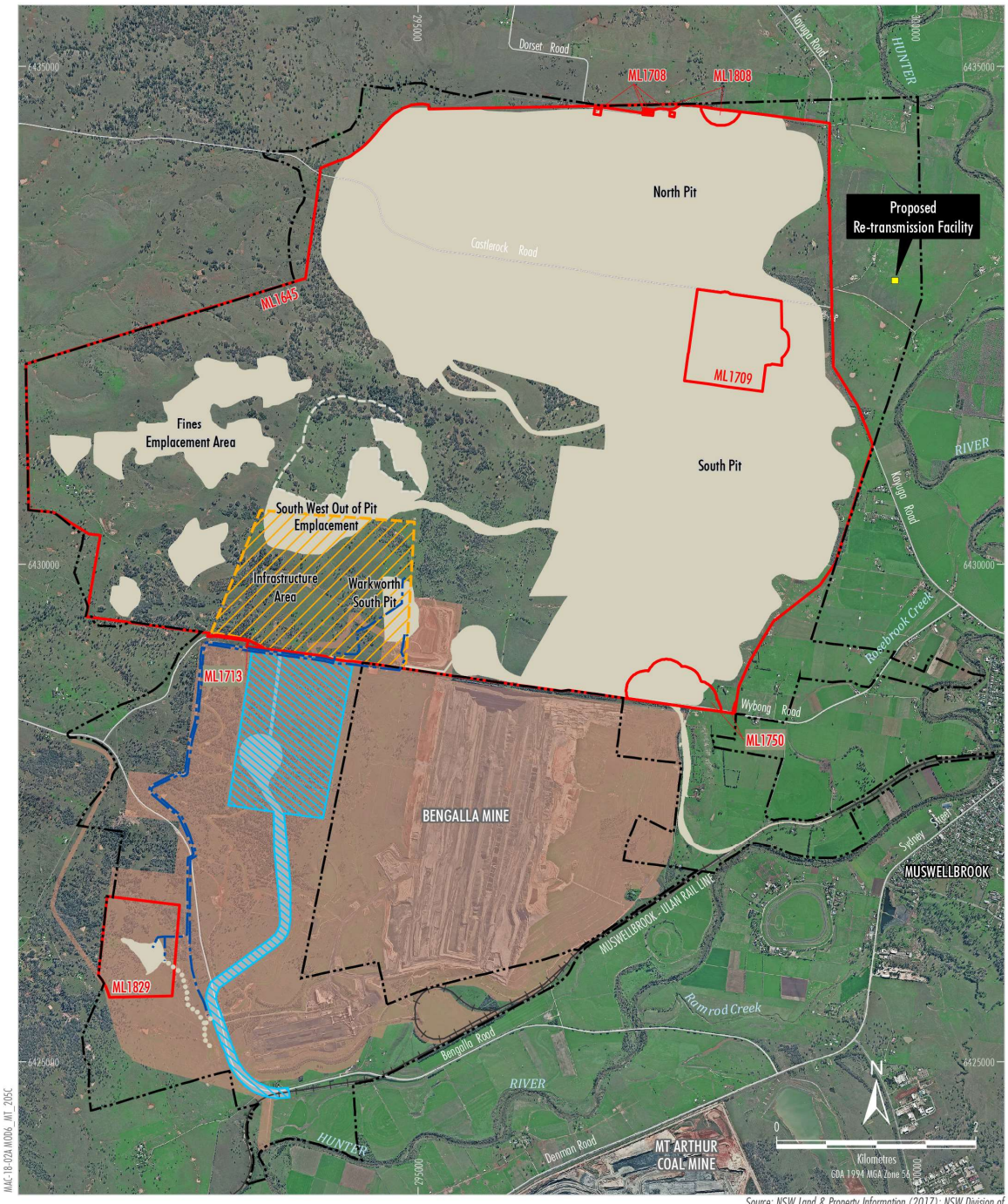
MOUNT PLEASANT OPERATION

FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Development Consent Boundary (DA 92/97)
- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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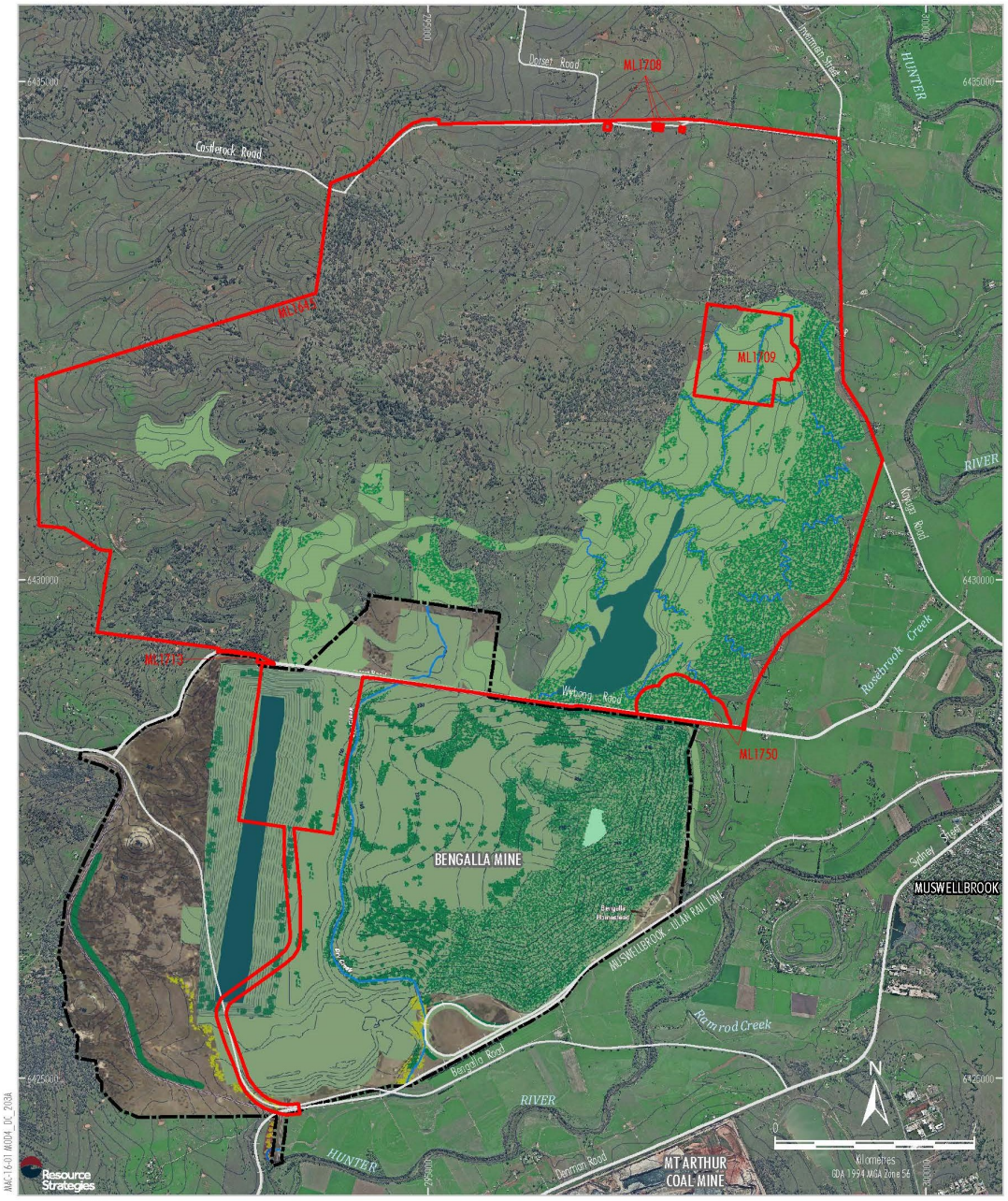
MOUNT PLEASANT OPERATION

Revised Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



LEGEND

- Mt Pleasant Mining Lease Boundary
- Final Void
- Final Rehabilitation
- Bengalla Mine Conceptual Final Landform *
- Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
- Dry Creek
- Final Void Lake
- Rehabilitation
- Rehabilitation Class III
- Indicative Tree Screens (or equivalent)
- Treed Rehabilitation
- Indicative Restorative Area

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

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION
Conceptual Final Landform (2026)

ATTACHMENT 2

APPENDIX 2 OF DEVELOPMENT CONSENT SSD 10418

APPENDIX 2 DEVELOPMENT LAYOUT PLANS

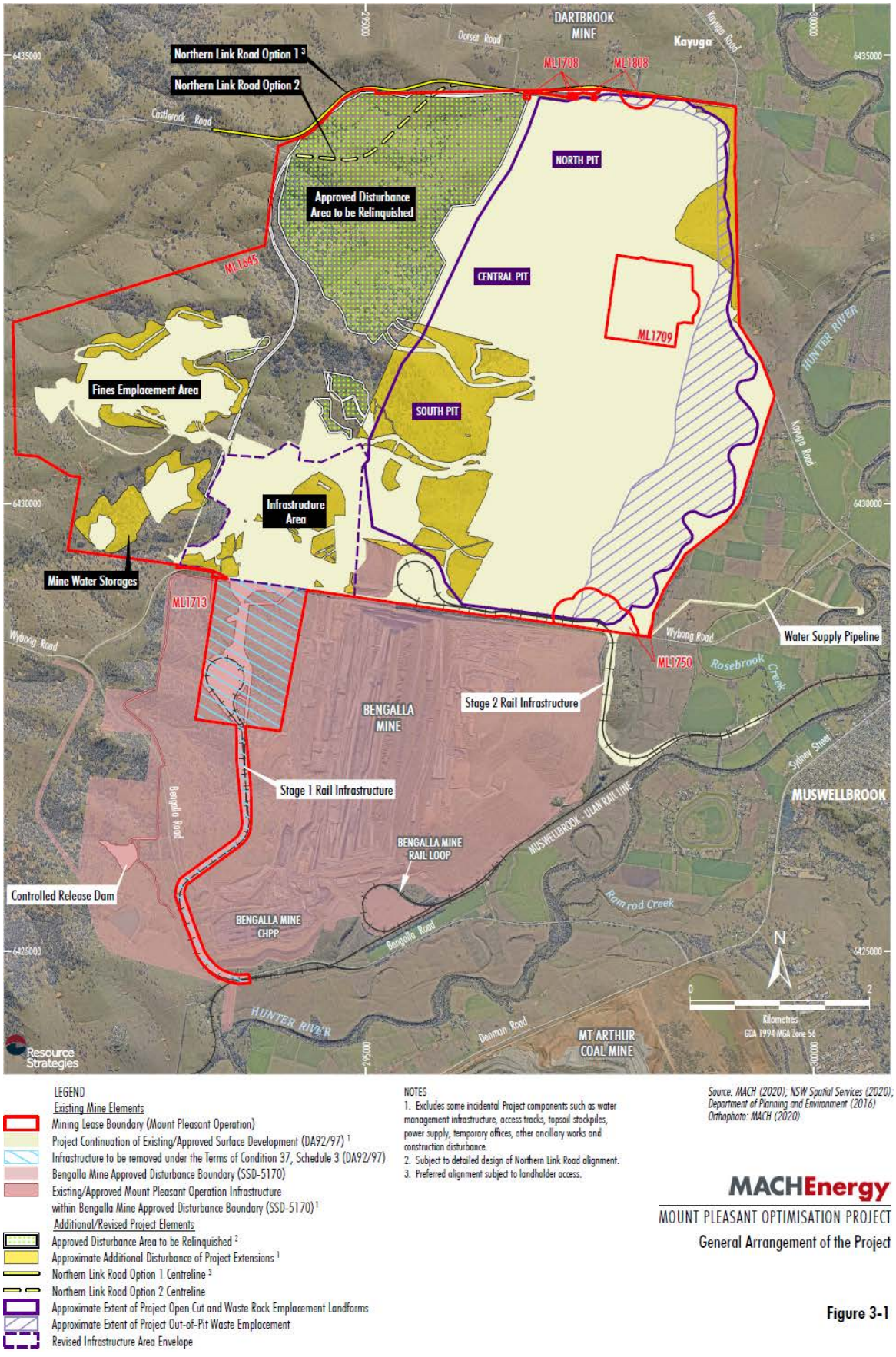


Figure 1: General Project Arrangement

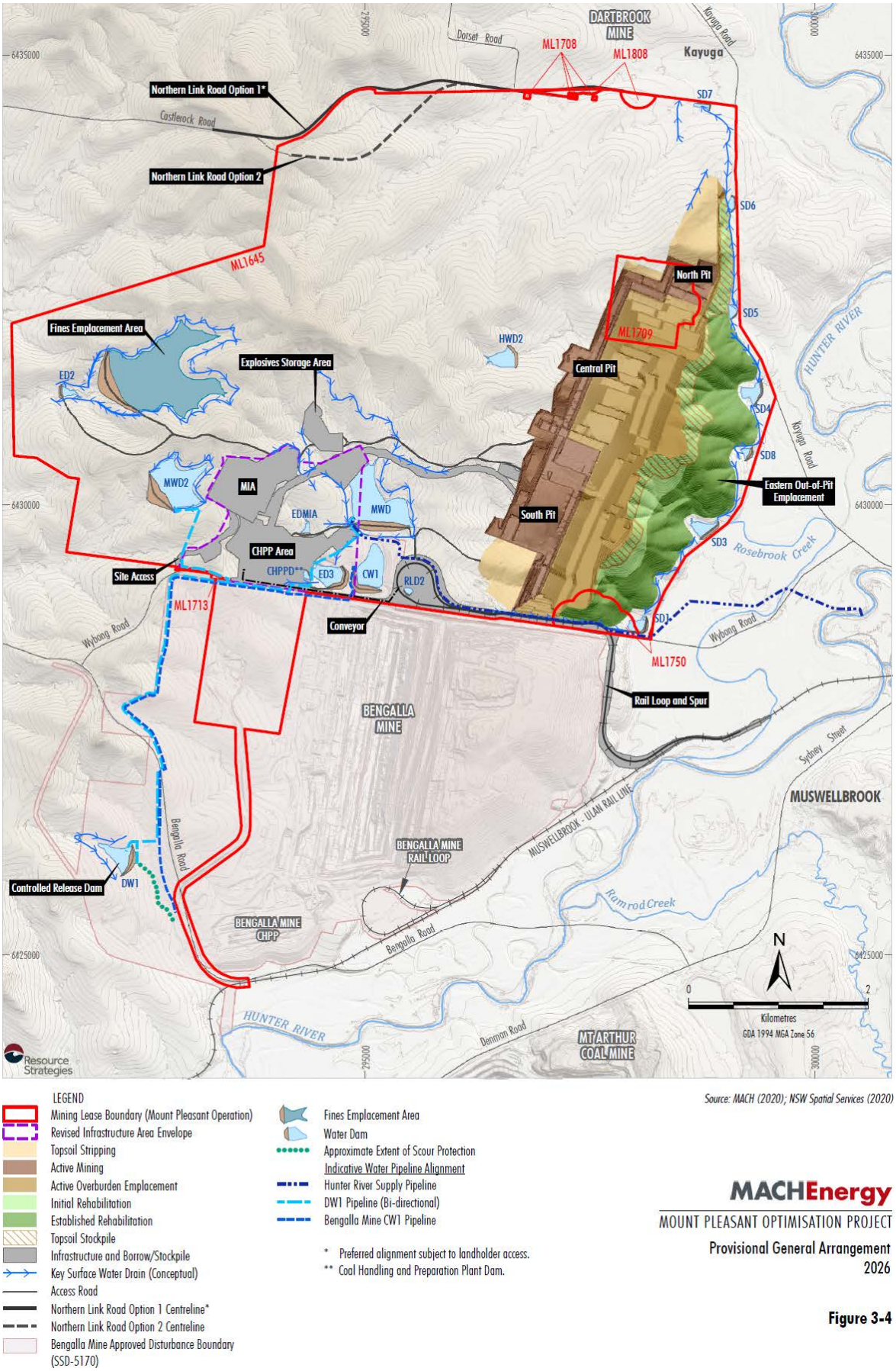
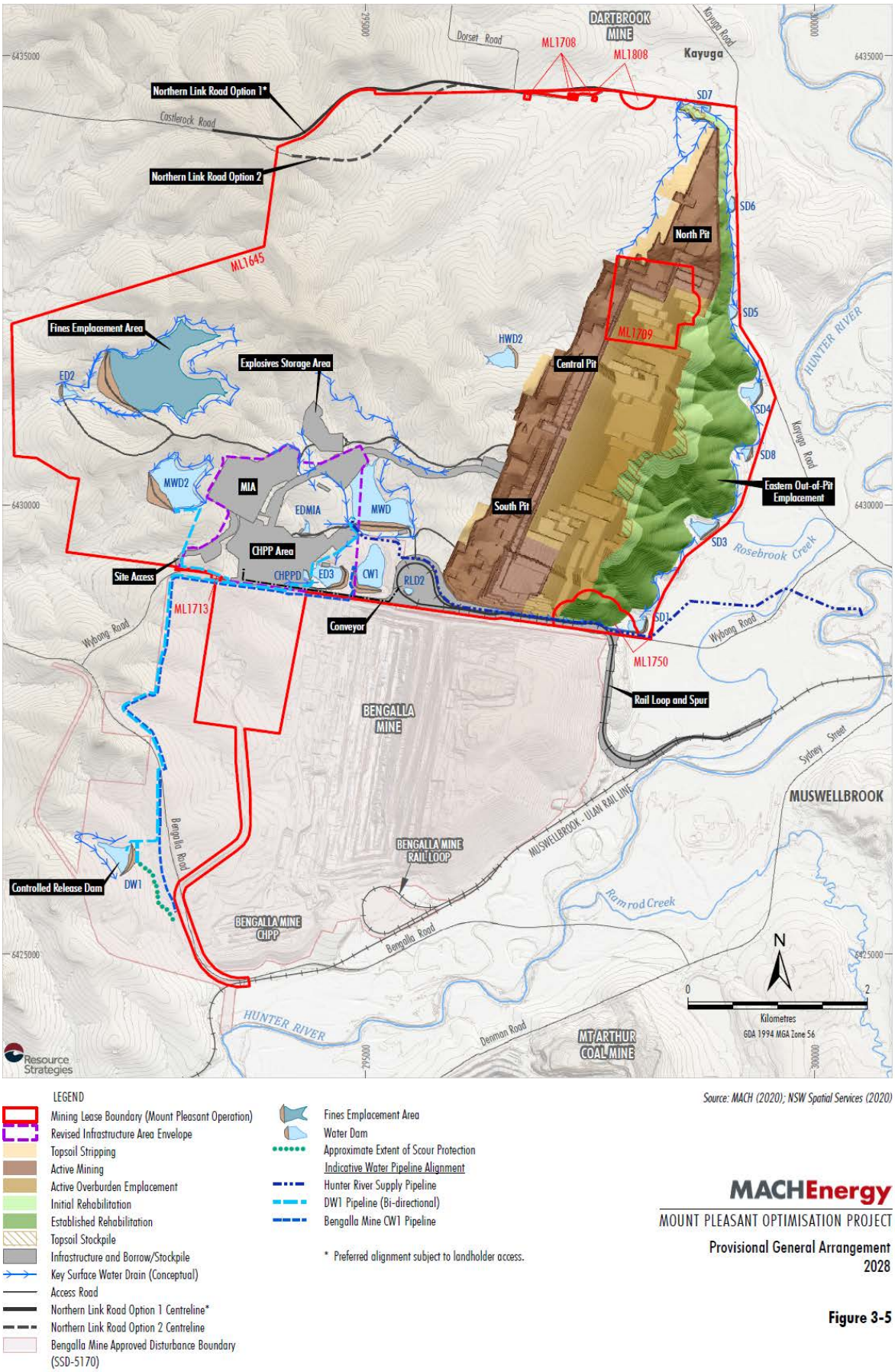


Figure 2: General Project Arrangement – 2026



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.

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

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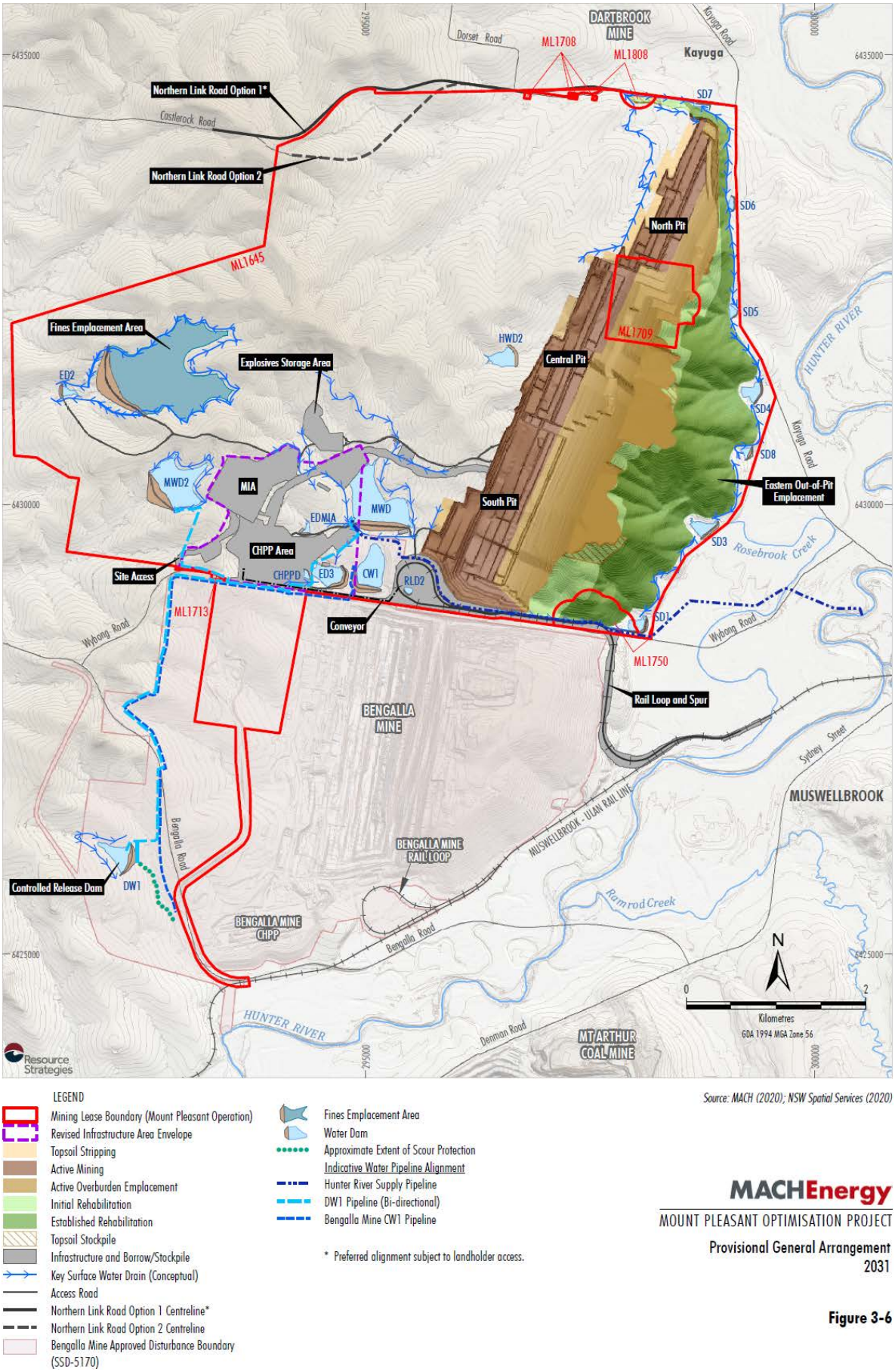
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5

Figure 3: General Project Arrangement – 2028



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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- 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

Figure 4: General Project Arrangement - 2031

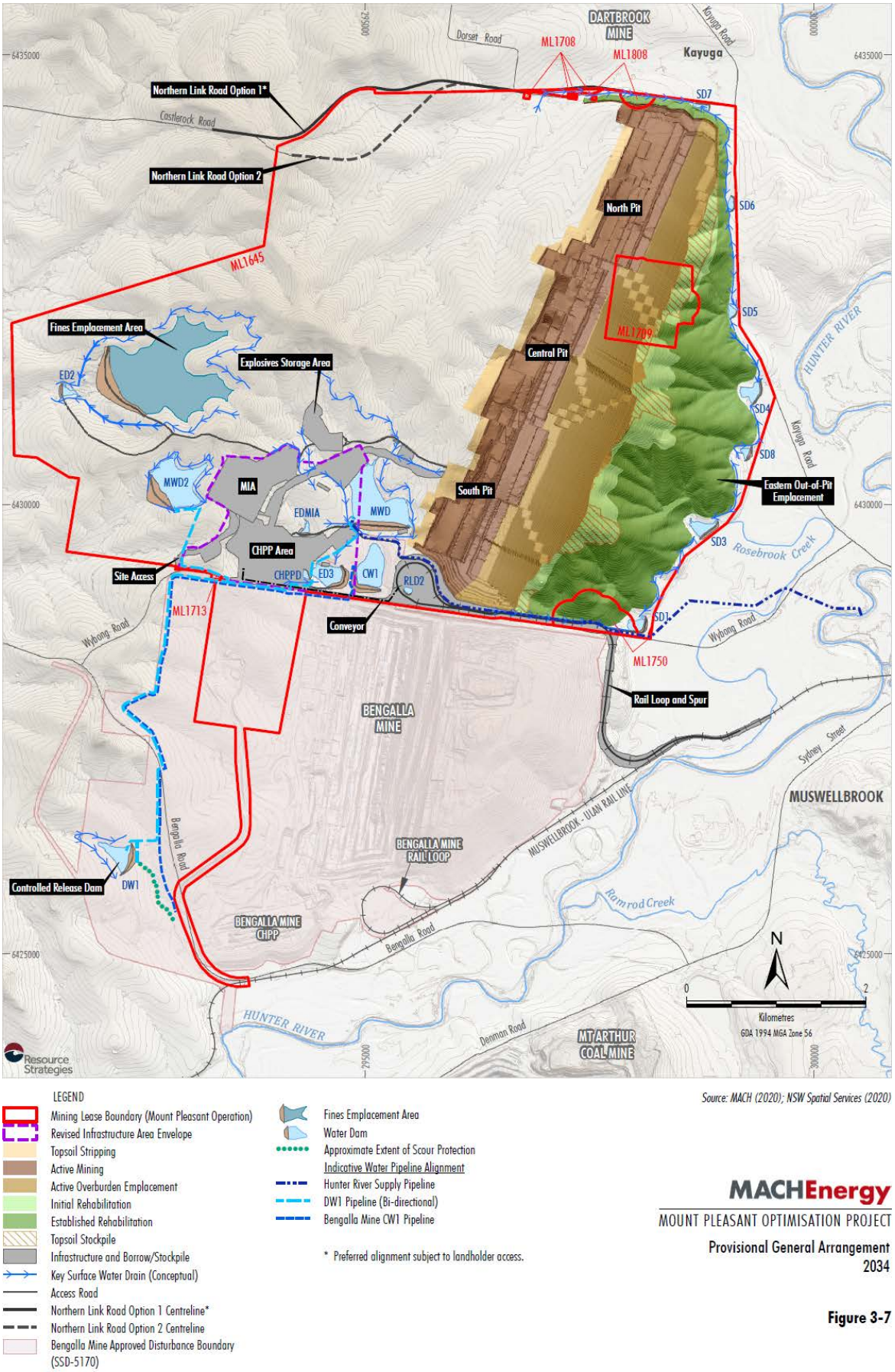


Figure 5: General Project Arrangement - 2034

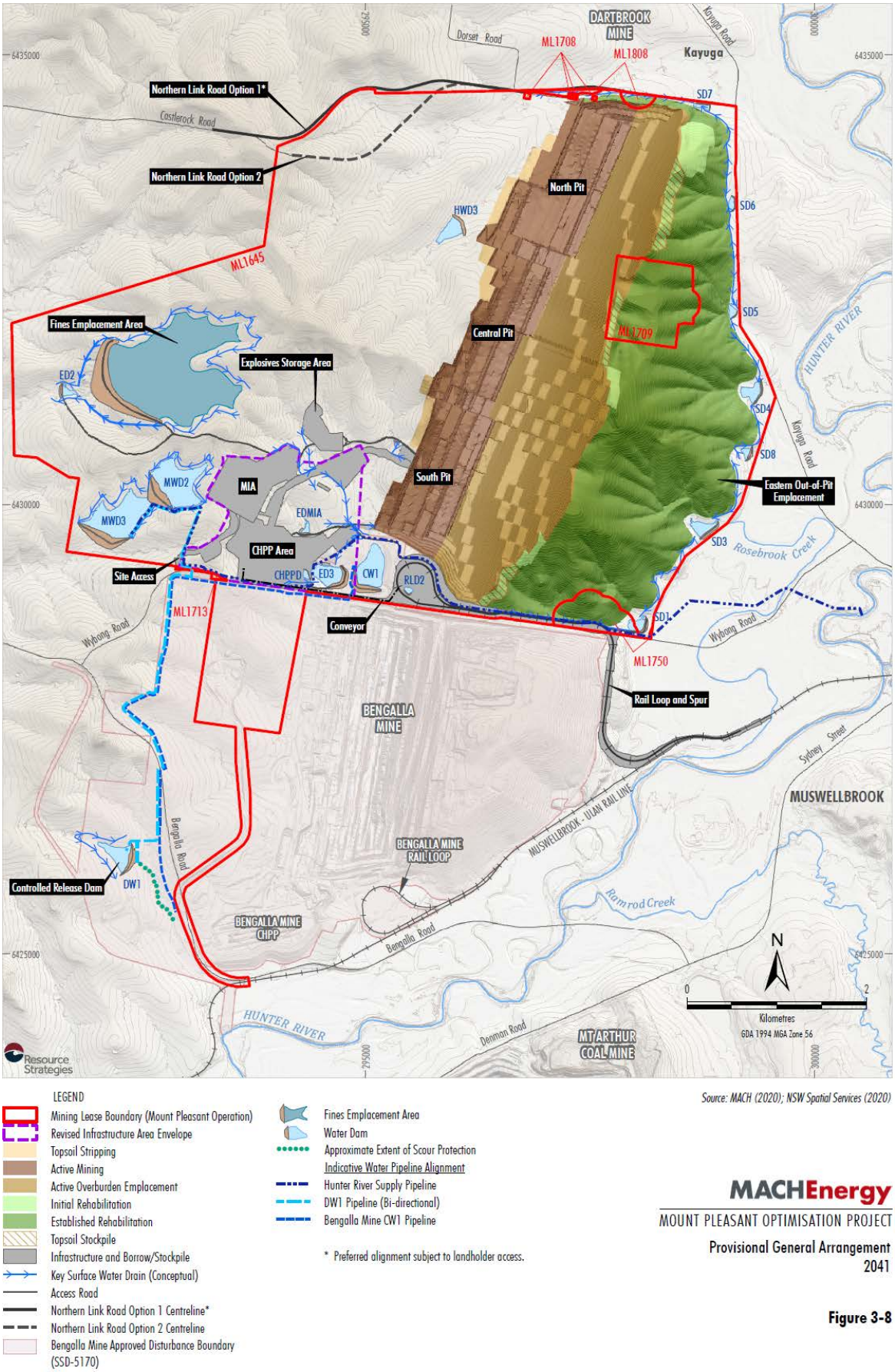
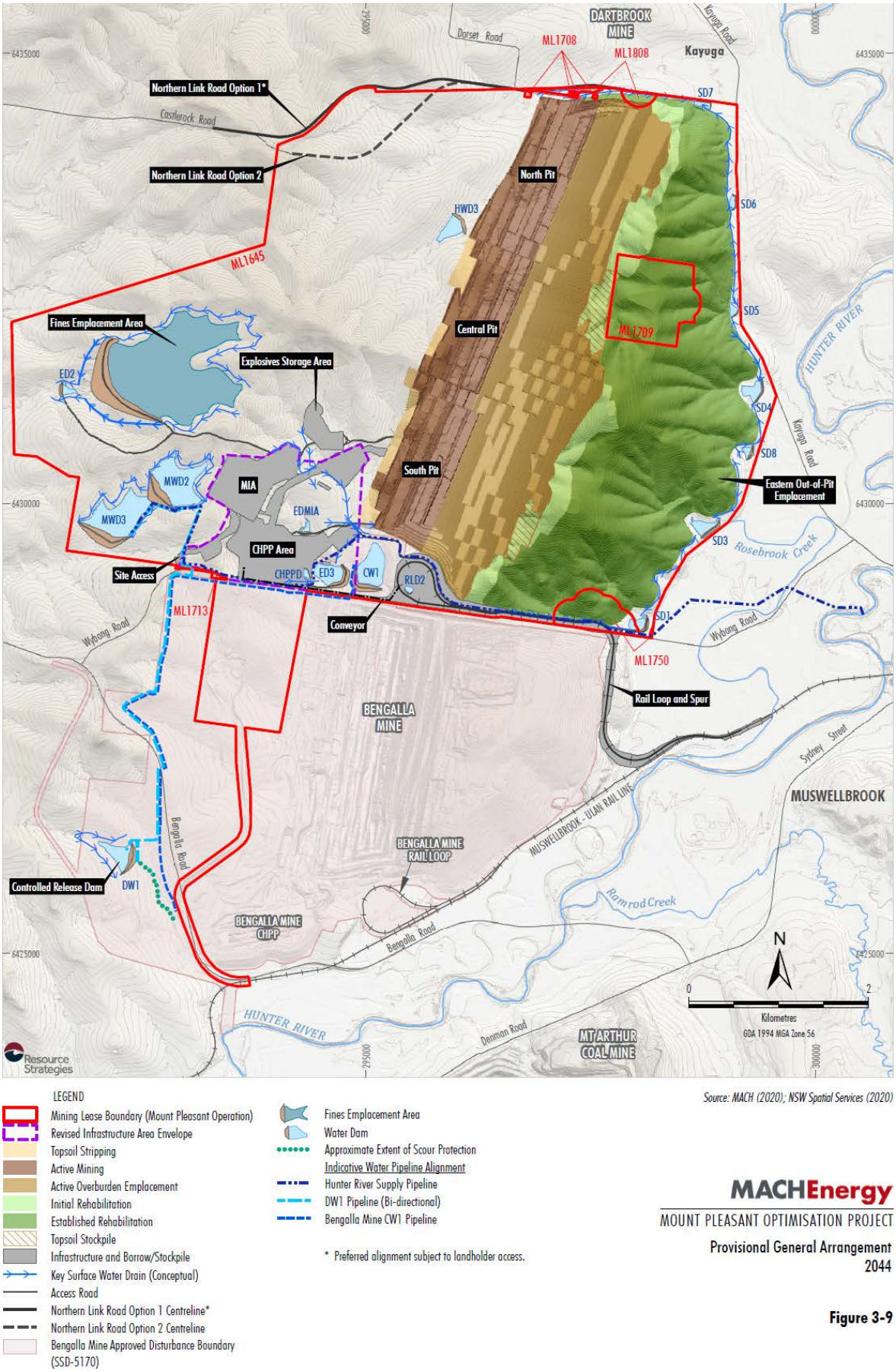


Figure 6: General Project Arrangement - 2041



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
- Topsoil Stripping
- Active Mining
- Active Overburden Emplacement
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- DW1 Pipeline (Bi-directional)
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* Preferred alignment subject to landholder access.

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

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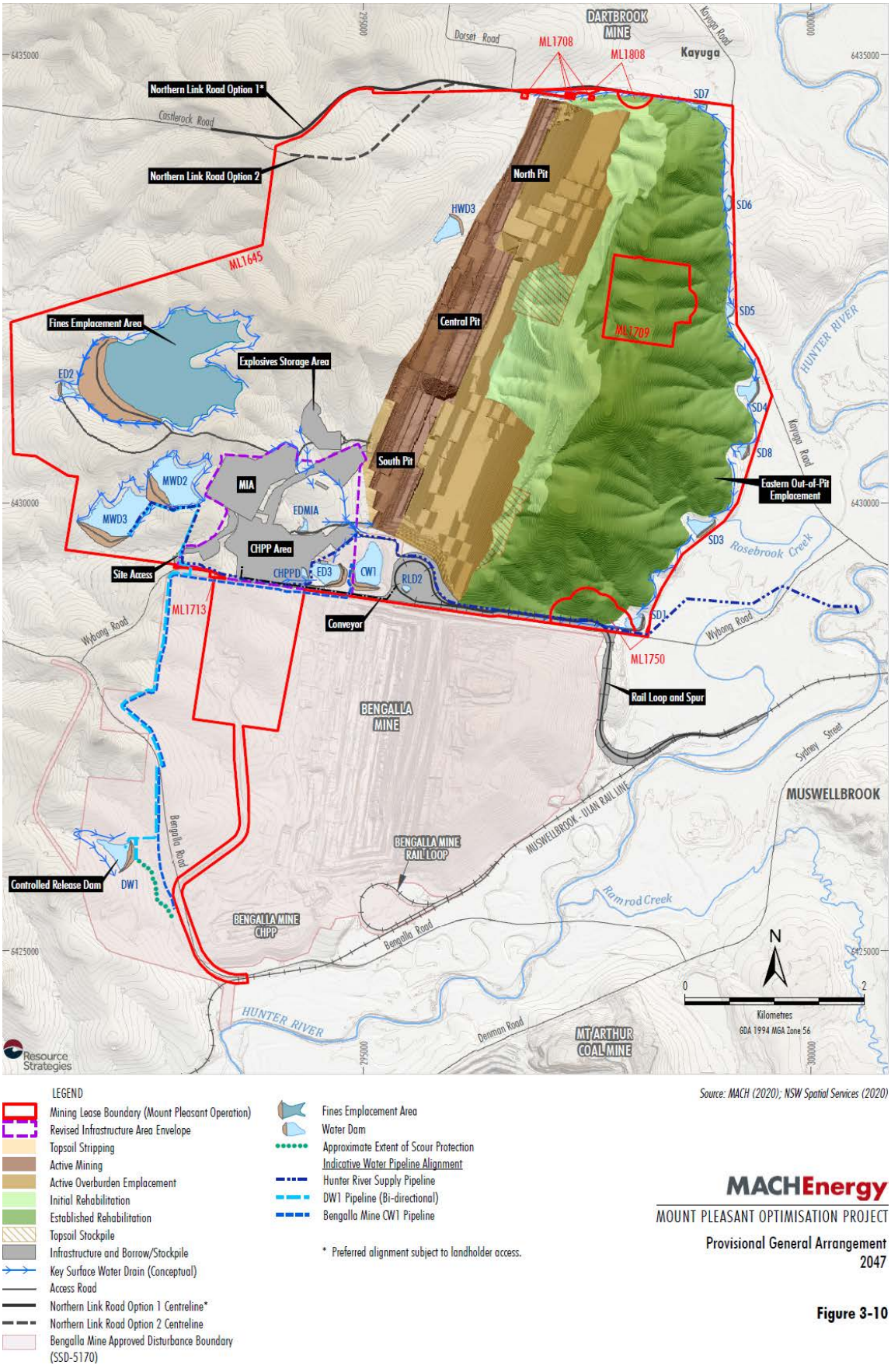
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9

Figure 7: General Project Arrangement - 2044



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
- Topsoil Stripping
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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

Figure 8: General Project Arrangement – 2047

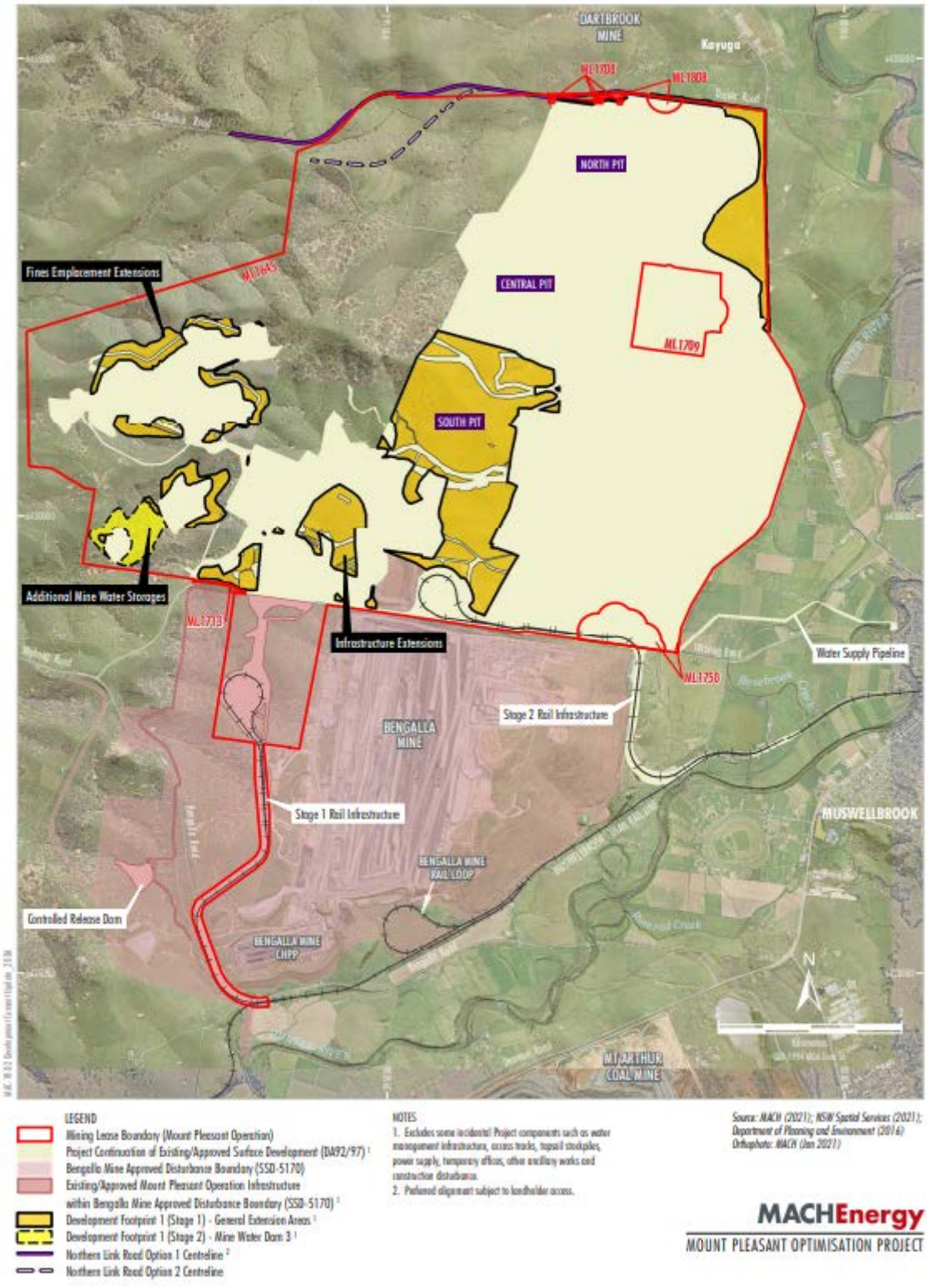


Figure 9: Staging of Project Disturbance Areas

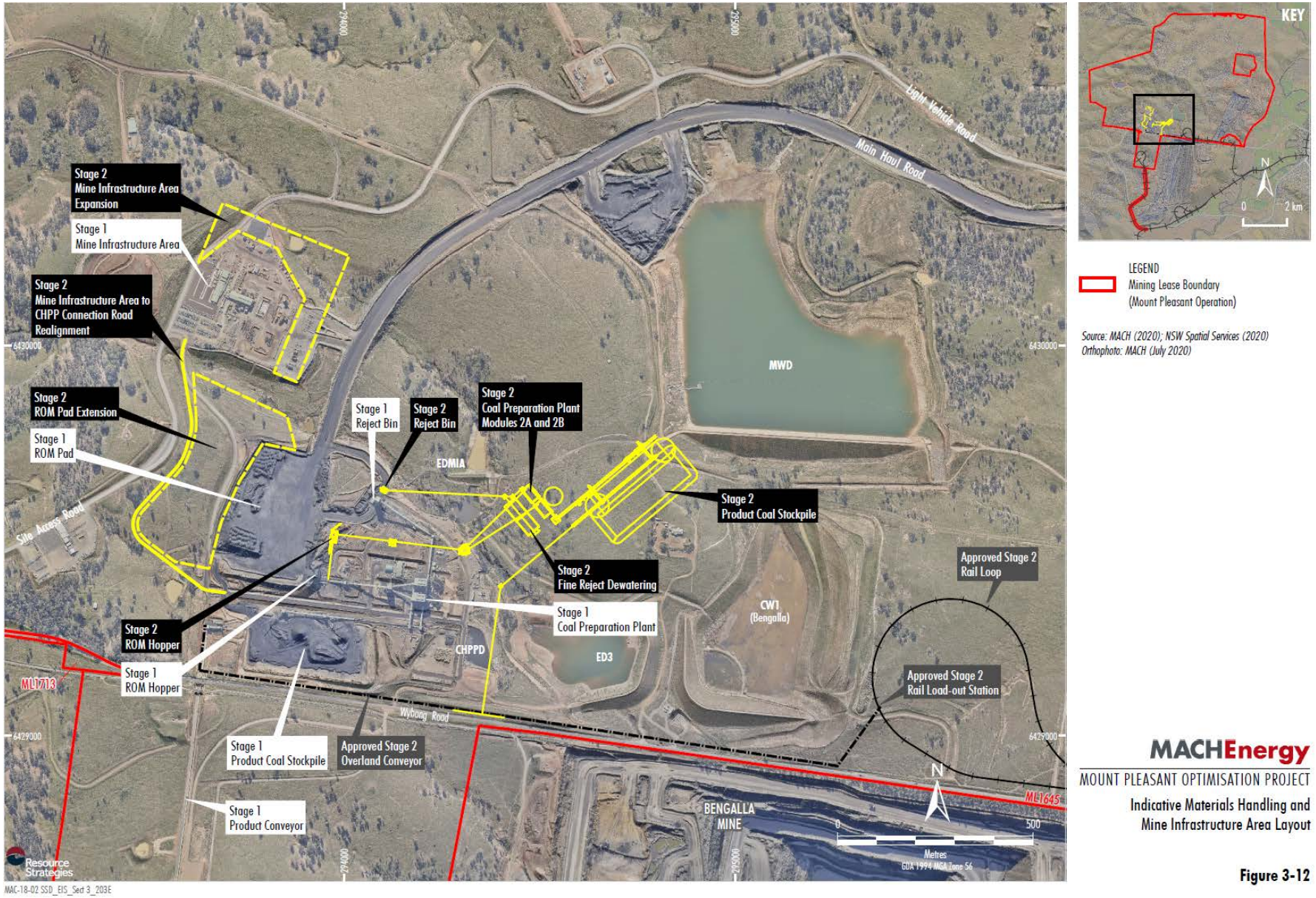
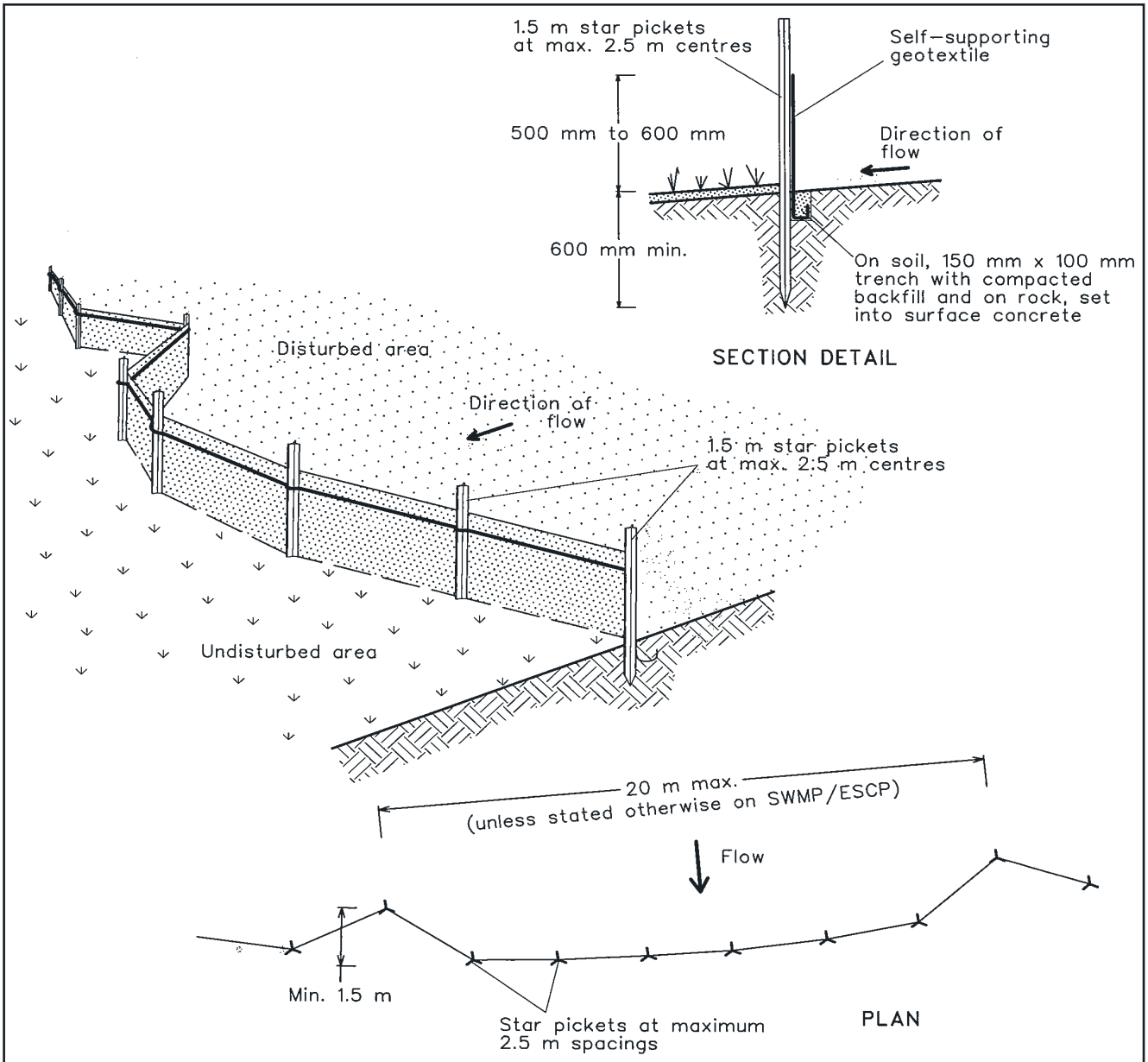


Figure 10: Indicative Mine Infrastructure Area Layout

ATTACHMENT 3

LANDCOM BLUE BOOK FIGURE SD6 – 8 (LANDCOM, 2004)



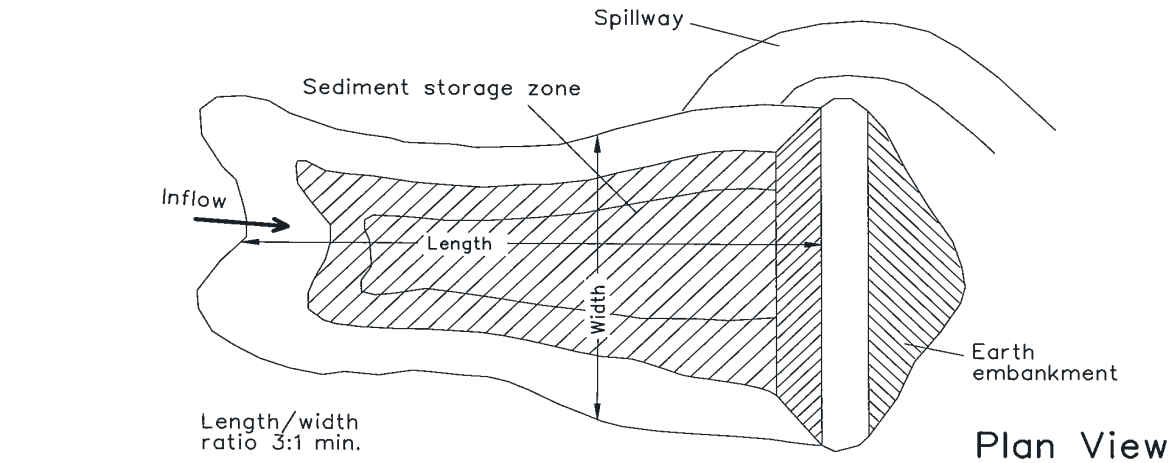
Construction Notes

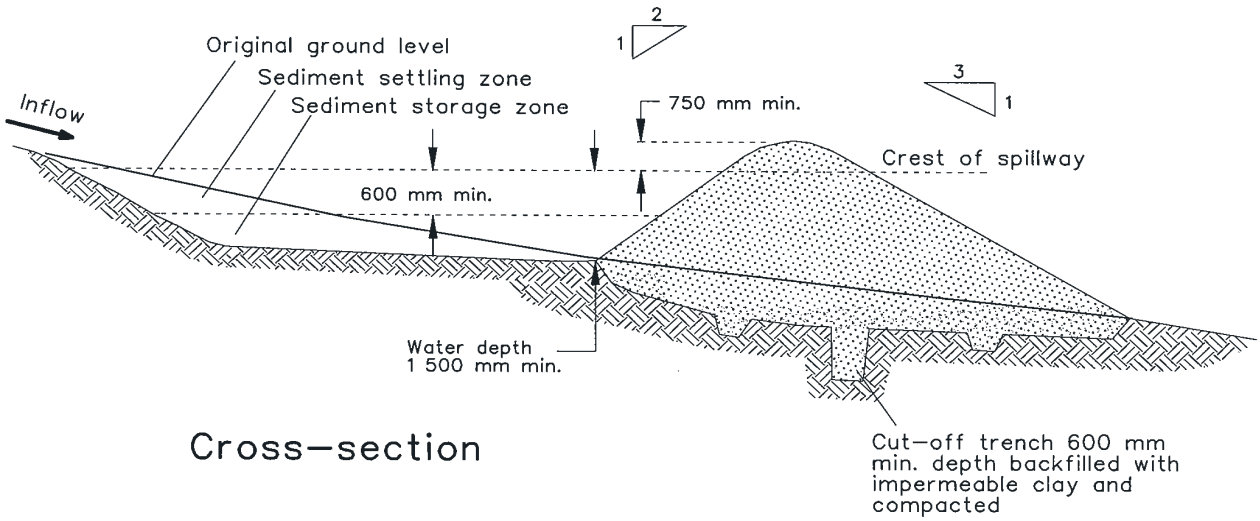
1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE — SD 6-8

ATTACHMENT 4

LANDCOM BLUE BOOK FIGURE SD6 – 4 (LANDCOM, 2004)





Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

EARTH BASIN - WET

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

SD 6-4

APPENDIX 3

SURFACE WATER MANAGEMENT AND MONITRING PLAN

MACHEnergy

MOUNT PLEASANT OPERATION

SURFACE WATER MANAGEMENT AND MONITORING PLAN

Document ID:	MP001-0000-ENV-PLN-0006		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	August 2024	**Status:**	Final
Approved By:	Andrew Reid	**Revision Number:**	02

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy Australia Pty Ltd (MACH Energy) purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Surface Water Management and Monitoring Plan (SWMMP) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for operations 24 hours per day seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

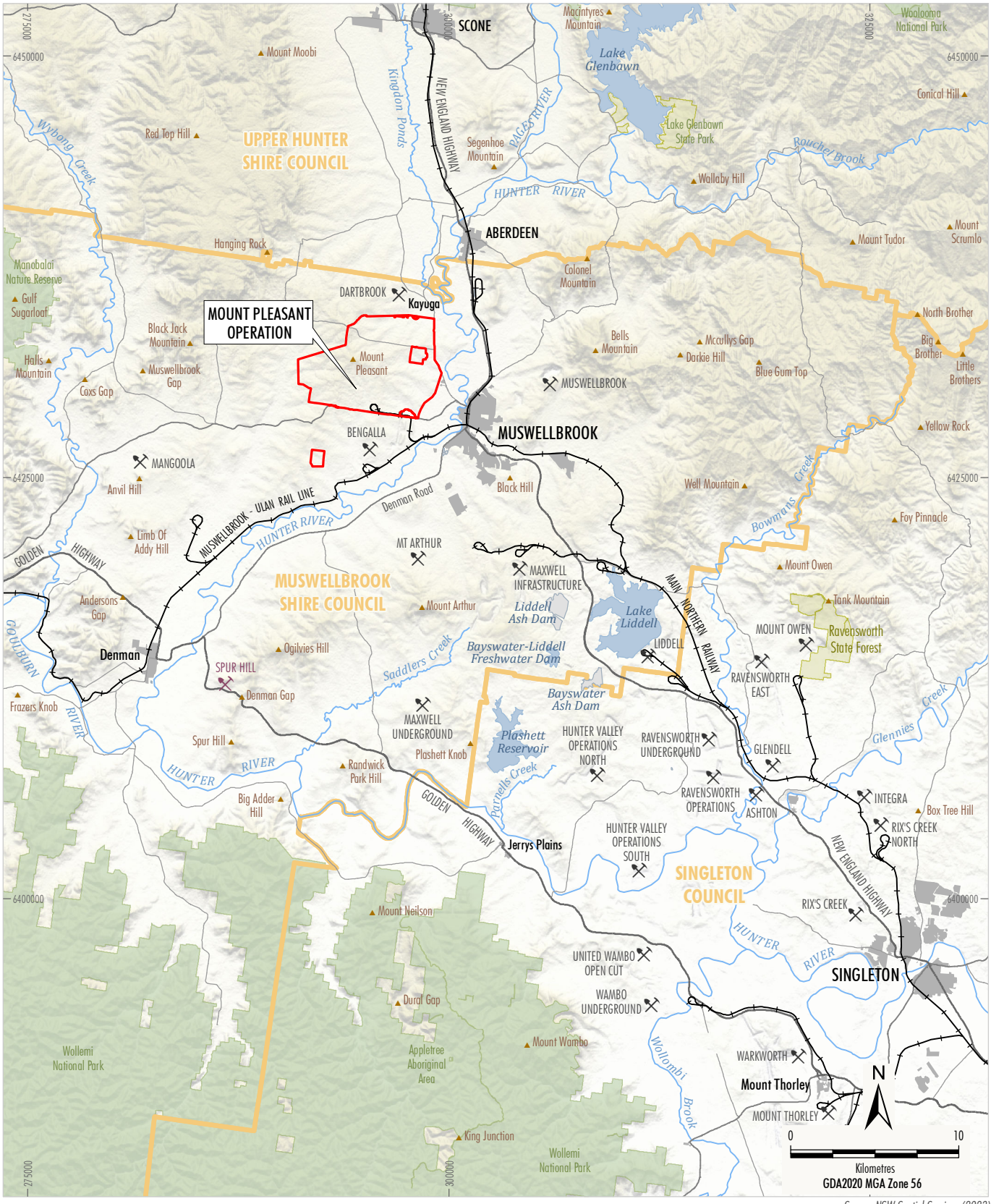
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

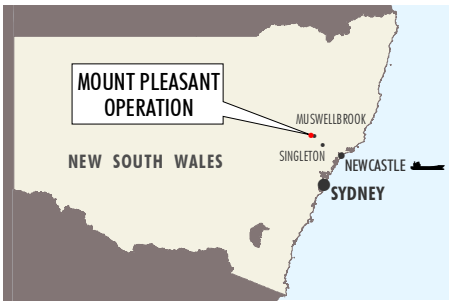
The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out-of-Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.



Source: NSW Spatial Services (2023)



LEGEND

- Mining Operation
- Proposed Mining Operation (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

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MOUNT PLEASANT OPERATION

Regional Location

Figure 1

MAC-18-03A MP2023_Figure 1_Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the Department of Planning and Environment (DPE) (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

Modification 5 (MOD 5) was submitted to rectify an administrative error in Development Consent DA 92/97 and was approved by DPE on 29 June 2022.

Modification 6 (MOD 6) was submitted to modify Development Consent DA 92/97 and was approved on 6 November 2023. MOD 6 will allow for the construction and operation of a re-transmission facility including a tower or mast, shed and associated transmission infrastructure to re-transmit local digital television signals from the Broadcast Australia site at Rossgole Lookout. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Revised Approved Surface Disturbance Plan incorporating the MOD 6 infrastructure (Attachment 1).

On 22 January 2021, MACH Energy submitted the Mount Pleasant Optimisation Project (the Project) EIS in support of a State Significant Development (SSD) Application under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Key aspects of the Project generally involve (among other things):

- increased open cut extraction within the MPO's existing Mining Leases (MLs);
- a staged increase in extraction, handling and processing of ROM coal up to 21 million tonnes per annum (Mtpa);
- upgrades to existing infrastructure and new infrastructure to support mining of the proposed Project; and
- an extension to the time limit on mining operations to 22 December 2048.

The Project was approved by the NSW Independent Planning Commission on 6 September 2022. Appendix 2 of Development Consent SSD 10418 illustrates the General Project Arrangement at 2026, 2028, 2031, 2034, 2041, 2044 and 2047, Staging of Project Disturbance Areas, and Indicative Mine infrastructure Area Layout (Attachment 2).

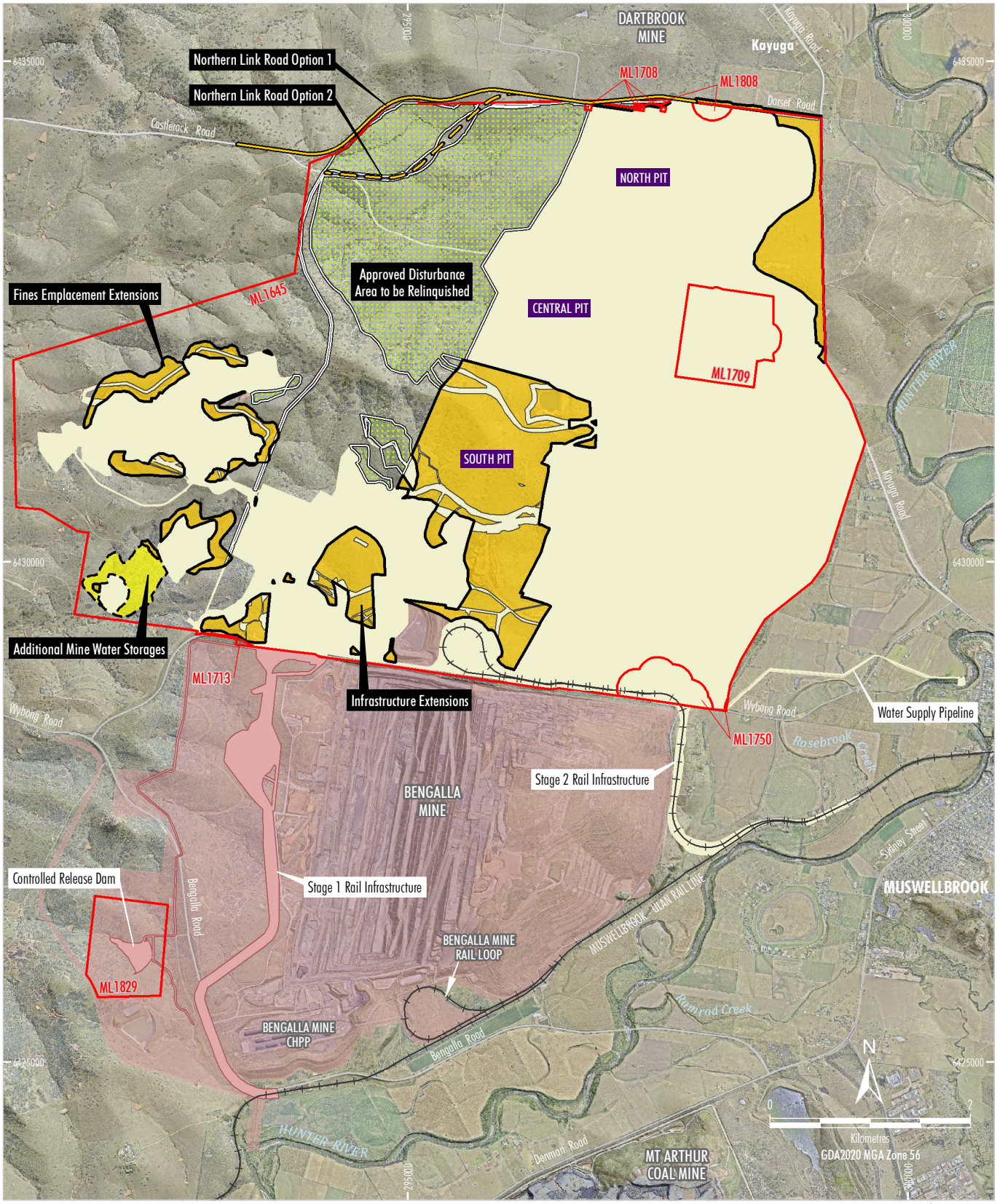
Part A, Condition A14 of Development Consent SSD 10418 requires the surrender of Development Consent DA 92/97 within 12 months of the date of commencement of development under Development Consent SSD 10418, or an alternative timeframe agreed with the Planning Secretary of the DPE (now Department of Planning, Housing and Infrastructure [DPHI]).

The Project EIS was supported by a Surface Water Assessment (Hydro Engineering and Consulting Pty Ltd [HEC], 2020). The Surface Water Assessment findings and mitigation measures relevant to the preparation of this SWMMP have been incorporated into this document.

Following the commencement of development under Development Consent SSD 10418 and prior to the surrender of Development Consent DA 92/97, MACH Energy will comply with the requirements of both consents.

This SWMMP has been prepared to satisfy the relevant conditions of both Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender). Where relevant, this SWMMP builds on the components of the existing/approved SWMMP, including previous feedback from government stakeholders and recommendations.

Figure 2 shows the indicative Project general arrangement and existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished.



MAC-18-03A MP2023_Figure 2_Rev C

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]
- Development Footprint 1 (Stage 1) - General Extension Areas [1]
- Development Footprint 1 (Stage 2) - Mine Water Dam 3 [1]
- Relinquishment Area
- Northern Link Road Option 1 Centreline
- Northern Link Road Option 2 Centreline

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.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016)
Orthophoto: MACH (Dec 2022)

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MOUNT PLEASANT OPERATION

General Arrangement of the Project

Figure 2

1.1 PURPOSE AND SCOPE

This SWMMP has been prepared by MACH Energy to satisfy the requirements under Development Consent SSD 10418, specifically Part B, Condition B52. It also satisfies the requirements of Development Consent DA 92/97 (prior to its surrender) and specifically Condition 28(c), Schedule 3.

The SWMMP applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The SWMMP applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent SSD 10418, which permits mining until 22 December 2048, and Development Consent DA 92/97 (prior to its surrender). As required by Part A, Condition A5 of Development Consent 10418, this SWMMP will continue to apply (excluding mining operations) beyond 22 December 2048, as required, until the rehabilitation and any additional undertakings (required by the Planning Secretary of the DPHI (previously DPE), or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

All conditions and statutory requirements under Development Consent DA 92/97 will become null and void after its surrender at which time the MPO will operate under Development Consent SSD 10418 and other relevant legislation.

In accordance with Part B, Condition B52(b) of Development Consent SSD 10418, this SWMMP has been prepared and reviewed by Dr Camilla West, Associate Scientist at ATC Williams, who has been endorsed by the Planning Secretary as a suitably qualified and experienced person. A copy of the endorsement by the Planning Secretary is included in Attachment 3 of the Water Management Plan (WMP).

As required by Part B, Condition B53 of Development Consent SSD 10418, MACH Energy will not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the WMP (of which this SWMMP forms a part) is approved by the Planning Secretary.

This SWMMP has been prepared to manage surface water related impacts associated with construction and operation of the MPO, including for example, initial establishment and development works, open cut mining, operation of the coal handling and preparation plant (CHPP), rail spur/loop, and Fines Emplacement Area, and the supply of water to the MPO. This SWMMP describes the response protocols in the event of an exceedance of trigger levels, and appropriate measures to prevent, minimise, mitigate, compensate and/or offset such adverse impacts.

1.2 STRUCTURE OF THE SWMMP

This SWMMP consists of the following sections:

- Section 2: Outlines the statutory obligations relevant to this SWMMP.
- Section 3: Describes the existing environment including regional and local drainage network.
- Section 4: Describes the baseline data available for the MPO which relates to this SWMMP.
- Section 5: Describes the surface water management measures implemented at the MPO.
- Section 6: Outlines the surface water impact performance measures and trigger levels proposed for the MPO.
- Section 7: Describes the surface water monitoring program proposed for the MPO.
- Section 8: Describes the Surface Water Trigger Action Response Protocols
- Section 9 Describes the contingency plan to be enacted in the event that any unpredicted impacts occur.
- Section 10 Describes the review process for MPO documentation, including for this SWMMP.
- Section 11: Outlines the reporting procedures proposed for the MPO.
- Section 12: Lists the references cited in this report.

2 STATUTORY OBLIGATIONS

MACH Energy's statutory obligations are contained in:

- the conditions of Development Consent SSD 10418;
- the conditions of Development Consent DA 92/97 (prior to its surrender);
- the conditions of the Commonwealth Approval EPBC 2020/8735 (once granted);
- the condition of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850), permits and mining leases (ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829); and
- other relevant legislation.

Obligations relevant to this SWMMP are described below.

2.1 DEVELOPMENT CONSENT SSD 10418

The conditions of Development Consent SSD 10418 relevant to the content and structure of this SWMMP are described below. A comprehensive list of all conditions in Development Consent SSD 10418 relevant to water is provided in the WMP.

2.1.1 SWMMP Requirements

Part B, Condition B52 of Development Consent SSD 10418 requires the preparation of a SWMMP as part of the WMP for the Project (refer Table 1).

Table 1
SWMMP Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWMMP document
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:… *(f) include a:* *iii) Surface Water Management and Monitoring Plan that includes:* • *detailed baseline data on surface water flows and quality of watercourses and/or water bodies potentially impacted by the development, including:* – *stream and riparian vegetation health;* – *channel stability (geomorphology); and* – *water supply for other surface water users;* • *a detailed description of the water management system;*	Section 4 Site Water Balance (Section 4)
• *details of the water licensing requirements for all water storages (i.e. exempt, harvestable rights or licensed);*	Section 5.1

Table 1 (Continued)
SWMMP Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWMMP document
• *detailed plans, design objectives and performance criteria for water management infrastructure, including:* – *water run-off diversions and catch drains;* – *water storages and sediment dams including mine water management systems;* – *emplacement areas;* – *backfilled pits and final voids for the development; and* – *reinstated drainage networks on rehabilitated areas of the site;*	Section 5
• *surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development, for:* – *water supply for other water users;* – *downstream surface water flows and quality;* – *downstream flooding impacts;* – *stream and riparian vegetation health; and* – *post-mining pollution from rehabilitated areas of the site, including final voids;*	Section 6
• *a water pollution impact assessment to manage discharge from the site;*	Section 5.7
• *a program to monitor and evaluate:* – *compliance with the relevant performance measures listed in Table 6 and the performance criteria in this plan;* – *controlled and uncontrolled discharges and seepage/leachate from the site;* – *impacts on water supply for other users, including potential cumulative impacts;* – *surface water inflows, outflows and storage volumes, to inform the Site Water Balance; and* – *the effectiveness of the surface water management system and the measures in the Erosion and Sediment Control Plan;*	Section 7
• *reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results; and*	Section 10
• *a trigger action response plan to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset adverse surface water impacts of the development, including measures to provide compensatory water supply to any affected water user under condition B41 of this Schedule.*	Section 8

2.1.2 Management Plan General Requirements

Part D, Condition D5 of Development Consent SSD 10418 outlines the general management plan requirements that are applicable to the preparation of this SWMMP.

Table 2 presents these requirements and indicates where each is addressed within this SWMMP, or within the overarching WMP for the MPO.

Table 2
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this SWMMP document
D5. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) summary of relevant background or baseline data;	Section 4
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(ii) any relevant limits or performance measures and criteria; and	Section 6
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 6
(c) any relevant commitments or recommendations identified in the document/s listed in Condition A2(c);	Sections 6, 7.4, 7.6 and 9.1
(d) a description of the measures to be implemented to comply with the statutory requirements, limits, or performance measures and criteria;	Section 5
(e) a program to monitor and report on the:	Sections 7 and 10
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to Condition D4(c);	
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 9
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 9 and 10
(h) a protocol for managing and reporting any:	Sections 9 and 10
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements;	
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Sections 9 and 10
(j) a protocol for periodic review of the plan.	Section 9
***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	

2.2 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this SWMMP are described below. A comprehensive list of all conditions in Development Consent DA 92/97 relevant to the water is provided in the WMP.

2.2.1 SWMMP Requirements

Condition 28(c), Schedule 3 of Development Consent DA 92/97 requires the preparation of a SWMMP as part of the WMP for the Project (refer Table 3).

Table 3
SWMMP Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this SWMMP Document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary. *The plan must include:* *...* *(c) a Surface Water Management Plan, which must include:*	
• *detailed baseline data on surface water flows and quality in creeks and other waterbodies that could potentially be affected by the development;*	Section 4
• *surface water and stream health impact assessment criteria including trigger levels for investigating any potentially adverse surface water impacts;*	Section 6
• *a program to monitor and maintain the bridge openings and culverts associated with the MOD 4 rail infrastructure and ensure that they remain clear of blockages;*	Section 7.7
• *a program to monitor surface water flows and quality in the watercourses that could be affected by the project; and*	Section 7
• *reporting procedures for the results of the monitoring program;*	Sections 9 and 10

2.2.2 Surface and Ground Water Response Plan Requirements

Condition 28(e), Schedule 3 of Development Consent DA 92/97 requires the preparation of a Surface and Ground Water Response Plan (refer Table 4).

Table 4
SGWRP Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this SWMMP Document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary. *The plan must include:* *…* *(e) a Surface and Ground Water Response Plan, which must include:*	
• *a response protocol for any exceedances of the surface water and groundwater assessment criteria;*	Section 8 and Groundwater Management Plan (GWMP)
• *measures to offset the loss of any baseflow to watercourses caused by the development;*	GWMP
• *measures to prevent, minimise or offset groundwater leakage from alluvial aquifers caused by the development;*	GWMP
• *measures to compensate landowners of privately-owned land whose water supply is adversely affected by the development; and*	Section 8 and GWMP
• *measures to mitigate and/or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation.*	Section 8 and GWMP

2.2.3 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of the SWMMP.

Table 5 presents these requirements and indicates where each is addressed within this SWMMP.

Table 5
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this SWMMP Document
2. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
(a) detailed baseline data;	Section 4
(b) a description of: • *the relevant statutory requirements (including any relevant consent, licence or lease conditions);*	Section 2
• *any relevant limits or performance measures/criteria;*	Section 6
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	Section 6
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 5
(d) a program to monitor and report on the: • *impacts and environmental performance of the development;* • *effectiveness of any management measures (see c above);*	Sections 7 and 10
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9

Table 5 (Continued)
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this SWMMP Document
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 10
(g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 11
(h) a protocol for periodic review of the plan. *Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Section 10

2.3 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences (WALs) issued under the *Water Management Act, 2000*.
- Discharge credits (51) held under the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation, 2002* (HRSTS).
- ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources.
- EPL 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the NSW Environment Protection Authority (EPA).
- The Rehabilitation Management Plan (RMP), as required by ML conditions issued under the *Mining Act, 1992* and approved by the MEG.[1]

2.4 OTHER LEGISLATION / GUIDELINES / POLICY / PLANS

Other NSW Acts, Regulations and policies that may be applicable to the SWMMP for the MPO are summarised in the following sub-sections.

2.4.1 Water Management Act, 2000

The *Water Management Act, 2000* aims to provide sustainable and integrated management of the water sources of NSW for the benefit of both present and future generations.

The MPO is located in the Hunter Catchment, and is regulated under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* and the *Water Sharing Plan for the Hunter Regulated River Water Source 2016*.

[1] As of 1 August 2022, MPO operates under a RMP along with the supporting Annual Rehabilitation Report and Forward Program which has replaced the Mining Operations Plan (1 July 2021 – 30 June 2023).

The water sharing plans contain various rules applying to surface water sources in the MPO, such as access licence dealing rules, water supply works approval rules, water allocation account rules and access rules for rivers and creeks.

2.4.2 ANZECC/ARMCANZ (2000) Guidelines

The Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000) provide a national benchmark for assessing water quality in systems throughout Australia and New Zealand. The ANZECC & ARMCANZ (2000) guidelines provide guidance for developing local guidelines or strategies such as catchment water quality and river flow objectives (Section 2.4.3).

The ANZECC & ARMCANZ (2000) guidelines have been superseded by the Australian New Zealand Guidelines 2018 (ANZG, 2018). However, relevant guideline trigger values remain unchanged for the Southeast Coast water drainage division (in which the MPO is located)[2].

2.4.3 NSW Water Quality and River Flow Objectives

The NSW Water Quality and River Flow Objectives (NSW Office of Environment and Heritage [OEH], 2006) have been developed to guide plans and actions to achieve healthy waterways in NSW. Each objective is based on providing the right water quality for the environment and the different beneficial uses of the water. They are based on measurable environmental values, which are those values or uses of water that the community believes are important for a healthy ecosystem for public benefit, welfare, safety or health. The target concentrations for each water quality objective are based on ANZG (2018) / ANZECC & ARMCANZ (2000).

2.4.4 Hunter River Salinity Trading Scheme

The HRSTS was originally established by the then Department of Land and Water Conservation and Hunter River Trust in 1995 as a pilot trial to manage salinity discharges to the Hunter River, such that salt concentrations would be held below irrigation and environmental standards.

The scheme is now managed by the NSW EPA under a statutory regulation attached to the *Protection of Environmental Operations Act, 1997*. The regulation came into effect on 1 December 2002. The stated objectives of the HRSTS are:

a) *to minimise the impact of discharges of saline water on irrigation, other water uses and on aquatic ecosystems in the Hunter River catchment:*
    i. *at the lowest overall cost to the community, and*
    ii. *in a way that provides ongoing financial incentives to reduce pollution, and*
b) *to facilitate sustainable water management by industry in the Hunter River catchment.*

The HRSTS achieves these objectives by prohibiting the release of saline water during periods of low flow in the Hunter River and controlling releases of saline water during periods of high flow in the Hunter River such that specific salinity targets at various points in the river are not exceeded.

Participants in the HRSTS are issued with tradeable discharge credits. Each credit entitles the holder to a share of the available salt discharge capacity announced by WaterNSW during high flow periods.

[2] As of 28 July 2022.

Discharges at the MPO would be undertaken in accordance with the HRSTS and EPL 20850. MACH Energy currently holds 51 discharge credits.

2.4.5 Local Policy and Plans

Local land service plans and policies for the Hunter region have been considered in the development of this SWMMP. The key plan is the *Hunter-Central Rivers Catchment Action Plan 2013 – 2023* (Hunter Central Rivers Catchment Management Authority, 2013). This plan provides a direction for all government, industry and community actions in the region to maintain the health of natural systems in the region. The goals, targets and outcomes of the *Hunter-Central Rivers Catchment Action Plan 2013 – 2023* have been considered where relevant in the preparation of this SWMMP.

3 EXISTING ENVIRONMENT

3.1 REGIONAL DRAINAGE NETWORK

The MPO is located within the Hunter Catchment. The Hunter Catchment has an overall size of 21,500 square kilometres (km^2), and includes the city of Newcastle and the major towns of Singleton and Muswellbrook. The Hunter River is the main drainage feature within the catchment, rising on the northern side of the Barrington Tops (Mount Royal Range) and flowing south and then east through Muswellbrook and Singleton, before draining to the Pacific Ocean at Newcastle.

The Hunter River contains a number of significant tributaries upstream of Muswellbrook, including the Pages and Isis Rivers, as well as the Middle, Dart, Stewarts, Moonan and Rouchel Brooks. Alluvial floodplains ranging in width from 1.5 to 2 km border the river over the majority of its length. The eastern extent of the MPO mining lease boundary is located directly adjacent to these floodplains.

The Hunter River is regulated by two major storages, the Glenbawn and the Glennies Creek Dams. The Glenbawn Dam is located approximately 16 km north-east of the MPO mining lease boundary. The dam mainly serves as a flood mitigation measure for the surrounding area, as well as for supplying water to surrounding agriculture and industries. The dam has a current capacity of 750,000 megalitres (ML), with potential for an additional 120,000 ML during flood events (WaterNSW, 2018a). Glennies Creek Dam is approximately 37 km south-east of the MPO mining lease boundary and has a capacity of 283,000 ML (WaterNSW, 2018b).

3.2 LOCAL DRAINAGE NETWORK

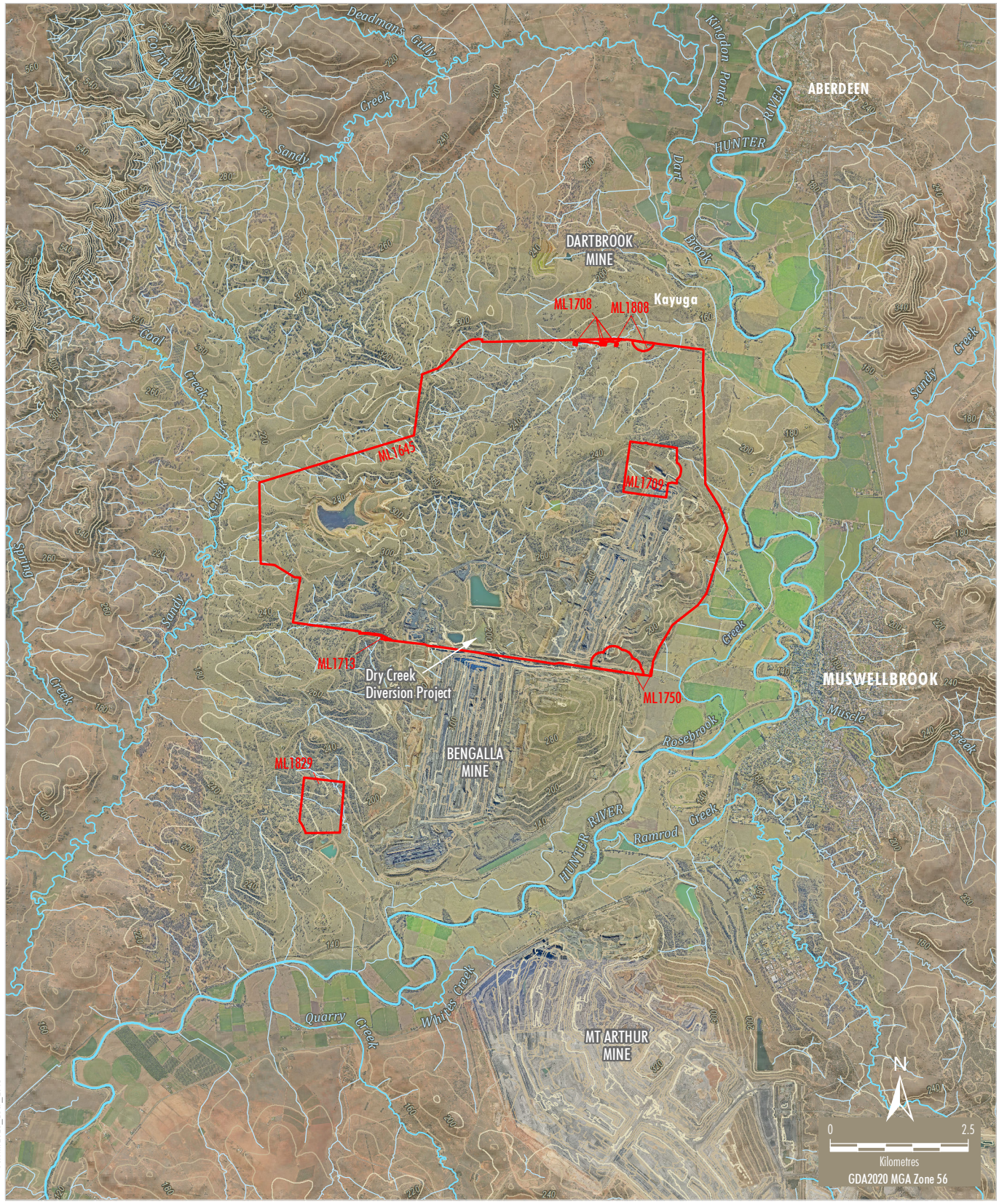
The local drainage network in the vicinity of the MPO is shown on Figure 3.

The drainage network is generally characterised by steep gullies which drain from the surrounding hills into the flat alluvial plains adjacent to the Hunter River.

The main drainage feature within the vicinity of the MPO is the Hunter River which flows in a southerly direction approximately 1 km to the east of the MPO mining lease boundary. There are a number of ephemeral drainage lines which traverse the MPO area and drain into the Hunter River. The eastern portion of the MPO area drains via Rosebrook Creek, as well as other unnamed drainages. Areas in the south and west of the MPO area drain via an unnamed drainage line (sometimes referred to as Dry Creek) and Sandy Creek respectively, both of which are tributaries of the Hunter River. All other areas drain into unnamed drainage lines, which also flow to the Hunter River.

The Bengalla Mine's Dry Creek Diversion Project diverts the unnamed drainage line that drains the south of the MPO area (Figure 2). The Dry Creek Diversion Project includes a clean water dam north of Wybong Road, a pump station and pipeline used to direct water around the Bengalla Mine and a protective contour levee to release water from the pipeline into an unnamed tributary of the Hunter River. The Bengalla Mining Company (BMC) monitors a number of unnamed drainage lines and the Hunter River, downstream of the MPO. Relevant monitoring information from the Bengalla Mine has been considered in this SWMMP.

Part of Mangoola Coal is located within the Sandy Creek catchment. Accordingly, Mangoola Coal Operations Pty Limited (MCO) undertake surface water and stream health monitoring in Sandy Creek. Relevant monitoring information has been considered in this SWMMP.



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Source: MACH (2023); NSW Spatial Services (2023)
Orthophoto: MACH (Jun 2023, 2020)

LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

Contour (20 m Interval)

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MOUNT PLEASANT OPERATION

Local Drainage Network and Topography

Figure 3

4 BASELINE DATA

Surface water monitoring was undertaken from January 1993 to December 1995 to inform the 1997 EIS Water Management Study. The results of this monitoring are presented in PPK Environment & Infrastructure (1997) and included creeks and other waterbodies in the vicinity of the MPO.

The collection of surface water monitoring data at the MPO resumed in 2000 at ten monitoring locations. For the purposes of this plan, baseline monitoring is taken as the period up to and including July 2016. Construction at the MPO commenced in November 2016. Surface water monitoring at sites W12 and W15 commenced in October 2017, and baseline monitoring at these sites was undertaken between October 2017 and May 2020. Sampling locations used to establish baseline data for the MPO are summarised in Table 6 and shown on Figure 4.

Table 6
Baseline Surface Water Monitoring Locations

Site	Watercourse	Baseline Period of Record
W1	Hunter River	July 2000 – October 2011
W2	Hunter River	July 2000 – July 2016
W3	Hunter River	July 2000 – July 2016*
W4	Muscle Creek	July 2000 – July 2016
W5	Unnamed Drainage Line	July 2000 – July 2016
W6#	Hunter River	July 2000 – April 2015
W7	Unnamed Drainage Line	July 2000 – July 2016
W8^	Unnamed Drainage Line	July 2000 – July 2016
W9	Unnamed Drainage Line	July 2000 – July 2016
W10^	Unnamed Drainage Line (Dry Creek)	July 2000 – July 2016
W12	Sandy Creek	October 2017 – May 2020
W15	Hunter River	October 2017 – May 2020

* Located adjacent to Department of Primary Industry – Water (DPI – Water) gauging station. Only monitored intermittently for laboratory analysis.

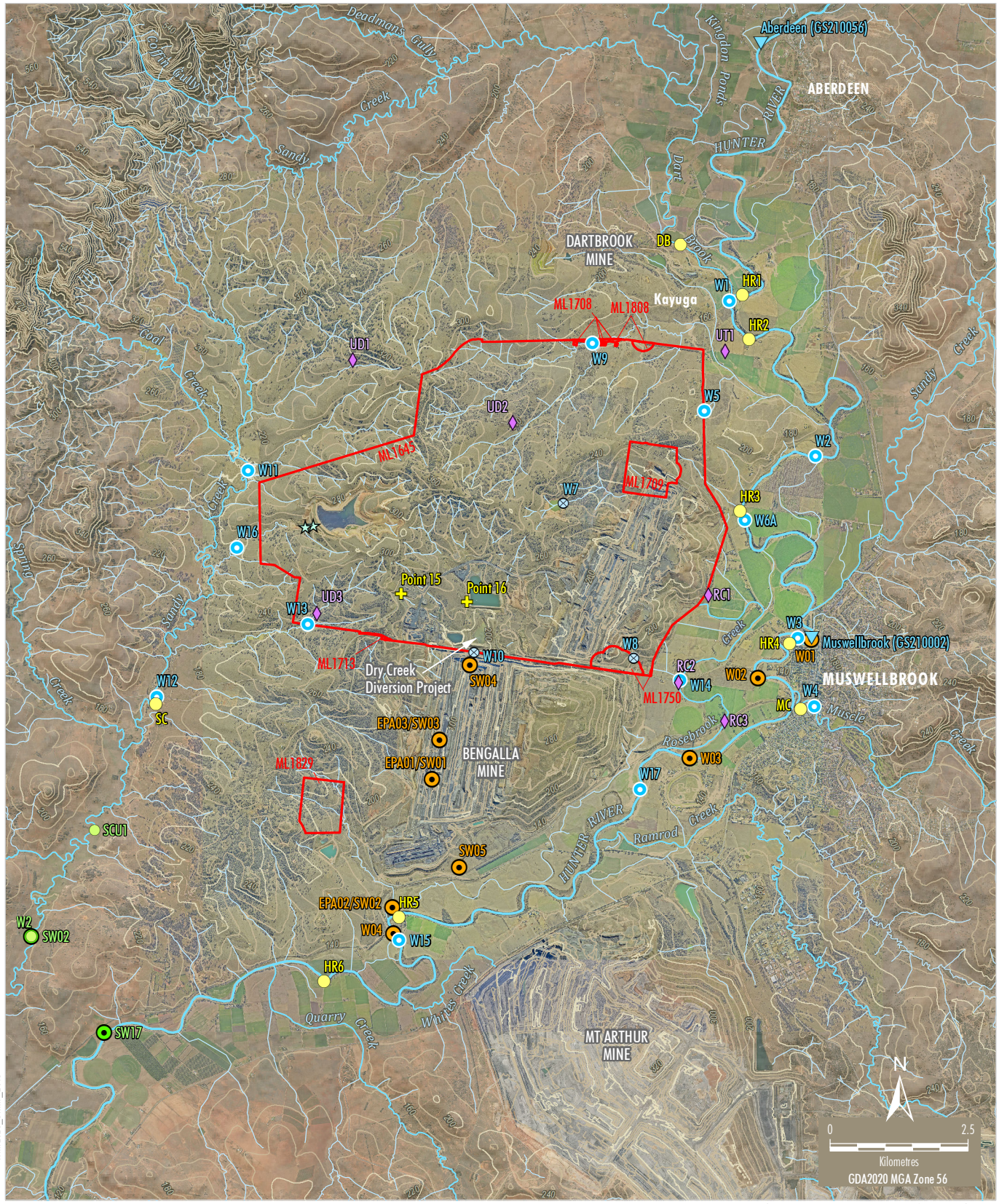
^ Note these monitoring locations have since been disturbed by mining activities and are therefore no longer monitored (Figure 4).

Note this monitoring site has been replaced by Site W6A, as outlined in Section 7.4.

Other baseline monitoring data and assessments undertaken for creeks and other waterbodies by surrounding mining operations have also been utilised where available, including (Figure 4):

- downstream water quality monitoring undertaken by the BMC;
- water quality monitoring on Sandy Creek undertaken by MCO; and
- stream health monitoring on Sandy Creek undertaken by MCO.

In addition to the above, the Department of Climate Change, Energy, the Environment and Water - Water (DCCEEW Water) streamflow and electrical conductivity (EC) gauging stations are located on the Hunter River at Aberdeen (GS210056), Muswellbrook (GS210002) and Denman (GS210055) (Figure 4).



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LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Contour (20 m Interval)
- DPI Water Gauging Station

Mount Pleasant Monitoring

- Aquatic Ecology Habitat Assessment Site
- Surface Water Monitoring Site
- Historical Surface Water Monitoring Site
- Stream Health Monitoring Site
- V-notch Weir
- Water Discharge/Monitoring Point (EPL 20850)

Mangoola Monitoring

- Surface Water Monitoring Site
- Stream Health Monitoring Site

Bengalla Monitoring

- Surface Water Monitoring Site

Source: MACH (2023); NSW Spatial Services (2023); NSW Department of Primary Industries - Water (2016); Bengalla Mining Company (2015); Mangool Coal Operations Pty Ltd (2014)
Orthophoto: MACH (Jun 2023, 2020)

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MOUNT PLEASANT OPERATION

Surface Water and Stream Health Monitoring Sites

Figure 4

4.1 SURFACE WATER USERS

4.1.1 Hunter Regulated River Water Source

The Hunter River is a Major Regulated River, with flows regulated by Glenbawn Dam and Glennies Creek Dam. The Mount Pleasant Operation is located adjacent to the Hunter Regulated River Water Source Management Zone 1A, which extends from Glenbawn Dam to the Goulburn River confluence.

A summary of the water access licences in the Hunter Regulated River Water Source is provided in Table 7.

Table 7
Hunter Regulated River Water Source – Water Access Licences

Category	Number of WALs	Total Shares
Domestic and stock	165	1,569
Domestic and stock (domestic)	60	144
Domestic and stock (stock)	21	103
Local water utility	5	10,832
Major utility (power generation)	1	36,000
Regulated river (general security)	827	128,544
Regulated river (high security)	156	21,740
Supplementary water	240	48,519

Source: NSW Water Register (2020).

4.1.2 Muswellbrook Water Source

The Project is located wholly within the Muswellbrook Water Source, which is regulated under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009.*

There are two unregulated river licences located downstream of the Project on Sandy Creek:

- Water access licence 18701 has a total entitlement of 28 units and is located on land owned by Mangoola Coal, approximately 9 km downstream of ML 1645.
- Water access licence 18700 has a total entitlement of 5 units and is located in Denman, approximately 23 km downstream of ML 1645.

A summary of the water access licences in the Muswellbrook Water Source is provided in Table 8.

Table 8
Muswellbrook Water Source – Water Access Licences

Category	Number of WALs	Total Shares
Aquifer	14	1,169
Domestic and stock	15	81
Domestic and stock (domestic)	2	2
Domestic and stock (stock)	1	5
Unregulated river	24	636

4.2 STREAMFLOW

4.2.1 Hunter River

DCCEEW Water monitor flow in the Hunter River at three gauging stations in the vicinity of the MPO (Figure 4). Data from these gauging stations is summarised in Table 9. All three gauging stations monitor flow continuously.

Table 9
Hunter River Streamflow

Monitoring Site	Monitoring Commenced	Percentage of Days with Data*	Catchment Area (km^2)	Daily Flow (ML/day)*		
				Minimum	Median	Maximum
Aberdeen (GS210056)	1959	65.3%	3,090	13.7	372	91,556
Muswellbrook (GS210002)	1906	67.6%	4,220	0.0	348.5	167,292
Denman (GS210055)	1908	80.9%	4,530	0.0	346.1	108,560

Note: ML/day = Megalitres per day.

* Data Source: http://realtimedata.water.nsw.gov.au/water.stm?ppbm=SURFACE_WATER&rs&3&rskm_url; accessed 15 Dec 2016

Under current catchment conditions (since the construction of Glenbawn Dam was completed in 1958), the Hunter River is perennial, with a minimum flow rate at Aberdeen of approximately 14 ML/day (Table 9). Flow duration curves derived from mean daily flow data for the period 1988 to 2016 for each gauge are shown on Figure 5. These flow duration curves indicate that flow in the Hunter River is fairly consistent immediately upstream and downstream of the MPO, with some variation primarily due to missing data.

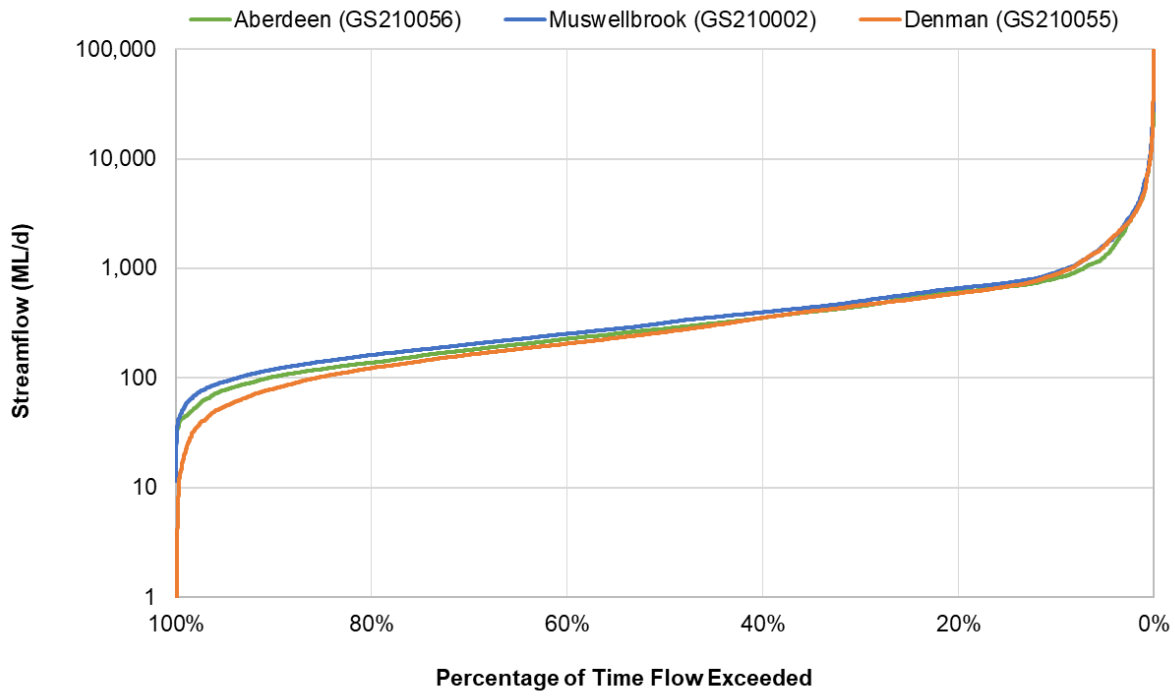

Figure 5: Flow Duration Curves

4.2.2 Sandy Creek

MCO monitor Sandy Creek at SW01 (downstream of Mangoola Coal) and SW02 (upstream of Mangoola Coal). Both monitoring sites are located downstream of the MPO, where Sandy Creek has a larger catchment than adjacent to the MPO.

The Mangoola Coal Water Management Plan (MCO, 2014) includes monitoring data for SW01 and SW02 from 2002 to 2014 (reproduced in Attachment 3). During this period, both monitoring sites were frequently dry with SW01 reporting dry/no flow approximately 50% of the time and SW02 reporting dry/no flow approximately 42% of the time.

4.2.3 Other Local Drainages

A summary of samples collected from local drainages in the MPO area between 2000 and 2016 is provided in Table 10. This indicates that the drainages are highly ephemeral, with dry samples representing more than 85% of the total samples obtained at each site.

Table 10
Flow Frequency of Local Drainages

Site	Number of Samples	Number of Dry Samples	Flow Frequency
W5	186	183	1.6%
W7	188	186	1.1%
W8	188	161	14.4%
W9	188	178	5.3%
W10	187	186	0.5%

BMC has historically monitored the unnamed drainage line that drains the south of the MPO area (referred to as Dry Creek in the Bengalla Mine Water Management Plan). From 2008 to 2013, there were only 14 occasions that the unnamed drainage line had sufficient flow (not including controlled discharges from Bengalla Mine's Staged Discharge Dam in accordance with the HRSTS) for water quality sampling to be undertaken (BMC, 2015). As described in Section 3.2, Bengalla Mine's Dry Creek Diversion Project involves the diversion of flow in this unnamed drainage line.

4.3 SURFACE WATER QUALITY

Baseline surface water quality data is presented in Attachment 2 and a summary is provided in Tables 11 and 12 below.

Median pH values at creek sites show that surface water in the vicinity of the site ranges from slightly acidic to slightly alkaline. Sites located along the Hunter River (i.e. W1, W2 and W6), have a median pH value and overall pH range which is slightly alkaline.

With the exception of sites W4 and W12, median EC values for the surface water sites were generally below 400 µS/cm. Given the frequency in which the unnamed drainage lines were dry, the monitoring results for these drainage lines likely reflect surface flow occurring during or immediately after rainfall events i.e. high rainfall dilution. This is with the exception of sites W4 and W12, located at Muscle Creek and Sandy Creek, where a median EC value of 2,030 µS/cm and 4,970 µS/cm respectively was recorded. The EC values recorded at these sites indicate that EC is naturally elevated in the catchments of Muscle Creek and Sandy Creek.

Table 11
Surface Water Quality Summary – pH and Electrical Conductivity

Site	Number of Samples with Flow	Median pH	Median Electrical Conductivity (µS/cm)
W1	131	8.00	400
W2	184	8.10	410
W3*	-	-	-
W4	186	7.60	2,030
W5	3	6.30	120
W6	123	8.10	400
W7	2	7.30	228
W8	27	7.30	238
W9	10	7.05	255
W10	1	6.20	30
W12**	36	8.00	4,970
W15**	36	7.90	414

Note: µS/cm = micro Siemens per centimetre,

* Located adjacent to DPI Water gauging station. Only monitored intermittently for laboratory analysis.

** Monitoring at sites W12 and W15 commenced in October 2017, and baseline monitoring at these sites was undertaken between October 2017 and May 2020.

Table 12
Surface Water Quality Summary – Total Suspended Solids and Total Dissolved Solids

Site	Number of TSS Samples	Median TSS (mg/L)	Number of TDS Samples	Median TDS (mg/L)
W1	129	8	1	<5
W2	182	8	5	251
W3*	-	-	-	-
W4	185	6	4	1,620
W5	3	15	0	-
W6	119	8	0	-
W7	2	46	0	-
W8	26	292	1	1,560
W9	10	159	0	-
W10	1	139	0	-
W12**	36	8.5	36	2,905
W15**	36	16	36	263

Note: TSS = Total Suspended Solids, TDS = Total Dissolved Solids.

* Located adjacent to DPI Water gauging station. Only monitored intermittently for laboratory analysis.

** Monitoring at sites W12 and W15 commenced in October 2017 and baseline monitoring at these sites was undertaken between October 2017 and May 2020.

4.4 STREAM HEALTH

Stream health surveying at a number of surface water sites in the Hunter Catchment was undertaken from 1994 – 1999 and included as part of the EPA's *River Health in the New South Wales Lower North Coast, Hunter and Central Coast Catchments* report (Hose and Turak, 2004). This report identified a number of parameters using the Australian River Assessment System (AusRivAS), averaged over two monitoring periods (Autumn and Spring) during a single year. AusRivAS is a rapid river health assessment system which uses the presence or absence of macro invertebrate taxa to assess the biological health of Australian rivers. Observed (O) numbers of macro invertebrates at the site are compared with the Expected (E) number of macro invertebrates which could be found at the site, if the site was in a natural state (i.e. had not been disturbed). This informs an overall 'band of impairment' score ranging from X (more biologically diverse than expected) to D (extremely impaired).

The measured average parameters and the resulting 'band of impairment' score for four sites in the vicinity of the MPO are outlined in Table 13 below.

Table 13
Historical Stream Health in the Vicinity of the MPO

Historical Site ID	Updated Site ID	Site Location	Edge			Riffle		
			O/E Taxa	Band	O/E Signal	O/E Taxa	Band	O/E Signal
Hunt 585	DB	Dart Brook at MacIntyre Bridge	0.79	B	0.88	0.75	B	0.93
Hunt 506	MC	Muscle Creek at Muswellbrook	0.77	B	0.83	-	-	-
Hunt 571	HR4	Hunter River at Muswellbrook	0.56	B	0.88	0.73	B	1.06
Hunt 854	HR3	Hunter River downstream of Aberdeen	1.02	A	1	-	-	-

Source: Hose and Turak, 2004.

As shown, three of the four monitoring sites fell within band 'B'. This indicates that the ecological condition of macro invertebrates at the sites has been 'significantly impaired', meaning that a potential impact on water quality and/or habitat quality has resulted in a loss of taxa. The monitoring location on the Hunter River downstream of Aberdeen however, fell within band 'A'. This indicates that impacts on water and habitat condition at the site have not resulted in a loss of macro invertebrate diversity.

Stream health monitoring has been undertaken at three points along Sandy Creek by Glencore for Mangoola Coal. This monitoring has involved assessing macro invertebrate community structures, water quality, and overall riparian health using AusRivAS, SIGNAL2 sampling, HABSCORE assessments, and physicochemical water quality testing. Stream health results published as part of the 2015 *Mangoola Annual Review* indicates that Sandy Creek has remained in a poor but stable condition since monitoring began in 2009 (SLR Consulting Australia Pty Ltd, 2015).

Extensive historical surveying of river health in the Hunter River has been undertaken due to its regional ecological and agricultural significance. This surveying has indicated that the river has been historically degraded due to agricultural and industrial use, however surveys in recent years suggest river health has improved.

The 2002 Healthy Rivers Commission investigation of the Hunter River determined that the river was not ecologically sustainable in its current capacity (Healthy Rivers Commission, 2002). The commission found that the overall water quality of the river was variable, and that nearly two thirds of streams were considered to be in a degraded condition. Approximately 30% of native fish species were estimated to have been lost from the Hunter River, and between 40 and 70% of sampled macro invertebrate sites were found to be in poor condition.

A suite of more contemporary surveys undertaken between 2004 – 2006 have shown the overall health of the Hunter River has been improving (Cumberland Ecology, 2013). These surveys showed suitable habitat for a variety of macro invertebrates and amphibians, with the presence of a diverse variety of macro invertebrate species.

A 2010 *State of the Catchment Report* (NSW Government) determined that although the health of the overall Hunter Catchment was poor, the health of the Hunter River was considered 'moderate'.

Macro invertebrate condition (a measure of the remaining proportion of macro invertebrate assemblages which have been retained in the river system) of the Hunter River and surface water drainages in the vicinity of the MPO, was found to be 'moderate'. This means that less than half, but more than a quarter, of macro invertebrate were estimated to have been lost in the river system.

Although overall fish condition for the Hunter Catchment was determined to be very poor, fish condition along the Hunter River in the vicinity of the MPO was rated as 'moderate'. Fish condition scores are based upon both the proportion of fish species which are native to the region, as well as the proportion of fish species that have been retained relative to pre-disturbance conditions (NSW Government, 2010).

Historical surveys of the Hunter River have not indicated the presence of any threatened species and the overall habitat of the Hunter River Catchment has been considered unsuitable for threatened species and communities listed under both the *Fisheries Management Act, 1994* and the *Environmental Protection and Biodiversity Conservation Act, 1999* (Cumberland Ecology, 2013).

A contemporary stream health monitoring program commenced at the MPO in Spring 2017 (November 2017) in accordance with the SWMMP. The Spring 2017 monitoring round is the only contemporary survey undertaken at the stream health monitoring sites prior to commencement of operations at the MPO. The Spring 2017 monitoring round results are outlined in Table 14 below and were reported in the MPO 2017 Annual Review (MACH Energy, 2018).

Table 14
Spring 2017 Stream Health Monitoring Round Results

Historical Site ID	Updated Site ID	Number of Taxa	SIGNAL 2*	Baseline Band of Impairment Score	O/E Taxa
W1	HR1	8	3.31	C	0.41
W1	HR2	11	3.38	B	0.59
Hunt 854	HR3	13	3.19	B	0.64
Hunt 571	HR4	12	2.88	C	0.51
W15	HR5	10	3.04	B	0.61
SW17	HR6	13	3.38	B	0.73
Sandy 1	SC	11	3.28	B	0.61
Hunt 585	DB	18	3.41	B	0.66
Hunt 506	MC	13	3.24	B	0.55

Source: BIO-ANALYSIS Pty Ltd (2018).

* The SIGNAL score for a macroinvertebrate sample is calculated by averaging the pollution sensitivity grade numbers of the families present, which may range from 10 (most sensitive) to 1 (most tolerant).

The Spring 2017 monitoring results indicated that the band of impairment score measured at sites HR3 and HR4 were lower than the previously assigned stream health performance criteria, which were determined by combining edge and riffle habitat scores of the samples collected in mid-1990s as discussed above. Contributions from agriculture, mining, urban run-off, drought and flow regulation, among others, since the mid-1990s are likely to have had a considerable influence on aquatic biota within the area. Accordingly, the contemporary data collected in 2017 is considered to provide a more appropriate representation of the baseline conditions of the Hunter River prior to commencement of operations at the MPO.

Further discussion regarding the stream health trigger levels is presented in Section 6.2.

4.5 RIPARIAN VEGETATION HEALTH AND CHANNEL STABILITY

Surveys were undertaken in 2018 (Bio-Analysis, 2020) and included identification of channel morphology and riparian vegetation. Assessments were undertaken at sites along the Hunter River, Muscle Creek, Sandy Creek, Dart Brook and Rosebrook Creek as well as several unnamed drainage lines. Assessments of channel and riparian vegetation condition are summarised in Table 15. Channel morphology and riparian vegetation assessments were undertaken at the Habitat Assessment Sites and Stream Health Monitoring Sites shown in Figure 4.

Table 15
Summary of Observations from Bio-Analysis (2020)

Location	Channel Type	Condition
Hunter River (Plates 1 and 2)	Series of continuous, slow flowing pools up to approximately 30 m wide and greater than 1 m deep.	Undercut banks present on all sides. Riparian zone heavily degraded, largely due to historical clearing of vegetation, bank erosion and invasion by introduced plant species. Introduced species include Morning Glory, Privet, Balloon Vine (*Cardiospermum grandiflorum*), Wandering Jew (*Tradescantia albiflora*), Willow. River Oak and River Red Gum.
Muscle Creek (Plates 3 and 4)	Stream width from 0.5 m up to approximately 16 m, and up to approximately 2 m deep.	Highly modified with imported rock used in places to stabilise the bank. Stream bank mostly clear of vegetation with the exception of some well-established trees (River Oak and River Red Gum) and shrubs (such as Mat Rush) that appear to have been planted to stabilise the stream bank and reduce erosion.
Sandy Creek (Plates 5 and 6)	Stream width from 1 m to greater than 7 m and maximum depth approximately 0.5 m.	Stream banks approximately 3 m high and heavily disturbed on either side by historical agricultural activities. Erosion and undercutting of the stream bank apparent in areas not bound by River Oak or exotic trees and grasses.
Dart Brook (Plates 7 and 8)	Pools up to approximately 5 m wide and 1.5 m deep.	Stream banks approximately 3 m high and heavily disturbed on either side by historical agricultural activities. Erosion and undercutting of the stream bank apparent in areas not bound by River Oak or exotic grasses.
Rosebrook Creek (Plates 9 and 10)	Small ephemeral creek (approximately 7.5 km long).	Banks almost entirely cleared of trees and riparian vegetation. Stream bank and channel regularly grazed and trampled by livestock. Creek channel mostly colonised by pasture grasses.
Unnamed Tributary of Hunter River (Plate 11)	Ephemeral drainage path.	Banks almost entirely cleared of trees and riparian vegetation.
Unnamed Drainage Lines (Plate 12)	Ill-defined ephemeral drainage.	Banks largely cleared of trees and riparian vegetation. Stream banks and channel regularly grazed and trampled by livestock.

Plate 1: Hunter River (HR1) – Aerial View (Bio-Analysis , 2020)

Plate 2: Hunter River (HR1) – View Upstream (Bio-Analysis , 2020)

Plate 3: Muscle Creek (MC) – View Downstream (Bio-Analysis , 2020)

Plate 4: Muscle Creek (MC) – View Upstream (Bio-Analysis , 2020)

Plate 5: Sandy Creek (SC) – Aerial View (Bio-Analysis , 2020)

Plate 6: Sandy Creek (SC) – View Upstream (Bio-Analysis , 2020)

Plate 7: Dart Brook (DB)– Aerial View (Bio-Analysis , 2020)

Plate 8: Dart Brook (DB) – View Across Stream (Bio-Analysis , 2020)

Plate 9: Rosebrook Creek (RC) – Midstream reaches (Bio-Analysis , 2020)

Plate 10: Rosebrook Creek (RC) – View Downstream (Bio-Analysis , 2020)

Plate 11: Unnamed Tributary (UT1) (Bio-Analysis , 2020)

Plate 12: Unnamed Drainage Line (UD2) (Bio-Analysis , 2020)

4.6 POTENTIAL CUMULATIVE IMPACTS

Overview of Cumulative Impacts

From the Surface Water Assessment (HEC, 2020), in the context of surface water resources potentially impacted by the Project, there has been significant past development in the upstream, immediate and downstream catchment areas which, if taken from European settlement, include widespread agricultural development and urbanisation. The effects of past development are inevitably incorporated into the baseline descriptions of surface water resources developed for the Project which are based on contemporary monitoring (HEC, 2020).

Local Cumulative Impacts

From the Surface Water Assessment (HEC, 2020), no overflow from the MPO to Sandy Creek is predicted to occur. As such, it is highly unlikely that the MPO will result in impacts to the water quality of Sandy Creek.

Regional Cumulative Impacts

The MPO is situated adjacent to the Bengalla Mine and in the vicinity of the Muswellbrook Coal Mine, Dartbrook Mine, Mount Arthur Coal Mine and Mangoola Coal Mine. These mines operate in a highly regulated water system with licensing of water take undertaken in accordance with the *Water Management Act 2000* and release of water undertaken in accordance with the HRSTS, the relevant Development Consent and the EPL for each site. Each of these mines are located downstream of the Glenbawn and Glennies Creek Dams and therefore would not affect the volume of water stored in, or released from, the dams. With the implementation of the various controls under these regulatory systems, the cumulative impacts on downstream water users associated with the Project are expected to be negligible (HEC, 2020). Notwithstanding, water quality monitoring and assessment of potential impacts on the water supply of other surface water users downstream of the mine development will be undertaken in accordance with the program detailed in Section 7.

5 SURFACE WATER MANAGEMENT MEASURES

A number of surface water management measures are employed at the MPO, including limits on water take, reduction in water use, design and location infrastructure, and management of potentially polluting material. These measures are discussed in detail below. Performance criteria have been developed from baseline data and the performance measures specified in Table 6 of Development Consent SSD 10418 (the performance measures relevant to surface water have been reproduced as Table 16).

Table 16
Water Management Performance Measures

Feature	Performance Measure*
Water management – General	• Maintain separation of undisturbed area, disturbed area (i.e. sediment-laden) and mine water management systems • Minimise the use of clean and potable water on the site • Maximise water recycling, reuse and sharing opportunities • Minimise the use of make-up water from external sources, including extraction from the Hunter River • Minimise the need for discharges to the Hunter River Salinity Trading Scheme • Design, install, operate and maintain water management systems in a proper and efficient manner • Minimise risks to the receiving environment and downstream water users
Erosion and sediment control works	• Design, install and maintain erosion and sediment controls in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book* (Landcom, 2004), *Volume 2A: Installation of Services* (DECC, 2008), *Volume 2C: Unsealed Roads* (DECC, 2008), *Volume 2D: Main Road Construction* (DECC, 2008) and *Volume 2E: Mines and Quarries* (DECC, 2008) • Design, install and maintain any creek crossings in accordance with the *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries, 2003) • Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for *Controlled Activities on Waterfront Land* (DPI Water, 2012)
Clean water diversions and storage infrastructure	• Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site
Sediment dams	• Design, install and maintain sediment dams in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004) and *Volume 2E: Mines and Quarries* (DECC, 2008) and the requirements under the POEO Act
Mine water storages	• Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water • New mine water storages designed to contain the 1% AEP 24-hour storm event and minimise permeability • On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and maintained (including to minimise permeability) • Ensure adequate freeboards within all pit voids at all times to minimise the risk of discharge to surface waters
Chemical and hydrocarbon storage	• Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard
Tailings storages	• Maximise dewatering and co-disposal of dewatered tailings from the Stage 2 CHPP within overburden emplacements • Design and maintain tailings storage areas to prevent the movement of tailings seepage/leachate offsite
Overburden emplacements	• Design, install and maintain emplacements to prevent migration of acid forming and potentially acid forming materials, and saline and sodic materials • Design, install and maintain out-of-pit emplacements to prevent and/or manage long term saline seepage

Table 16 (Continued)
Water Management Performance Measures

Feature	Performance Measure
Aquatic and riparian ecosystems	• Negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c) • Maintain or improve baseline channel stability • Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006) or its latest version

* The performance measures do not apply to water management structures constructed under previous consents. The dam storage design criteria are described in the SWB, Table 8.

In accordance with Part B, Condition B51 of Development Consent SSD 10418, the performance measures in Table 6 of Development Consent SSD 10418 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.

5.1 WATER LICENSING REQUIREMENTS

Harvestable rights orders under the *Water Management Act, 2000* allow owners or occupiers of a landholding to collect, without the need for a water access licence, a proportion of the average regional rainfall runoff on their land by means of one or more dams.

More specifically, the Harvestable Rights Order for the Eastern and Central Division of NSW made under section 54 of the *Water Management Act, 2000* (NSW Government Gazette No. 40 of 31 March 2006, p 1628) allows the capture of up to 10% of the average regional rainfall runoff on a landholding by a dam or dams up to a certain capacity, which are located on minor streams.

The maximum harvestable rights dam capacity (MHRDC) for MACH Energy was calculated using the WaterNSW online harvestable rights calculator. An assumed total contiguous property area of 5,110 ha resulted in a maximum harvestable rights capacity of 358 ML based on an average annual rainfall runoff of 0.7 ML/ha specified by the WaterNSW harvestable rights calculator.

There are currently 66 farm dams on MACH Energy's landholdings. The total combined surface area of these dams is 6.1 ha. Based on an average assumed depth of 1.5 m, the total capacity of these existing farm dams has been conservatively estimated to be approximately 92 ML. Accordingly, the residual harvestable rights dam capacity available for the Project is 266 ML.

A summary of the total entitlement held by MACH Energy is provided in Table 5 of the SWB.

Item 12 of Schedule 4 of the *Water Management (General) Regulation, 2018* (WM Regulation) provides access licence exemptions in relation to water take from or by means of certain works specified in Schedule 1, known as 'excluded works'.

Items of relevance to the MPO in Schedule 1 of the WM Regulation are as follows:

1. *Dams solely for the control or prevention of soil erosion:*
    a. *from which no water is reticulated (unless, if the dam is fenced off for erosion control purposes, to a stock drinking trough in an adjoining paddock), or pumped, and*
    b. *the structural size of which is the minimum necessary to fulfill the erosion control function; and*

c. that are located on a minor stream

…

3. Dams solely for the capture, containment and recirculation of drainage and/effluent, consistent with best management practice or required by a public authority (other than Landcom or the Superannuation Administration Corporation or any of their subsidiaries) to prevent the contamination of a water source, that are located on a minor stream.

The MPO will result in a very small indirect take of surface water associated with groundwater extraction in the open cut pit extent.

Baseflow to streams in the vicinity of MPO is reduced as mining draws down the water table, influencing the magnitude and direction of surface water-groundwater exchange, resulting in the indirect take of surface water. The groundwater model was used to provide estimates of indirect 'water take' in accordance with the AIP.

The predicted reduction in baseflow to the Hunter River due to the Project is 27 ML/year at the end of 2048, rising to a peak of 32 ML/year in the post-mining phase (Table 17). Potential impacts to baseflow in Sandy Creek and Dart Brook are predicted to be negligible and do not require licensing.

Table 17
Surface Water Licensing Requirements

Water Sharing Plan	Water Source	Share Components (Units)	During Mining Water Licensing Requirements (ML/year)	Post-mining Water Licensing Requirements (ML/year)
Hunter Regulated River Water Source, 2016	Hunter Regulated River (Management Zone 1A)	961 (High) 2,937 (General)	27	32

5.2 REDUCTION OF WATER USE

MACH Energy's water management strategy includes preferential use of on-site derived mine-affected water (i.e. water that has come into contact with mining or processing operations), thereby reducing the need to import raw water from external sources for operational purposes. As described in the Site Water Balance (SWB), the water management system involves recycling site runoff, fine rejects reclaim water and groundwater inflow wherever practicable, for reuse in the CHPP, vehicle wash down and for dust suppression.

General water management measures implemented at the site include, but are not limited to:

- Finalising construction of proposed water storages as early as possible to increase site yield.
- Limiting the extent of disturbance to reduce dust suppression requirements.
- Regular review of site water use, identification of opportunities for improvement and implementation of best practice technologies.

Surface water and groundwater extraction is undertaken in accordance with MACH Energy's WALs.

Site water use is reviewed every year as part of the Annual Review process (Section 10.1).

During construction activities, water may be sourced externally (e.g. taken from commercial water fill points in the light industrial area).

In addition, in order to reduce make-up water demand from the Hunter River over the life of the MPO, MACH Energy may also source excess mine water from the adjoining mines (i.e. Dartbrook and Bengalla Mines) for use on-site. Should this water sharing be undertaken, it would be subject to MACH Energy and the other mining operator obtaining all necessary approvals.

5.3 INFRASTRUCTURE DESIGN

Sediment dams will be designed with consideration given to soil and overburden characteristics and the contributing area of disturbance. The sediment dams will be sized in accordance with current recommended design standards in the following guidelines:

- *Managing Urban Stormwater, Volume 1 – Soils and Construction* (Landcom, 2004).
- *Managing Urban Stormwater, Soils and Construction, Volume 2E - Mines and Quarries* (DECC, 2008).

Discussion on the design of specific sediment and mine water dams is provided in the SWB.

5.4 CREEK CROSSINGS AND WATERCOURSES

Creek crossings will be designed, installed and maintained in accordance with the following policies and guidelines:

- Fisheries NSW *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013); and
- *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries, 2003).

New infrastructure located within 40 m of a watercourse will be designed, installed and maintained in accordance with the *Guidelines for Controlled Activities on Waterfront Land* (DPI, 2012).

5.5 DOWNSTREAM FLOODING IMPACTS

The MPO is located outside the 1% AEP flood extent for the Hunter River. Therefore, the potential for major landforms to result in changes to flood depth, extent or velocity in the vicinity of the MPO is considered negligible.

Notwithstanding, as the MPO MOD 4 rail spur crosses the Hunter River floodplain, it has been designed to meet the following flood risk management performance criteria:

a) no more than 0.1 m increase in flood levels on any privately-owned land;

b) no more than 0.01 m increase in flood levels at any privately-owned residence or commercial spaces;

c) no more than 0.01 m increase in flood levels at any public roads servicing privately-owned properties; and

d) no more than 0.1 m per second increase in flood velocities at privately-owned residences or commercial spaces.

5.6 MANAGEMENT OF POTENTIALLY ACID FORMING MATERIALS

Geochemical testing of overburden, interburden and coal reject found that most overburden and interburden materials have a very low risk of acid generation and a high factor of safety with respect to the potential for acid mine drainage (AMD). Fine reject material was generally classified as non-acid forming (NAF). A small portion of waste rock materials, namely the Archerfield sandstone interburden materials, and rejects generated from processing the Edderton and Wynn Seams are potentially acid forming (PAF). MACH Energy will continue to undertake confirmatory geochemical test work over the life of the mine to support the detailed mapping of PAF material that is completed as part of the exploration operations.

Scheduled PAF material extraction and dumping (including coal reject handling) is managed and monitored by the Open Cut Examiner. Key operational controls to manage PAF material include:

- all waste coal (e.g. oxidised coal) is treated as PAF, irrespective of seam source;
- all coal reject is treated as PAF and deposited in-pit, irrespective of seam source;
- fine coal reject is to be placed in fine coal reject cells/ or fines emplacement systems only;
- Wynn Seam overburden and interburden (i.e. inclusive of the Archerfield Sandstone) is treated as PAF; and
- the Wynn Seam itself is processed and blended as coal product.

Due to the predicted small proportion of PAF material, it is expected that operational blending during ROM dumping will produce a non-acid forming material within the overburden emplacement and back-filled open cuts. The management strategy for the MPO will provide that no zones of poorly blended, potentially acid forming material are exposed in the final surface of the overburden emplacement and back-filled open cut. This will be achieved by excluding the material identified as potentially acid forming from the final face of the overburden emplacement.

PAF material will be either blended with non-acid forming (NAF) or acid-consuming waste rock, producing overall NAF material, or encapsulated within NAF waste rock. NAF material will 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 will 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.

Using this strategy, it is anticipated that no surface water will come into contact with potentially acid forming materials at the site.

The specific management of PAF waste rock and coarse reject material is described in detail in the sections below.

The operational procedure to manage PAF material at the MPO will continue to be developed and refined based on the development of the mine and ongoing monitoring of environmental performance over the life of the MPO. MACH Energy is also developing further associated QA/QC procedures to effectively manage PAF material at the MPO, based on operational experience.

Further detail regarding the management of PAF materials will be documented in the Rehabilitation Management Plan, which will be periodically prepared in consultation with the Resources Regulator and other relevant government agencies over the life of the MPO.

5.6.1 Potentially Acid Forming Waste Rock Management

MACH Energy maintains two separate types of waste emplacement areas, namely 'Unrestricted' emplacement areas (i.e. PAF material can be emplaced in conjunction with general run-of-mine waste in these areas) and 'NAF Only' emplacement areas. To maintain a minimum of 10 m of NAF cover over Unrestricted waste disposal areas, the designation between these two areas (i.e. the "PAF line") is regularly reviewed and adjusted based on the latest geomorphic landform designs.

PAF interburden material is covered with NAF waste material within timeframes determined by the relative reactivity of the material.

Physical controls for PAF material include:

- the "PAF line" is pegged by surveyors prior to PAF material deposition on each bench;
- PAF load and dump locations are recorded, and haul trucks are GPS-tracked;
- in-pit cameras provide real-time monitoring of PAF mining and depositional activities; and
- a minimum cover of 10 m is maintained between PAF materials and the final landform surface.

5.6.2 Potentially Acid Forming Coal Reject Management

All coal reject hauled to the open cut is treated as PAF material and is disposed in-pit. Coarse coal reject material is hauled from the CHPP and managed by the Open Cut Examiner, with these materials reporting to specific in-pit Unrestricted dump areas that are identified for that shift. Coarse rejects are covered with NAF waste material within timeframes determined by the relative reactivity of the material.

Fine rejects are not currently trucked for in-pit disposal, as all fine rejects currently report to the Fines Emplacement Area. Over the life of the MPO, fines emplacement cells will be established in-pit (within the Unrestricted emplacement area) to manage the geotechnical aspects of emplacing a proportion of Project fine reject within the integrated waste emplacement. The planning for and scheduling of fines emplacement cells within the integrated waste emplacement will be managed through both long term and short term mine planning, and a range of suitable operational and physical controls will be established and implemented over the life of the MPO to manage this new operational activity.

5.6.3 Potentially Acid Forming Material Monitoring

Monitoring relevant to PAF material management at the MPO includes:

- periodic confirmation assays of the acid forming potential of key materials;
- regular mine water quality monitoring (e.g. in-pit and MWD);
- quarterly groundwater level monitoring;
- quarterly groundwater quality monitoring; and
- landform erosion monitoring, and rectification where required.

In the event that ongoing monitoring identifies a need for additional PAF material management measures, appropriate additional measures to control acid formation will be developed and documented in the relevant RMP (prepared in accordance with the *Mining Act, 1992*) and this SWMMP. Additional measures that may be implemented to control acid formation are outlined in Section 9.1. Any revisions to the SWMMP will be undertaken in accordance with the procedure described in Section 10.2.

5.7 CHEMICAL AND HYDROCARBON STORAGE

Chemicals and hydrocarbons will be managed through the MPO procedures for site contamination prevention and control. Implementation of the procedures will reduce the potential for land and water contamination from the handling, storage and disposal of these substances.

Chemicals and hydrocarbons will be transported and stored on-site in accordance with AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*, 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). Additionally, MACH Energy will register all chemicals used on site within a central database. The central database will contain all information in the Safety Data Sheets (SDS) and an inventory of chemicals held on-site. The information will be accessible at any computer terminal within the MPO and provide guidance on storage, use and disposal.

On-site controls will include storage within properly sealed containers and controlled areas, bunded for medium to long-term storage requirements. These storage and waste receival areas will be isolated from clean water catchments to reduce the risk of land or water pollution should an unplanned spill occur.

The response to any accidental spills or ground contamination will be assessed on a case-by-case basis and remediated using biodegradable spill absorbent. Emergency response procedures will also be enacted as required in accordance with the relevant environmental procedures. Hydrocarbon or chemical spills will be reported in the mine site incident reporting and management system with corrective and preventative measures undertaken as appropriate.

5.8 WATER POLLUTION IMPACT ASSESSMENT

A Water Pollution Impact Assessment was undertaken in 2022 to support an application for a variation to EPL 20850 to include licensed discharge of excess mine water to the Hunter River. The assessment comprised estimation of the potential water quality of the Hunter River downstream of discharge from the MPO. Discharges are authorised to occur from the Mine Water Dam (MWD) via the Discharge Dam (refer to SWB) which is intended to facilitate controlled releases to the Hunter River under the conditions of the HRSTS The assessment was conservatively undertaken based on the following assumptions:

- A maximum potential discharge rate of 65 ML/day, based on the proposed pumping capacity of 750 L/s.
- A minimum flow rate in the Hunter River during discharge of 1,000 ML/day in accordance with the requirements of the HRSTS. In practice, flows typically exceed 1,000 ML/day during permitted discharge periods (median flows during discharge periods are 2,549 ML/day, calculated from streamflow data for the Hunter River at the Denman Gauging Station (210055) on permitted discharge days between 2011 and 2022).
- Median and maximum concentrations of metals recorded historically in the Hunter River[3].
- The maximum concentration of metals recorded historically in the MWD.

Based on the above conservative assumptions, Table 18 presents the estimated total metal concentrations of aluminium, cadmium, copper, nickel and zinc in the Hunter River downstream of the MPO during discharge events. The values presented in Table 18 indicate that:

- The maximum concentration of aluminium recorded historically in the MWD is less than the median and maximum concentrations recorded historically in the Hunter River[3]. Accordingly, discharges may result in a modest reduction in aluminium concentrations in the Hunter River.
- Assuming median background concentrations in the Hunter River at the time of discharge from the MPO, the concentrations of cadmium, copper, nickel and zinc in the Hunter River downstream of discharge are estimated to remain below the default guideline value.
- The maximum concentrations of copper and zinc recorded historically in the MWD are less than the maximum concentrations recorded historically in the Hunter River. Accordingly, if discharges occur when copper and zinc are naturally elevated in the Hunter River, the discharges may result in a modest reduction in the concentration of these metals in the Hunter River.
- The maximum concentration of nickel recorded historically in the Hunter River exceeded the default guideline value. If discharges occur when nickel is elevated in the MWD and naturally elevated in the Hunter River, a modest increase in the concentration of nickel further above the default guideline value may occur.

[3] Monitoring sites (Figure 4) W1, W2, W3, W6a, W15, W17, W01 and W04.

Table 18
Hunter River Discharge Assessment

Hunter River Baseline Median (mg/L)^		MWD (mg/L)*	Estimated Hunter River Concentration after Discharge (mg/L)	Aquatic Ecosystem Guideline Values# (mg/L)
Aluminium (Al)	0.5	0.3	0.48	0.055
Cadmium (Cd)	<0.0001	0.0004	0.0001	0.0002
Copper (Cu)	0.001	0.003	0.0011	0.0014
Nickel (Ni)	0.001	0.026	0.003	0.011
Zinc (Zn)	0.005	0.031	0.007	0.008
Hunter River Baseline Maximum (mg/L)				
Aluminium (Al)	10.1	0.3	9.5	0.055
Cadmium (Cd)	0.0001	0.0004	0.0001	0.0002
Copper (Cu)	0.011	0.003	0.0105	0.0014
Nickel (Ni)	0.016	0.026	0.0166	0.011
Zinc (Zn)	0.19	0.031	0.18	0.008

^ Monitoring sites (Figure 4) W1, W2, W3, W6a, W15, W17, W01 and W04.

* Historical maximum concentration recorded in the MWD.

Toxicant default guideline values for water quality in aquatic ecosystems (ANZG, 2018).

In consideration of the above, the proposed discharges of water from the MWD are expected to have a negligible impact on water quality in the Hunter River.

5.9 REINSTATED DRAINAGE NETWORKS ON REHABILITATED AREAS

The conceptual final landform has been developed using geomorphic design principles to address key design principles. The key design principles include surface water drainage from the waste emplacement landform incorporating micro-relief to increase drainage stability, avoid major engineered drop structures and limit erosion potential.

The final 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.

6 SURFACE WATER TRIGGER LEVELS

Triggers have been developed to prompt investigations and appropriate responses, identified in trigger action response protocols, to prevent exceedance of the performance criteria.

6.1 DOWNSTREAM SURFACE WATER FLOWS

During active mining operations, the mine water system will capture runoff from areas that would have previously flowed to the receiving waters. A reduction in total flow in the surface water catchments of the Hunter River, Sandy Creek, Rosebrook Creek and Dry Creek has been estimated on the basis of the reduction in catchment area due to the MPO and is presented in the Surface Water Assessment of the Mount Pleasant Optimisation Project EIS.

As part of the annual water balance modelling update (see SWB, Section 10.2), the predicted inflows and outflows of the water management system will be compared to the pumping records and site water storage levels.

Any complaints from a downstream landholder regarding a potential impact on water supply would trigger an investigation (Section 8.2).

6.2 SURFACE WATER QUALITY TRIGGER LEVELS

Surface water quality trigger levels have been developed using baseline data collected at the site, in accordance with the ANZG (2018) / ANZECC & ARMCANZ (2000) guidelines.

The ANZG (2018) / ANZECC & ARMCANZ (2000) guidelines recommend that wherever possible, site-specific data is used to define trigger values for physical and chemical factors which can adversely impact the environment. Trigger values are not regarded as assessment criteria; rather are used as an indicator of potential impact and the need to undertake further investigation.

The approach generally recommended by ANZG (2018) / ANZECC & ARMCANZ (2000) for developing site-specific trigger values for slightly to moderately disturbed ecosystems, is to formulate trigger values based on the 20th and 80th percentile of the site-specific monitoring data. These values should be calculated from a minimum of 2 years of monthly data (i.e. 24 data points).

Site-specific reference values have been established for sites upstream of the MPO (i.e. W1, W4 and W11) which are located outside of the influence of potential mining related effects. The site-specific reference values have been derived from baseline monitoring data. In comparison to on-going site-specific monitoring data, the site-specific reference values provide an indication of a change in water quality trends at upstream monitoring sites located outside of the influence of potential mining related effects.

Site-specific trigger values have been developed for sites W2, W6(A) and W15 on the Hunter River, in addition to site W12 on Sandy Creek. The reference / trigger values were derived from a minimum of 24 data points for each site, with the exception of site W11 on Sandy Creek for which a total of 19 data points were available for the baseline monitoring period.

Trigger values have also been adopted for site W17 on the Hunter River, calculated from baseline monitoring data recorded at sites adjacent to W17 (e.g. Bengalla monitoring sites W01, W02 and W03). MACH Energy has established trigger values for site W17 as it is the only site on the Hunter River that is located downstream of the MPO and upstream of the Bengalla Mine. MACH Energy therefore considers this site particularly important for assessing potential surface water impacts associated with the MPO.

Due to the ephemeral nature of the local tributaries, the EC values recorded at these sites are highly variable with EC values increasing substantially during periods of below average rainfall due to evapoconcentration effects. As such, site-specific trigger values are not proposed for these sites. Notwithstanding, the water quality records for these sites would continue to be reviewed and assessed as a component of the water quality response protocol (refer Section 8.3).

MCO has also established site-specific trigger values for Sandy Creek at monitoring sites located downstream of the MPO. A description of these triggers and how they were derived is contained in the *Mangoola Coal Surface Water Monitoring Plan* (MCO, 2018).

The site-specific reference values and trigger values for the surface water monitoring sites are presented in Table 19 below.

Table 19
Surface Water Quality Reference / Trigger Values

Site	pH	EC (µS/cm)	TSS (mg/L)
	20th – 80th Percentile Trigger Values**	80th Percentile Trigger Value	80th Percentile Trigger Value
Site Specific Reference / Trigger Values			
Hunter River			
W1 (reference site)	6.5 – 8.2	529	18
W2	6.5 – 8.3	539	18
W6*	6.5 – 8.4	496	19
W17#	6.5 – 8.1	650	40
W15	6.5 – 8	460	23
Sandy Creek			
W11 (reference site)	6.5 – 8	7,050	10
W12	6.5 – 8.1	6,420	30
Muscle Creek			
W4 (reference site)	6.5 – 8	2,480	11

* Due to safe access no longer being available at site W6, triggers developed for this site will now be used at the new monitoring location W6A approximately 500 metres (m) downstream of W6, as described in Section 7.4.

** Where the 20th – 80th percentile trigger values were within the default trigger levels, the default trigger levels were adopted. Default triggers are based on ANZECC & ARMCANZ (2000) guideline values for upland rivers in south-east Australia.

Trigger values have been sourced from the *Bengalla Water Management Plan* (BMC, 2017), which have been established from baseline data for monitoring sites adjacent to W17 (e.g. Bengalla sites W01, W02 and W03 [Figure 4]), as well as the ANZECC & ARMCANZ (2000) guideline.

6.2.1 Post-mining Pollution from Rehabilitated Areas

The final landform will be designed such that site runoff from upstream areas is conveyed away from the final void catchment. Permanent diversion drains will be constructed adjacent to the south-eastern, south-western and north-western edges of the final void catchment to divert runoff to existing surface water drainages. Modelling will be undertaken to confirm that the final void catchment is reduced as far as practically possible with negligible flood risk.

Water retained on the site will be fit for post-mining land uses, and water discharged from the site will be suitable for receiving waters, aquatic ecology and riparian vegetation. Runoff from rehabilitated areas will continue to be monitored at downstream surface water sites following the cessation of mining. Water quality monitoring data will be reviewed annually and results compared to the surface water trigger levels listed in Table 19. Monitoring will continue until the water quality objectives in the Rehabilitation Management Plan have been achieved.

6.3 STREAM AND RIPARIAN VEGETATION HEALTH

Baseline data of the health of surface water systems in the vicinity of the MPO has been collected using the AusRivAS system, which is described in Section 4.3. Using the AusRivAS system, observed (O) numbers of macro invertebrate taxa were compared with the expected (E) numbers of macro invertebrate taxa found at each site. An O/E proportion was then calculated which informed an overall 'band of impairment' score for each site.

Band of impairment scores are based upon where the O/E values fall within a specified range, as shown in Table 20 below.

Table 20
Stream Health Band of Impairment Scores

Band Label	O/E Taxa Range	Band Name	Band Description
Band X	>1.12	More biologically diverse than reference sites.	More taxa found than expected. Potential biodiversity hot-spot. Possible mild organic enrichment.
Band A	0.85 – 1.15	Reference condition.	Most/all of the expected families found. Water quality and/or habitat condition roughly equivalent to reference sites. Impact on water quality and habitat condition does not result in a loss of macro invertebrate diversity.
Band B	0.55 – 0.84	Significantly impaired.	Fewer families than expected. Potential impact either on water quality or habitat quality or both resulting in loss of taxa.
Band C	0.25 – 0.54	Severely impaired.	Many fewer families than expected. Loss of macro invertebrate biodiversity due to substantial impacts on water and/or habitat quality.
Band D	0 – 0.24	Extremely impaired.	Few of the expected families remain. Extremely poor water and/or habitat quality. Highly degraded.

Source: Gray B. (2004); Hose, G. and Turak, E. (2004).

Contributions from agriculture, mining, urban run-off, drought and flow regulation, among others, since the mid-1990s are likely to have had a considerable influence on aquatic biota within the area and the previously assigned baseline band of impairment scores, which were determined by combining edge and riffle habitat scores of the samples collected in mid-1990s.

Revised baseline band of impairment scores have been determined based on the Spring 2017 monitoring round results, which is the only contemporary survey undertaken at the stream health monitoring sites (Table 14) prior to commencement of operations at the MPO. The band of impairment scores derived from the Spring 2017 monitoring round were generally lower than the previously assigned baseline band of impairment scores (likely due to the activities described above). Accordingly, the contemporary data collected in 2017 is considered to provide a more appropriate representation of the baseline conditions of the Hunter River prior to commencement of operations at the MPO.

MACH Energy commenced stream health monitoring at three additional downstream sites in Spring 2017, including one on Sandy Creek and two on the Hunter River. MCO has established stream health trigger levels for monitoring sites on Sandy Creek (Figure 4). In the event that a deterioration in stream health is observed at these locations, MACH Energy would consult with MCO during the implementation of their response mechanisms. Stream health trigger values are shown in Table 21.

Table 21
Stream Health Trigger Levels

Historical Site ID	Updated Site ID	Baseline Band of Impairment Score	O/E Taxa^
Reference Site			
W1	HR1	C	0.41
W1	HR2	B	0.59
Hunt 506	MC	B	0.55
Hunt 585	DB	B	0.66
Potential Impact Site			
Hunt 854	HR3	B	0.64
W15	HR5	B	0.61
SW17	HR6	B	0.73
Sandy 1	SC	B	0.61

^ Derived from the Spring 2017 monitoring round (refer Table 14).

* Previously recorded as Band A, which is considered unrealistic due to the disturbances that the site is regularly exposed to (e.g. stream bank erosion, water regulation and agricultural activities).

7 SURFACE WATER MONITORING PROGRAM

7.1 STANDARDS

Surface water monitoring at the MPO will be undertaken in accordance with relevant Australian Standards, legislation and NSW Guidelines, including (but not limited to):

- *Approved Methods for the Sampling and Analysis of Water pollutants in NSW* (DEC, 2022);
- *AS/NZS 5667.1:1998 Water Quality – Sampling – Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples*; and
- *ISO 5667.10:2020 Water Quality – Sampling – Part 10: Guidance on Sampling of Waste Water.*

7.2 DISCHARGES

7.2.1 Controlled and Uncontrolled Discharges

Discharges from some water storages, such as sediment dams and environmental dams, are permitted when a rainfall event results in the stored water volume exceeding the design capacity (refer Table 16). The water quality is required to be tested prior to discharge to ensure that the relevant criteria are met. All discharges will be in accordance with Development Consent DA 92/97 (prior to its surrender), Development Consent SSD 10418 and EPL 20850. All off-site discharges and on-site transfers of water will be recorded.

Discharge of water to the Hunter River is permitted in accordance with EPL 20850 and the HRSTS. Discharges released via the Hunter River pipeline will be monitored daily during discharge for volume, pH and total suspended solids (TSS), and continuously during discharge for EC. The authorised water discharge/monitoring point is MWD1, and is referred to as 'Point 16' in EPL 20850 (Figure 4). The water quality limits authorised under EPL 20850 are discussed in the SWB. The monitoring requirements are shown in Table 22.

Monitoring of effluent discharge quality from the Mine Infrastructure Area Sewage Treatment Plant (MIA STP) is required in accordance with EPL 20850. The authorised discharge/monitoring point is referred to as 'Point 15' in EPL 20850 (Figure 4). The monitoring requirements are shown in Table 22.

Table 22
Water and/or Land Monitoring Required Under EPL 20850, Condition M2

Pollutant	Units of Measure	Frequency	Sampling Method
Point 15			
Faecal Coliforms	Colony forming units per 100 millilitres	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Point 16			
Conductivity	Microsiemens per centimetre	Continuous during discharge	A probe designed to measure the range 0 to 10,000 uS/cm
pH	pH	Daily during discharge	Representative sample
Total suspended solids	Milligrams per litre	Daily during discharge	Representative sample

Sediment dams SD5, and SD8 to SD10 will be monitored daily during discharge and for five days after for pH, EC, TSS, TDS, and occurrence and duration of spillway flow.

7.2.2 Seepage/leachate

Surface water and seepage from the mine water storage areas will be monitored to ensure that key water quality parameters remain within appropriate licence criteria. Surface water quality monitoring is discussed in detail in Section 7.4, and groundwater quality monitoring is discussed in the GWMP.

7.3 STREAMFLOW

MACH Energy would continue to review data from DCCEEW Water's gauging stations in the vicinity of the MPO (e.g. to inform groundwater modelling reviews). All three of these gauges continuously monitor:

- level (m);
- discharge/flow (ML/day);
- EC (μS/cm); and
- water temperature (degrees Celsius).

A qualitative measure of flow would also be recorded at all surface water quality sites at the time of sampling (e.g. dry, stagnant pool, low flow or high flow).

7.4 SURFACE WATER QUALITY

Surface water monitoring is undertaken at the monitoring locations listed in Table 22. This includes the seven new surface water monitoring sites that were added to the monitoring network following commencement of operations (W11 – W17). The surface water monitoring program is shown on Figure 4 and summarised in Table 23 below.

Since 2011, monitoring data has not been collected at the Hunter River site W6 due to the river bank being too steep at this location to allow safe access. As such, water monitoring at site W6 has been discontinued and monitoring is undertaken at the new monitoring site W6A. This site is located at the same point as stream health monitoring site HR3, approximately 500 m downstream of the historical W6 site (Figure 4). Given its close proximity to the original site, as well as the overall scale of the Hunter River, trigger values developed at site W6 (Table 19) are used for assessment of monitoring data recorded at site W6A.

Monitoring at sites W7 and W8 have been discontinued due to being disturbed by mining activities. Monitoring at site W10 has been discontinued as the site is located on Dry Creek directly downstream of the Bengalla Mine Dry Creek Diversion Project.

Table 22
Surface Water Monitoring Locations

Site	Watercourse and Location
Reference Site	
W1	Hunter River (upstream)
W4	Muscle Creek (upstream)
W11	Sandy Creek (upstream)
Potential Impact Site	
W2	Hunter River (central)
W3	Hunter River (Muswellbrook)
W5	Unnamed Drainage Line (north-east of the MPO site)
W6A	Hunter River (central)
W9	Unnamed Drainage Line (north of the MPO site)
W12	Sandy Creek (downstream)
W14	Rosebrook Creek
W15	Hunter River (downstream)
W16	Unnamed Drainage Line (west of the MPO site)
W17	Hunter River (downstream)

Table 23
Surface Water Monitoring Program

Feature	Location/Sites	Parameters	Frequency[1]
Hunter River[#]	Upstream (Aberdeen [GS210056])	Streamflow, EC	Continuous (DCCEEW Water)
	Upstream (W1)	Water Quality (Suite 1)	Monthly & Event Based
	Upstream (W1)	Water Quality (Suite 2)	Minimum annually
	Upstream (W1)	Water Quality (Suite 3)	Minimum annually
	*Upstream / Downstream (Muswellbrook [210002])	Stream Flow	Continuous (DCCEEW Water)
	*Upstream / Downstream (W2, W3 & W6A)	Water Quality (Suite 1)	Monthly (*Baseline*)
			Monthly & Event Based (*When development within sub-catchment*)
	*Upstream / Downstream (W2, W3 & W6A)	Water Quality (Suite 2)	Minimum annually
	*Upstream / Downstream (W2, W3 & W6A)	Water Quality (Suite 3)	Minimum annually
	*Upstream / Downstream (HR3 & HR4)	Stream Health[%]	Bi-Annual (Spring and Autumn)
	Downstream (W15 & W17)	Water Quality (Suite 1)	Monthly & Event Based
	Downstream (W15 & W17)	Water Quality (Suite 2)	Minimum annually
	Downstream (W15 & W17)	Water Quality (Suite 3)	Minimum annually
	Downstream (Denman [210055])	Stream Flow	Continuous (DCCEEW Water)
Dart Brook	Upstream (DB)	Stream Health[%]	Bi-Annual (Spring and Autumn)
Muscle Creek	Upstream (W4)	Stream Quality	Event Based
	Upstream (W4)	Water Quality (Suite 1)	Monthly & Event Based
	Upstream (W4)	Water Quality (Suite 2)	Minimum annually
	Upstream (MC)	Stream Health[%]	Bi-Annual (Spring and Autumn)
Unnamed Tributaries – Draining ML 1645 (North-east to Hunter River)	Downstream (W5 & W9)	Water Quality (Suite 1)	Event Based (*Baseline*)
			Monthly & Event Based (*When development within sub-catchment*)
	Downstream (W5 & W9)	Water Quality (Suite 2)	Minimum annually
	Downstream (W5 & W9)	Water Quality (Suite 3)	Minimum annually

Table 23 (Continued)
Surface Water Monitoring Program

Feature	Location/Sites	Parameters	Frequency[1]
Rosebrook Creek	Downstream (W14)	Water Quality (Suite 1)	Monthly & Event Based
	Downstream (W14)	Water Quality (Suite 2)	Minimum annually
	Downstream (W14)	Water Quality (Suite 3)	Minimum annually
Sandy Creek^	Upstream (W11)	Water Quality (Suite 1)	Monthly & Event Based
	Upstream (W11)	Water Quality (Suite 2)	Minimum annually
	Upstream (W11)	Water Quality (Suite 3)	Minimum annually
	Downstream (W12)	Water Quality (Suite 1)	Event Based (*Baseline*)
			Monthly & Event Based (*When development within sub-catchment*)
	Downstream (W12)	Water Quality (Suite 2)	Minimum annually
	Downstream (W12)	Water Quality (Suite 3)	Minimum annually
	Downstream (SC)	Stream Health[%]	Bi-Annual (Spring & Autumn)
Unnamed Tributaries – Draining ML 1645 (West to Sandy Creek)	Downstream (W13 & W16)	Water Quality (Suite 1)	Event Based (*Baseline*)
			Monthly & Event Based (*When development within sub-catchment*)
	Downstream (W13 & W16)	Water Quality (Suite 2)	Minimum annually
	Downstream (W13 & W16)	Water Quality (Suite 3)	Minimum annually

[1] Event based frequency would be no greater than once per month.

[#] Available water monitoring results from the Mangoola Coal water monitoring program at nearby sites on Hunter River (SW14, SW15 & SW17) would also be used for comparative purposes.

* Upstream / Downstream – reflects monitoring locations that would not be potentially affected by the development until later in the Project life.

^ Available water monitoring results from the Mangoola Coal water monitoring program at nearby sites on Sandy Creek (SW1 & SW2) would also be used for comparative purposes.

[%] Stream health monitoring parameters are described in Section 7.5.

Suite 1 = pH, EC, TSS and TDS sampling.

Suite 2 = pH, EC, TSS, Cu, Pb, Zn, Ni, Fe, Mn, As, Se, Cd, Cr, Li, Ba, Sr, Turbidity, Dissolved Oxygen, Total P and Total N.

Suite 3 = Al, Sb, B, Be, Co, Mo, Th, U, alkalinity, Ca, Mg, K, Na, Cl, F, SO_4.

7.5 STREAM AND RIPARIAN VEGETATION HEALTH

The stream health monitoring program is based on the AusRivAS aquatic invertebrate monitoring protocol, as used for the baseline stream health study.

AusRivAS is a rapid biological assessment protocol with twice yearly (spring and autumn) aquatic macro invertebrate sampling. Monitoring would continue to be undertaken at the nine sites shown on Figure 4. Stream health monitoring is also undertaken by MCO on Sandy Creek, to the south of the MPO monitoring site (site SC), and to the south-west of the MPO (Figure 4) and published in the Mangoola Coal Annual Reviews.

In addition to the aquatic macro invertebrate sampling, monitoring at the MPO stream health sites will also include:

- fish observations;
- site water quality;
- stream condition;
- channel stability; and
- aquatic and riparian edge plants.

Riparian vegetation will be assessed for any changes in density or extent as a result of impacts on alluvial aquifers or water quality. Associated effects to channel stability, as a result of changes in streamflow characteristics and riparian vegetation, would also be assessed.

Due to the highly ephemeral nature of drainage lines within the MPO boundary, it is unlikely that these drainage lines support significant ecosystems. Therefore, all stream health monitoring locations are located on significant watercourses outside the MPO boundary.

Notwithstanding, drainage lines within the MPO boundary would be monitored for potential impacts to channel stability. Specifically, drainage lines located immediately downstream of diversion channels and/or sediment dams would be visually inspected following significant rainfall events and/or overflow from sediment dams to identify locations of sediment build-up and/or enhanced scouring and erosion. The inspection outcomes will be documented, and measures implemented as necessary to improve channel stability and integrity.

The outcomes of the annual stream health monitoring (i.e. two rounds of monitoring) will be described in the Annual Review.

7.6 ON-SITE (MINE) WATER MANAGEMENT

A description of the on-site water management system is provided in the SWB.

Regular monitoring of the water management system is undertaken to identify the potential for environmental harm, ensure compliance with relevant statutory requirements and to improve the water management system implemented at the site. Monitoring activities include the following:

- monthly (minimum) monitoring of water levels in all mine water storages;
- monitoring of the integrity of clean water diversion and runoff collection structures - following rainfall events resulting in flow and during scheduled inspections;
- visual and olfactory checks following any contamination incidents, to monitor for any remnant contamination (this may involve laboratory assessment);
- monthly sampling of mine water storages (including open cut pits) for Suite 1[4] water quality parameters;
- monthly sampling of sediment dams for Suite 1[4] water quality parameters;
- quarterly sampling of SD5, and SD8 to SD10 (upon commissioning), RLD2, HWD2, HWD3, MWD2 and MWD3 for Suite 2[5] water quality parameters;

[4] Suite 1 = pH, EC, TSS and TDS sampling.

[5] Suite 2 = pH, EC, TSS, Cu, Pb, Zn, Ni, Fe, Mn, As, Se, Cd, Cr, Li, Ba, Sr, Turbidity, Dissolved Oxygen, Total P and Total N.

- quarterly sampling of FEA and ED3 for Suite 2[5] and Suite 3[6] water quality parameters;
- annual (minimum) sampling of mine water storages (including open cut pit sumps) and sediment dams for Suite 2[5] and Suite 3[6] water quality parameters;
- inspections of erosion and sediment control structures monthly and following significant rainfall events (Section 5.6 of ESCP);
- inspections of key water management infrastructure monthly and following rainfall greater than 20 mm in a 24 hour period.
- recording the volume of water take from the Hunter River;
- recording the volume of transfers around the site and any transfers to or from the site (e.g. under any water sharing arrangements); and
- recording off-site discharges (Section 7.2.1).

The Planning Secretary of the DPHI and the Chief Executive Officer of the EPA will be notified as soon as practicable after monitoring has identified a discharge incident causing material environmental harm. A detailed report on the incident will be made available within seven calendar days after the incident is identified.

To further reduce the risk of a discharge incident causing material harm, MACH Energy has developed a Surface Water Management Procedure which provides a set of recommended work practices for use by MPO employees and contractors to manage dams within the MPO. The Surface Water Management Procedure is an internal MACH Energy document, which expands on the procedures outlined in this SWMMP[7].

Two v-notch weirs have been installed to the west of the Fines Emplacement Area for internal monitoring purposes. The location of the installed v-notch weirs is shown on Figure 4. The established v-notch weirs may be relocated as part of any future works. Should the v-notch weirs be relocated, this SWMMP will be revised to show the new location. Further information regarding the SWMMP revision process is provided in Section 10.2.

7.7 BRIDGE OPENINGS AND CULVERTS

Condition 28(c), Schedule 3 of Development Consent DA 92/97 (prior to its surrender) requires MACH Energy to implement a program to monitor and maintain the bridge openings and culverts associated with the MOD 4 rail infrastructure and ensure that they remain clear of blockages.

An assessment of the potential for blockages to occur in the proposed final design of bridge openings and culverts was undertaken by WRM Water and Environment (2020).

Assessment of the design blockage for the conceptual rail spur bridge openings was undertaken in accordance with Australian Rainfall and Runoff 2019, which included consideration of key design criteria including debris availability, mobility and transportability. The blockage assessment for the conceptual rail spur bridge openings indicated a low blockage potential and resulted in a 0% blockage for the most likely inlet blockage level (WRM Water and Environment, 2020).

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[6] Suite 3 = Al, Sb, B, Be, Co, Mo, Th, U, alkalinity, Ca, Mg, K, Na, Cl, F, SO4.

[7] Note that the Surface Water Management Procedure has not been reviewed or endorsed by the DPHI. MACH Energy takes responsibility for ensuring the procedures in the Surface Water Management Procedure are in accordance with provisions in this SWMMP and provisions in Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender).

MACH Energy has also designed the final MOD 4 rail infrastructure to meet specific flooding criteria in accordance with Conditions 44C and 44D, Schedule 3 of Development Consent DA 92/97 (WRM Water and Environment, 2020).

An independent review of the final design of the MOD 4 rail infrastructure was undertaken by Royal HaskoningDHV (2020) in accordance with Condition 44D, Schedule 3 of Development Consent DA 92/97. The final design of the MOD 4 rail infrastructure meets the performance criteria specified in Condition 44C, Schedule 3 of Development Consent DA 92/97 (Royal HaskoningDHV, 2020) and was approved by the DPHI on 5 August 2020.

Notwithstanding the limited potential for blockages to occur, MACH Energy would undertake visual inspections annually and following flooding events[8] of the existing culvert crossings, culvert crossing extension and rail bridges to identify any blockages or potential blockage risks.

Any blockages that are identified would be removed by MACH Energy personnel and disposed of in accordance with the Waste Management Plan.

7.8 POST-MINING MONITORING

Water quality monitoring will continue for at least two years following cessation of mining operations, with monitoring data reviewed at annual intervals as part of the Annual Review process (see Section 10.1). Reviews will involve assessment against long-term performance objectives that are derived from baseline conditions or a justifiable departure from these, with due allowance for climatic variations. If objectives are not substantially met within the two-year period, management measures will be revised, and the monitoring period extended.

7.9 EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES

Erosion and sediment control structures will be inspected at regular intervals (monthly) and also following significant rainfall events (i.e. more than 20 mm in a 24 hour period), using both drone surveys and on the ground visual inspections.

MACH Energy will also undertake periodic internal erosion and sediment control audits at the MPO via an independent/third-party specialist with the appropriate qualifications/experience (i.e. Certified Professional in Erosion & Sediment Control [CPESC]).

Erosion and sediment controls may be decommissioned, or active management ceased, as rehabilitated land establishes sufficient groundcover and meets the relevant completion criteria set out in the RMP.

The effectiveness of the surface water management system in relation to erosion and sediment control will be collectively determined through surface water monitoring, review of performance and implementation of adaptive management strategies and/or contingency measures and will be evaluated as described in the ESCP.

[8] Defined as a flood event equal to or exceeding the 'minor flooding' classification in the Muswellbrook Shire Local Flood Plan (NSW State Emergency Service, 2013).

8 SURFACE WATER TRIGGER ACTION RESPONSE PROTOCOLS

8.1 DOWNSTREAM WATER FLOWS RESPONSE PROTOCOL

As part of the annual water balance modelling update (refer Section 3 of the WMP), the predicted inflows and outflows of the water management system will be compared to observed pumping records and water storage levels. If there is a significant difference between the predicted and observed site water balance, the Surface Water Flow Response Protocol in Table 24 will be activated.

Table 24
Downstream Surface Water Flows Response Protocol

Response Protocol	
Trigger	Significant difference between predicted and observed annual site water balance.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Review preceding environmental conditions (e.g. climatic, hydrological, hydrogeological.) 3. Review preceding operational activities where relevant. 4. Review and quality assure relevant monitoring data, including water storage levels, pumped flows, rainfall records and data associated with operational activities. 5. Inspect relevant water management infrastructure and erosion and sediment controls to identify any impacts to integrity and function. 6. Review catchment and sub-catchment areas (land use types) for mine water storages, sediment dams, collection drains and diversion drains to identify potential for unintended capture of additional catchment area. 7. Review relevant streamflow data for the Hunter River at a location immediately downstream of potential impact to identify any evident changes in streamflow characteristics. 8. Determine if an incident and/or non-compliance has occurred and the likely cause/s. 9. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• If an incident and/or non-compliance has occurred, undertake a review of the water balance model and hydrogeological model predictions, and update models as necessary to revise predicted site water balance and further assess potential impact to downstream surface water flows. • Assess risk of environmental harm and develop/design contingency and remedial measures to prevent or minimise environmental harm to the environment. Contingency and remedial measures considered practicable for implementation may include: – notifying local landholders; – repairing or reinstating upslope clean water diversions; – reviewing and refining the SWB; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps); – repairing, replacing, or constructing new or enlarged water management infrastructure; and – developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the relevant sections of the WMP and resubmit to the DPHI (if required).

8.2 SURFACE WATER SUPPLY ON PRIVATELY OWNED LAND

A number of privately-owned properties are located along unnamed drainage lines which flow out of the MPO to the east and west of the MPO boundary. MACH Energy has designed the surface water management system (see SWB) so that any discharge from the site occurs in a controlled manner and is undertaken in accordance with the EPL 20850 and the HRSTS. Notwithstanding, in the event that a surface water-related complaint is received from a local landholder in relation to a potential MPO-related impact on their water supply, the Surface Water Supply Response Protocol in Table 25 will be initiated. All complaints will be managed in accordance with the complaints procedure described in Section 11.2.

Table 25
Surface Water Supply Response Protocol

Response Protocol	
Trigger	Complaint by local landholder regarding potential impact to surface water supply.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of receiving the complaint. 2. Check and validate the information provided with the complaint. 3. Undertake a review of relevant monitoring data. 4. Collect and analyse supplementary samples of the exceedance parameter (as well as any other relevant parameters) upstream (where possible) and downstream of the MPO, to assess whether the exceedance is ongoing. 5. Assess any changes to MACH Energy activities and inspect all relevant water management structures and infrastructure, and erosion and sediment controls in the area of the complaint. 6. Assess conditions (climatic, hydrological, hydrogeological and changes in land use activities in the catchment – including other mining/pastoral activities and riparian revegetation works), both prevailing and preceding the complaint and assess the potential impact. 7. Identify plausible and possible causative mechanisms and assess/quantify these against all relevant data and information to identify most likely causes. 8. Identify if the impact (i.e. impact on surface water supply) is solely attributable to activities being undertaken by or directly related to the MPO. 9. Notify owner of the outcome of the investigation. 10. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: – notifying other local landholders who may be impacted; – providing an alternative water source for the duration of impact caused by the incident/non-compliance; – reviewing and refining surface water monitoring program; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps); – repairing, replacing, enlarging or constructing new water management infrastructure; and – developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

8.3 DOWNSTREAM SURFACE WATER QUALITY RESPONSE PROTOCOL

The Surface Water Quality Response Protocol in Table 26 will be activated when:

- a water quality indicator at a downstream receiving water monitoring location is above (or outside the range) of the site-specific trigger value for three consecutive sampling events;
- the same has not occurred at the relevant upstream reference site(s); and
- a water quality indicator at a downstream water monitoring location is above (or below in the event of a trigger of the lower pH limit) the corresponding upstream monitoring location (where such a monitoring location exists) sampled on the same day.

Table 26
Surface Water Quality Response Protocol

Response Protocol	
Trigger	• A water quality indicator at a downstream water monitoring location is above (or outside the range) of sites-specific trigger values (refer to Table 18) for three consecutive sampling events; • The same has not occurred at the relevant upstream reference site(s); and • A water quality indicator at a downstream water monitoring location is above (or below in the event of a trigger of the lower pH limit) the corresponding upstream monitoring location (where such a monitoring location exists) sampled on the same day.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates an exceedance of the trigger conditions. 3. Review the baseline monitoring data to assess if similar values were recorded during the baseline monitoring period or if a similar trigger exceedance occurred during the baseline monitoring period. 4. Where relevant, collect and analyse supplementary samples of the exceedance parameter (as well as any other relevant parameters) upstream (where possible) and downstream of the MPO, to assess whether the exceedance is ongoing. 5. Review the water quality data of other relevant monitoring sites to identify any spatial and/or temporal trends. 6. Assess any changes to MACH Energy activities and inspect all relevant water management structures and infrastructure, and erosion and sediment controls in the area of the trigger event. 7. Review overflow and discharge monitoring data to ensure compliance with EPL 20850 and the HRSTS. 8. Review conditions (climatic, hydrological, hydrogeological and changes in land use activities in the catchment – including other mining activities and riparian revegetation works), both preceding and during the event, and assess their impact. 9. For the Hunter River monitoring locations, investigate changes in continuously recorded salinity values over time and compare with WaterNSW streamflow gauging stations located on the river, to assess if any trends are evident. 10. For the Hunter River, assess whether releases were occurring from Glenbawn Dam or other mines. 11. Identify plausible and possible causes of the exceedance. 12. Identify if the exceedance was directly caused by or predominantly as a result of activities being undertaken by or directly related to the MPO. 13. If required (i.e. if it is deemed that the exceedance was directly caused by or predominantly as a result of activities being undertaken by or directly related to the MPO), engage a suitably qualified aquatic ecologist or similar to assess if any material harm to the surface water ecosystems have occurred. 14. Provide a preliminary investigation report to the DPHI, Environment Protection Authority (EPA) and DCCEEW Water within seven days of identifying the trigger exceedance.

Table 26 (Continued)
Surface Water Quality Response Protocol

Response Protocol	
Response	• Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: – notifying local landholders; – providing an alternative water source for the duration of water quality impact caused by the incident/non-compliance; – reviewing and refining surface water monitoring program; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps); – repairing, replacing, enlarging or constructing new water management infrastructure; and – developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

8.4 FLOOD IMPACTS RESPONSE PROTOCOL

If there is a significant difference between the MOD 4 rail spur design performance criteria on flood levels or velocity and observed flooding or a complaint about flooding impacts from a local landowner, the Flood Impacts Response Protocol in Table 27 will be activated. All complaints will be managed in accordance with complaints procedure described in Section 11.2.

Table 27
Flood Impacts Response Protocol

Response Protocol	
Trigger	• Complaint about flooding impacts by local landholder; or • Flood levels and/or velocity higher than design performance criteria.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Review preceding environmental conditions (e.g. climatic, hydrological, hydrogeological, operational activities). This will include a review of relevant monitoring data, such as water management system monitoring, and data associated with operational activities. 3. Review land use activities / changes in the catchment which may affect flood conditions – including other mining activities and riparian revegetation works. 4. Identify if the exceedance was directly caused by or predominantly as a result of activities being undertaken by or directly related to the MPO. 5. Provide a preliminary investigation report to the DPHI, Environment Protection Authority (EPA) and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• Undertake review of flood model, update as necessary and revise results. • Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practicable for implementation may include: – notifying local landholders, where relevant; – repairing, replacing, or constructing flood management infrastructure; – reviewing and refining processes for inspection, maintenance and siting of flood management infrastructure (where relevant); and

Table 27 (Continued)
Flood Impacts Response Protocol

Response Protocol	
Response (continued)	– developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

8.5 STREAM AND RIPARIAN VEGETATION HEALTH RESPONSE PROTOCOL

Should a measured band of impairment score at a particular downstream monitoring site degrade below the baseline band level outlined in Table 20, and the band level at a corresponding upstream monitoring site remain the same for two successive monitoring rounds, the Stream Health Response Protocol in Table 28 will be initiated[9].

Table 28
Stream Health Response Protocol

Response Protocol	
Trigger	A stream health indicator at a particular downstream monitoring site falls below the specified trigger level and the stream health indicator at a corresponding upstream monitoring site remains the same or improves for two consecutive monitoring rounds[10].
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates an exceedance of the trigger conditions. 3. Compare data with other stream health data available in the vicinity (e.g. Muscle Creek and Dart Brook). 4. Undertake supplementary stream health investigations upstream (where possible) and downstream of the MPO. 5. Assess any changes to MACH Energy activities and inspect all relevant water management structures and infrastructure, and erosion and sediment controls in the area of the trigger event. 6. Assess conditions (climatic, hydrological, hydrogeological and changes in land use activities in the catchment – including other mining/pastoral activities and riparian revegetation works), both preceding and during the event and assess their impact. 7. Review relevant water quality data and assess if a change in trend is evident. 8. Identify plausible and possible causative mechanisms and assess/quantify these against all relevant data and information to identify most likely causes. 9. Identify if the exceedance was directly caused by or predominantly as a result of activities being undertaken by or directly related to the MPO. If required (i.e. if it is deemed that the exceedance was directly caused by or predominantly as a result of activities being undertaken by or directly related to the MPO), engage a suitably qualified aquatic ecologist or similar to assess the cause of the stream health deterioration. 10. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water when stream health monitoring and investigation is complete.

[9] There is no corresponding upstream site for site SC. The stream health investigation protocol would be initiated if the band of impairment score at site SC degrades below the baseline band level outlined in Table 18 for two consecutive monitoring rounds.

[10] There is no corresponding upstream site for site SC. The stream health investigation protocol would be initiated if the stream health indicator at site SC degrades below the specified trigger levels (refer to Table 19) for two successive monitoring rounds.

Table 28 (Continued)
Stream Health Response Protocol

Response Protocol	
Response	• Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: – undertaking stream bank remedial works including desilting and stabilisation / revegetation works; – reviewing and refining the stream health and surface water monitoring programs; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps); – repairing, replacing, enlarging or constructing new water management infrastructure; and – restricting stock access to affected areas of the stream. • MACH Energy to consult with MCO during the implementation of their response mechanisms. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

In the event that deterioration of riparian vegetation condition and/or channel stability is identified during stream health monitoring, the Riparian Vegetation Condition and Channel Stability Response Protocol in Table 29 will be initiated.

Table 29
Riparian Vegetation Condition and Channel Stability Response Protocol

Response Protocol	
Trigger	• Detection of deterioration in riparian vegetation along watercourses in the vicinity of the MPO. • Detection of deterioration in channel stability of watercourses in the vicinity of the MPO.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the deterioration. 2. Check and validate the data/information which indicates an impact. 3. Undertake supplementary channel stability and/ riparian vegetation investigations upstream (where possible) and downstream of the MPO. 4. Review the impact, including consideration of: a. any relevant monitoring data; b. current mine activities and land management practices in the relevant catchment, including other mining/pastoral activities; and c. climatic, hydrological, hydrogeological conditions in the catchment – including other mining/pastoral activities and riparian revegetation works. 5. Commission an impact investigation by an appropriate specialist, if considered appropriate by the Environmental Superintendent. 6. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• Develop appropriate contingency/remedial measures based on the results of the above investigations, in consultation with the relevant authorities if or as required. Contingency and remedial measures considered practical for implementation may include: – undertaking stream bank remedial works including desilting and stabilization / revegetation works; – reviewing and refining the channel stability and riparian vegetation monitoring programs; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps);

Table 29 (Continued)
Riparian Vegetation Condition and Channel Stability Response Protocol

Response Protocol	
Response (continued)	– repairing, replacing, enlarging or constructing new water management infrastructure; and – restricting stock access to affected areas of the stream. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

8.6 DISCHARGE OF WATER RESPONSE PROTOCOL

8.6.1 Mine Water Discharge Under the Hunter River Salinity Trading Scheme

Licensed discharges from the MPO are permitted in accordance with the HRSTS and criteria described in EPL 20850. In the event that an uncontrolled/unlicensed discharge of mine water occurs that is not compliant with the requirements of the HRSTS and EPL 20850, the Mine Water System Discharge Response Protocol in Table 30 will be activated.

Table 30
Mine Water System Response Protocol

Response Protocol	
Trigger	• Uncontrolled or unlicensed discharge from mine water management system. • Incident and/or non-compliance has occurred.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates a non-compliance. 3. Review operational pumping and dewatering procedures. 4. Review preceding environmental conditions (e.g. climatic, hydrological, hydrogeological, operational activities) and relevant monitoring data, such as water management system monitoring and data associated with operational activities. 5. Review water quality monitoring data downstream of discharge location to assess if a non-negligible change in water quality has occurred and identify if a water quality exceedance has occurred; 6. Undertake additional monitoring e.g. surface water quality monitoring upstream and downstream of the discharge point daily for five days following cessation of the discharge. 7. Inspect relevant water management infrastructure and erosion and sediment controls. 8. Assess risk of environmental harm . 9. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water when stream health monitoring and investigation is complete.
Response	• Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: – notifying local landholders; – providing a compensatory water supply equivalent in quality and volume to any affected landholder as soon as practicable; – undertake dewatering of relevant storages to limit the volume of discharge; – reviewing the adequacy of water storage design, construction, management, maintenance and dewatering procedures; – reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps);

Table 30 (Continued)
Mine Water System Response Protocol

Response Protocol	
Response (continued)	– repairing, replacing, enlarging or constructing new water management infrastructure; and – developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Take all reasonable and feasible measures to prevent or minimise environmental harm. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

8.6.2 Water Storage Discharge

Discharges from some water storages, such as sediment dams and environmental dams, are permitted when the design rainfall event is exceeded (refer Table 16) or the water to be discharged contains less than 50 mg/L of TSS. In the event that water released exceeds 50 mg/L TSS or if uncontrolled discharge from the mine water system occurs as a result of a storm event less than the design criteria, the Water System Discharge Response Protocol in Table 31 will be activated.

Table 31
Water System Response Protocol

Response Protocol	
Trigger	• Discharge from the mine water storage system as a result of a storm event less than the dam design criteria. • Incident and/or non-compliance has occurred.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates an exceedance of the trigger conditions. 3. Review operational pumping and dewatering procedures. Undertake dewatering of relevant storages to limit the volume of discharge. 4. Review preceding environmental conditions (e.g. climatic, hydrological, hydrogeological, operational activities) and relevant monitoring data, such as water management system monitoring and data associated with operational activities. 5. Review water quality monitoring data downstream of discharge location to assess if a non-negligible change in water quality has occurred and identify if a water quality exceedance has occurred; 6. Undertake additional monitoring (e.g. surface water quality monitoring upstream and downstream of the discharge point daily for five days following cessation of the discharge. 7. Inspect relevant water management infrastructure and erosion and sediment controls. 8. Assess risk of environmental harm. 9. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water when stream health monitoring and investigation is complete.
Response	• Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: – notifying local landholders; – providing a compensatory water supply equivalent in quality and volume to any affected landholder as soon as practicable; – reviewing the adequacy of water storage designs and operational and dewatering procedures;

Table 31 (Continued)
Water System Response Protocol

Response Protocol	
Response (continued)	– reviewing and refining processes for inspection, maintenance and siting of water management infrastructure (e.g. dams, pipelines, pumps); – repairing, replacing, or constructing new or enlarged water management infrastructure; and – developing and implementing a training package specifically related to the cause of the incident/non-compliance. • Take all reasonable and feasible measures to prevent or minimise environmental harm • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the WMP and resubmit to the DPHI (if required).

9 CONTINGENCY PLAN

In the event that any unpredicted impacts occur, MACH Energy will implement the following Contingency Plan:

- The Environmental Superintendent will report the incident in accordance with Section 11.
- MACH Energy will identify the appropriate course of action with respect to the identified impact(s), in consultation with technical specialists, DCCEEW Water and any other relevant agencies, as necessary. For example, contingency measures such as, but not limited to, those described in Section 9.1 would be implemented.
- In the event that there is a dispute over the proposed remedial course of action or if the actions conflict with current approvals, MACH Energy will submit the proposed course of action to the DCCEEW Water for approval.
- MACH Energy will implement the appropriate course of action to the satisfaction of the DPHI.

9.1 POTENTIAL CONTINGENCY MEASURES

Potential contingency measures will be reviewed during revisions of the SWMMP. Potential contingency measures for a range of events are described in the Response Protocols tables (see Section 8). In addition, the following measures may be implemented:

- MACH Energy will notify (in writing) the affected landowners and tenants of the exceedance as soon as practicable and provide them with regular water quality monitoring results, until the results show that the MPO is complying with the water-related criteria.
- MACH Energy will investigate further water quality controls if monitoring results indicate that this is required.
- MACH Energy will conduct additional monitoring (e.g. increase in monitoring frequency or additional sampling locations) to confirm impacts and inform the proposed contingency measures.
- MACH Energy will make refinements to the water management system design such as additional containment dams, increases to storage or pumping capacity, or installation of new structures as required to address the identified issue.
- MACH Energy will implement stream remediation measures and possible additional controls (e.g. rock armouring) to reduce the extent and effect of erosion.
- MACH Energy will implement revegetation measures in conjunction with other stabilisation techniques (as required) to remediate impacts of vegetation loss due to erosion.
- MACH Energy will review the relevant procedures to prevent a reoccurrence of the exceedance, incident or non-compliance.
- In the event that ongoing monitoring identifies a need for additional PAF material management measures, MACH Energy will develop appropriate additional controls which include:
    - additional blending of PAF materials with NAF materials that have excess acid-neutralising capacity;
    - additional traffic compaction to reduce oxygen ingress to PAF material to extend the lag period preceding acid generation, prior to covering with NAF material; and/or
    - dosing PAF material with agricultural lime (fine limestone) to extend the lag period preceding acid generation, prior to covering with NAF material.

10 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

10.1 ANNUAL REVIEW

In accordance with Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the preceding calendar year).

In relation to water, the MPO Annual Review will:

- include a comprehensive review of the surface water monitoring data and site water balance relating to the MPO over the past year, which includes a comparison of these results to the:
  - relevant statutory requirements, limits or performance measures/criteria (refer Sections 2 and 5);
  - monitoring results of the previous years;
  - relevant predictions in the Mount Pleasant Operation EIS and MOD 1, MOD 2, MOD 3 and MOD 4 EAs (prior to the surrender of Development Consent DA 92/97); and
  - relevant predictions in the Project EIS.
- identify any surface water-related non-compliance over the past year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- identify any trends in the surface water monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual surface water impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what surface water-related measures will be implemented over the next year to improve the environmental performance of the MPO.

As mentioned in Part D, Condition D11 of Development Consent SSD 10418 (above) relating to MPO Annual Reviews, MACH Energy will include a comprehensive review of environmental performance at the MPO in accordance with Part A, Condition A2 of Development Consent SSD 10418 requires that:

A2. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) generally in accordance with the EIS and EAs;

(d) generally in accordance with the Development Layout in Appendix 2.

Monitoring data will be used to review and update the surface water trigger levels, if necessary, in consultation with relevant government agencies.

Copies of the MPO Annual Review will be submitted to Muswellbrook Shire Council and made available to the CCC and any interested person upon request, in accordance with Part D, Condition D12 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender). The MPO Annual Review will also made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/).

10.2 SWMMP REVISION

In accordance with Part D, Condition D7 of Development Consent SSD 10418 and Condition 4, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), this SWMMP will be reviewed, and if necessary revised to the satisfaction of the Planning Secretary of the DPHI (previously DPE), within three months of the submission of:

- An MPO Annual Review (Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97);
- an incident report (Part D, Condition D9 or D10 of Development Consent SSD 10418 and Condition 7, Schedule 5 of Development Consent DA 92/97);
- an IEA (Part D, Condition D13 of Development Consent SSD 10418 and Condition 9, Schedule 5 of Development Consent DA 92/97);
- the approval of any modification of the conditions of Development Consent SSD 10418;
- any modification to the conditions of Development Consent DA 92/97[11]; and
- notification of a change in development phase (Part A, Condition A12 of Development Consent SSD 10418).

Prior to the surrender of Development Consent DA 92/97, within four weeks of conducting a review of this SWMMP, MACH Energy will advise the Planning Secretary of the DPHI of the outcomes of the review, and submit any revised documents for the approval of the Planning Secretary. After the surrender of Development Consent DA 92/97, in accordance with Part D, Condition D8 of Development Consent SSD 10418, within six weeks of conducting such a review the revised documents will be submitted to the Planning Secretary for approval.

In accordance with Condition 4A, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy may submit a revised SWMMP for the approval of the Planning Secretary at any time, and may also submit any revision to this SWMMP required under Development Consent DA 92/97 on a staged basis.

In accordance with Part D, Condition D8 of Development Consent SSD 10418, MACH Energy must, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, revise the SWMMP to the satisfaction of the Planning Secretary.

If agreed with the Secretary of the DPHI, a revision to this SWMMP required under Development Consent DA 92/97 (prior to its surrender) may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97.

This SWMMP will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Part D, Condition D17(iii) of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender).

[11] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3 of Development Consent DA 92/97, the latter prevails.

10.3 INDEPENDENT ENVIRONMENTAL AUDIT

Within one year of commencement of development under Development Consent SSD 10418, and every three years after, an Independent Environmental Audit (IEA) will be undertaken and submitted as required, in accordance with Part D, Condition D13 of Development Consent SSD 10418.

In accordance with Part D, Condition D14 of Development Consent SSD 10418, within three months of commencing the IEA, MACH Energy will submit a copy of the audit report to the Planning Secretary, and other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. MACH Energy will ensure that the recommendations will be implemented and the findings and compliance with the IEA will be reported in the MPO Annual Reviews.

Once Development Consent DA 92/97 is surrendered, all subsequent Internal Environmental Audits commissioned by MACH Energy will be in accordance with Part D, Condition D13 and D14 of Development Consent SSD 10418.

Subsequent versions of the IEA will be provided to the Planning Secretary of the DPHI and made available on the MACH Energy website. The IEA will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary of the DPHI.

10.4 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418, MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in Development Consent SSD 10418.

Where any exceedance of the criteria and/or performance measures occurs, at the earliest opportunity MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to DPHI describing those options and any preferred remediation measures or other course of action; and
- implement reasonable remediation measures as directed by the Planning Secretary.

11 REPORTING PROCEDURES

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418 and Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in MACH Energy's Environmental Management Strategy (EMS).

In accordance with Part D. Condition D17(vi) of Development Consent SSD 10418 and Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

11.1 INCIDENT REPORTING

An incident is defined as an occurrence or a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent SSD 10418.

In the event that review of monitoring data or a complaint indicates an incident has occurred, the incident will be reported in accordance with Part D, Condition D9 of Development Consent SSD 10418. The Planning Secretary will be notified in writing via the Major Projects website immediately after MACH Energy becomes aware of an incident. The notification will identify the Project name and development application number, and set out the location and nature of the incident.

In accordance with Part D, Condition D10 of Development Consent SSD 10418, within seven days of becoming aware of a non-compliance MACH Energy will notify DPHI (previously DPE) of the non-compliance.

The notification must be made in writing via the Major Projects Website and will:

- identify the MPO (including the Development Application number and name);
- set out the condition of Development Consent SSD 10418 that the incident is non-compliant with; and
- describe the location and nature of the incident, the reason for the non-compliance (if known); and what actions have been, or will be, undertaken to address the non-compliance.

As described in Section 9.1, MACH Energy will notify (in writing) the affected landowners and tenants of the exceedance as soon as practicable and provide them with regular water quality monitoring results, until the results show that the MPO is complying with the water-related criteria.

Additionally, in accordance with Condition R4 of EPL 20850, MACH Energy will notify the EPA by telephoning the Environment Line service on 131555 immediately after becoming aware of any contravention or potential contravention of section 120 of the *Protection of the Environment Operations Act 1997*, except where expressively provided in a condition of EPL 20850. MACH Energy will provide written details of the notification to the EPA at info@epa.nsw.gov.au within seven days of the date of the notification.

11.2 COMPLAINTS

MACH Energy maintains a Community Hotline (1800 886 889), which is dedicated to the receipt of community complaints. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database.

MACH Energy has developed a procedure that outlines its commitment to receiving, responding to and maintaining a record of phone calls from the community. This procedure is supported by a Community and Stakeholder Engagement Register. This is described in MACH Energy's EMS.

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), a complaints register will be made available on the MACH Energy website (https://machenergyaustralia.com.au/) and updated monthly.

11.3 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of MACH Energy's EMS and is described below.

Compliance with all approval plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with MACH Energy and the Project. In accordance with Part A, Condition A2 of Development Consent SSD 10418 and Schedule 2, Condition 2 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will carry out the development in accordance with:

- the conditions of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender)[12];
- all written directions of the Planning Secretary;
- Statement of Commitments (Appendix 3 of Development Consent DA 92/97);
- the 1997 EIS, EA (MOD 1), EA (MOD 2), EA (MOD 3), EA (MOD 4), the Project EIS; and
- with the Development Layout in Appendix 2 of Development Consent SSD 10418 (Appendix D).

MACH Energy will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 11.1, MACH Energy will report incidents in accordance with Part D, Condition D9 of Development Consent SSD 10418.

A review of compliance with all conditions in Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender) and relevant mining leases will be undertaken prior to (and included within) each Annual Review (Section 10.1).

[12] In accordance with Part A, Condition A4 of Development Consent SSD 10418, the conditions in Development Consent SSD 10418 and directions of the Planning Secretary prevail to the extent of inconsistency, ambiguity or conflict between them and any document/s listed in condition A2(c). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition A2(c), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

Additionally, in accordance with Part D, Condition D13 of Development Consent SSD 10418, an IEA (Section 10.3) will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary to assess whether MACH Energy is complying with the requirements in Development Consent SSD 10418 and Development Consent DA 92/97.

11.4 ACCESS TO INFORMATION

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Schedule 5, Condition 11 of Development Consent DA 92/97, the MACH Energy website will be maintained as a tool for the provision of information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information required by MACH Energy to be available on the website is outlined in MACH Energy's EMS.

11.5 HRSTS REPORTING

In accordance with Condition R5.7 of EPL 20850, MACH Energy will compile a written report of the activities under the HRSTS for each scheme year. The scheme year runs from 1 July to 30 June each year. The written report will be submitted to the EPA's regional office within 60 days after the end of each scheme year and be in a form and manner approved by the EPA. The information will be used by the EPA to compile an annual scheme report.

12 REFERENCES

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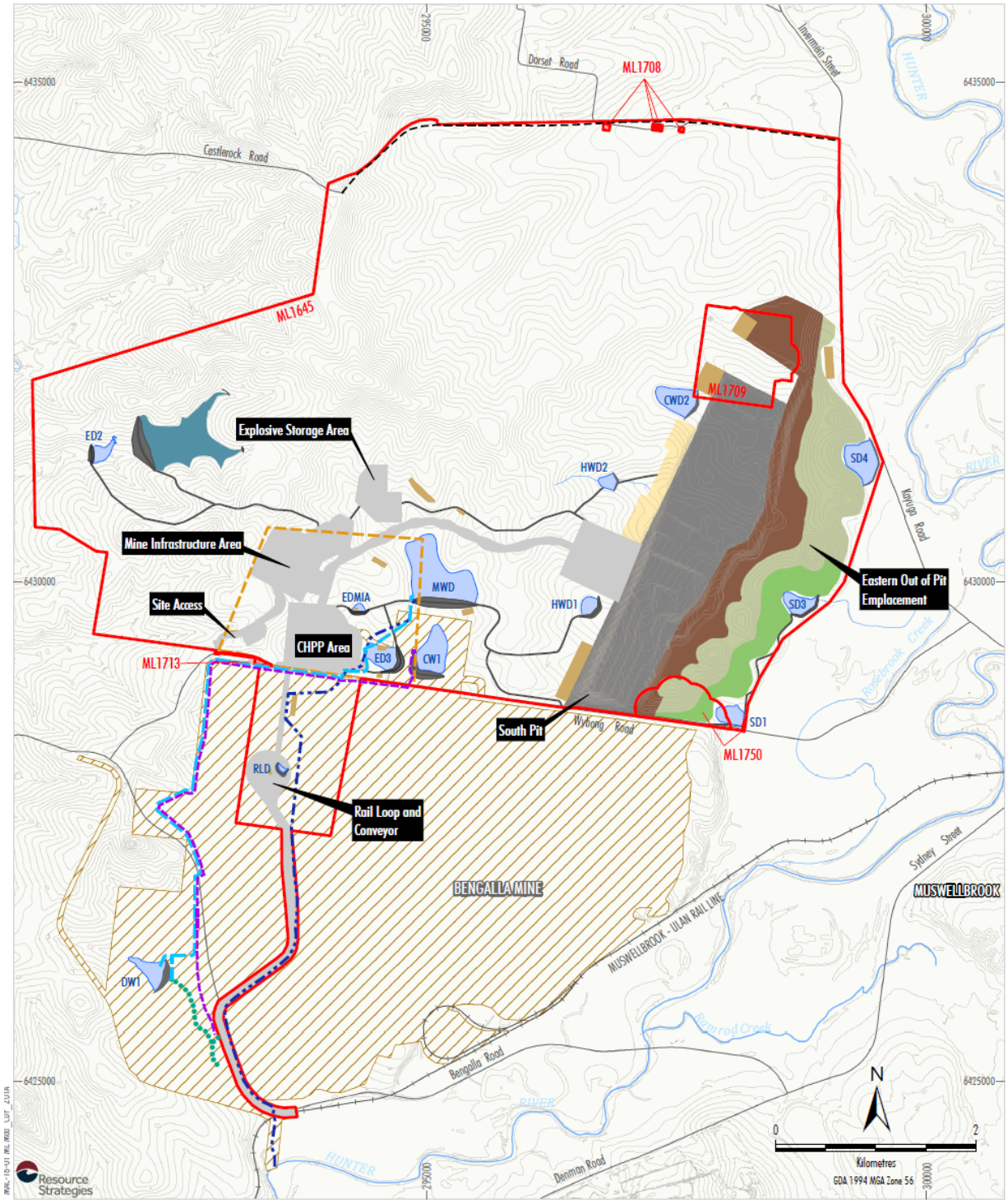
ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

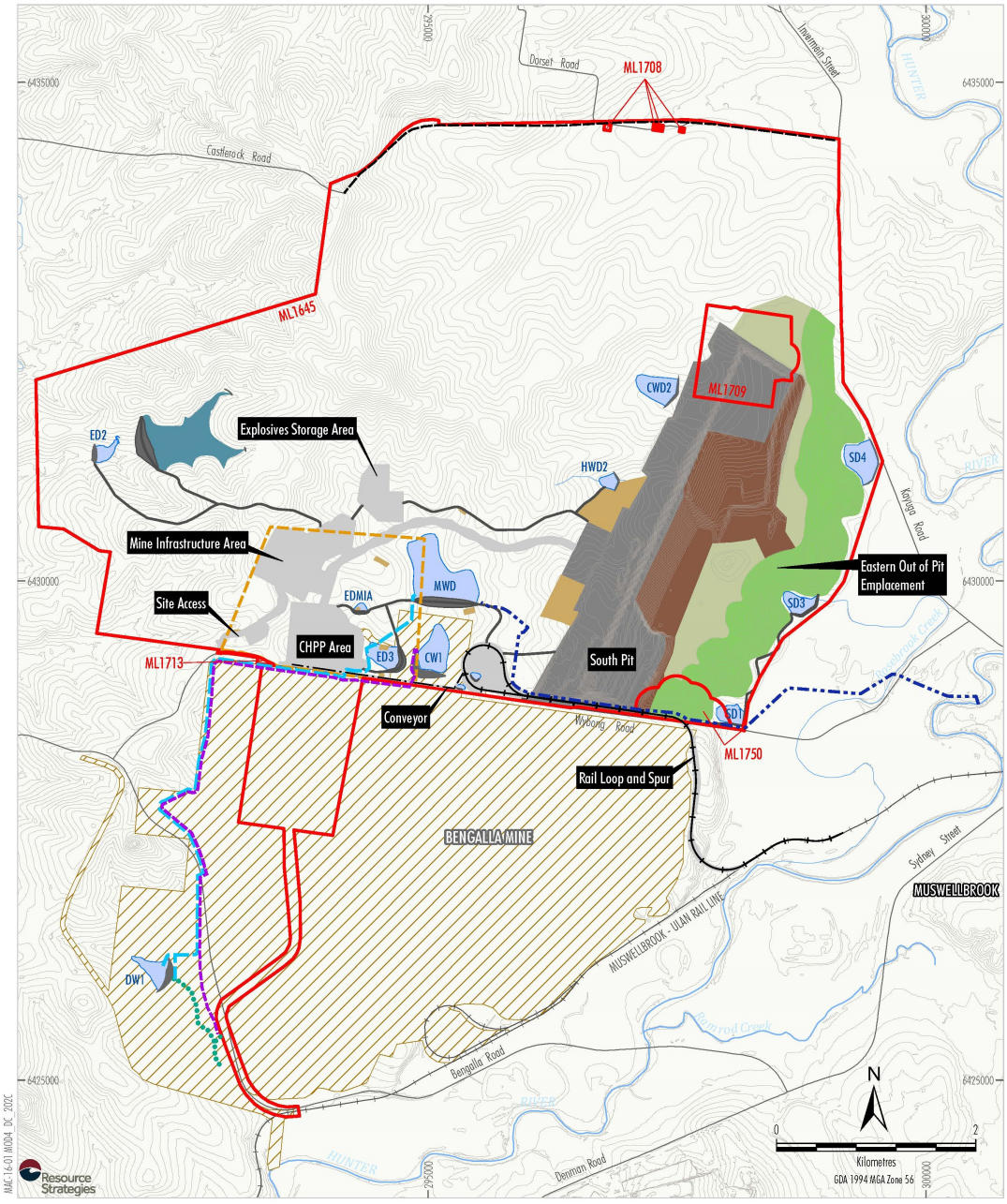
Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

MACHEnergy
MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

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- MPO Hunter River Supply Pipeline
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- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2018)

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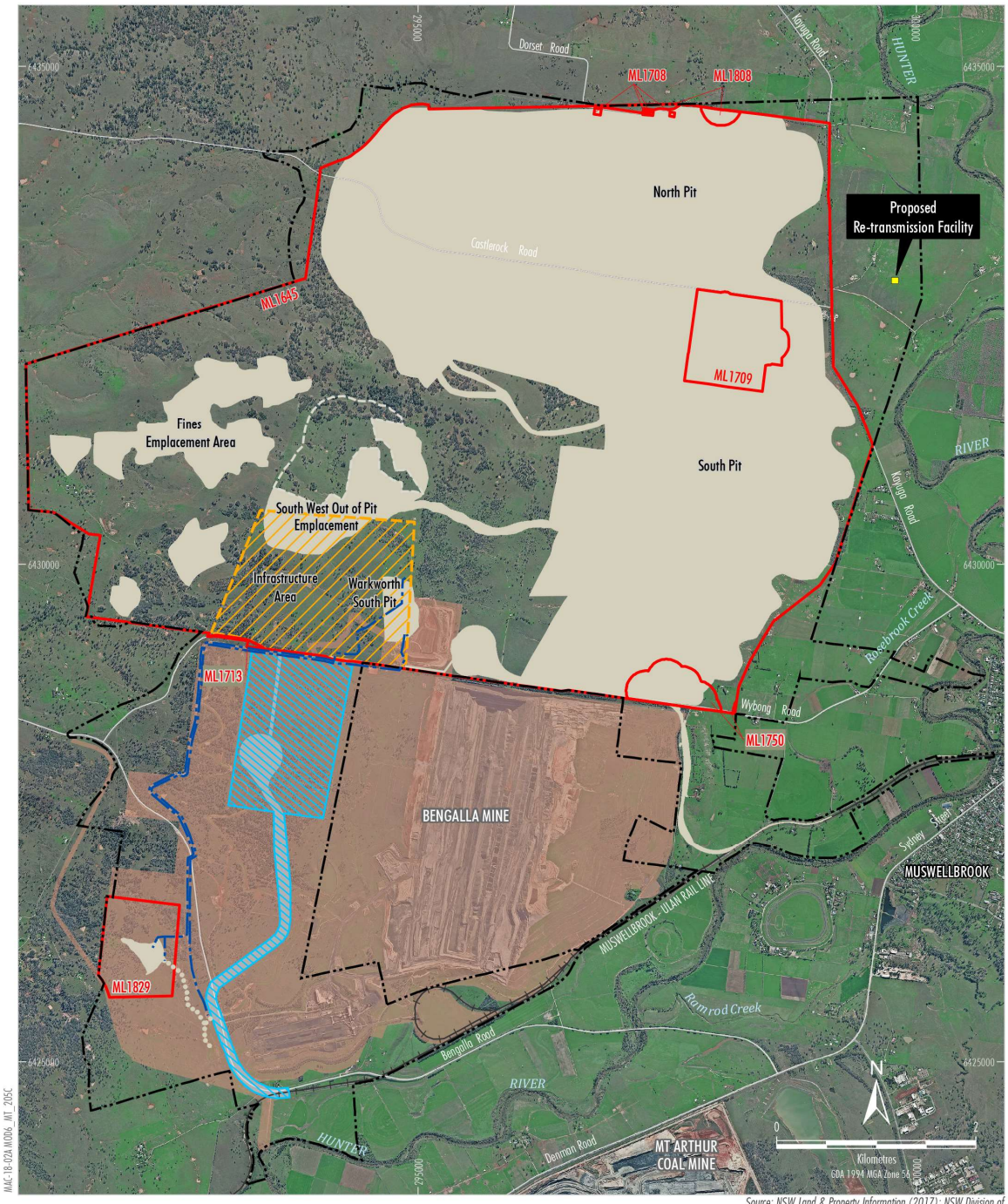
MOUNT PLEASANT OPERATION

FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Development Consent Boundary (DA 92/97)
- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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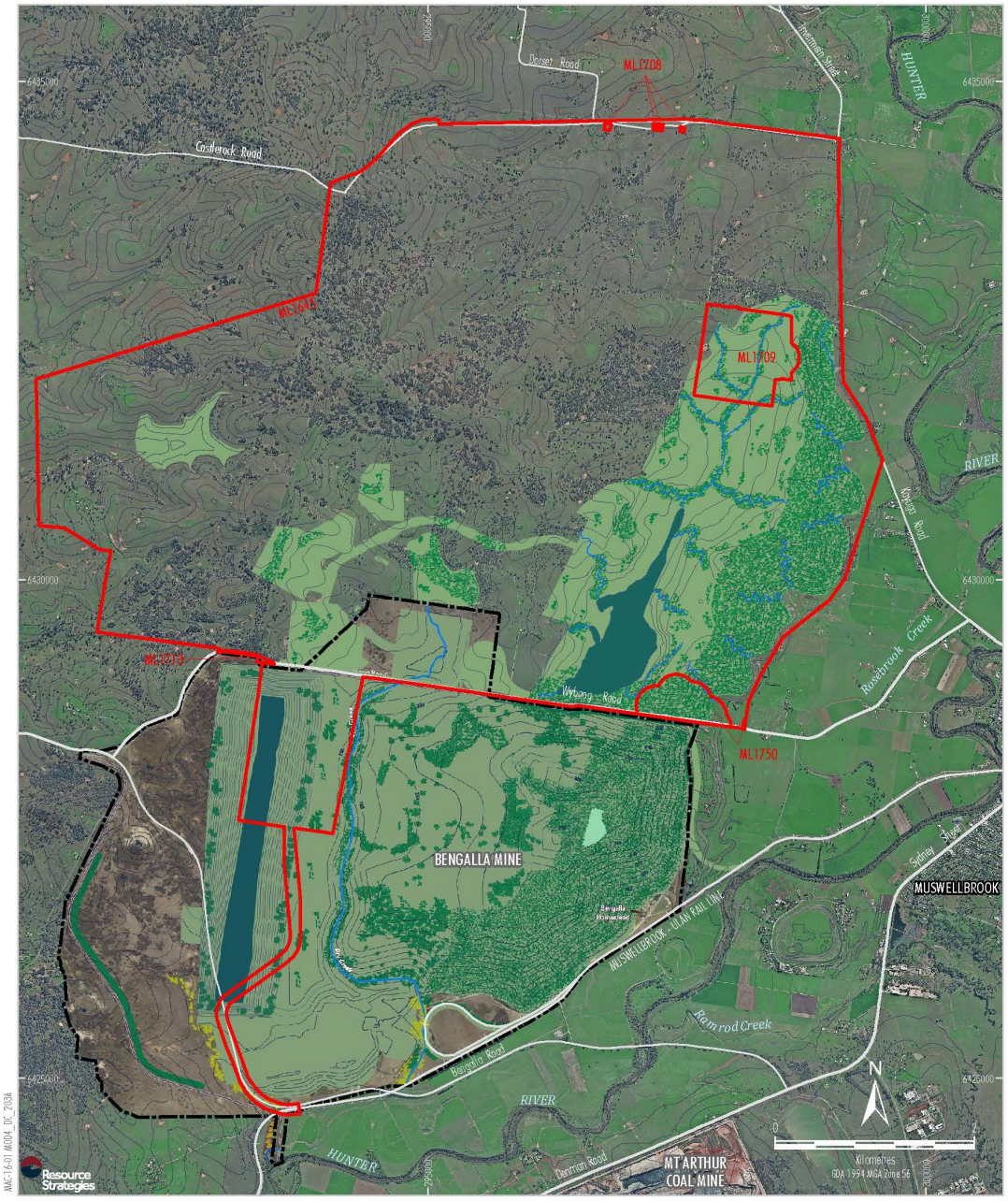
MOUNT PLEASANT OPERATION

Revised Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



LEGEND

- Mt Pleasant Mining Lease Boundary
- Final Void
- Final Rehabilitation

Bengalla Mine Conceptual Final Landform *

- Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
- Dry Creek
- Final Void Lake
- Rehabilitation
- Rehabilitation Class III
- Indicative Tree Screens (or equivalent)
- Treed Rehabilitation
- Indicative Restorative Area

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

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Conceptual Final Landform (2026)

ATTACHMENT 2

APPENDIX 2 OF DEVELOPMENT CONSENT SSD 10418

APPENDIX 2 DEVELOPMENT LAYOUT PLANS

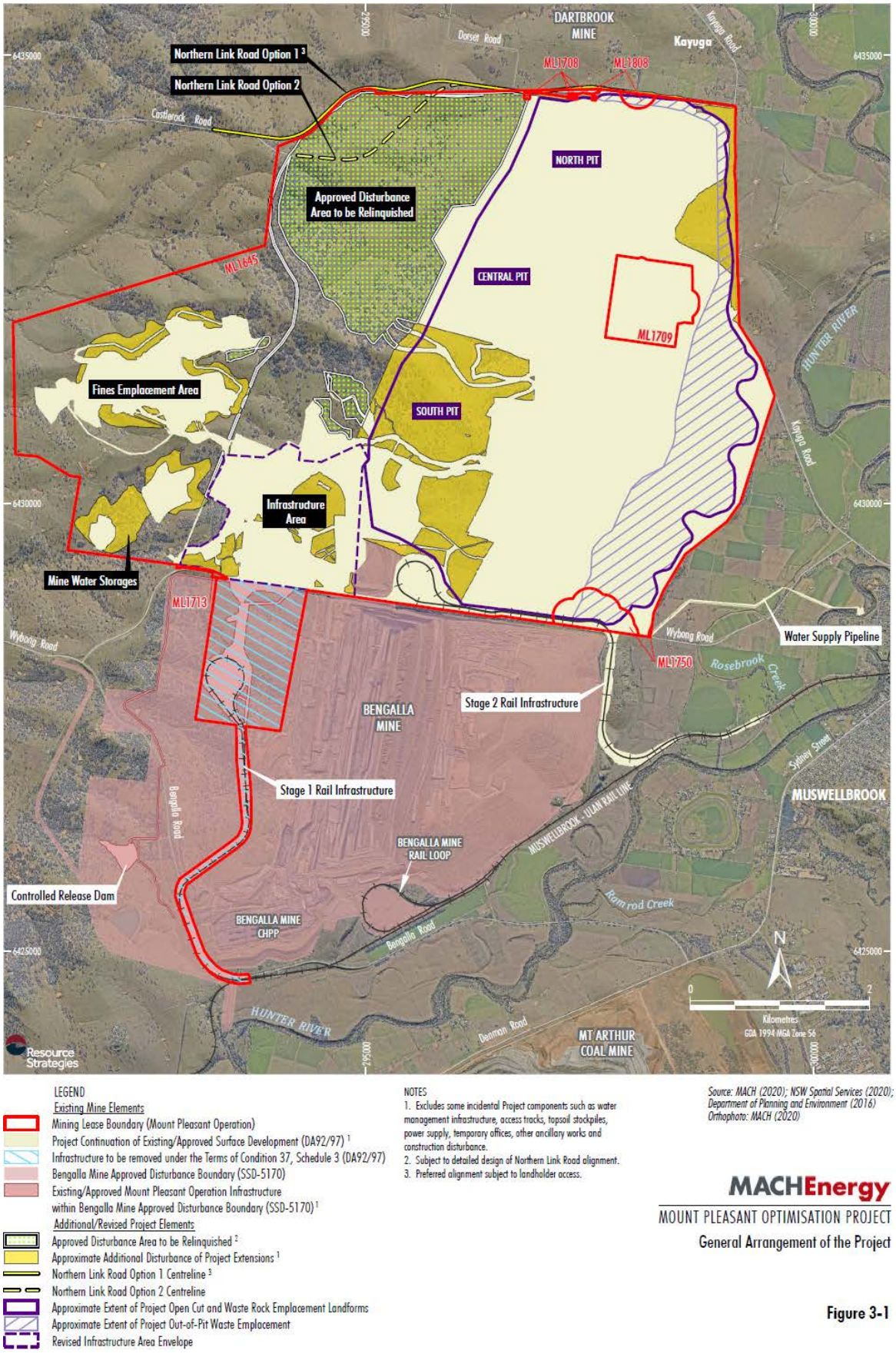


Figure 1: General Project Arrangement

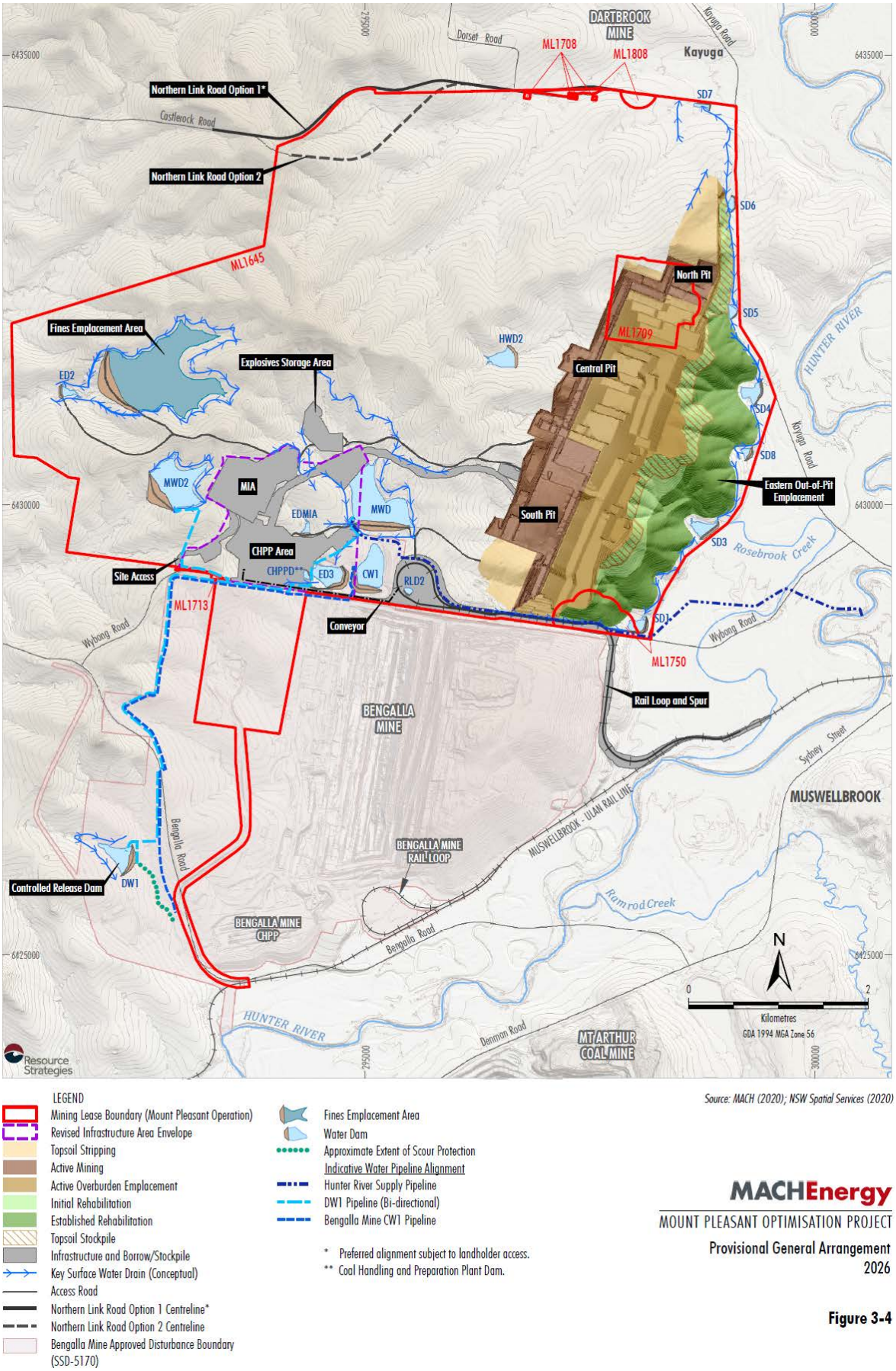
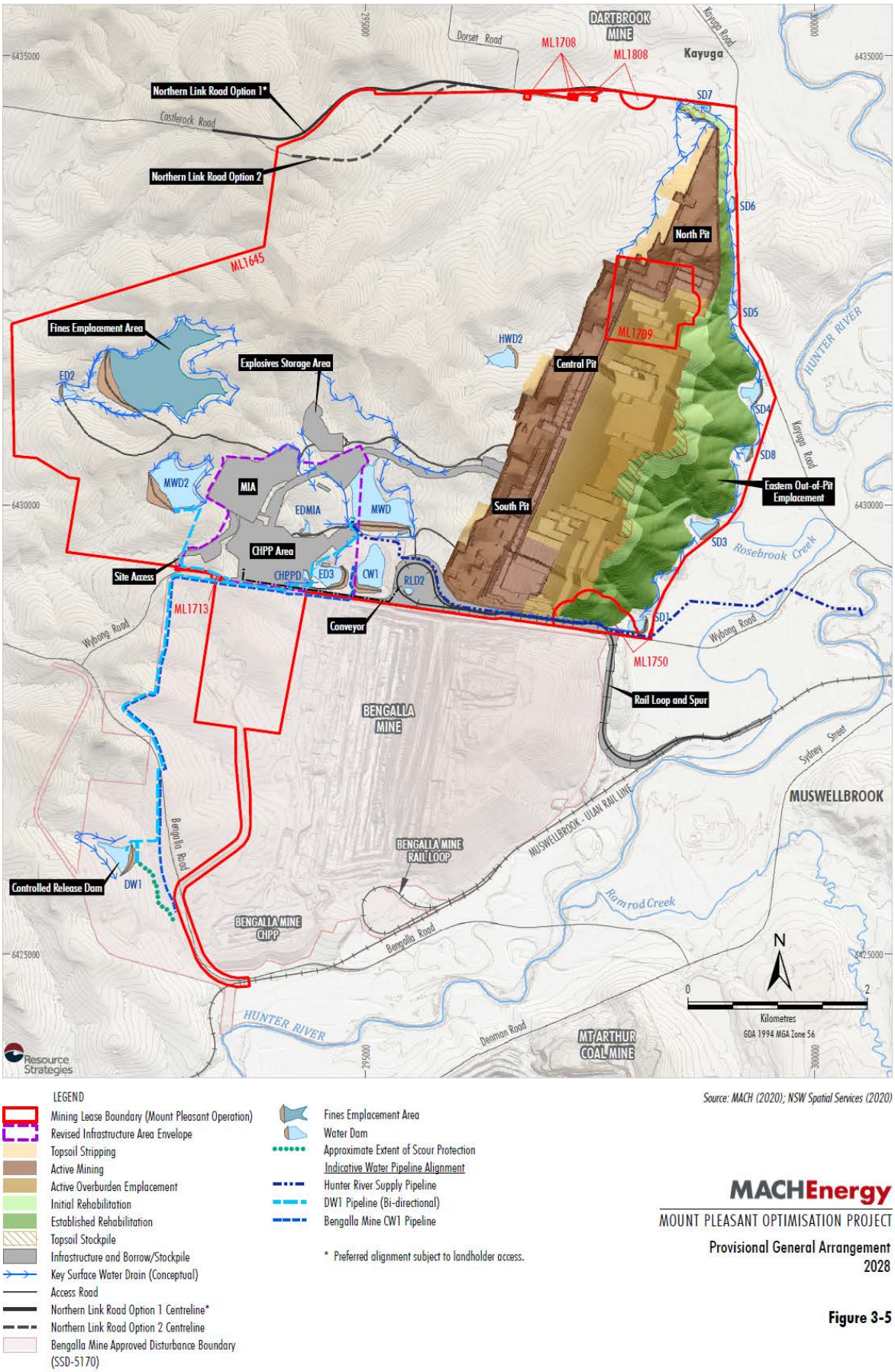


Figure 2: General Project Arrangement – 2026



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.

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

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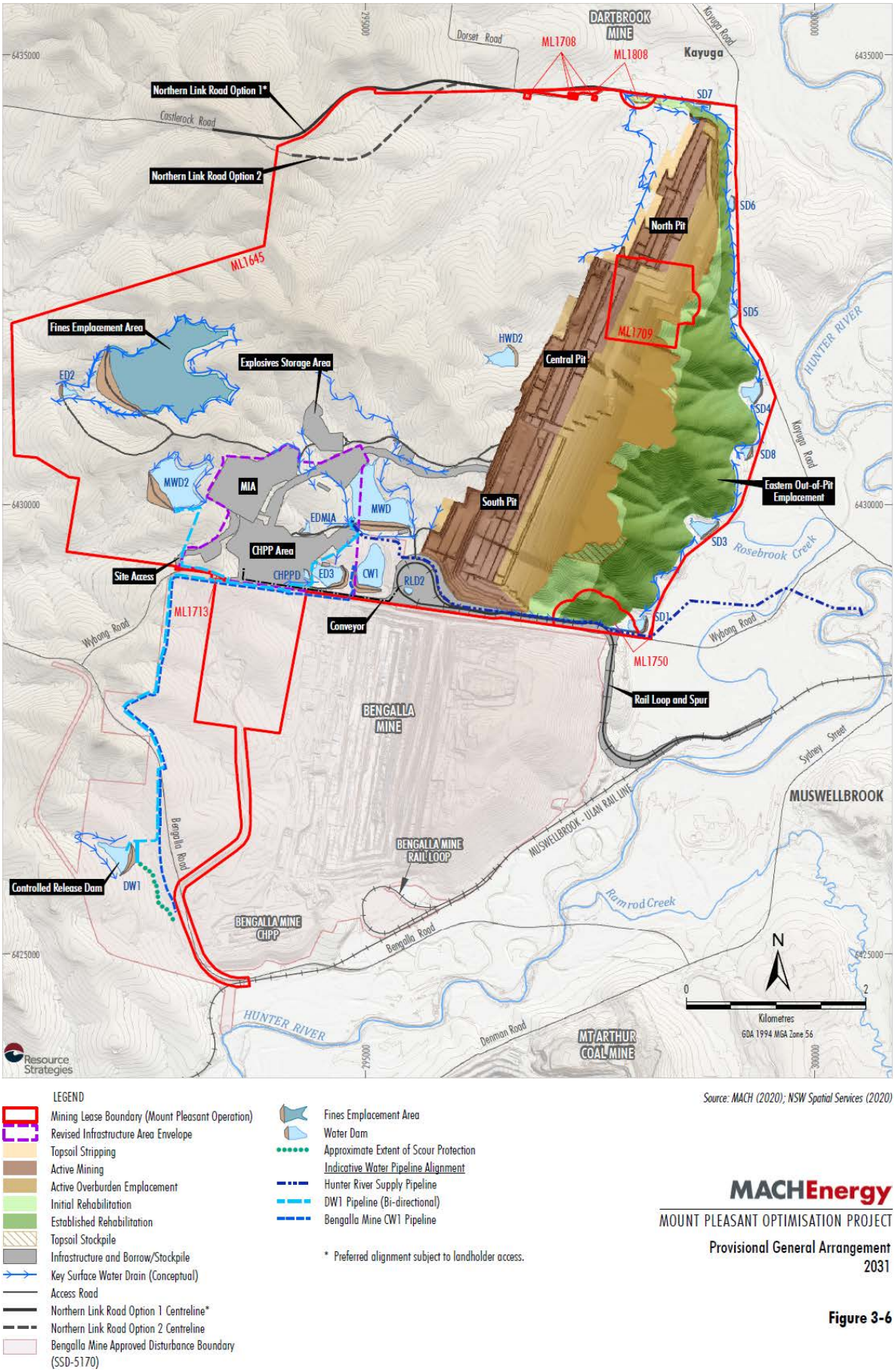
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5

Figure 3: General Project Arrangement – 2028



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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- 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

Figure 4: General Project Arrangement - 2031

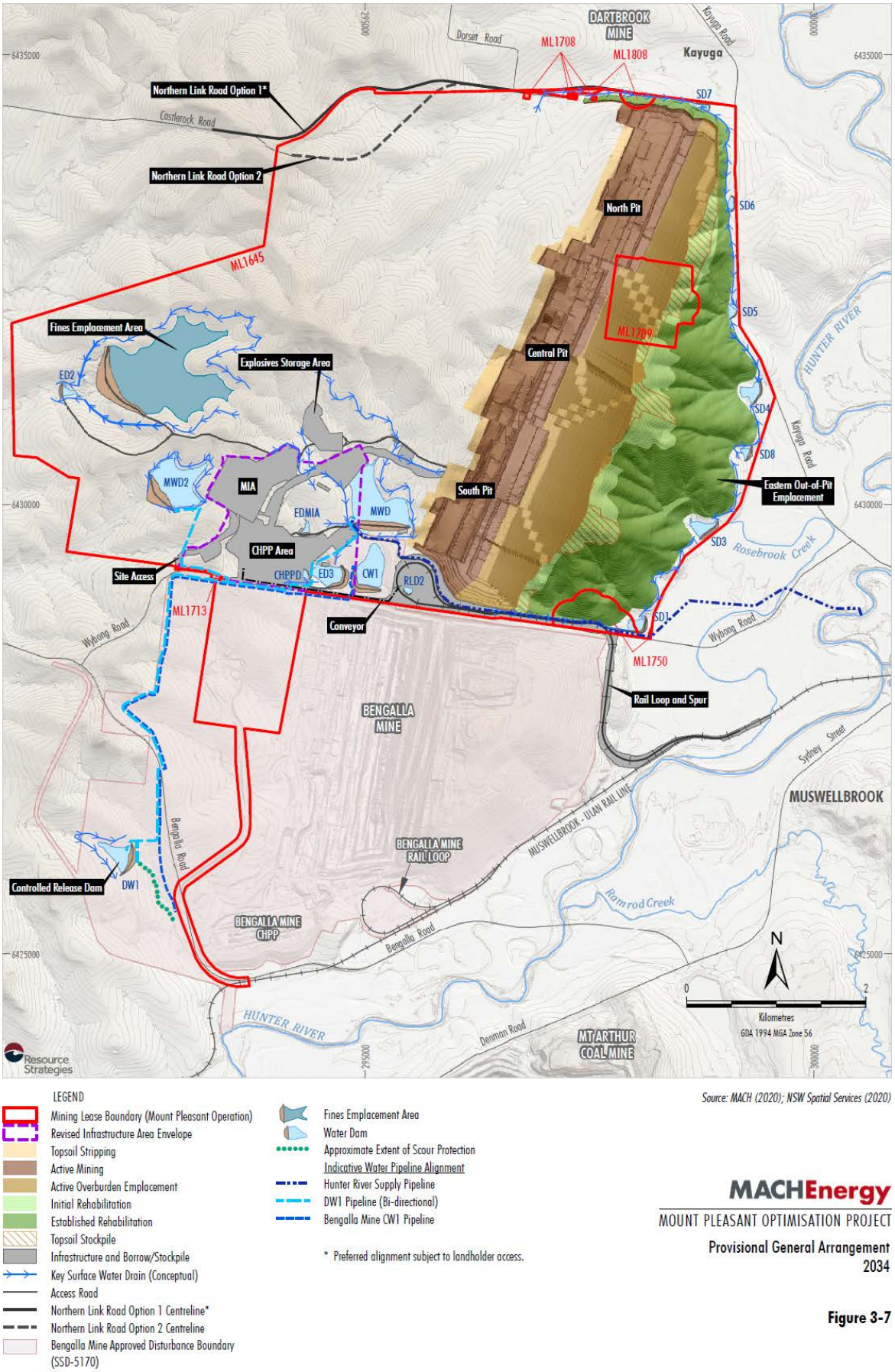


Figure 5: General Project Arrangement - 2034

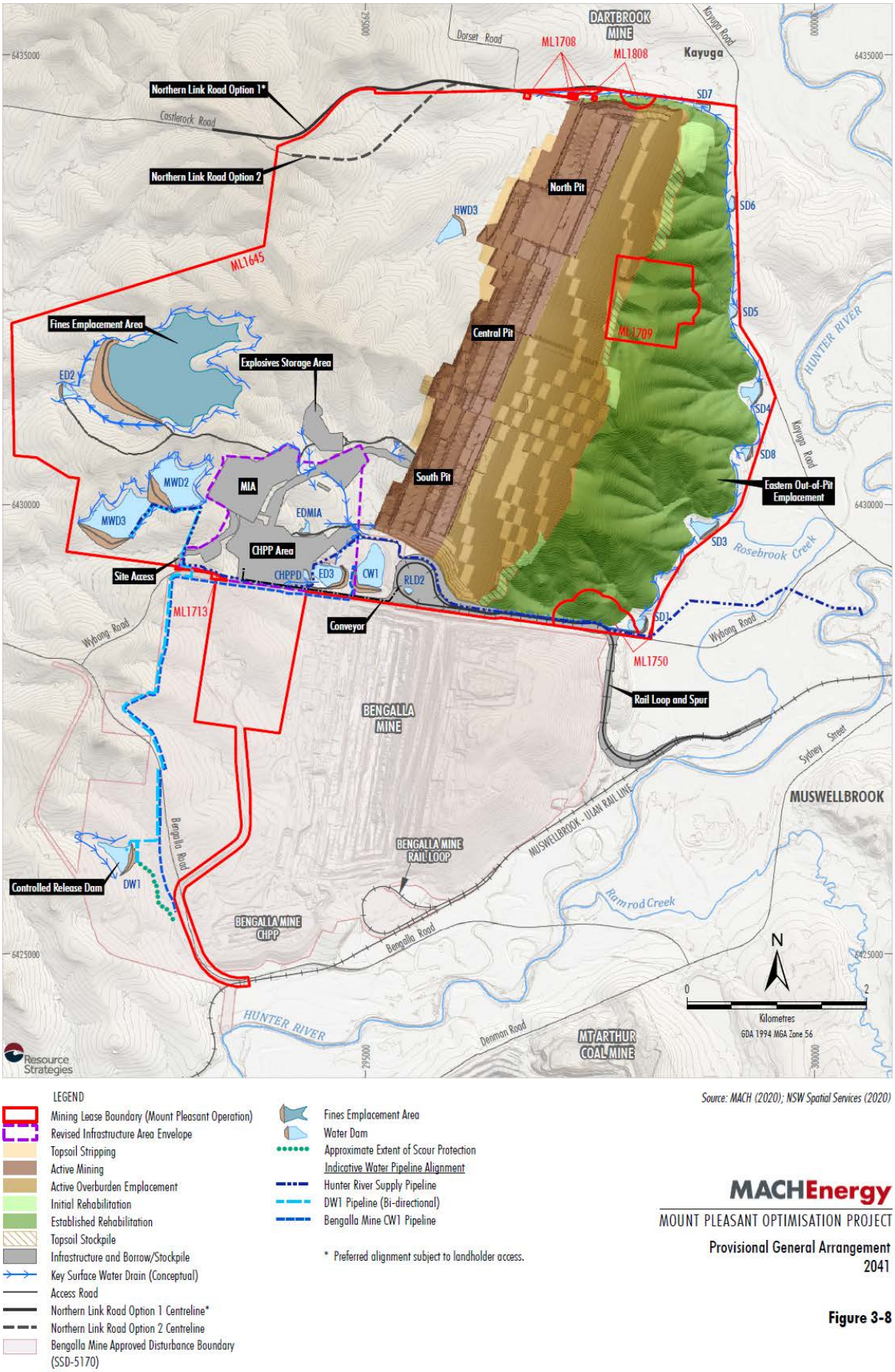
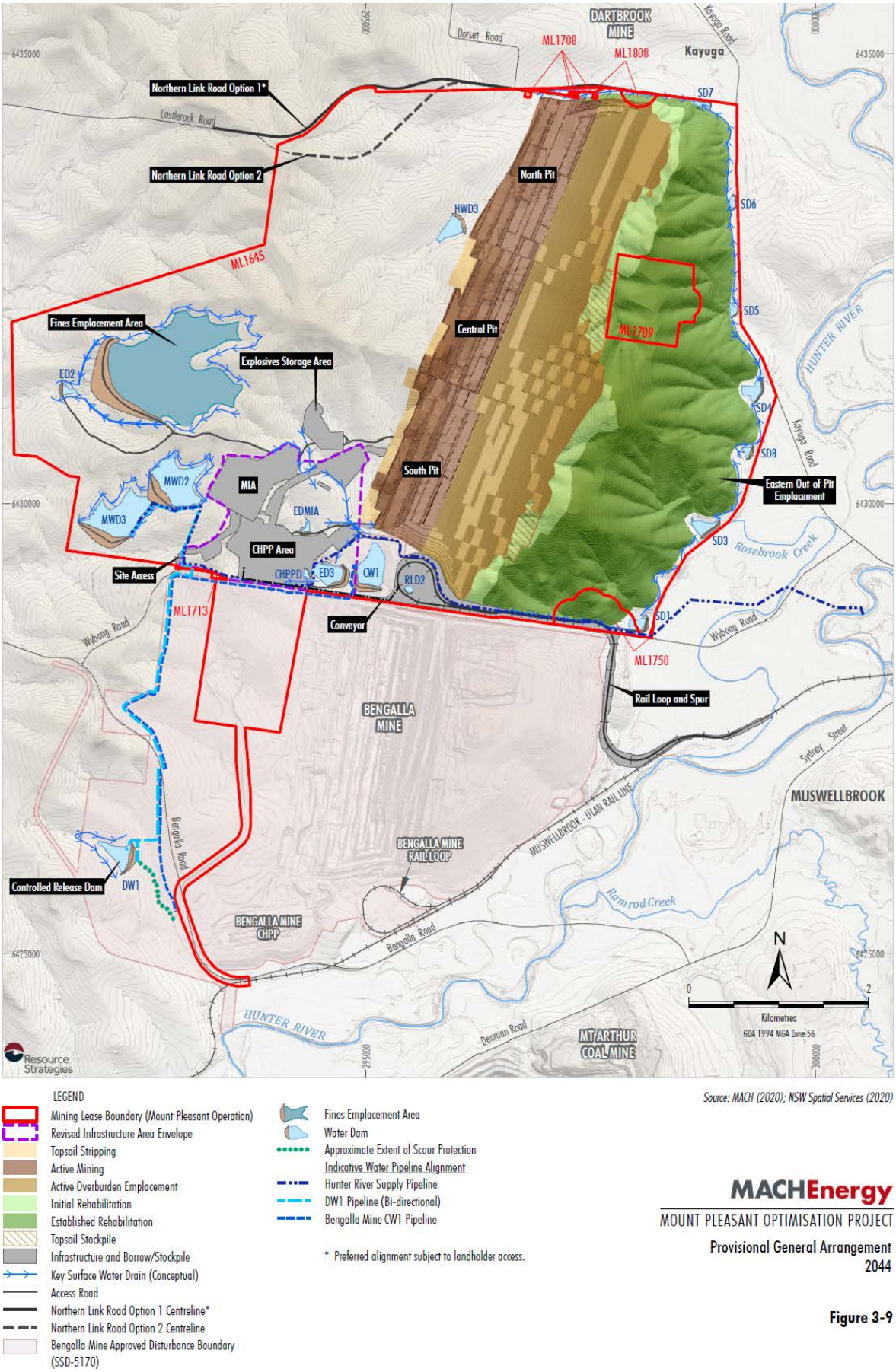


Figure 6: General Project Arrangement - 2041



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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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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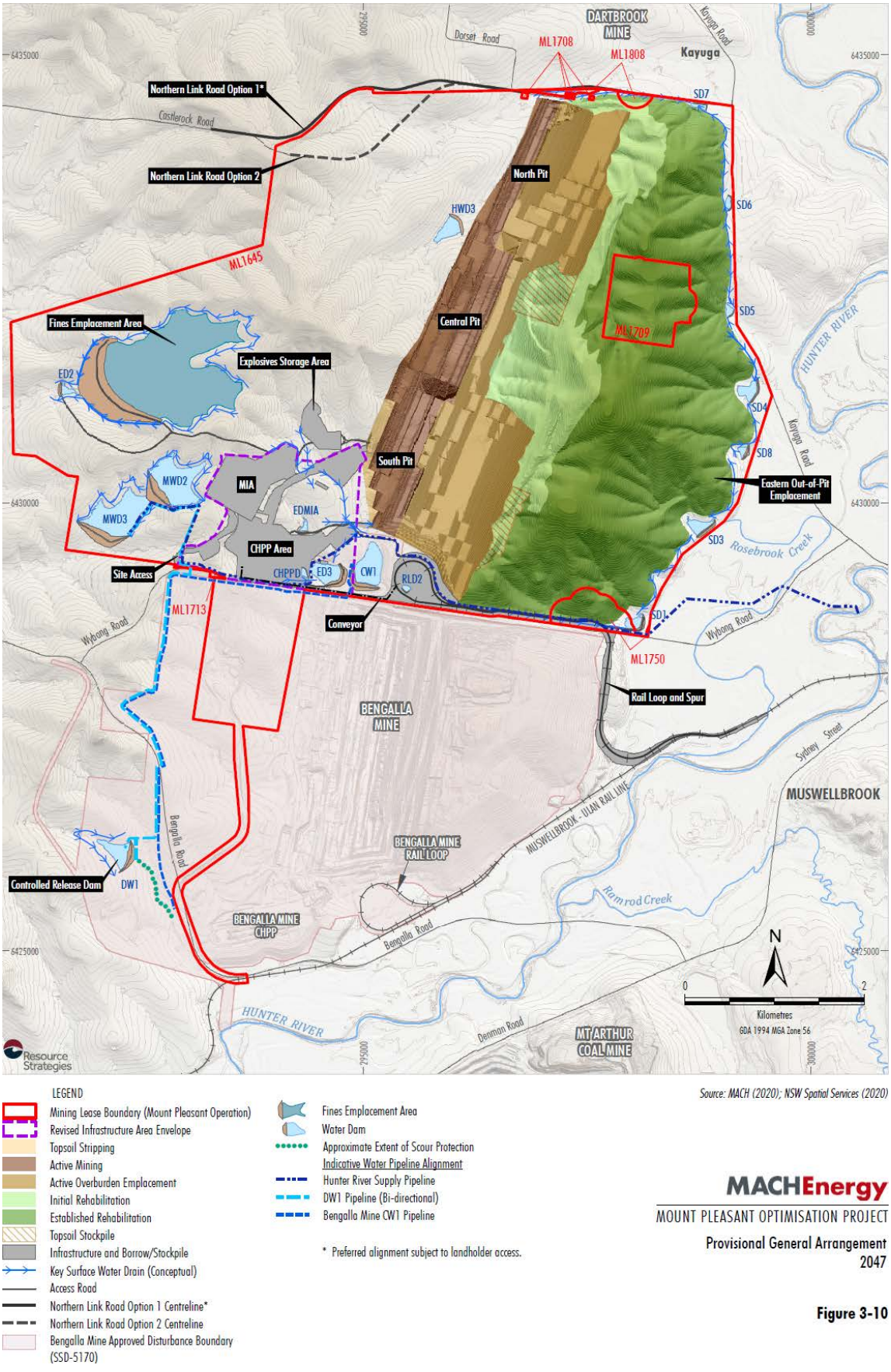
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9

Figure 7: General Project Arrangement - 2044



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
- Topsoil Stripping
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- Active Overburden Emplacement
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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

Figure 8: General Project Arrangement – 2047

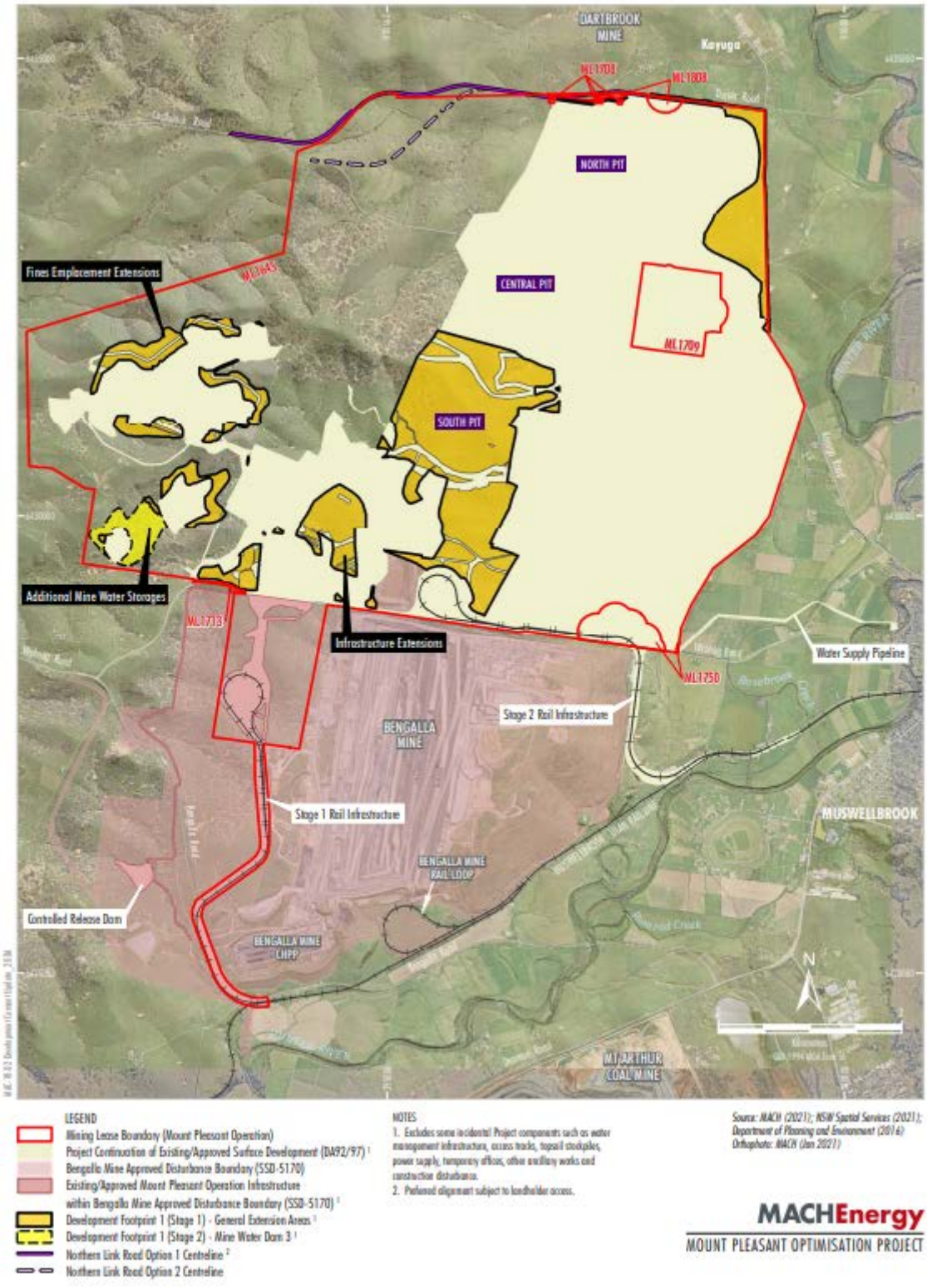

Figure 9: Staging of Project Disturbance Areas

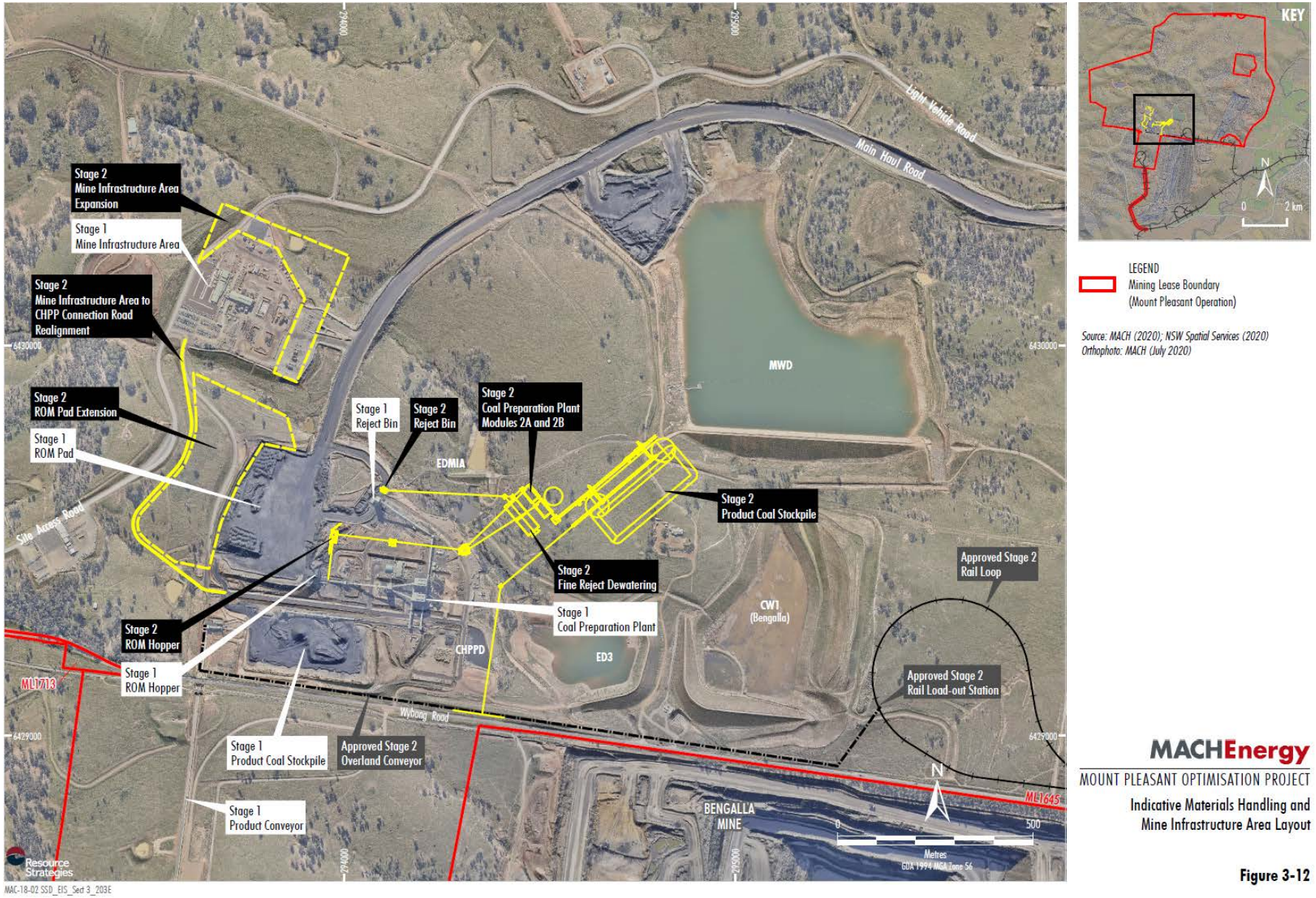

Figure 10: Indicative Mine Infrastructure Area Layout

ATTACHMENT 3

MPO BASELINE SURFACE WATER QUALITY DATA

Table A3-1
MPO Baseline Surface Water pH and EC Water Quality Data Summary

Site	Number of Samples	Number of Dry Samples	First Record	Final Record	pH					EC				
					Min	20th %ile	Median	80th %ile	Max	Min	20th %ile	Median	80th %ile	Max
W1	131	0	20/07/2000	17/10/2011	6.14	7.60	8.00	8.20	8.60	231	355	400	529	880
W2	184	0	20/07/2000	12/07/2016	6.47	7.80	8.10	8.30	8.80	229	351	410	539	790
W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W4	186	0	20/07/2000	12/07/2016	6.50	7.36	7.60	7.80	8.30	383	1,468	2,030	2,480	5,580
W5	186	183	20/07/2000	12/07/2016	6.10	6.18	6.30	6.72	7.00	80	96	120	983	1,558
W6	123	0	20/07/2000	17/04/2015	6.89	7.8	8.10	8.40	8.70	280	358	400	496	860
W7	188	186	20/07/2000	12/07/2016	6.80	7.00	7.30	7.60	7.80	145	178	228	277	310
W8	188	161	21/07/2000	12/07/2016	6.10	6.90	7.30	7.60	8.50	60	114	238	318	930
W9	188	178	21/07/2000	12/07/2016	6.40	6.68	7.05	7.30	7.40	50	128	255	365	537
W10	187	186	21/07/2000	12/07/2016	6.20	6.20	6.20	6.20	6.20	30	30	30	30	30
W12	36	-	23/10/2017	01/05/2020	7.50	7.70	8.00	8.10	8.40	897	4,270	4,970	6,420	7,890
W15	36	-	23/10/2017	01/05/2020	7.40	7.80	7.90	8.00	8.20	278	366	414	460	778

Table A3-2
MPO Baseline Surface Water TSS and TDS Water Quality Data Summary

Site	Number of Samples	Number of Dry Samples	First Record	Final Record	TSS (mg/L)					TDS (mg/L)				
					Min	20th %ile	Median	80th %ile	Max	Min	20th %ile	Median	80th %ile	Max
W1	131	0	20/07/2000	17/10/2011	1	3	8	20	194	-	-	-	-	-
W2	184	0	20/07/2000	12/07/2016	1	4	8	18	211	8	178	251	262	268
W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W4	186	0	20/07/2000	12/07/2016	1	3	6	12	232	1530	1,566	1,620	1,758	1,850
W5	186	183	20/07/2000	12/07/2016	8	11	15	18	20	-	-	-	-	-
W6	123	0	20/07/2000	17/04/2015	1	4	8	19	219	-	-	-	-	-
W7	188	186	20/07/2000	12/07/2016	20	30	46	61	71	-	-	-	-	-
W8	188	161	21/07/2000	12/07/2016	7	100	292	672	2,060	1560	1,560	1,560	1,560	1,560
W9	188	178	21/07/2000	12/07/2016	28	36	159	678	784	-	-	-	-	-
W10	187	186	21/07/2000	12/07/2016	139	139	139	139	139	-	-	-	-	-
W12	36	-	23/10/2017	01/05/2020	1	4	8.5	30	172	448	2610	2,905	3,890	4,730
W15	36	-	23/10/2017	01/05/2020	4	11	16	23	3,550	189	226	263	306	483

ATTACHMENT 4

MANGOOLA COAL BASELINE SURFACE WATER DATA – SANDY CREEK

	old site name	W1					W2				
	new site name	SW01					SW02				
	Eastings (MGA, z 56)	284041					286917				
	Northings (MGA, z 56)	6419087					6423773				
month	date sampled	Flow Condition	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	Flow Condition	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)
Feb-02	19/02/2002		6.81	304	29	328		7.48	839	119	704
Mar-02	19/03/2002		7.60	605	11	410		7.50	4060	21	2330
Apr-02	17/04/2002		8.25	568	10	360		7.86	5910	8	3650
May-02	14/05/2002		8.27	696	10	355		8.02	6840	0	3700
Jun-02	18/06/2002		8.40	548	38	330		8.10	4920	25	2810
Jul-02	24/07/2002		8.40	830	0	434		8.20	4940	25	3070
Aug-02	21/08/2002		8.26	1090	14	645		8.12	5640	6	3140
Sep-02	20/09/2002		8.00	1100	60	665		8.00	5850	2	3150
Oct-02	18/10/2002	Dry						7.93	6890	4	3920
Nov-02	19/11/2002	Dry					Dry				
Dec-02	11/12/2002		7.50	279	69	195		7.60	3390	21	1960
Jan-03	16/01/2003		8.26	520	9	398		7.39	4620	20	2670
Feb-03	19/02/2003		8.06	779	14	569		7.23	5430	116	2800
Mar-03	12/03/2003		8.29	518	27	363		7.26	5560	103	2960
Apr-03	15/04/2003		8.29	633	31	430		7.28	5310	58	3040
May-03	21/05/2003		8.60	735	18	577		7.33	5670	54	3310
Jun-03	18/06/2003		8.44	1010	444	706		7.28	5520	48	2970
Jul-03	17/07/2003		8.31	538	26	360		8.07	6990	3	3940
Aug-03	18/08/2003		7.98	419	6	264		7.86	4190	6	2260
Sep-03	15/09/2003		7.95	247	10	295		7.75	2950	10	1540
Oct-03	14/10/2003		7.90	304	9	243		7.95	5820	7	3230
Nov-03	17/11/2003		8.30	459	26	336	Dry				
Dec-03	24/11/2003		7.37	216	29	242		7.34	968	22	517
Jan-04	15/12/2003		7.63	233	21	261		7.52	1780	6	961
Feb-04	13/01/2004		8.23	440	26	344	Dry				
Mar-04	11/02/2004		7.77	283	30	243	Dry				
Apr-04	10/03/2004		8.62	286	18	202	Dry				
May-04	14/04/2004		8	347	31	233	Dry				
Jun-04	12/05/2004		8.24	505	44	316	Dry				
Jul-04	15/06/2004		8.5	423	41	270	Dry				
Aug-04	15/07/2004		8.3	527	48	342	Dry				
Sep-04	16/08/2004		8.3	599	123	384	Dry				
Oct-04	14/09/2004		7.9	372	843	262	Dry				
Nov-04	1/10/2004		7.74	373	141	270	Dry				
Dec-04	5/11/2004		8.31	314	130	350	Dry				
Jan-05	14/12/2004		8	620	5	380	Dry				
Feb-05	4/01/2005		8.2	470	103	300	Dry				
Mar-05	10/02/2005		7.3	240	97	230	Dry				
Apr-05	1/03/2005		7.9	370	68	250	Dry				
May-05	6/04/2005		7.5	503	58	518	Dry				
Jun-05	3/05/2005		7.4	634	25	414	Dry				
Jul-05	9/06/2005	Dry					Dry				
Aug-05	4/07/2005		7.22	116	65	245	Dry				
Sep-05	31/08/2005		7.3	331	80	256	Dry				
Oct-05	12/09/2005		7.2	360	129	282	Dry				
Nov-05	11/10/2005		7.6	479	63	320	Dry				
Dec-05	15/11/2005		8.2	437	99	216	Dry				
Jan-06	19/01/2006		7.1	561	49	466	Dry				
Feb-06	17/02/2006		7.3	831	101	564	Dry				
Mar-06	6/03/2006	Dry					Dry				
Apr-06	6/04/2006	Dry					Dry				
May-06	9/05/2006	Dry					Dry				
Jun-06	8/06/2006	Dry					Dry				
Jul-06	10/07/2006	Dry					Dry				
Aug-06	10/08/2006	Dry					Dry				
Sep-06	8/09/2006	Dry					Dry				
Oct-06	18/10/2006	Dry					Dry				
Nov-06	23/11/2006	Dry					Dry				
Dec-06	28/12/2006	Dry					Dry				
Jan-07	25/01/2007	Dry					Dry				
Feb-07	22/02/2007	Dry					Dry				
Mar-07	21/03/2007	Dry					Dry				
Apr-07	26/04/2007	Dry					Dry				
May-07	24/05/2007	Dry					Dry				
Jun-07	8/06/2007		5.63	62	456	420		5.77	16	120	20
Jul-07	20/07/2007		8.1	528	11	356		7.5	7050	22	3944
Aug-07	21/08/2007		7.1	567	68	343		7.6	3335	92	2334
Sep-07	12/09/2007		7.6	701	254	370		7.4	4930	13	2690
Oct-07	17/10/2007		8	1695	99	1061		7.2	5720	200	3795
Nov-07	19/11/2007		7.9	1382	44	870		6.9	7765	34	4420
Dec-07	14/12/2007		8.1	964	13	436		7.9	1915	7	1072
Jan-08	15/01/2008		7.9	950	31	542		8.3	3700	10	1890
Feb-08	14/02/2008		6.4	825	34	500		7.3	1792	12	1034
Mar-08	14/03/2008		7.8	840	54	556		8.3	5385	0	2760
Apr-08	16/04/2008		7.6	1899	57	1031		8.3	6440	11	10675
May-08	13/05/2008		9.8	1310	47	854		9.2	5920	14	3635
Jun-08	12/06/2008		7.6	1331	63	676		7.8	5220	8	3100
Jul-08	10/07/2008		8.4	1500	38	770		8.1	5620	3	3080
Aug-08	12/08/2008		8.3	1288	26	662		7.9	6120	6	2960
Sep-08	15/08/2008		8.6	730	86	376		8	3250	3	1570
Oct-08	10/10/2008		7.8	680	142	482		8	1940	21	1126
Nov-08	12/11/2008		8.3	952	139	590		8.4	4620	6	3215
Dec-08	8/12/2008		8.3	1160	185	700		8	4480	8	3110
Jan-09	20/01/2009	Dry					Dry				
Feb-09	12/02/2009	Dry						7.2	4800	20	3000
Mar-09	19/03/2009		7.9	790	30	530		8.2	5300	20	3300
Apr-09	16/04/2009		7.6	630	26	420		8	5220	4	3020
May-09	13/05/2009	Dry						8.3	5200	2	3400
Jun-09	11/06/2009	Dry						8	5000	3	2740
Jul-09	15/07/2009	Dry						8.2	4940	2	2805
Aug-09	10/08/2009	Dry						8.3	5065	1	2978
Sep-09	11/09/2009	Dry						8.1	4900	1	2600
Oct-09	15/10/2009	Dry						9	5600	4	3600
Nov-09	12/11/2009	Dry						8.1	4800	5	2800
Dec-09	29/12/2009	Dry						7.5	5600	8	3200
Jan-10	15/01/2009		7.6	510	7	350		7.8	3100	7	2500
Feb-10	12/02/2010		8.5	650	100	440	Dry				
Mar-10	17/03/2010	Dry					Dry				
Apr-10	12/04/2010		7.3	400	15	340	Dry				
May-10	12/05/2010	Dry					Dry				
Jun-10	11/06/2010	Dry						8	4310	27	1960

	old site name	W1					W2				
	new site name	SW01					SW02				
	Eastings (MGA, z 56)	284041					286917				
	Northings (MGA, z 56)	6419087					6423773				
month	date sampled	Fluw Conditions	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	Fluw Conditions	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)
Jul-10	9/07/2010	Dry					Flow	8.4	5495	6	2805
Aug-10	20/08/2010	No Flow	8.6	287	3	182	Flow	8.2	5330	11	2865
Sep-10	16/09/2010	No Flow	8.0	336	8	178	Flow	7.8	5465	14	2915
Oct-10	19/10/2010	Dry					No Flow	8.1	5630	232	3050
Nov-10	10/11/2010	No Flow	7.8	318	8	242	No Flow	7.7	4020	4	2570
Dec-10	2/12/2010	No Flow	7.7	334	15	282	No Flow	7.7	4310	26	2440
Jan-11	10/01/2011	No Flow	8.2	297	35	380	No Flow	8.2	5440	19	3080
Feb-11	14/02/2011	No Flow	7.5	859	249	580	No Flow	7.7	6470	23	4070
Mar-11	10/03/2011	No Flow	7.5	999	394	694	Dry				
Apr-11	14/04/2011	No Flow	7.4	678	725	514	Dry				
May-11	11/05/2011	Dry					Dry				
Jun-11	9/06/2011	No Flow	8.8	383	48	228	No Flow	8.0	3890	5	2220
Jul-11	25/07/2011	No Flow	7.6	487	17	282	Flow	8.0	5250	21	2870
Aug-11	18/08/2011	No Flow	8.0	529	11	327	Flow	8.0	5230	2	2960
Sep-11	29/09/2011	Flow	9.0	485	15	310	Flow	7.8	5220	<1	2900
Oct-11	20/10/2011	No Flow	7.3	269	5	358	Flow	8.0	3410	1	1880
Nov-11	17/11/2011	No Flow	7.4	283	43	209	Flow	7.8	5380	16	2920
Dec-11	28/12/2011	No Flow	9.0	1253	4	714	Flow	7.7	2730	1	1500
Jan-12	26/01/2012	No Flow	7.9	1461	23	924	Flow	7.6	4580	4	2660
Feb-12	24/02/2012	No Flow	8.8	825	5	475	Flow	7.7	2560	4	1380
Mar-12	3/03/2012	Flow	6.7	126	25	223	Flow	7.9	1993	293	1230
Apr-12	20/04/2012	No Flow	8.5	1736	4	976	Flow	8.0	3260	3	1970
May-12	22/05/2012	No Flow	8.4	1739	11	991	Flow	8.1	3850	2	2060
Jun-12	28/06/2012	No Flow	8.4	1660	10	892	Flow	8.1	3690	5	2060
Jul-12	26/07/2012	Flow	7.9	1463	8	773	Flow	8.2	3070	3	1650
Aug-12	27/08/2012	No Flow	8.3	1983	6	1090	Flow	8.2	3790	<1	2120
Sep-12	24/09/2012	No Flow	8.8	2820	24	1500	Flow	8.1	3940	2	2150
Oct-12	16/10/2012	No Flow	9.0	3080	13	1750	Flow	8.0	4080	1	2330
Nov-12	13/11/2012	No Flow	7.7	4460	215	2450	No Flow	7.9	4950	11	2760
Dec-12	21/12/2012	No Flow					Dry				
Jan-13	16/01/2013	Dry					No Flow	7.6	6200	11	3460
Feb-13	14/02/2013	No Flow	7.4	541	12	391	Flow	7.9	4040	69	2460
Mar-13	14/03/2013	Flow	7.5	1739	1	974	Flow	7.8	2030	3	1160
Apr-13	17/04/2013	No Flow	8.3	2270	2	1340	Flow	7.9	3550	<1	1920
May-13	16/05/2013	No Flow	8.4	2970	10	1560	Flow	8.1	3930	1	2190
Jun-13	6/06/2013	No Flow	8.3	2940	15	1460	Flow	8.2	4180	<5	2150
Jul-13	10/07/2013	No Flow	8.6	1615	7	934	Flow	8.2	3740	3	2150
Aug-13	19/08/2013	No Flow	9.2	3190	9	1740	Flow	8.6	3800	<1	2140
Sep-13	12/09/2013	No Flow	8.4	3820	29	2170	Flow	8.0	3850	<1	2240
Oct-13	10/10/2013	No Flow	8.3	4640	32	5310	Flow	8.0	4220	3	2400
Nov-13	20/11/2013	No Flow	7.8	1329	82	774	Flow	7.8	1984	19	1090
Dec-13	18/12/2013	No Flow	8.3	2020	25	1130	Flow	7.7	3800	4	2090
Jan-14	20/01/2014	No Flow	8.9	4150	51	2400	No Flow				
Feb-14	13/02/2014	No Flow					No Flow				
Mar-14	20/03/2014	No Flow	7.5	554	17	408	No Flow	7.6	5510	6	3260
Apr-14	9/04/2014	No Flow	7.4	371	24	327	Flow	7.7	3900	1	2220
May-14	7/05/2014	No Flow	7.7	485	95	926	Flow	7.9	3980	1	2310
Jun-14	19/06/2014	No Flow	8.2	672	10	388	Flow	8.1	4540	<5	2320
Jul-14	9/07/2014	No Flow	7.8	768	39	458	Flow	8.0	4340	<1	2430
All data	95th Percentile		8.8	3014	251	1632		8.3	6544	118	3924
July 2010 to July 2014 - Flow	95th Percentile		8.8	1698	24	944		8.3	5410	57	2917
July 2010 to July 2014 - No Flow	95th Percentile		9.0	4181	264	2405		8.2	6362	150	3826
All data	Maximum		9.8	4640	843	5310		9.2	7765	293	10675
All data	Minimum		5.6	62	0	178		5.8	16	0	20

APPENDIX 4

GROUNDWATER MANAGEMENT PLAN

MACHEnergy

MOUNT PLEASANT OPERATION

GROUNDWATER MANAGEMENT PLAN

Document ID:	MMP001-0000-ENV-PLN-0006		
Company:	MACH Energy Australia Pty Ltd		
Effective Date:	August 2024	**Status:**	Final
Approved By:	Andrew Reid	**Revision Number:**	02

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy Australia Pty Ltd (MACH Energy) purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Groundwater Management Plan (GWMP) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for operations 24 hours per day seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

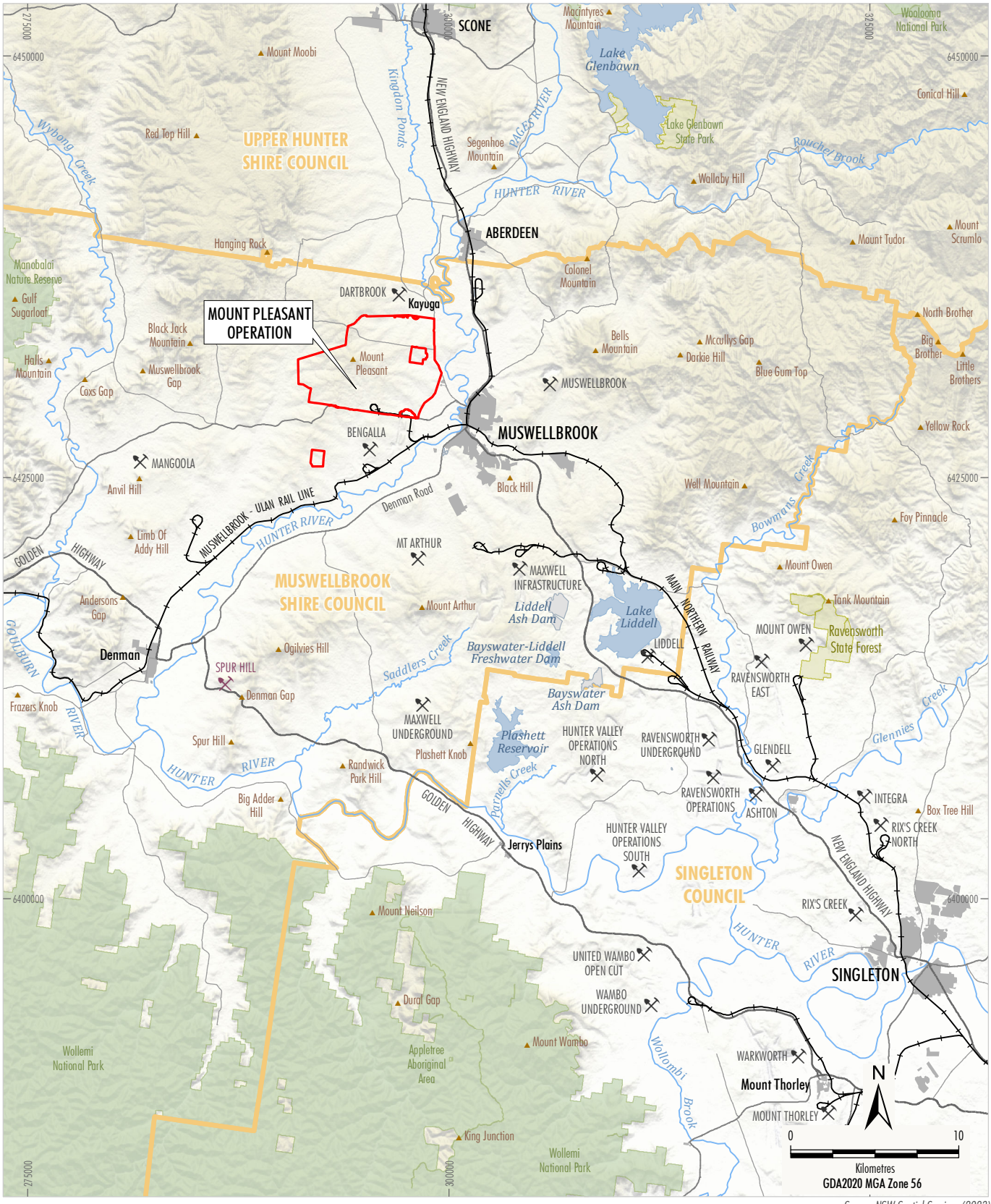
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

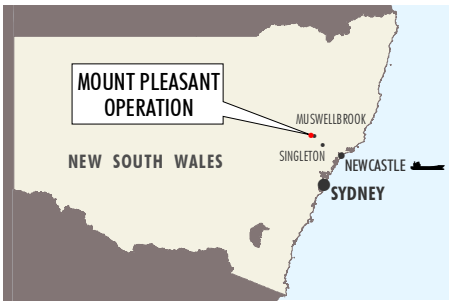
The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out-of-Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.



Source: NSW Spatial Services (2023)



LEGEND

- Mining Operation
- Proposed Mining Operation (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

MACHEnergy

MOUNT PLEASANT OPERATION

Regional Location

Figure 1

MAC-18-03A MP2023_Figure 1_Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the NSW Department of Planning and Environment (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

Modification 5 (MOD 5) was submitted to rectify an administrative error in Development Consent DA 92/97 and was approved by DPE on 29 June 2022.

Modification 6 (MOD 6) was submitted to modify Development Consent DA 92/97 and was approved on 6 November 2023. MOD 6 will allow for the construction and operation of a re-transmission facility including a tower or mast, shed and associated transmission infrastructure to re-transmit local digital television signals from the Broadcast Australia site at Rossgole Lookout. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Revised Approved Surface Disturbance Plan incorporating the MOD 6 infrastructure (Attachment 1).

On 22 January 2021, MACH Energy submitted the Mount Pleasant Optimisation Project (the Project) EIS in support of State Significant Development (SSD) 10418 under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Key aspects of the Project generally involve (among other things):

- increased open cut extraction within the MPO's existing mining leases;
- a staged increase in extraction, handling and processing of ROM coal up to 21 million tonnes per annum (Mtpa);
- upgrades to existing infrastructure and new infrastructure to support mining of the proposed Project; and
- an extension to the time limit on mining operations to 22 December 2048.

The Project was approved by the NSW Independent Planning Commission on 6 September 2022. Appendix 2 of Development Consent SSD 10418 illustrates the General Project Arrangement at 2026, 2028, 2031, 2034, 2041, 2044 and 2047, Staging of Project Disturbance Areas, and Indicative Mine infrastructure Area Layout (Attachment 2).

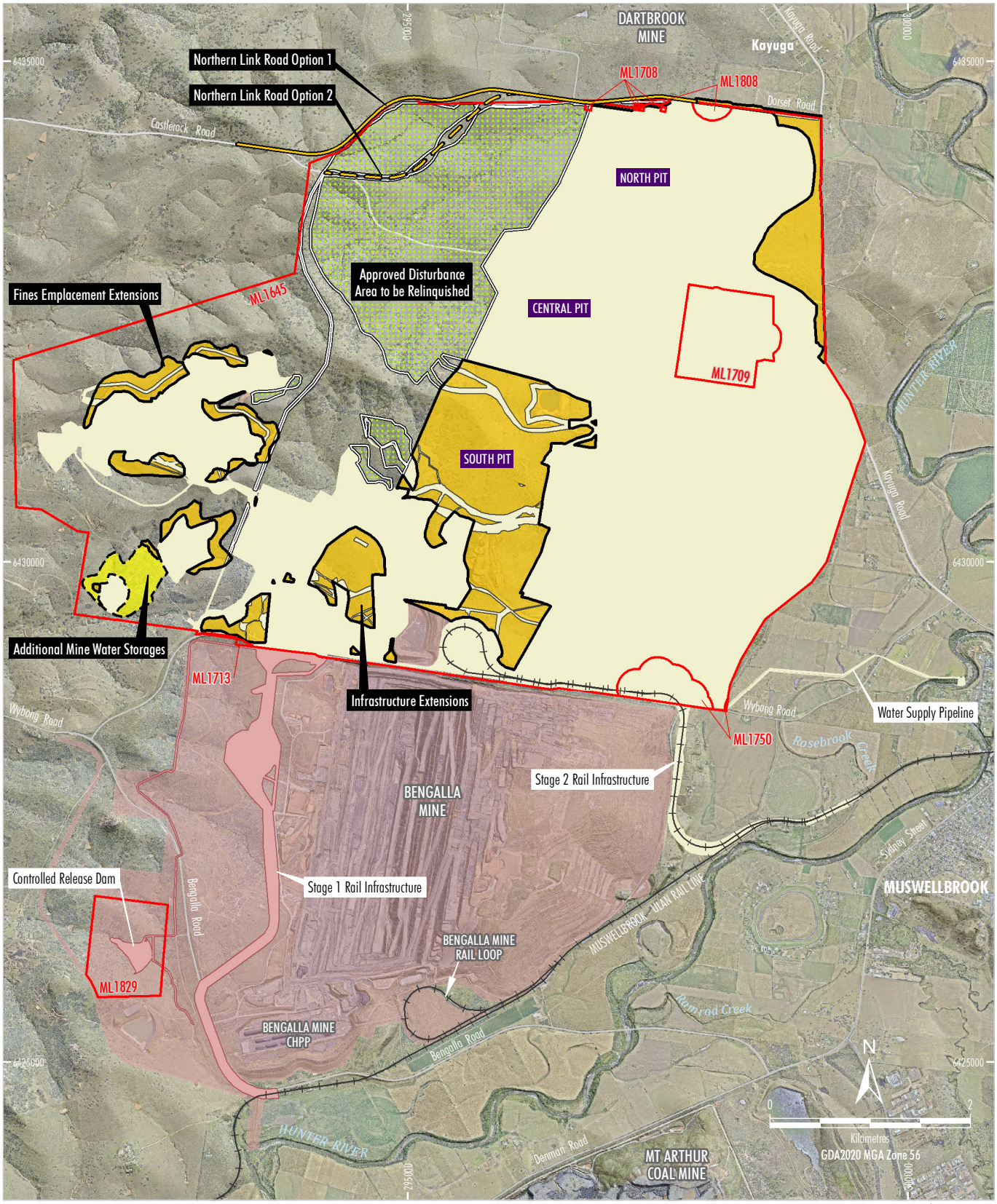
The Project EIS was supported by a Groundwater Impact Assessment (Australasian Groundwater and Environmental Consultants Pty Ltd ([AGE Consultants], 2020). The Groundwater Impact Assessment findings and mitigation measures relevant to the preparation of this GWMP have been incorporated into this document.

Part A, Condition A14 of Development Consent SSD 10418 requires the surrender of Development Consent DA 92/97 within 12 months of the date of commencement of development under Development Consent SSD 10418, or an alternative timeframe agreed with the Planning Secretary of the DPE (now Department of Planning, Housing and Infrastructure [DPHI]).

Following the commencement of development under Development Consent SSD 10418 and prior to the surrender of Development Consent DA 92/97, MACH Energy will comply with the requirements of both consents.

This GWMP has been prepared to satisfy the relevant conditions of both Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender). Where relevant, this GWMP builds on the components of the existing/approved GWMP, including previous feedback from government stakeholders and recommendations.

Figure 2 shows the indicative Project general arrangement and existing/approved surface development areas that would continue to comprise part of the Project and the areas that would be relinquished.



MAC-18-03A MP2023_Figure 2_Rev C

LEGEND

- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Project Continuation of Existing/Approved Surface Development (DA92/97) [1]
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Existing/Approved Mount Pleasant Operation Infrastructure within Bengalla Mine Approved Disturbance Boundary (SSD-5170) [1]
- Development Footprint 1 (Stage 1) - General Extension Areas [1]
- Development Footprint 1 (Stage 2) - Mine Water Dam 3 [1]
- Relinquishment Area
- Northern Link Road Option 1 Centreline
- Northern Link Road Option 2 Centreline

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.

Source: MACH (2023); NSW Spatial Services (2023); Department of Planning and Environment (2016)
Orthophoto: MACH (Dec 2022)

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General Arrangement of the Project

Figure 2

1.1 PURPOSE AND SCOPE

This GWMP has been prepared by MACH Energy to satisfy the requirements under Development Consent SSD 10418, specifically Part B, Condition B52. It also satisfies the requirements of Development Consent DA 92/97 (prior to its surrender) and specifically Condition 28(d), Schedule 3.

The GWMP applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The GWMP applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent SSD 10418, which permits mining until 22 December 2048, and Development Consent DA 92/97 (prior to its surrender). As required by Part A, Condition A5 of Development Consent 10418, this GWMP will continue to apply (excluding mining operations) beyond 22 December 2048, as required, until the rehabilitation and any additional undertakings (required by the Planning Secretary of the DPHI (previously DPE), or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

All conditions and statutory requirements under Development Consent DA 92/97 will become null and void after its surrender at which time the MPO will operate under Development Consent SSD 10418 and other relevant legislation.

In accordance with Part B, Condition B52(b) of Development Consent SSD 10418, this GWMP has been prepared and reviewed by Bryce McKay of AGE Consultants, who has been endorsed by the Planning Secretary as a suitably qualified and experienced person. A copy of the endorsement by the Planning Secretary is included in Attachment 3 of the Water Management Plan (WMP).

As required by Part B, Condition B53 of Development Consent SSD 10418, MACH Energy will not commence construction of the Northern Link Road or extract more than 10.5 Mt of ROM coal in a calendar year until the WMP (of which this GWMP forms a part) is approved by the Planning Secretary.

This GWMP has been prepared to monitor and manage potential groundwater related impacts (through groundwater model validation and the development of trigger levels) associated with the MPO, including open cut mining. This GWMP describes the response protocols in the event of an exceedance of trigger levels from this GWMP and appropriate measures to prevent, minimise, mitigate, compensate and/or offset such adverse impacts.

1.2 STRUCTURE OF THE GROUND WATER MANAGEMENT PLAN

This GWMP consists of the following sections:

- Section 2: Outlines the statutory obligations relevant to this GWMP.
- Section 3: Describes the existing groundwater environment present at the MPO.
- Section 4: Describes the baseline data available for the GWMP.
- Section 5: Describes the groundwater management system and final void water management.
- Section 6: Describes the groundwater model prediction impacts.
- Section 7: Outlines the groundwater impact performance criteria and trigger levels.
- Section 8: Describes the groundwater monitoring program.
- Section 9: Describes the Groundwater Trigger Action Response Protocols.
- Section 10 Describes the contingency plan to be enacted in the event that any unpredicted impacts occur.
- Section 11 Describes the review process for MPO documentation, including for this GWMP.
- Section 10: Outlines the reporting procedures for MPO documentation.
- Section 11: Lists of the references cited in this report.

2 STATUTORY OBLIGATIONS

MACH Energy's statutory obligations are contained in:

- the conditions of Development Consent SSD 10418;
- the conditions of Development Consent DA 92/97 (prior to its surrender);
- the conditions of the Commonwealth Approval EPBC 2020/8735 (once granted);
- the conditions of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850), permits and mining leases (ML 1645, ML 1708, ML 1709, ML 1713, ML 1750, ML 1808 and ML 1829); and
- other relevant legislation.

Obligations relevant to this GWMP are described below.

2.1 DEVELOPMENT CONSENT SSD 10418

The conditions of Development Consent SSD 10418 relevant to the content and structure of this GWMP are described below. A comprehensive list of all conditions in Development Consent SSD 10418 relevant to water is provided in the WMP.

2.1.1 GWMP Requirements

Part B, Condition B52 of Development Consent SSD 10418 requires the preparation of a GWMP as part of the WMP for the Project (refer Table 1).

Table 1
Groundwater Management Plan Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this GWMP document
B52. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:… *(f) include a:* *iv) Groundwater Management Plan that includes:*	
• *detailed baseline data of groundwater levels, yield and quality for groundwater resources and groundwater dependent ecosystems potentially impacted by the development, including groundwater supply for other water users;*	Section 4
• *a detailed description of the groundwater management system;*	Section 5.1
• *groundwater performance criteria, including trigger levels for identifying and investigating any potentially adverse groundwater impacts (or trends) associated with the development, on:* – *regional and local aquifers (alluvial and hardrock); and* – *groundwater supply for other water users such as licensed privately-owned groundwater bores;*	Section 7

Table 1 (Continued)
Groundwater Management Plan Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this GWMP document
• *a program to monitor and evaluate:* – *compliance with the relevant performance measures listed in Table 6 and the performance criteria in this plan;* – *water loss/seepage from water storages into the groundwater system, including from final voids;* – *impacts on GDEs identified outside the development footprint (including stygofauna);* – *groundwater inflows, outflows and storage volumes, to inform the Site Water Balance;* – *the hydrogeological setting of any nearby alluvial aquifers and the likelihood of any indirect impacts from the development;* – *impacts on groundwater supply for other water users, including cumulative impacts; and* – *the effectiveness of the groundwater management system;*	Section 8
• *reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results;*	Section 12
• *a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development, including measures to provide compensatory water supply to any affected water user under condition B41 of this Schedule;*	Section 9
• *a program to periodically validate the groundwater model for the development, including a peer review of the model every 3 years, and comparison of monitoring results with modelled predictions; and…*	Section 11

2.1.2 Management Plan (General) Requirements

Part D, Condition D5 of Development Consent SSD 10418 outlines the general management plan requirements that are applicable to the preparation of this GWMP.

Table 2 presents these requirements and indicates where each is addressed within this GWMP, or within the overarching WMP for the MPO.

Table 2
General Development Consent SSD 10418 Conditions

MPO Development Consent SSD 10418 Part B	Section where addressed in this GWMP document
D5. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a) summary of relevant background or baseline data;	Section 4
(b) details of:	
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(ii) any relevant limits or performance measures and criteria; and	Section 7
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 7
(c) any relevant commitments or recommendations identified in the document/s listed in Condition A2(c);	Sections 7.1, 8.1 and 10.1
(d) a description of the measures to be implemented to comply with the statutory requirements, limits, or performance measures and criteria;	Sections 5 and 9
(e) a program to monitor and report on the:	Sections 8 and 12
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to Condition D4(c);	
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Sections 9 and 10
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 11 and 12
(h) a protocol for managing and reporting any:	Section 12
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	
(ii) complaint; or	
(iii) failure to comply with other statutory requirements;	
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Sections 11 and 12
(j) a protocol for periodic review of the plan.	Section 11
***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	

2.2 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this GWMP are described below. A comprehensive list of all conditions in Development Consent DA 92/97 relevant to water resources (in general) is provided in the Water Management Plan (WMP).

2.2.1 GWMP Requirements

Condition 28(d), Schedule 3 of Development Consent DA 92/97 requires the preparation of a GWMP (refer Table 3).

Table 3
Groundwater Management Plan Development Consent DA 92/97 Condition

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this GWMP Document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DoI Water and EPA, and be submitted to the Secretary for approval by 30 June 2019, unless otherwise agreed by the Secretary.	
The plan must include:	
…	
(d) a Groundwater Management Plan, which must include:	
• *detailed plans, including design objectives and performance criteria, for the design and management of the proposed final voids;*	Section 5
• *detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores, that could be affected by the development;*	Section 4
• *groundwater impact assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts;*	Section 7
• *a program to monitor and assess:*	Section 8
– *groundwater inflows to the mining operations;*	
– *impacts on regional and local (including alluvial) aquifers;*	
– *impacts on the groundwater supply of potentially affected landowners;*	
– *impacts on groundwater dependent ecosystems and riparian vegetation;*	

2.2.2 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of the GWMP.

Table 4 presents these requirements and indicates where each is addressed within this GWMP.

Table 4
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this GWMP Document
2. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
(a) detailed baseline data;	Section 4
(b) a description of:	
• *the relevant statutory requirements (including any relevant consent, licence or lease conditions);*	Section 2
• *any relevant limits or performance measures/criteria;*	Section 7
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	Section 7
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 5 and 9

Table 4 (Continued)
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this GWMP Document
(d) a program to monitor and report on the: • *impacts and environmental performance of the development;* • *effectiveness of any management measures (see c above);*	Sections 8 and 12
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Sections 9 and 10
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 11 and 12
(g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 12
(h) a protocol for periodic review of the plan. *Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Section 11

2.3 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences (WALs) issued under the NSW *Water Management Act, 2000*.
- Discharge credits (51) held under the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation, 2002*.
- Mining leases 1645, 1708, 1709, 1713, 1750, 1808 and 1829 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources in December 2010.
- EPL 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the NSW Environment Protection Authority (EPA).
- Rehabilitation Management Plan (RMP), as required by ML conditions issued under the *Mining Act, 1992* and approved by the MEG.[1]

2.4 OTHER LEGISLATION / POLICY / PLANS

Other NSW Acts and Regulations that may be applicable to the GWMP for the MPO are discussed in the following sub-sections.

[1] As of 1 August 2022, MPO operates under a RMP along with the supporting Annual Rehabilitation Report and Forward Program which has replaced the Mining Operations Plan (1 July 2021 – 30 June 2023).

2.4.1 Water Management Act, 2000

The NSW *Water Management Act, 2000* aims to provide sustainable and integrated management of the water sources of NSW for the benefit of both present and future generations.

Under the NSW *Water Management Act, 2000*, the MPO is regulated under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2022* and the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources, 2016*.

The following groundwater sources are relevant to the MPO (Figure 3):

- *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources, 2016:*
  - Sydney Basin – North Coast;
  - New England Fold Belt Coast; and
  - Liverpool Ranges Basalt Coast.
- *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2022*:
  - Hunter Regulated River Alluvial Water Source;
  - Unnamed alluvium within the Muswellbrook Water Source; and
  - Unnamed alluvium within the Dart Brook Water Source.
- *Water Sharing Plan for the Hunter Regulated River Water Source, 2016:*
  - Hunter Regulated River Water Source.

A summary of licences held by MACH Energy is provided in Tables 5 and 6.

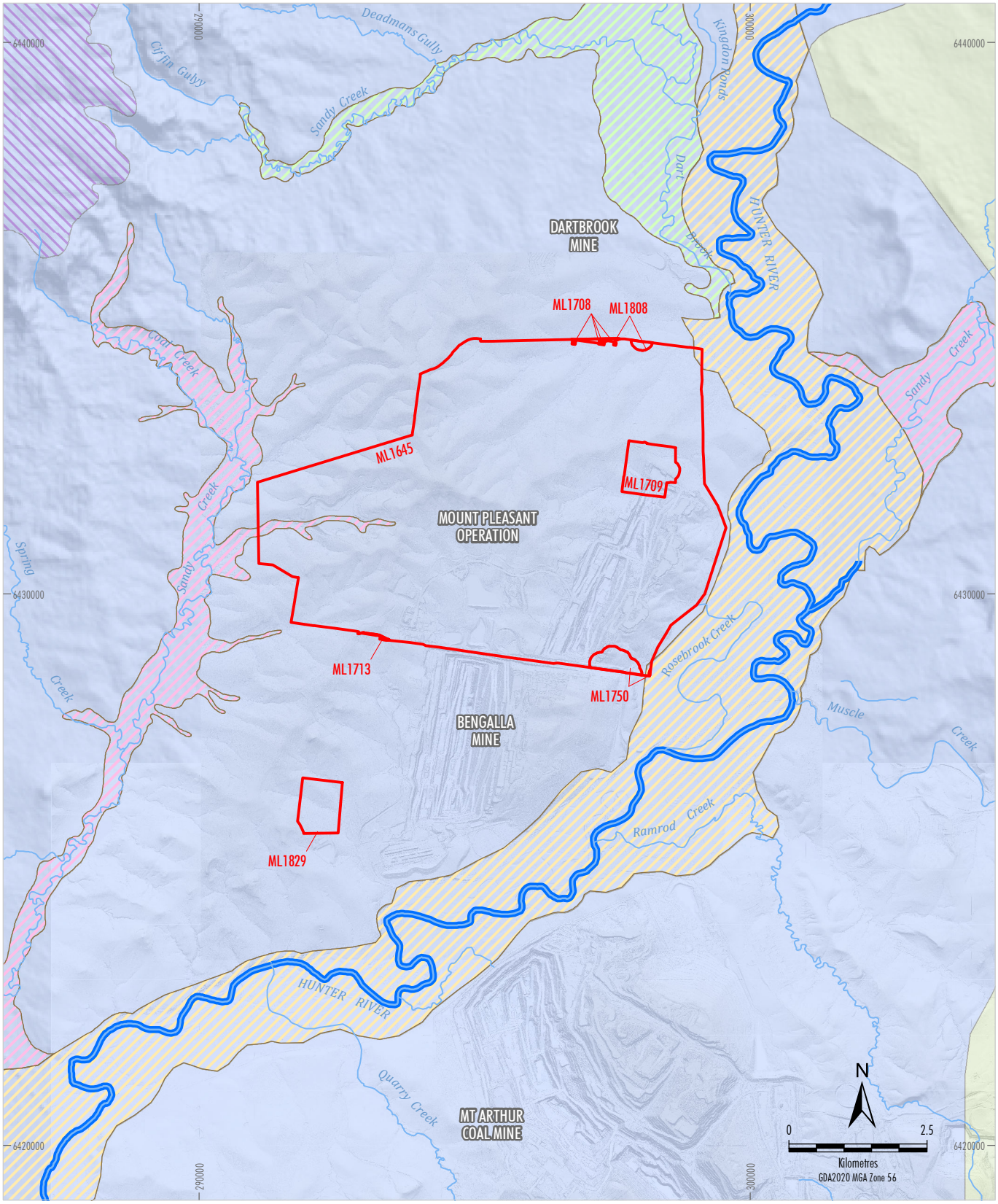
In addition to licensing requirements, the NSW *Water Management Act, 2000* includes the concept of ensuring “no more than minimal harm”. Minimal impact considerations have been developed in the *NSW Aquifer Interference Policy* (Department of Primary Industries [DPI], 2012) (Section 2.4.3).

Table 5
Water Access Licences – Groundwater Sources

Water Access Licence	Water Source	Shares (units)
18253	Hunter Regulated River Alluvial Water Source	74
18266	Hunter Regulated River Alluvial Water Source	68
18206	Hunter Regulated River Alluvial Water Source	24
18199	Hunter Regulated River Alluvial Water Source	5
18122	Hunter Regulated River Alluvial Water Source	33
18131	Hunter Regulated River Alluvial Water Source	60
21503	Hunter Regulated River Alluvial Water Source	21
18154	Hunter Regulated River Alluvial Water Source	5
18177	Hunter Regulated River Alluvial Water Source	5
23935	Muswellbrook Water Source	41
41437	Sydney Basin - North Coast Groundwater Source	640
40298	Sydney Basin - North Coast Groundwater Source	90
18836	Krui River Water Source	12
44101	Dart Brook Water Source	20
	Aquifer Subtotal	**1098**

Table 6
Water Access Licences – Surface Water Sources

Water Access Licence	Water Source	Type	Shares (units)
879	Hunter Regulated River Water Source	Regulated River (High Security)	243
880	Hunter Regulated River Water Source	Regulated River (High Security)	124
1113	Hunter Regulated River Water Source	Regulated River (High Security)	366
973	Hunter Regulated River Water Source	Regulated River (High Security)	3
638	Hunter Regulated River Water Source	Regulated River (High Security)	225
		High Security Subtotal	**961**
639	Hunter Regulated River Water Source	Regulated River (General Security)	134
974	Hunter Regulated River Water Source	Regulated River (General Security)	210
988	Hunter Regulated River Water Source	Regulated River (General Security)	156
1229	Hunter Regulated River Water Source	Regulated River (General Security)	480
1227	Hunter Regulated River Water Source	Regulated River (General Security)	99
992	Hunter Regulated River Water Source	Regulated River (General Security)	75
7808	Hunter Regulated River Water Source	Regulated River (General Security)	36
702	Hunter Regulated River Water Source	Regulated River (General Security)	267
993	Hunter Regulated River Water Source	Regulated River (General Security)	265
604	Hunter Regulated River Water Source	Regulated River (General Security)	183
662	Hunter Regulated River Water Source	Regulated River (General Security)	9
10775	Hunter Regulated River Water Source	Regulated River (General Security)	243
41438	Hunter Regulated River Water Source	Regulated River (General Security)	455
969	Hunter Regulated River Water Source	Regulated River (General Security)	39
1074	Hunter Regulated River Water Source	Regulated River (General Security)	5
8406	Hunter Regulated River Water Source	Regulated River (General Security)	168
8598	Hunter Regulated River Water Source	Regulated River (General Security)	3
10531	Hunter Regulated River Water Source	Regulated River (General Security)	120
		General Security Subtotal	**2,947**
975	Hunter Regulated River Water Source	Domestic and Stock	8
989	Hunter Regulated River Water Source	Domestic and Stock	8
1230	Hunter Regulated River Water Source	Domestic and Stock	8
605	Hunter Regulated River Water Source	Domestic and Stock	8
677	Hunter Regulated River Water Source	Domestic and Stock	24
663	Hunter Regulated River Water Source	Domestic and Stock	16
13785	Hunter Regulated River Water Source	Domestic and Stock	1
1259	Hunter Regulated River Water Source	Supplementary Water	33.2
1258	Hunter Regulated River Water Source	Supplementary Water	5
1307	Hunter Regulated River Water Source	Supplementary Water	37.5
1260	Hunter Regulated River Water Source	Supplementary Water	4.8
1308	Hunter Regulated River Water Source	Supplementary Water	15.1
1338	Hunter Regulated River Water Source	Supplementary Water	17.5
8445	Hunter Regulated River Water Source	Supplementary Water	12.6
		Other Subtotal	**198.7**



Source: NSW Spatial Services (2023); NSW Department of Primary Industries - Water (2019)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)

Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016

- Liverpool Ranges Basalt Coast
- New England Fold Belt Coast
- Sydney Basin - North Coast

Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009

- Unnamed Alluvium within Dart Brook Water Source
- Hunter Regulated River Alluvial Water Source
- Unnamed Alluvium within Muswellbrook Water Source

Water Sharing Plan for the Hunter Regulated River Water Source 2016

- Hunter Regulated River Water Source

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Relevant Groundwater Sources

Figure 3

2.4.2 Water Act, 1912

As water sharing plans have been commenced under the NSW *Water Management Act, 2000* for all groundwater and surface water systems that the MPO is predicted to take water from, the NSW *Water Act, 1912* is not relevant to licensing considerations for the MPO.

2.4.3 NSW Aquifer Interference Policy

The *NSW Aquifer Interference Policy* has been developed by the NSW Government as a component of the *NSW Government's Strategic Regional Land Use Policy*.

The *NSW Aquifer Interference Policy* applies State-wide and details water licence and impact assessment requirements. The *NSW Aquifer Interference Policy* has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The *NSW Aquifer Interference Policy* also enhances existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *NSW Aquifer Interference Policy* includes minimal impact considerations relating to water table and groundwater pressure drawdown and changes in groundwater and surface water quality. Where relevant, these minimal impact considerations have informed the groundwater impact trigger levels (i.e. more than 2 metres [m] drawdown) (Section 7). The *NSW Aquifer Interference Policy* establishes minimal impact considerations for groundwater categories of both 'highly productive' and 'less productive' groundwater. 'Highly productive groundwater' is defined by the *NSW Aquifer Interference Policy* as groundwater which (NSW Government, 2012):

> *...is defined in this Policy as a groundwater source that is declared in the Regulations and will be based on the following criteria:*
>
> *a) has total dissolved solids of less than 1,500 mg/L, and*
>
> *b) contains water supply works that can yield water at a rate greater than 5 L/sec.*

The NSW Government's classification of the productivity of the various Groundwater Sources in this area is discussed in Section 3.

3 EXISTING GROUNDWATER ENVIRONMENT

A Groundwater Impact Assessment (AGE Consultants, 2020), which included a regional groundwater investigation, was undertaken to inform the Mount Pleasant Optimisation Project EIS. Various studies have been undertaken previously as part of mine planning and feasibility studies, as well as development applications for previous mines, including a Water Management Study for the Mount Pleasant EIS by PPK Environment & Infrastructure (1997). A summary of the existing groundwater environment is provided below.

Consistent with the relevant water sharing plans under the NSW *Water Management Act, 2000* (Section 2.4.1), the two key groundwater systems identified are the:

- **Alluvial groundwater system** – associated with the alluvial plains of the Hunter River and its tributaries.
- **Hard (fractured and porous) rock groundwater system** – including the Permian aged Wittingham Coal measures.

The regional geology of the MPO area is shown on Figure 4.

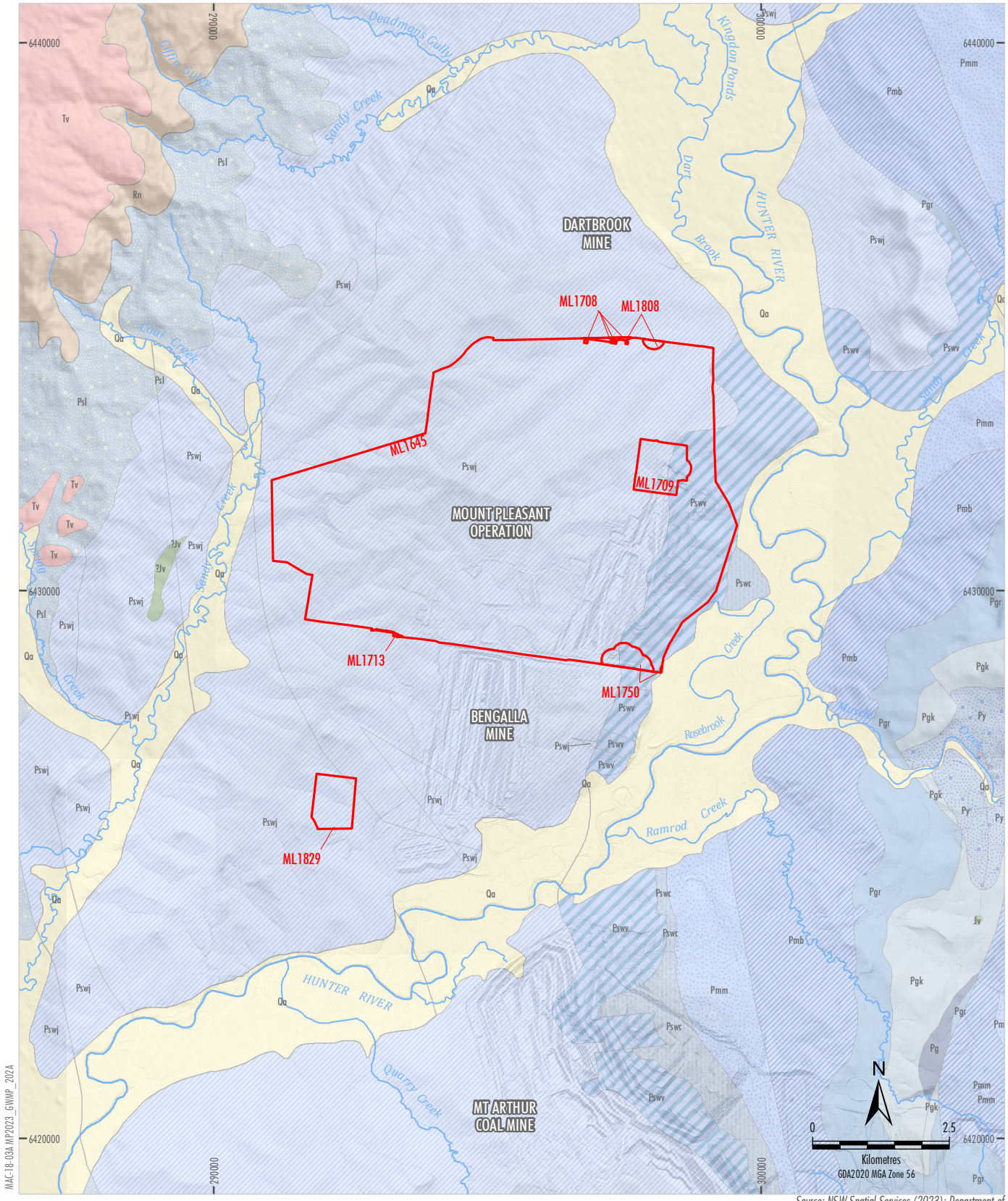
3.1 HARD (FRACTURED AND POROUS) ROCK GROUNDWATER SYSTEM

The MPO coal resource is located in the Permian Wittingham Coal measures of the Singleton Supergroup. 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.

The sequence of stratigraphic units, focussing on the seams targeted at the MPO, is outlined in Table 7.

Table 7
MPO Stratigraphic Units

Coal Measure	Subgroup	Coal Seam
Wittingham Coal Measures	Jerrys Plains Subgroup	Warkworth seam
		Interburden #1
		Mount Arthur seam
		Interburden #2
		Piercefield seam
		Interburden #3
		Vaux seam
		Interburden #4
		Broonie seam
		Interburden #5
		Bayswater seam
	Archerfield Sandstone	
	Vane Subgroup	Interburden #6
		Wynn seam
		Interburden #7
		Edderton seam
	Saltwater Creek Formation	
Maitland Group	Mulbring Sandstone / Branxton Formation	



MAC-18-03A MP2023_GWMP_202A

Source: NSW Spatial Services (2023); Department of Planning and Environment (2019)

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

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Regional Geology

Figure 4

The coal seams are recognised as the main aquifer zones within the hard rock groundwater system, providing storage and transmission within cleats and joints.

The interburden mainly comprises sandstones and siltstones with very low permeabilities and porosities, which limits the rate of groundwater transmission. The interburden zones often act as aquitards, effectively impeding or constraining the vertical exchange of groundwaters.

Higher aquifer pressures within the coal measures and a regional gradient towards the alluvium result in pressure driving groundwater movement towards the Hunter River. It is likely groundwater seeps naturally from the hard (fractured and porous) rock groundwater system into the alluvial groundwater system.

The hard (fractured and porous) rock groundwater system is considered ‘less productive’ under the *NSW Aquifer Interference Policy* (Section 2.4.3). The exception to this is the 'highly productive' Liverpool Ranges Basalt, which is about 8 km from the MPO.

3.2 ALLUVIAL GROUNDWATER SYSTEM

Alluvial sediments associated with the Hunter River are located to the east of the MPO. Alluvial sediments associated with Sandy Creek are located to the west of the MPO (Figures 3 and 4).

The Hunter River alluvium comprises silt underlain by sands and gravels, reaching a thickness of up to 30 m. The Hunter River alluvium is classified as a highly productive groundwater source. These alluvial sediments offer increased groundwater storage when compared to the hard (fractured and porous) rock groundwater system due to their higher porosity. Gravel zones within the alluvium are capable of providing the highest storage and permeability when compared to sand, silt and clay zones.

Groundwater flow within the Hunter River alluvium is in the direction of streamflow. Water levels in alluvial monitoring bores indicate a high degree of interaction between the alluvium and the Hunter River with surface water flow from the river to the adjacent alluvium (AGE Consultants, 2020). Within the MPO, there is a groundwater divide associated with the topographic high in the western section of the MPO with:

- westward and then southerly groundwater flow toward Sandy Creek; and
- eastward and south-eastward groundwater flow toward the Hunter River.

Groundwater take from the Hunter Regulated River Alluvial Water Source will be reported as part of the Annual Review, where relevant.

4 BASELINE DATA

Groundwater monitoring was undertaken from 1994 to 1995 to inform the Mount Pleasant EIS Water Management Study. The results of this monitoring are presented in PPK Environment & Infrastructure (1997). The collection of baseline groundwater monitoring data at the MPO resumed in 2003. The baseline period of record has been taken up until August 2018. Mining activities have been undertaken prior to August 2018, however, these activities have been minor in nature and are not anticipated to have caused propagation of drawdown at monitoring sites.

Additional bores were drilled in November 2019 and January 2020, and further additions are proposed, as indicated in Table 8. Augmentations to the groundwater bore network are described in detail in Section 8.1.

Bores in the MPO groundwater monitoring network are shown on Figure 5 and summarised in Table 8.

Table 8
Groundwater Monitoring Network

Bore	Bore Group	Bore Depth/Screened Interval (mBG)	Aquifer/Unit Monitored	Period of Record
MPBH1	Eastern	Screen 12.6 – 18.6	Hunter Alluvium	Jan 2003 – Nov 2022
MPBH1-C	Eastern	Screen 68.77 – 74.77	Coal Seam	Drilled Nov 2019/Jan 2020
MPBH1-HR	Eastern	Screen 48.8 – 50.8	Interburden	Drilled Nov 2019/Jan 2020
MPBH2	Eastern	Screen 11.5 – 17.5	Hunter Alluvium	Jan 2003 – Nov 2022
MPBH2-C	Eastern	Screen 66.5 – 76.5	Coal Seam	Drilled Nov 2019/Jan 2020
MPBH2-HR	Eastern	Screen 46.2 – 52.2	Interburden	Drilled Nov 2019/Jan 2020
MPBH3*	Eastern	Depth 14.0	Hunter Alluvium	Historical (Jan 2003 – Oct 2010)
MPBH3b	Eastern	Depth 14.0	Hunter Alluvium	Jan 2011 – Nov 2022
MPBH4 (formerly A1)	Eastern	Screen 6.0 – 12.0	Hunter Alluvium	Drilled Feb 2018
MPBH4-C	Eastern	Screen 71.9 – 81.9	Coal Seam	Drilled Nov 2019/Jan 2020
MPBH4-HR	Eastern	Screen 45.15 – 51.15	Interburden	Drilled Nov 2019/Jan 2020
MPBH5 (formerly B1)	Eastern	Screen 5.8 – 8.8	Hunter Alluvium	Drilled Feb 2018
MPBH5-C	Eastern	Screen 27.5 – 33.5	Coal Seam	Drilled Nov 2019/Jan 2020
MPBH5-HR	Eastern	Screen 19.5 – 22.5	Interburden	Drilled Nov 2019/Jan 2020
MPBH6	Eastern	Screen 10.63 – 16.63	Hunter Alluvium	Drilled Nov 2019/Jan 2020
MPBH6-C	Eastern	Screen 105.68 – 115.68	Coal Seam	Drilled Nov 2019/Jan 2020
MPBH6-HR	Eastern	Screen 58.4 – 64.4	Interburden	Drilled Nov 2019/Jan 2020

Table 8 (Continued)
Groundwater Monitoring Network

Bore	Bore Group	Bore Depth/Screened Interval (mBG)	Aquifer/Unit Monitored	Period of Record
MPBH7	Western	Screen 4.1 – 10.1	Hunter Alluvium	Drilled Nov 2019/Jan 2020 (Mar 2020 – Nov 2022)
MPBH7-C	Western	Screen 71.45 – 74.45	Coal Seam	Drilled Nov 2019/Jan 2020
Melody Bore	Central	Depth 43.8	Unknown	Mar 2017
3500B500S*	Central	Depth 21.43	Interburden #1	Historical (Oct 2011 – Aug 2018)
3500B500L*	Central	Depth 175.36	Bayswater Seam	Historical (Jan 2003 – Aug 2017)
3500C500S	Central	Depth 28.48	Interburden #1	Jan 2003 – Nov 2022
3500C500L	Central	Depth 86.77	Mount Arthur Seam	Oct 2011 – Nov 2022
3500E000U*	Central	Screen 50 – 55	Warkworth Seam	Historical (Aug 2012 – May 2016)
3500E000M*	Central	Screen 120 – 125	Piercefield Seam/ Interburden #3	Historical (Aug 2012 – May 2016)
3500E000L*	Central	Screen 180 – 186	Vaux Seam	Historical (Aug 2012 – May 2016)
4500F000	Central	Depth 121.24	Vaux Seam	Jan 2003 – Nov 2022
5000A500*	Central	Screen 56 – 65	Vaux Seam	Historical (Pre-EIS Only)
5000D000	Central	Depth 171.35	Wynn/Edderton Seams	Historical Jan 2003 – Nov 2022
5000D000R	Central	Screen 262 – 268 Depth 278	Wynn/Edderton Seams	Aug 2022 – Nov 2022
5500D000*	Central	Screen 130 – 136	Interburden #7/Wynn Seam	Historical (Jan 2003 – Nov 2022)
6000C000S*	Central	Depth 51.27	Wynn Seam	Historical (Oct 2011 – Dec 2017)
6000C000L*	Central	Depth 20.69	Interburden #2	Historical (Jan 2003 – Dec 2017)
6500F500U	Central	Depth 35.10	Interburden #4/Broonie Seam	Jan 2003 – Nov 2022
6500F500M	Central	Depth 77.30	Interburden #6/Wynn Seam	Jan 2003 – Nov 2022
6500F500L	Central	Depth 115.20	Maitland Group	Jan 2003 – Nov 2022
6500F625	Central	Depth 36.30	Permian	Jan 2003 – Nov 2022
7000D000U*	Central	Depth 12.89	Interburden #7/Edderton Seam	Historical (Jan 2003 – May 2019)
7000D000L*	Central	Depth 98.73	Maitland Group	Historical (Nov 2014 – May 2019)
7500F000	Central	Depth 182.80	Edderton Seam	Jan 2003 – Nov 2022
WRA1U	Western	Depth 6.50	Alluvium/Regolith	Jan 2007 – Nov 2022
WRA1L	Western	Depth 19.40	Warkworth/Permian	Jan 2003 – Nov 2022
WRA2U*	Western	Depth 5.50	Alluvium/Regolith	Historical (Jan 2007 – Aug 2018)
WRA2L*	Western	Depth 18.95	Warkworth/Permian	Historical (Jan 2003 – Aug 2018)

Table 8 (Continued)
Groundwater Monitoring Network

Bore	Bore Group	Bore Depth/Screened Interval (mBG)	Aquifer/Unit Monitored	Period of Record
WRA3U*	Western	Depth 6.75	Alluvium/Regolith	Jan 2003 – Aug 2022
WRA3L*	Western	Depth 22.19	Warkworth/Permian	Jan 2003 – Aug 2022
WRA5U*	Western	Screen 1.64 – 7.64	Alluvium/Regolith	Historical (Jan 2003 – Aug 2018)
WRA5L*	Western	Screen 13.40 – 19.30	Warkworth/Permian	Historical (Jan 2003 – Nov 2019)
WRA6U	Western	Depth 18.98	Alluvium/Regolith	Jan 2003 – Nov 2022
WRA6L	Western	Depth 9.27	Warkworth/Permian	Jan 2003 – Nov 2022
GDE bore (shallow)	Central	Depth 5 (estimated)	Alluvium/weathered regolith	Proposed, no data yet
GDE bore (deep)	Central	Depth 10-20 (estimated)	Mount Arthur Seam	Proposed, no data yet
VWP	Central	Depth 22 (estimated)^	Warkworth Seam	Proposed, no data yet
		Depth 52 (estimated)^	Mount Arthur Seam	Proposed, no data yet
		Depth 61 (estimated)	Piercefield Seam	Proposed, no data yet
		Depth 137 (estimated)	Vaux Seam	Proposed, no data yet
		Depth 163 (estimated)	Broonie Seam	Proposed, no data yet
		Depth 169 (estimated)	Bayswater Seam	Proposed, no data yet
		Depth 198 (estimated)	Wynn Seam	Proposed, no data yet
		Depth 204 (estimated)	Edderton Seam	Proposed, no data yet
6000C000S (replacement)	Central	Depth 70 - 80	Mount Aurthur Seam	Proposed, no data yet
6000C000L (replacement)	Central	Depth 140 -150 (estimated)	Vaux Seam	Proposed, no data yet
WRA5U (replacement)	Western	Depth 5 (estimated)	Alluvium/weathered regolith	Proposed, no data yet
WRA5L (replacement)	Western	Depth 20 (estimated)	Permian	Proposed, no data yet
WRA3U (replacement)	Western	Depth 20 (estimated)	Alluvium / weathered regolith	Proposed, no data yet
WRA3L (replacement)	Western	Depth 100 (estimated)	Permian	Proposed, no data yet
NE Alluvium	Eastern	Depth 5 – 10 (estimated)	Alluvium	Proposed, no data yet
East Alluvium	Eastern	Depth 10 – 15 (estimated)	Alluvium	Proposed, no data yet

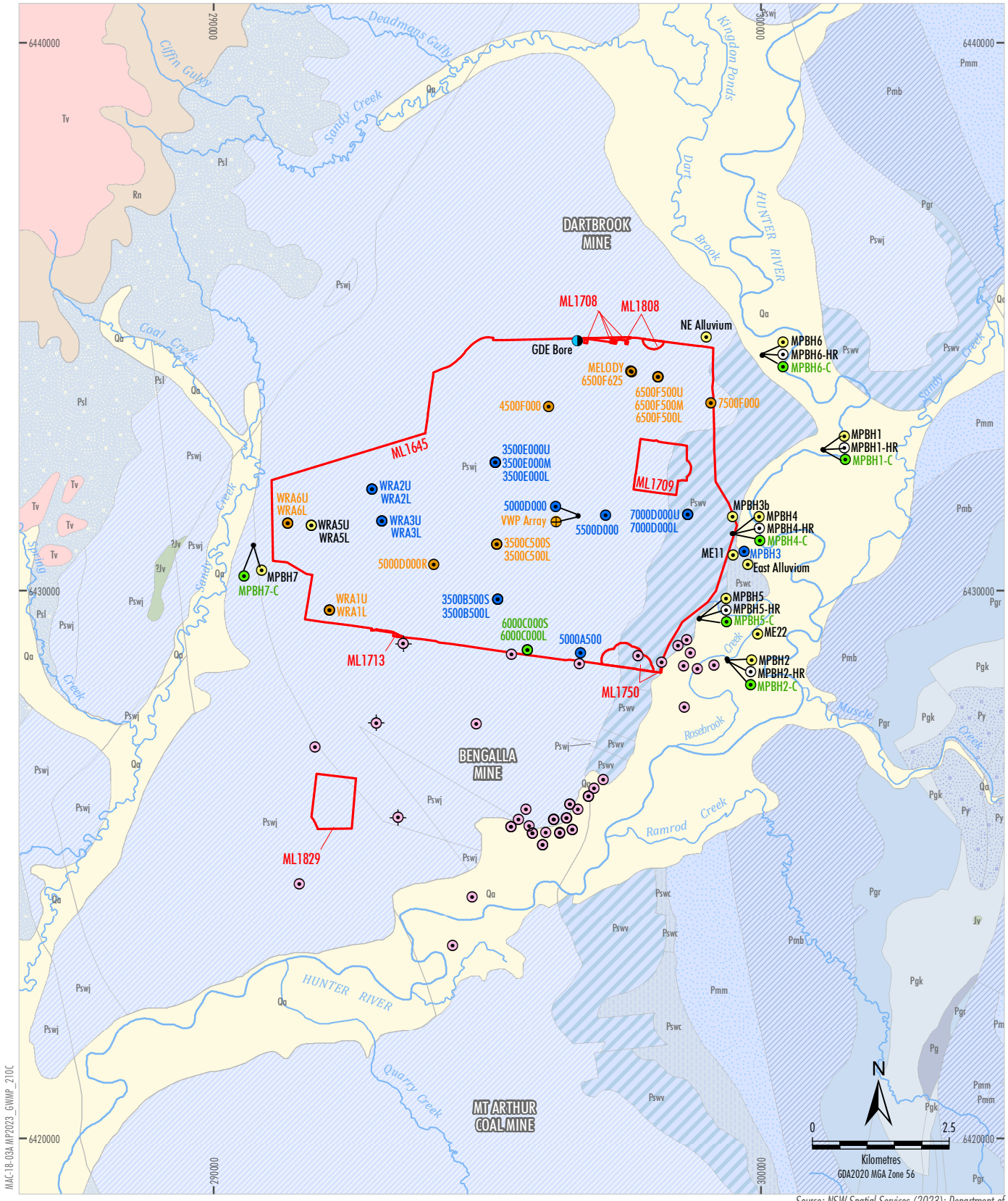
Note:

mBG = metres below ground level.

* Bore decommissioned. MPBH3 was replaced by MPBH3b in 2011; 3500E000 was unable to be located during the 2017 Bore Census (MACH Energy, 2017d); and the remaining sites have been disturbed by mining operations.

Sites with U, M and L suffixes refer to 'upper', 'middle' and 'lower' (depths), but sites with S and L suffixes usually refers to piezometer diameter (small and large), which may be unrelated to the depth.

^ Shallow strata may be dry or unable to be equipped with sensors.



MAC-18-03A MP2023_GWMP_210C

Source: NSW Spatial Services (2023); Department of Planning and Environment (2019)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)

Mount Pleasant Monitoring

- GDE Bore
- Vibrating Wire Piezometer
- Standpipe
- Standpipe - Alluvium
- Standpipe - Coal Seam
- Standpipe - Interburden
- Standpipe - Historical

Bengalla Monitoring

- Bengalla Standpipe
- Bengalla Vibrating Wire Piezometer

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MOUNT PLEASANT OPERATION

Groundwater Monitoring Network

Figure 5

4.1 GROUNDWATER LEVELS

Baseline groundwater levels are presented as hydrographs in Attachment 3. Depending on the bore location, the baseline period may include groundwater level effects from neighbouring Bengalla and Dartbrook mines.

4.1.1 Eastern Domain

A clear head separation is evident between the Hunter River at WaterNSW gauge 210002 and the nearest bore to the gauge (MPBH2, 980 m from the gauge). This separation suggests losing surface water conditions in this reach of the river. Review of LiDAR data and water levels at MPBH1 and MPBH3, both upstream of the gauge, indicate levels are below the invert of the river channel. This also suggests losing surface water conditions in the vicinity of these bores.

The conclusion drawn from the baseline monitoring conducted within the Hunter alluvium is that water levels in the alluvium are generally stable and do not exhibit a marked response to rainfall. This indicates that losses from the surface water system maintain the alluvial aquifer in this area.

4.1.2 Central Domain

Groundwater in the central section of the MPO, north and west of the open cut pits, has been historically monitored via a network of eleven monitoring bores. The monitoring bores of the central network target Permian sediments including interburden, coal seams and the underlying Maitland Group (6500F500L and 7000D000U). Three locations (6500F500, 3500C500 and 7000D000) are nested monitoring bores with an upper piezometer (U) and lower piezometer (L). Water level observations for these bores show that, apart from a slight decline at 3500C500L, water levels within the upper interburden units (3500C500L and 3500C500S) are relatively stable and show no response to rainfall variation, as shown by the cumulative rainfall departure. Mixed interburden and coal units (5500D000, 6500F00U, 6500F500M and 7000D000U) are also relatively stable and do not show drawdown influence from the nearby Dartbrook or Bengalla Mines.

4.1.3 Western Domain

Monitoring bores in the west of the MPO (WRA1, WRA2, WRA3, WRA5 and WRA6) are all located within shallow Permian sediments. These are nested monitoring bores with separate piezometers within the regolith and underlying unweathered Permian strata. The upper piezometer (U) is screened in regolith (i.e. weathered rock [WRA3, WRA5 and WRA6 only]), with the lower piezometer (L) screened in either Permian interburden or coal seams, below the depth of weathering. The water levels recorded within the regolith and underlying strata are similar, indicating a degree of connectivity between these units and/or limited vertical gradients between the strata. Comparison with the cumulative rainfall departure for the period indicates that water levels in the monitored strata do not exhibit a marked response to rainfall. Moderate groundwater flow is expected through the relatively permeable regolith and is expected to follow topography. Whilst the regolith has the potential to hydraulically connect the alluvium to the mine workings, this unit is typically dry, thin and topographically separated from the open cut pits (i.e. drainage divide)

4.2 GROUNDWATER QUALITY

Baseline groundwater quality data is provided in Attachment 4 and a summary is provided in Table 9.

Table 9
Groundwater Quality Summary

Bore Group	Groundwater System Monitored	Median pH	Median Electrical Conductivity (EC) (µS/cm)
Eastern Groundwater Site (MPBH1 and MPBH2)	Alluvium	6.9	790
Eastern Groundwater Site (MPBH3)	Alluvium	6.8	1,005
Eastern Groundwater Site (MPBH3b)	Alluvium / Permian regolith	7.6	3,860
Central Groundwater Site	Hard (Porous and Fractured) Rock	6.9	5,210
Western Groundwater Site	Hard (Porous and Fractured) Rock	7.2	5,690

Note: µS/cm = microsiemens per centimetre.

Median pH in both the alluvial and hard (porous and fractured) rock aquifer systems are neutral. The range of data shown in Attachment 4 indicate the pH is quite stable across both groundwater systems.

Groundwater within the alluvium is generally fresh to slightly brackish (median of 540 – 1,005 µS/cm), as recorded at MPBH1, MPBH2 and MPBH3. Bore MPBH3b intersects the basal alluvium and weathered Permian coal measures, resulting in more brackish water quality. Groundwater within the Permian coal measures (Central and Western groundwater sites) is generally brackish to moderately saline.

4.3 AQUIFER PARAMETERS/GROUNDWATER YIELD

A number of investigations into aquifer parameters have been undertaken at the MPO and neighbouring Bengalla and Mt Arthur mines.

A summary of these investigations is provided in the sub-sections below.

4.3.1 MPO Investigations

As part of the Water Management Study undertaken for the Mount Pleasant EIS (PPK Environment & Infrastructure, 1997), a suite of groundwater testing, including injection, pump out and packer tests, were undertaken at the site.

Groundwater testing of the hard rock aquifers involved injection, slug and packer testing, and indicated very low transmissivity rates. A range of <0.0001 metres per day (m/day) to 0.84 m/day was determined for the hydraulic conductivity of the aquifer, with a global median value (omitting extreme values) of 0.015 m/day across all testing types.

In contrast to the hard rock coal measures, the alluvial aquifer regime was found to be highly transmissive, with an average hydraulic conductivity of 20.3 m/day, and an overall range of 8.8 m/day to 33.2 m/day.

Data obtained from the groundwater testing undertaken for the Mount Pleasant EIS (PPK Environment & Infrastructure, 1997) is provided in Attachment 5.

4.3.2 Investigations at Neighbouring Mines

Various groundwater tests have been undertaken in the vicinity of the MPO area, including at the Bengalla Mine directly to the south of the MPO, and the Mt Arthur Coal Mine to the south-east.

Pumping tests were undertaken as part of the Bengalla Mine EIS (Mackie Martin and Associates, 1993) on the alluvial aquifer bordering the Hunter River, to the south-east of the MPO. These tests found a transmissivity ranging from 100 metres-squared per day (m^2/day) to 700 m^2/day. Assuming a saturated thickness of 10 m (which is typical, based on nearby bore logs), this equates to a hydraulic conductivity ranging from 10 m/day to 70 m/day (AGE Consultants, 2013).

Pumping tests were also undertaken on five bores bordering the Hunter River to the south of the MPO boundary, as part of the *Mt Arthur North Groundwater Management Studies* (Mackie Environmental Research, 2000). These tests indicated that basal gravel in the aquifer had a moderate to high hydraulic conductivity, which ranged from 5 m/day to 40 m/day, with a median value of 8.2 m/day.

Overall, available data in the area to the south of the MPO indicates a generally high but spatially variable hydraulic conductivity in the alluvial aquifer regime bordering the Hunter River (AGE Consultants, 2013).

In the Wittingham Coal Measures to the south of the MPO, various tests were undertaken as part of the Bengalla Mine EIS (HLA-Envirosciences, 1993) which found a transmissivity range of 0.2 m^2/day to 10 m^2/day.

Australian Groundwater Consultants (AGC) (1979) and Laurie, Montgomerie and Petit Pty Ltd (LM&P) (1982) undertook groundwater testing in the Wittingham Coal Measures at the Mt Arthur Coal Mine to the south of the MPO boundary. The outcomes of these tests are summarised in Attachment 5, which indicate a large variation in the hydraulic conductivities of coal seams in the area (AGE Consultants, 2013).

Horizontal hydraulic conductivity values for the coal seams and interburden units determined from field testing at other mine sites in the vicinity of the Project have been compiled (AGE Consultants, 2020). The results of this compilation are presented graphically in Figure 6 (coal) and Figure 7 (interburden). As shown on Figure 6, testing results indicate that horizontal hydraulic conductivity values in the coal seams are in the range between 1 x 10^{-5} to 1 m/day. Similar testing conducted in the Permian interburden units returned lower values, ranging from predominantly between 1 x 10^{-6} to 1 x 10^{-2} m/day (i.e. hydraulic conductivity was generally two orders of magnitude lower than the coals).

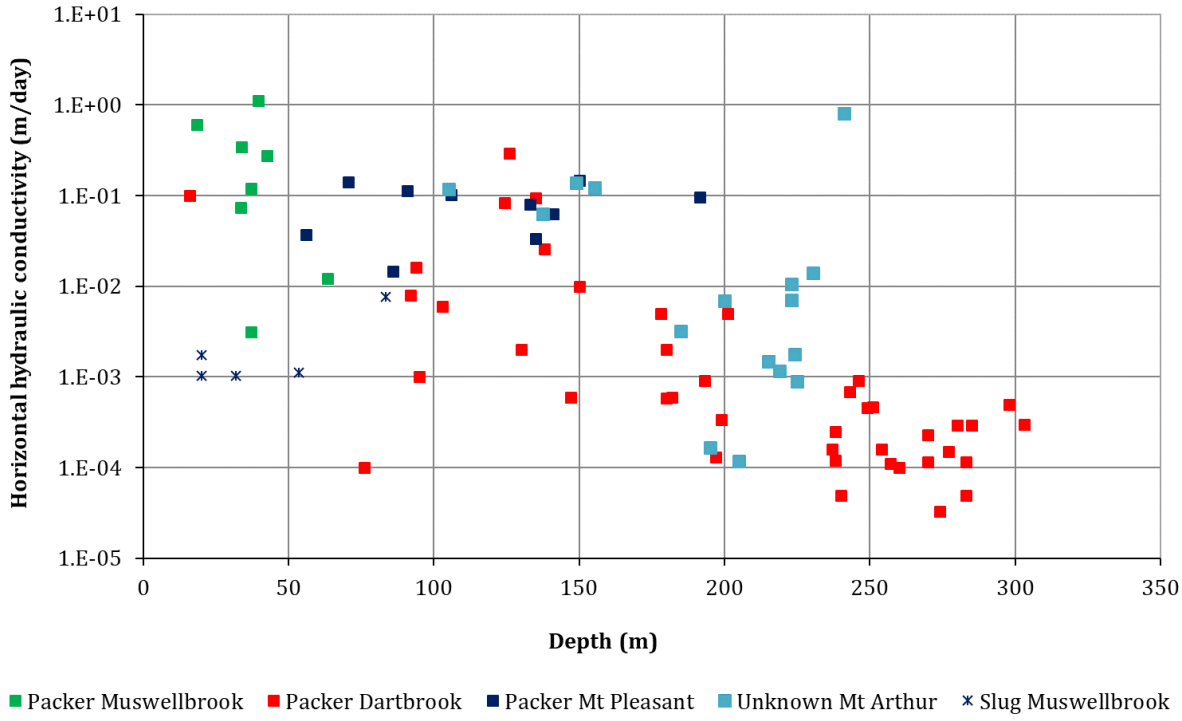


Figure 6: Hydraulic Conductivity vs depth – Permian Coal (AGE Consultants, 2020)

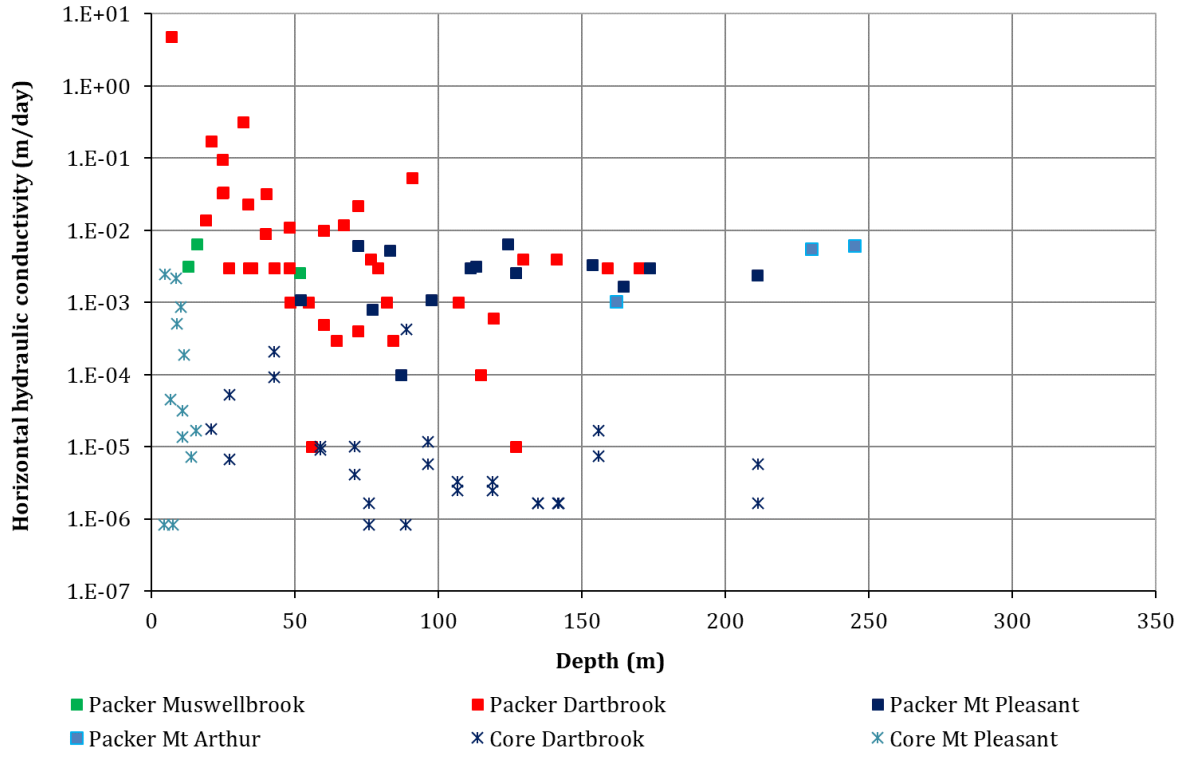


Figure 7: Hydraulic Conductivity vs depth – Permian Interburden (AGE Consultants, 2020)

4.4 PRIVATELY-OWNED GROUNDWATER BORES

MACH Energy has conducted a census of privately-owned groundwater bores in the vicinity of the MPO (MACH Energy, 2017d).

The census involved:

- Characterisation of existing groundwater bores through collation and review of the NSW Department of Planning, Industry and Environment – Water (DPIE – Water) (former Department of Industry – Water).
- DPIE – Water registered bore database and other regional information (e.g. 1:25,000 topographic maps).
- Site visits with local landholders to confirm the location and use of groundwater bores on their property.
- Opportunistic collection of baseline data where practical (e.g. water levels and basic water quality parameters).

The census identified 39 bores, well and springs located on privately-owned land and used for irrigation, stock watering and domestic purposes. Some bores also form part of the current and historic monitoring networks at surrounding coal mining operations. The privately-owned bores are located to the east, north and west of the MPO mining tenements. Bores to the east lie generally within 1-1.5 km of the proposed area of initial mining. Bores to the north and west are nominally 5-6 km from early mining, however they are also situated close to mining at the Bengalla Mine (western bores) and the Dartbrook Mine (northern bores).

Groundwater bores, wells and springs identified on privately-owned land during the census are listed in Table 10 and shown on Figures 8a, 8b and 8c. A number of bores were also visited on mine-owned land during the census (e.g. monitoring bores). PINNEENA records are shown for properties that were not visited (e.g. due to distance from the MPO mining areas).

A summary of the results of the bore census is provided in Attachment 6.

MACH Energy wrote to landholders that participated in the bore census in May 2020 to confirm recorded information regarding groundwater bores, wells and known seeps across the MPO mining leases and neighbouring properties remained correct and contemporary.

Table 10
Private Groundwater Bores Identified in Bore Census

Bore	Easting (m)1	Northing (m)1	Year drilled	Depth (mBGL)	Type
ADNUM1	300521	6429434	N/A	13	Well - Domestic
ASHFIELD1	289344	6428899	<50-60 (years)	5.75	Well - Stock
BARRY1	299564	6430431	N/A	13.56	Well - Stock & Domestic
BELGRAVE	295085	6434438	N/A	23.85	Well - Stock & Monitoring
COWTIME1	300330	6429753	N/A	-	Bore - Stock
CAS1 G	296503	6434654	1964	28.23	Bore - Not Used
CAS2 G	295914	6435419	<1950s	65	Bore- Monitoring
CAS3 G	295821	6435484	1957	76.7	Bore - Dry
CAS4 G	294928	6435957	NA	34.8	Bore - Monitoring
GRAY1	299882	6430334	N/A	-	Bore - Domestic
GRAY2	299856	6430316	N/A	-	Bore - Stock & Domestic
GW038412	291568	6437714	<1950s	7.7	Well - Stock & Domestic and Monitoring
HAYES1	299582	6430624	1930s	15.2	Well - Irrigation
HAYES2	299681	6430616	1950s-60s	15.5	Well - Stock & Domestic
JLON.1	292407	6434333	1971	57.9	Bore - Not in use (windmill not functioning)
JLON.2	292320	6434393	1965	37.4	Bore - Not Used
JLON1	298194	6434785	1979	6	Well & Bore - Monitoring
JLON2	300044	6434608	~1965-80s	82	Bore - Never used
JLON3	299887	6434455	<1961	12.83	Well - Domestic
JLON4	299404	6434623	1932	12.5	Well - Stock
JLON5	299629	6434796	1954	11.7	Well - Irrigation
KELMAN1	300925	6429305	N/A	12.4	Well - Domestic
MATHER1	299814	6430440	>40 years	13.08	Well - Domestic
MITCHELL1	299860	6430413	N/A	-	Well - Domestic

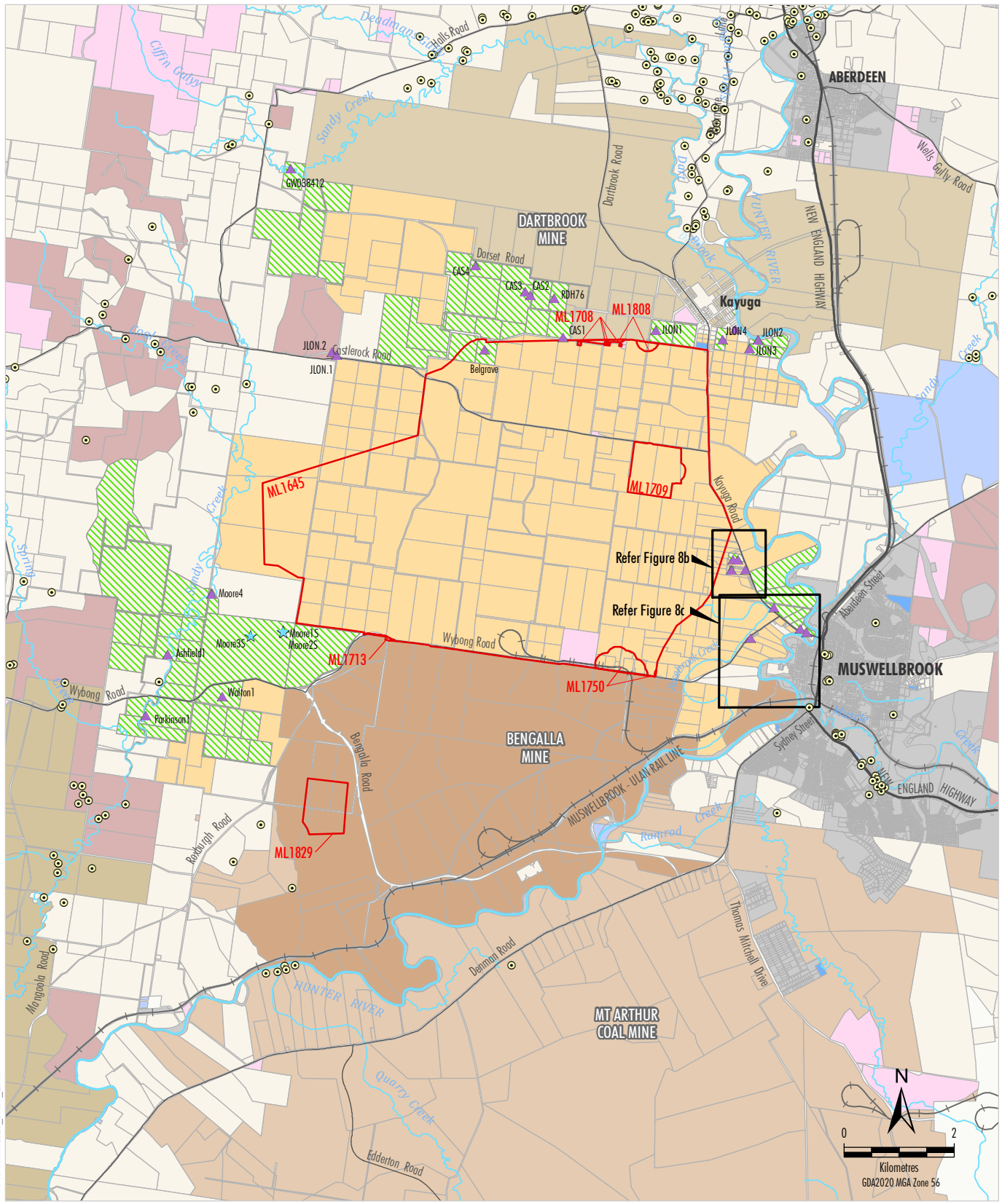
Table 10 (Continued)
Private Groundwater Bores Identified During Bore Census

Bore	Easting (m)1	Northing (m)1	Year drilled	Depth (mBGL)	Type
MOORE1	299668	6430812	1958	52-56FT	Well – Domestic
MOORE1S	291441	6429318	N/A	NA	Spring - Stock
MOORE2	299720	6430762	2003	Blocked	Bore - Not Used (previously monitoring)
MOORE2S	291427	6429323	N/A	NA	Spring - Stock
MOORE3S	290851	6429236	N/A	NA	Spring - Stock
MOORE4	290139	6430000	< 60 years	4.5	Well - Stock
MP-BH1	301149	6432563	2003	18	Bore-Monitoring
MP-BH3	299481	6431354	N/A	14	Well - Stock
PARKINSON1	288944	6427796	N/A	4.7	Well - Stock
PITMAN1	300806	6429378	1991	-	Bore - Domestic
RDH76	296343	6435365	1982	49.4	Bore - Monitoring
SIMPSON1	299906	6429198	>50 years	11.6	Well - Stock & Domestic
SORMAZ1	300010	6429263	1992	11.61	Bore - Not Used
WALTON1	290331	6428144	N/A	90	Bore - Stock
WICKS1	300534	6429472	N/A	12.5	Well – Domestic

4.5 METEOROLOGICAL DATA

Data from the Scientific Information for Land Owners (SILO) at location -32.25, 150.85 (latitude, longitude) has been processed (summarised in Table 11) to develop a rainfall residual mass curve using the average over the full period (1900 - 2022), shown on Figure 9. The rainfall residual mass curve has been used on the groundwater hydrographs in Attachment 3. This curve is used as it allows easy identification of short or long periods of below average rainfall (downward gradient) or above average rainfall (upward gradient), as well as periods of roughly average rainfall (flat). Comparison of this curve with groundwater level hydrographs indicates whether groundwater levels are responding to dry or wet conditions, or potentially to some other mechanism (e.g. groundwater pumping, mining).

Meteorological data is collected from a number of Bureau of Meteorology (BoM) stations in the vicinity of the MPO. Average monthly rainfall for each of these stations is summarised in Table 11 along with the SILO data for comparison.



MAC-18-03A MP2023_GWMP_204A

Source: MACH (2023); NSW Department of Industry - Water (2016); NSW Spatial Services (2023)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Mount Pleasant-controlled
- Bengalla-controlled
- Dartbrook-controlled
- Mangoola-controlled
- Muswellbrook Coal-controlled
- Mt Arthur-controlled
- Crown
- The State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Privately-owned Land
- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Relevant Privately-owned Land
- Bore/Well on Privately-Owned Land
- Spring on Privately-owned Land
- PINNEENA Record

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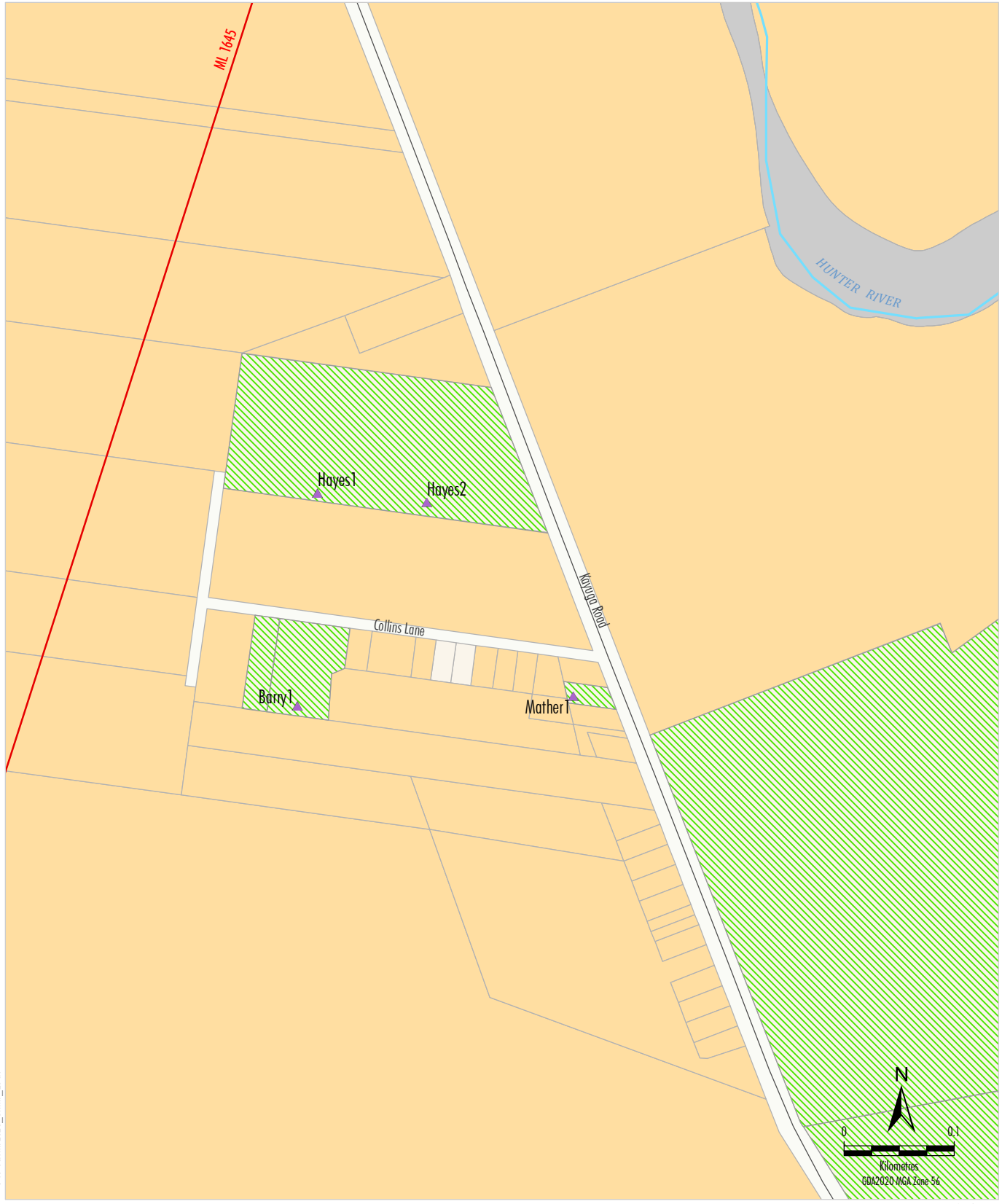
MOUNT PLEASANT OPERATION

Groundwater Bores, Wells and Springs Identified during the Bore Census

Figure 8a



MAC-18-03A MP2023_GWMP_204A

Source: MACH (2023); NSW Department of Industry - Water (2016); NSW Spatial Services (2023)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Mount Pleasant-controlled
- Privately-owned Land
- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Relevant Privately-owned Land
- Bore/Well on Privately-Owned Land

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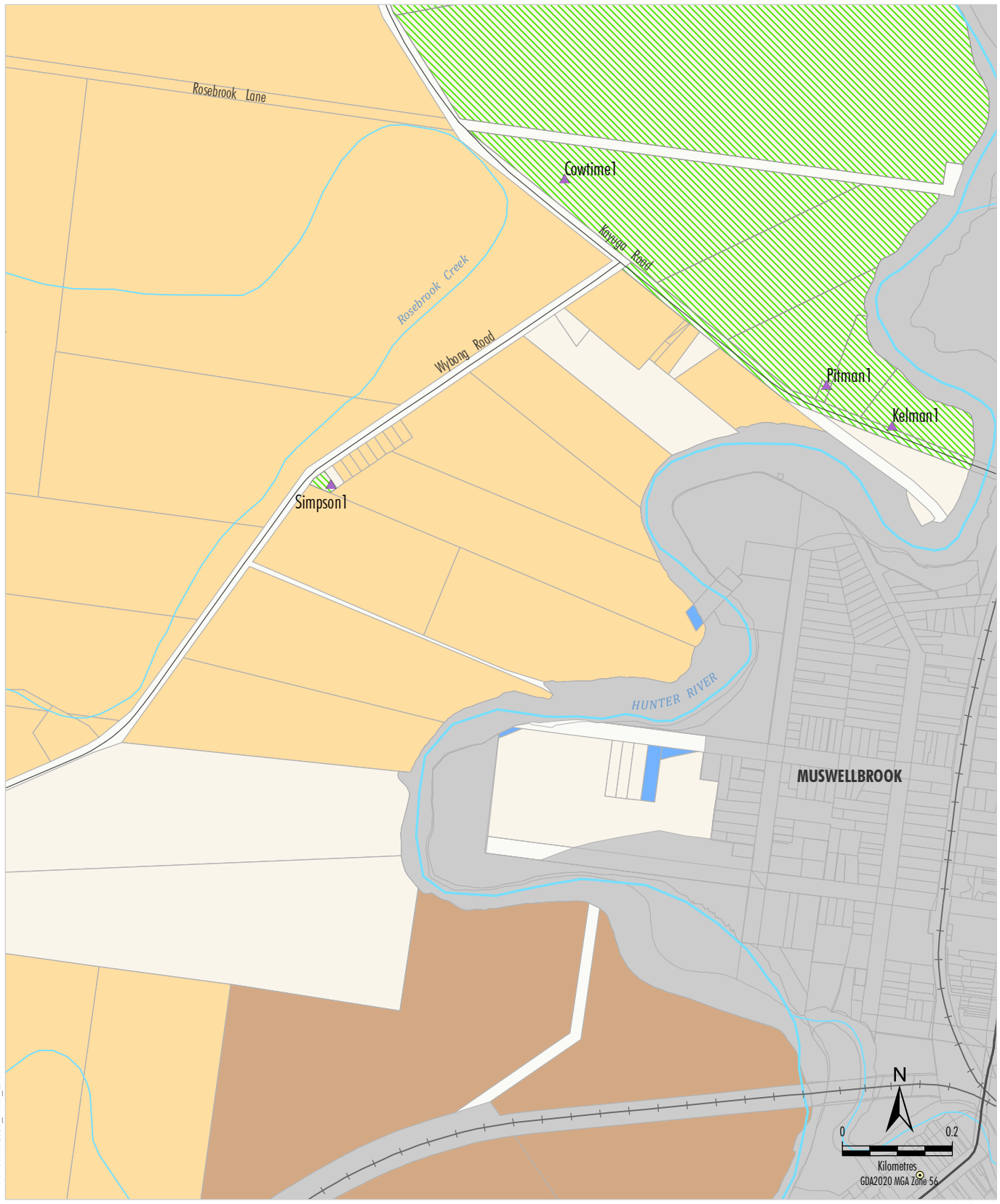
MOUNT PLEASANT OPERATION

Groundwater Bores, Wells and Springs Identified during the Bore Census

Figure 8b



Source: MACH (2023); NSW Department of Industry - Water (2016); NSW Spatial Services (2023)

LEGEND

- Mount Pleasant-controlled
- Bengalla-controlled
- Crown
- The State of NSW
- Muswellbrook Shire Council
- Privately-owned Land
- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Relevant Privately-owned Land
- Bore/Well on Privately-Owned Land
- PINNEENA Record

MACHEnergy

MOUNT PLEASANT OPERATION

Groundwater Bores, Wells and Springs Identified during the Bore Census

Figure 8c

Table 11
Average Monthly Rainfall in the Vicinity of the MPO

Parameter	Muswellbrook (St Heliers)	Aberdeen (Main Road)	Muswellbrook (Lindisfarne)	Muswellbrook (Spring Creek, Castle Vale)	SILO
Station Information					
Station Number	061374	61000	61168	61192	lat: 32.25 lon: 150.85
Period of Record	1992 - 2022	1894 - 2007 and 2013	1960 - 2022	1960 - 2022	1889-2022
Average Monthly Rainfall (mm)					
January	60.2	73.5	78	87.7	68.9
February	64.7	62.2	61.2	69.2	62.6
March	68.7	51.6	63.9	77.8	57.1
April	37.8	40.2	36.2	44.9	40.8
May	41.4	41.5	40.2	45.7	39.1
June	50.8	44.5	37.7	42.8	45.9
July	38.1	40.6	32.7	34.8	41.0
August	37.4	36.5	31.0	37.1	35.5
September	45.4	39.1	39.6	38.4	38.5
October	46.8	49.3	51.9	56.3	49.2
November	77.1	50.9	60.1	68.9	56.0
December	67.6	66.1	64.2	75.6	63.6
Annual Average Rainfall (mm)	***636***	***601***	***597***	***679***	***607.8***

Note: Data current as of 10 October 2023.

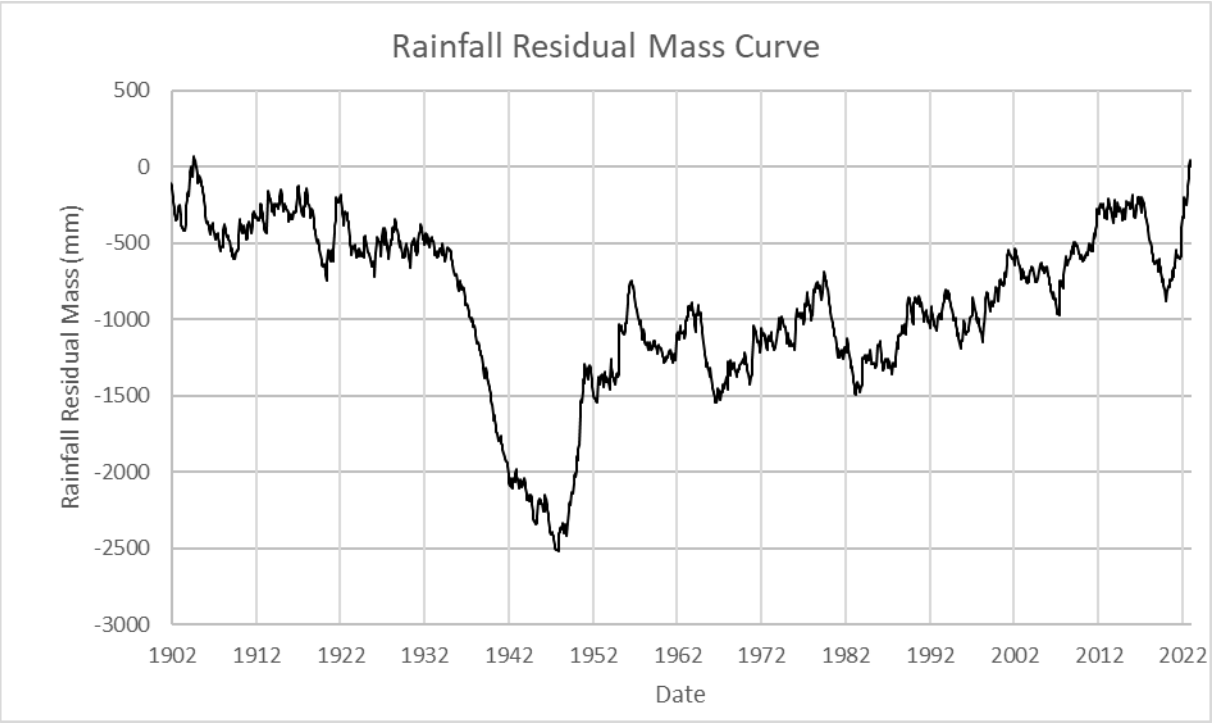


Figure 9: Rainfall Residual Mass Curve – SILO location -32.25, 150.85 (latitude, longitude)

4.6 FLOW MONITORING DATA

Baseline flow monitoring data in the vicinity of the MPO is described in the SWMMP.

4.7 GEOCHEMISTRY DATA

Geochemical assessment of overburden, interburden and coal reject material was undertaken by RGS Environmental Pty Ltd (2020). Most overburden and interburden materials have a very low risk of acid generation and a high factor of safety with respect to potential for acid mine drainage (AMD), and fine reject material are generally classified as non-acid forming (NAF). Potentially acid forming (PAF) material occurrence is limited to Bayswater-Wynn seam interburden, Wynn interburden seam (roof, floor and parting) and coarse rejects derived from processing the Wynn seam (and possibly the Edderton seam).

Initial and ongoing surface runoff and seepage from NAF overburden, interburden and coal reject material is expected to be pH neutral to slightly alkaline and have a low to moderate level of salinity. Surface runoff and seepage from PAF interburden and coal reject material has the potential to become progressively more acidic and saline, if left unmanaged and exposed to oxidising conditions. The management strategy for the MPO will provide that no zones of poorly blended, potentially acid forming material are exposed in the final surface of the overburden emplacement and back-filled open cut. This will be achieved by excluding the material identified as potentially being acid forming from the final face of the overburden emplacement.

Metals/metalloids are sparingly soluble at the neutral to slightly alkaline pH of the leachate expected from NAF overburden, interburden and coal reject materials. Dissolved metal/metalloid concentrations in surface runoff and seepage from bulk NAF waste rock materials are expected to be low and unlikely to pose a significant risk to the quality of groundwater resources at relevant storage facilities.

4.8 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater dependent ecosystems (GDEs) are ecosystems that rely upon groundwater for their continued existence. GDEs may be completely dependent on groundwater (i.e. obligate GDEs), such as aquifer GDEs, or may access groundwater intermittently to supplement their water requirements (i.e. facultative GDEs), such as riparian tree species in arid and semi-arid areas (Doody, Hancock and Pritchard, 2018).

The *Australian Groundwater-Dependent Ecosystems Toolbox* (Richardson et al., 2011) defines three main types of GDEs:

- Type 1: Subterranean ecosystems, including cave and aquifer ecosystems.
- Type 2: Aquatic ecosystems that rely on the surface expression of groundwater, including surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs.
- Type 3: Terrestrial ecosystems that rely on the subsurface presence of groundwater.

Three potential GDEs have been identified in the vicinity of the Project:

- the Hunter River is identified as a potential Type 2 aquatic GDE based on the BoM GDE Atlas;
- approximately 3 ha of *Forest Red Gum Grassy Open Forest* Plant Community Type (PCT) (618) has been identified as a potential Type 3 terrestrial GDE (Hunter Eco, 2020); and
- stygofauna collected from bores accessing the Hunter River alluvium.

An integrated assessment of GDEs was undertaken as part of the Mount Pleasant Optimisation Project EIS Aquatic Ecology Assessment, Groundwater Assessment and Biodiversity Development Assessment Report.

The depth to groundwater in the vicinity of *Forest Red Gum Grassy Open Forest* vegetation community has historically fluctuated by approximately 10 m due to drawdown influence from the Dartbrook Mine. The persistence of the community with this variation in groundwater elevation supports the observation that this community may access groundwater on a facultative basis.

Surveys of the *Forest Red Gum Grassy Open Forest* (PCT 618) vegetation community were conducted in 2020 (Hunter Eco, 2020) across two monitoring plots. The survey found 54 native species and 18 weed species, including 7 High Threat Weeds. The mean number of species per plot was 45±9.0SD. The dominant tree species were Forest Red Gum (*Eucalyptus tereticornis*), Yellow Box (*Eucalyptus melliodora*) and Grey Box x White Box hybrid (*Eucalyptus moluccana x Eucalyptus albens*). There were a few scattered Narrow-leaved Ironbark (*Eucalyptus crebra*). The ground cover consisted of forbs (22 species) and grasses (24 species).

In 2012, Eco Logical Australia (2013) undertook sampling for stygofauna at thirteen bores and wells in the vicinity of the Bengalla Mine. In 2018, Bio-Analysis (2020) undertook additional sampling for stygofauna in the vicinity of the MPO. The results of the 2018 sampling event are shown in Table 12.

Table 12
Invertebrate Records from Bores Near the MPO

Order	Low Taxa	Number of individuals				Likelihood of Stygofauna
		MPBH1	MPBH2	MPBH3	MPBH3b	
Ostracoda	cf Notodromadidae	-	-	-	1	Likely
Cyclopoida	Cyclopidae	1	-	-	-	Likely
Collembola	Isotomidae	1	-	-	-	Likely
Coleoptera	Unidentified larvae	-	1	-	-	Unlikely
Coleoptera	cf Staphylinidae	1	-	1	-	Unlikely
Hemiptera	-	-	2	-	-	Unlikely
Number of Taxa		**3**	**2**	**1**	**1**	-
Number of Individuals		**3**	**3**	**1**	**1**	-

5 GROUNDWATER MANAGEMENT MEASURES

A number of groundwater management measures are employed at the MPO. These measures are discussed in detail below. Performance criteria have been developed from baseline data and the performance measures specified in Table 6 of Development Consent SSD 10418 (the performance measures relevant to groundwater have been reproduced as Table 13).

Table 13
Water Management Performance Measures

Feature	Performance Measure
Alluvial aquifers	• Negligible impacts to alluvial aquifers as a result of the development, beyond those predicted in the document/s listed in condition A2(c), including: - negligible change in groundwater levels; - negligible change in groundwater quality; and - negligible impact to other groundwater users, • Maintain appropriate setbacks in accordance with the Aquifer Interference Policy (DPI, 2012) • Protect GDEs surrounding the site by maintaining negligible impacts as a result of the development, beyond those predicted in the documents listed in condition A2(c)
Tailings storages	• Maximise dewatering and co-disposal of dewatered tailings from the Stage 2 CHPP within overburden emplacements • Design and maintain tailings storage areas to prevent the movement of tailings seepage/leachate offsite
Overburden emplacements	• Design, install and maintain emplacements to prevent migration of acid forming and potentially acid forming materials, and saline and sodic materials • Design, install and maintain out-of-pit emplacements to prevent and/or manage long term saline seepage
Aquatic and riparian ecosystems	• Negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c) • Maintain or improve baseline channel stability • Develop site-specific in-stream water quality objectives in accordance with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000) and *Using the ANZECC Guidelines and Water Quality Objectives in NSW* (DEC, 2006) or its latest version

In accordance with Part B, Condition B51 of Development Consent SSD 10418, the performance measures in Table 6 of Development Consent SSD 10418 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.

5.1 GROUNDWATER MANAGEMENT SYSTEM

The groundwater management system is a sub-component of the water management system, which is designed to maintain separation of clean, dirty (i.e. sediment laden) and mine affected water, preventing the contamination of clean water, including downstream natural drainage systems, by mining systems.

The groundwater management system comprises the open cut pits, various water storages, a subsurface seepage collection system and groundwater bores for monitoring water level and quality. The water management system is described in detail in Section 4 of the SWB.

5.2 FINAL VOID WATER MANAGEMENT

At completion of mining, a single void will remain in the western portion of the site. MACH Energy has designed the final landform to reflect a less engineered profile that is more consistent with the surrounding natural environment. To achieve long-term landform stability, the excavated walls and in-pit overburden will be substantially re-shaped from their operational profiles to flatter, and more naturalistic profiles (Figure 10).

The final void will be rehabilitated to function as a groundwater sink, to minimise the size, depth, drainage catchment, risk of flooding interaction and highwall instability risk, and to maximise beneficial use (where practicable). To achieve these objectives, MACH Energy has designed the final landform to:

- 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^{o}.

The final void will act as a groundwater sink, reducing the potential for groundwater quality impacts. It will be located closer to the Fines Emplacement Area, drawing seepage towards the final void, as opposed to the Sandy Creek alluvium. The greater depth of the final void will also increase the hydraulic gradient from the Eastern Out-of-Pit Emplacement towards the final void, reducing the potential for seepage towards the Hunter River alluvium. Seepage from the MPO is also predicted to report to the Bengalla voids.

The revised final void water balance (AGE Consultants, 2021) demonstrates that the water level will remain significantly below the crest of the final void. The final void water level is predicted to be approximately 75 meters Australian Height Datum (mAHD), 125 m below the spill level (i.e. the final void is contained) (Figure 10). Once mining operations cease, groundwater inflows to the final void would no longer be collected and pumped out. As a result, the final void will gradually fill with water. Inflows into the final void will comprise incident rainfall, runoff within the final void catchment area and groundwater.

The design of the final landform minimises the catchment reporting to the final void whilst maintaining geomorphic design principles. The catchment area of the final void will be defined by permanent permitter bunds, diversion channels and/or embankment walls.

In consultation with the Division of Resources and Geoscience (now MEG) and the Muswellbrook Shire Council, MACH Energy has developed the following Provisional Post-mining design objectives for the final void:

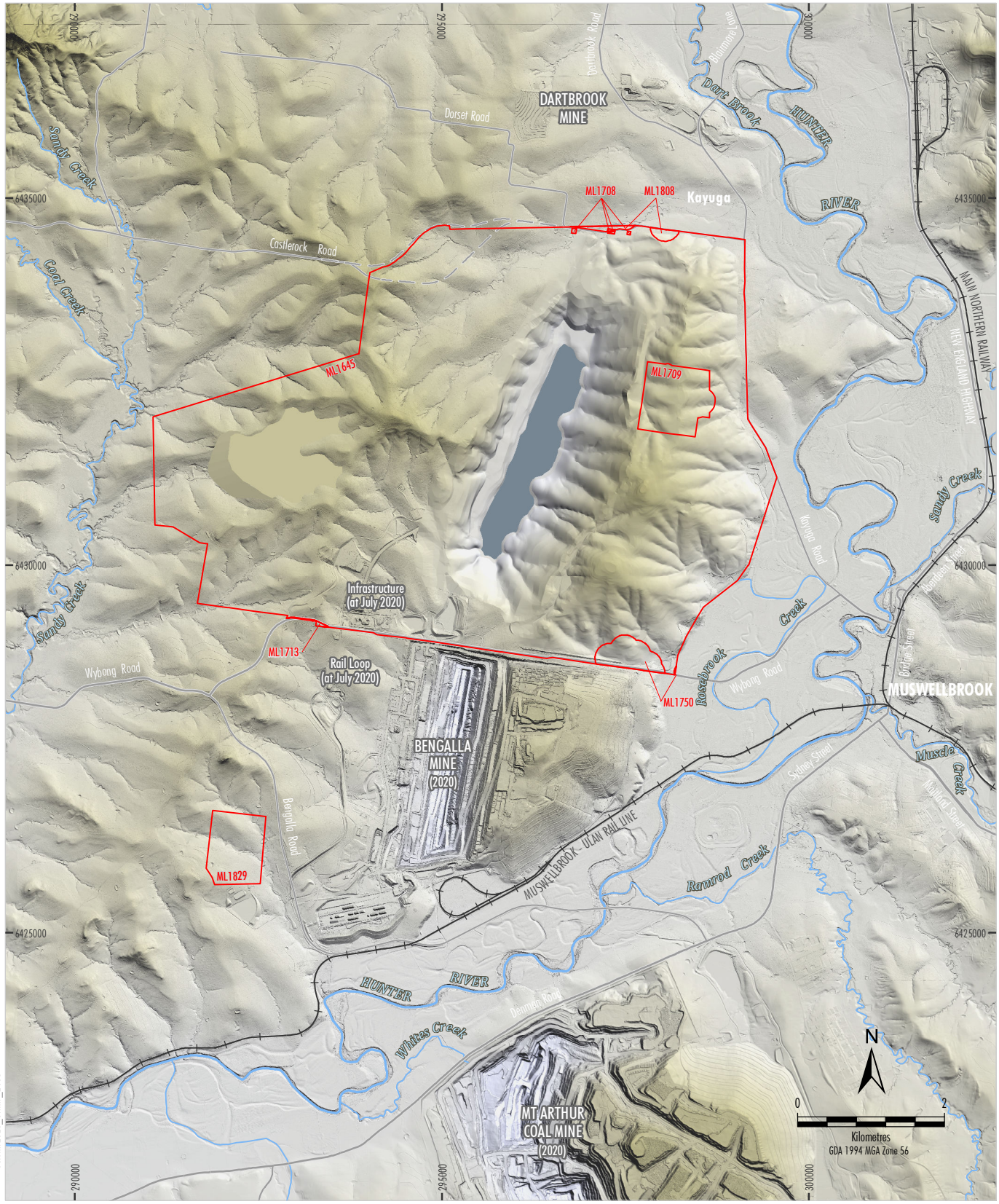
- The residual final void will form a waterbody.
- The final void (and associated drainage network) will be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment.
- The final void will typically act as a groundwater sink.
- The final void could provide long-term use for recreational or industrial activities.

The final void landform will be rehabilitated with vegetation species appropriate for the complex landform. The highwall will be rehabilitated using the best reasonable and feasible rehabilitation technologies available and revegetated with species that are appropriate for its steepness and aspect. Design alternatives for the final void will be continually evaluated and prepared as part of the closure planning process at the MPO and will be subject to ongoing regulatory consultation.

A geotechnical study was undertaken to assess the geotechnical stability and landform stability of the final void design. The study concluded that the final void configuration will be geotechnically stable, and is predicted to be a stable landform in the long term.

Appropriate measures will be used to limit access to steep areas around the final void to restrict cattle, pedestrian and vehicle access. These measures may include large rock placement, landform shaping, or fencing, as agreed with relevant government authorities prior to closure.

MACH Energy will refine the design objectives of the final void over the life of the MPO in the relevant RMP. In addition, MACH Energy will develop performance criteria relevant to the design and management of the final void in the next RMP.



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LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

Source: MACH (2021); NSW Spatial Services (2020)
File: 19116801_v14_WithFinalVoidMods_20201027 (void water level 75 m AHD)

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MOUNT PLEASANT OPTIMISATION PROJECT

Conceptual Project Final Landform

Figure 10

6 PREDICTED GROUNDWATER IMPACTS

Groundwater modelling was undertaken for the Mount Pleasant Optimisation Project EIS by AGE Consultants (2020). The predictions during mining and for the post-mining recovery phase, and the licensing requirements are described below.

6.1 GROUNDWATER INFLOWS

The groundwater inflow rates were calculated based on the EIS indicative mine schedule and progression, with mining having commenced in 2017 and continuing to the end of 2048. The total predicted groundwater inflows are shown in Figure 11.

The maximum predicted inflow is 303 megalitres (ML) in the 2034-35 water year (the 303 ML is the combined maximum inflow from all sources). The peak inflow is well within the 730 units of water access licence allocations currently held by MACH for the Sydney Basin - North Coast Groundwater Source (see Section 6.3).

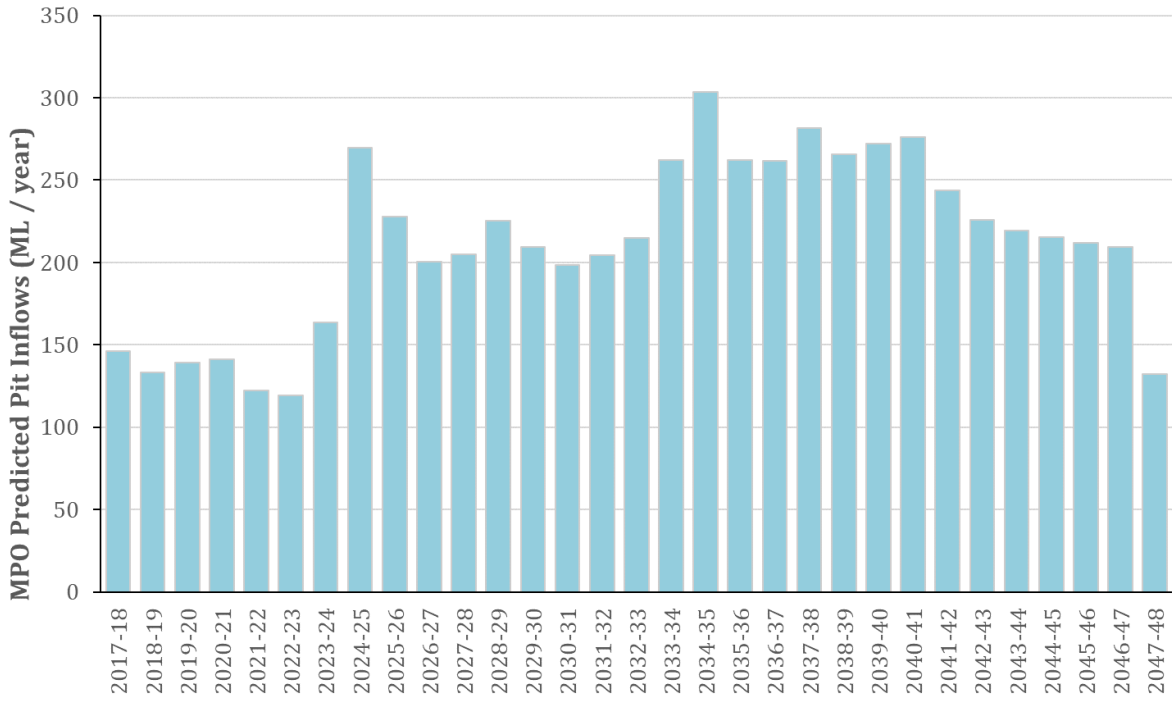


Figure 11: Predicted Groundwater Inflows (AGE Consultants, 2020)

6.2 GROUNDWATER QUALITY

As mining progresses, the void will act as a groundwater sink, preventing interaction between the final void water and the surrounding natural groundwater systems. Therefore, there will be no groundwater quality impacts associated with the Project open cut.

During operations, the Fines Emplacement Area would be managed in accordance with the Mount Pleasant Operation Fines Emplacement Plan (ATC Williams, 2017). The plan provides for the management of seepage from the Fines Emplacement Area as follows:

- a foundation drain is established to manage potential seepage through the embankment;
- a clay fill cut-off key is constructed into the bedrock underlying the embankment footprint to minimise the potential for shallow seepage beneath the fines emplacement area;
- seepage water is collected, tested and recovered using a pump back system as required; and
- the return of decant water to the water management system is prioritised, thereby minimising the decant pond volume and seepage potential of the Fines Emplacement Area.

With the implementation of the above measures, the potential impacts on groundwater quality during the operation of the Fines Emplacement Area is predicted to be negligible (AGE Consultants, 2020).

As described in Section 5, the location and depth of the final void will reduce the potential for seepage towards the Sandy Creek alluvium and Hunter River alluvium (AGE Consultants, 2020). Seepage from the Fines Emplacement Area and Out-of-Pit Waste Emplacement Area is predicted to primarily report to the Project and Bengalla Mine final voids (AGE Consultants, 2020).

6.3 LICENSING REQUIREMENTS

The *Water Management Act, 2000* and the *NSW Aquifer Interference Policy* (NSW Government, 2012) require that all groundwater taken, either directly or indirectly, is accounted for via WALs. Groundwater intercepted from the mining area is considered a direct take from the Permian groundwater system, whilst the changes in flow occurring within the Quaternary alluvium and rivers resulting from depressurisation of the underlying Permian is considered an indirect take.

MACH holds sufficient licences to account for the take from each water source. The estimated groundwater licensing requirements for the MPO are summarised in Table 14.

Table 14
Groundwater Licensing Requirements

Water Sharing Plan	Water Source	Share Components (Units)	During Mining Water Licensing Requirements (ML/year)	Post-mining Water Licensing Requirements (ML/year)
Hunter Regulated River Water Source, 2016	Hunter Regulated River (Management Zone 1A)	961 (High) 2,937 (General)	27	32
Hunter Unregulated and Alluvial Water Sources, 2022	Hunter Regulated River Alluvial	285	27	34
	Muswellbrook	41	2	6
	Dart Brook	20	6	13
North Coast Fractured and Porous Rock Groundwater Sources, 2016	Sydney Basin	730	247	44 (547 if spoil is included)

Source: AGE Consultants, 2020

6.4 ALLUVIAL GROUNDWATER SYSTEM AND SURFACE WATER

Mining is not predicted to directly intercept alluvial aquifers, however an indirect impact or 'water take' occurs as the Permian strata become depressurised and the volume of groundwater flowing from the Permian to the Quaternary alluvium progressively reduces. The indirect take from the Hunter River alluvium increases over time, with peak takes of 27 ML/year at the end of mining (2048) and 34 ML/year in the post-mining phase. The indirect take from the Sandy Creek alluvium increases over time, with peak takes of 2 ML/year by the end of mining (2048) and 6 ML/year in the post-mining phase. Indirect take from the Dart Brook alluvium increases over time, with peak takes of 6 ML/year by the end of mining (2048) and 13 ML/year in the post-mining phase.

The predicted reduction in baseflow to the Hunter River due to the Project is 27 ML/year at the end of end of mining (2048), rising to a peak of 32 ML/year in the post-mining phase. Potential impacts to baseflow in Sandy Creek and Dart Brook are predicted to be negligible (i.e. peak reduction in baseflow of 2 ML/year and 6 ML/year, respectively).

6.5 DRAWDOWN DURING MINING OPERATIONS

The MPO is predicted to result in only limited drawdown in the alluvium to the north of the MPO, near the existing Dartbrook Mine. Limited drawdown is predicted in the Hunter River alluvium as the majority of the target seams subcrop west of the alluvium extent. At the northern boundary of the MPO, the Edderton seam subcrop extends closer to and then under the alluvium. This is the cause of the predicted drawdown in the alluvium to the north. The maximum drawdown is constrained to the north and south by concurrent drawdowns occurring at neighbouring mines, and in the east by subcrops.

6.6 WATER SUPPLY BORES

An assessment of drawdown in private bores was conducted, considering both the impacts of the MPO and cumulative regional mining (future active mining at Dartbrook Mine, Bengalla Mine and Mt Arthur Coal Mine) on private bores. Of the 39 locations identified in the census (see Section 4.4), 35 of the locations were included in the impact assessment (AGE Consultants, 2020) as the remainder were abandoned.

Six bores on private property were predicted to experience drawdown exceeding 2 m due to cumulative impacts from the MPO and neighbouring mines, of which only one is in use. Two of the private bores, CAS3_G and JLON1, are understood to already be dry. A further three bores: CAS1_G, CAS2_G and CAS4_G that are projected to experience more than 2 m drawdown due to MPO are not currently in use. The BELGRAVE bore is the only location that is active and not dry, and predicted to experience more than 2 m drawdown due to cumulative impacts from the MPO and neighbouring mines.

The BELGRAVE bore has recorded a decline in groundwater levels in response to mining between 2004 and 2006, pH has fluctuated between 6.6 and 9.2, and EC has ranged between 5,000 µS/cm to 12,500 µS/cm. The BELGRAVE bore is accessing regolith material associated with the 'less productive' Sydney Basin-North Coast Groundwater Source. Details of the bore and predicted drawdown are summarised in Table 15.

Within three months of commencing development under Development Consent SSD 10418, in accordance with Part B, Condition B42 of Development Consent SSD 10418, MACH Energy has notified the owner of the BELGRAVE bore that they may request monitoring of the bore to determine the level of drawdown from the MPO. Additionally, within three months of the commencement of Development Consent SSD 10418, MACH Energy has notified the owner of the BELGRAVE bore that there is a predicted drawdown of greater than 2 m as a result of the MPO.

Table 15
Drawdown in Private Bores

Bore ID	Depth (mTOC)	Groundwater Level (mBGL)	Electrical Conductivity (µS/cm)	Maximum Drawdown:		Type
				All Mining (m)	MPO (m)	
BELGRAVE	23.85	7.16	6,280	7.74	3.34	Well – Stock & Monitoring

mTOC = metres from the top of casing
mBGL = metres below ground level

6.7 GROUNDWATER DEPENDENT ECOSYSTEMS

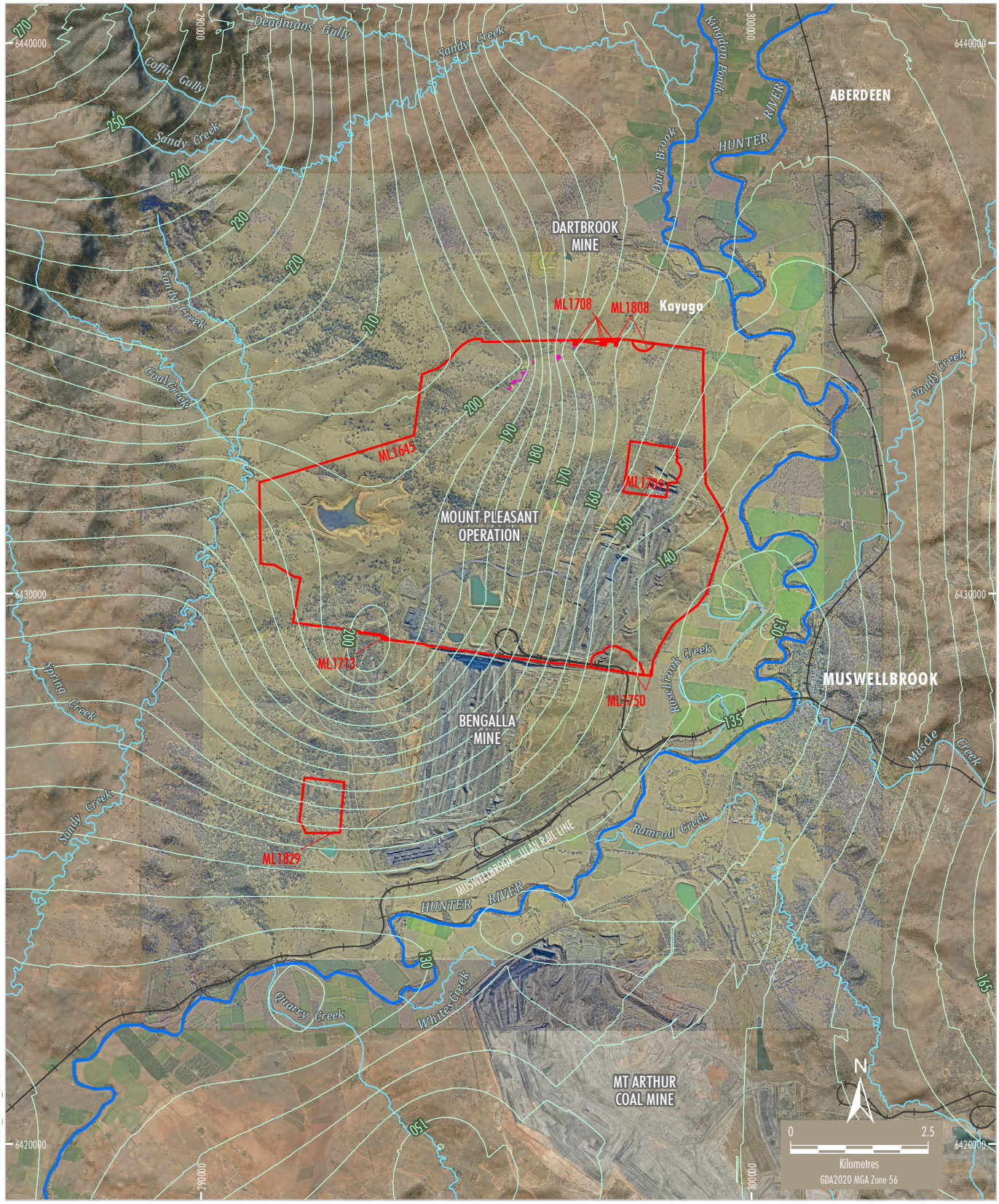
The Hunter River potential Type 2 aquatic GDE and the potential Type 3 terrestrial GDE are shown in Figure 12.

The potential GDEs in the vicinity of the Project are described in Section 4.8.

The predicted peak reduction in baseflow to the Hunter River due to the Project is 32 ML/year, which is negligible relative to the total flows in the Hunter River (greater than 100,000 ML/year on average).

During-mining, the predicted drawdown in the vicinity of PCT 618 is negligible. Larger drawdowns are predicted during the post-mining recovery period. However, these are not anticipated to impact the condition of the PCT 618 vegetation community on the basis that the community only accesses groundwater on a facultative basis and has persisted despite being subject to groundwater drawdowns from previous mining activities.

There is no significant drawdown predicted along the Hunter River alluvium and therefore potential impacts to these stygofauna populations are predicted to be negligible.



MAC-18-03A MP2023_GWMP_209B

Source: MACH (2023); BOM Atlas (2019); NSW Spatial Services (2023)
Orthophoto: MACH (June 2023)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Pre-mining Groundwater Level Contour (5 m Intervals)

Potential Aquatic Groundwater Dependent Ecosystems

- High Potential GDE
- Forest Red Gum Grassy Open Forest (PCT618)

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MOUNT PLEASANT OPERATION

Potential Groundwater Dependent Ecosystems

Figure 12

7 GROUNDWATER TRIGGER LEVELS

Groundwater trigger levels have been developed to prompt investigations and appropriate responses, identified in trigger action response protocols (see Section 8), to prevent exceedance of the performance criteria. Groundwater trigger levels have been developed for the MPO based on the *NSW Aquifer Interference Policy* and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council [ANZECC] and Agriculture and Resource Management Council of Australia and New Zealand [ARMCANZ], 2000).

MACH Energy will evaluate the environmental performance of the MPO against the predictions of impacts made by the contemporary groundwater modelling (AGE Consultants, 2020) (Sections 6.5).

In accordance with the *NSW Aquifer Interference Policy*, groundwater trigger levels have been developed with consideration for potential effects of mining on:

- the groundwater supply of potentially affected landowners;
- High Priority groundwater dependent ecosystems (GDEs); and
- High Priority culturally significant sites.

As there are no High Priority GDEs or High Priority culturally significant sites in the vicinity of the MPO described in the relevant water sharing plans, groundwater trigger levels have only been developed for the groundwater bores of potentially affected landowners. Trigger action response protocols have been developed for GDEs and are discussed in Section 9.4.

7.1 GROUNDWATER LEVELS

Groundwater level triggers have been established to monitor for potential impacts on the alluvial groundwater system to the east associated with the Hunter River. Water level triggers have been developed for the alluvial monitoring bores listed in Table 16 in order to identify trends that could potentially lead to a private bore being impacted (i.e. experiencing greater than 2 m drawdown) and to manage drawdown risks to GDEs.

The water level triggers for MPBH1, MPBH2 and MPBH3b have been calculated based on the criteria "*less than or equal to a 10% cumulative variation in the water table*" which is represented by the minimum recorded saturated thickness of the aquifer. The saturated thickness of the aquifer was calculated from the alluvium thickness at the locations of each bore and the deepest recorded groundwater level in the bore (the deepest recorded level accounts for climate variability over the period of record as none of the bore data shows evidence of mine-related impacts).

The water level trigger for MPBH7 is the base of the screened interval. This level is approximately 1.3 m below the maximum recorded groundwater level in the bore and is similar in magnitude to the 10% GDE trigger value adopted for MPBH1, MPBH2 and MPBH3b.It is not appropriate to adopt a trigger level for MPBH7 based on the criteria "*less than or equal to a 10% cumulative variation in the water table*" as this value would be greater than the base of the screened interval.

Table 16
Groundwater Triggers – Water Level

Bore	Deepest recorded GWL (mbgl)	Trigger Level (mbgl)	Method
MPBH1	10.22	10.70	10% GDE trigger
MPBH2	13.32	13.59	10% GDE trigger
MPBH3b	12.60	13.04	10% GDE trigger
MPBH7	8.82	10.10	Base of screened interval

Note: MPBH7 trigger value added in November 2023.

7.2 GROUNDWATER QUALITY

The Australian and New Zealand *Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000) apply to the quality of both surface waters and groundwaters since they have been developed to protect environmental values relating to above-ground uses such as irrigation and stock use.

ANZECC & ARMCANZ (2000) recommends that wherever possible site-specific data be used to define trigger values for physical and chemical factors which can adversely impact the environment, rather than using default trigger values for pH triggers however, a single trigger range of 6 - 8.5 was applied to all bores. This decision was made as the proposed 20th to 80th percentile trigger ranges proved to be too narrow to allow inaccuracy in pH measurement. The adopted range of 6 – 8.5 pH units is consistent with the pH recommended by ANZECC & ARMCANZ (2000) to prevent corrosion of infrastructure associated with the groundwater, as well as the recommend range for drinking water as outlined in the *Australian Drinking Water Quality Guidelines* (National Health and Medical Research Council [NHMRC] & National Resource Management Ministerial Council [NRMMC], 2011).

Baseline groundwater monitoring results indicate that baseline values of EC in the vicinity of the MPO vary across a wide range and can be outside of the ANZECC & ARMCANZ (2000) guideline values for ecosystem protection. Therefore, site-specific trigger levels based on the baseline data have been developed for monitoring the effect of the MPO.
The *NSW Aquifer Interference Policy* sets out the minimal impact considerations for aquifer interference activities for groundwater sources, including:

> *Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity;*

The water sharing plans that regulate groundwater use in the vicinity of the MPO do not describe beneficial use categories for the groundwater sources. However, the *National Land and Water Resources Audit* (Murray Darling Basin Commission, 2005) specified groundwater quality ranges for beneficial use categories based on salinity (Table 17).

Table 17
Groundwater Quality Categories – EC

Beneficial Use	Quality Range	Description
Potable	Up to 800 µS/cm (500 mg/L TDS)*	Suitable for all drinking water and uses.
Marginal Potable	800-2,350 µS/cm (500-1,500 mg/L TDS)*	At the upper level this water is at the limit of potable water, but is suitable for watering of livestock, irrigation and other general uses.
Irrigation	2,350-7,800 µS/cm (1,500-5,000 mg/L TDS)*	At the upper level, this water requires shandying for use as irrigation water or to be suitable for selective irrigation and watering of livestock.
Saline	7,800-22,000 µS/cm (5,000-14,000 mg/L TDS)*	Generally unsuitable for most uses. It may be suitable for a diminishing range of salt-tolerant livestock up to about 6,500mg/L [~10,150 µS/cm] and some industrial uses.
Highly Saline	> 22,000 µS/cm (14,000 mg/L TDS)*	Suitable for coarse industrial processes up to about 20,000 mg/L [~31,000 µS/cm].

Source: *National Land and Water Resources Audit* (Murray Darling Basin Commission, 2005).

Notes:

mg/L = milligrams per litre; and

TDS = Total Dissolved Solids.

* Approximate EC ranges derived from TDS ranges, with conversion Factor of 1.5625 applied.

Beneficial use categories have been assigned to each monitoring bore based on its 80th percentile baseline EC and the EC ranges specified in Table 17, with the exception of bores 5500D000, 6500F500L and 4500F000. These bores have been experiencing sustained increases in salinity since approximately 2012, leading to data collected since 2016-2017 being greater than the beneficial use category that would be otherwise designated by their respective 80th percentile EC value. Salinity in bores 5500D000, and 4500F000 stabilised around 2017, however, data indicates that bore 6500F500L is still becoming progressively more saline. It is believed that the salinity recorded at these bores indicates a new equilibrium and EC is not expected to return to values recorded pre-2012. Therefore, the beneficial use category allocated to these three bores has been assigned to complement the more saline measurements recorded in the previous two years and do not necessarily reflect the 80th percentile baseline EC value.

Should a measured EC value exceed the upper limit and/or a pH value be outside of the beneficial use quality range at a particular bore for three successive monitoring rounds, the groundwater investigation protocol, as detailed in Section 9.2, would be initiated.

The water quality triggers for each bore are presented in Table 18.

Sufficient data is not yet available to develop baseline trigger ranges for the new bores that have been established to the east and west of the MPO. The trigger ranges for the bores will be established once sufficient data becomes available. Further information regarding the newly established bores is presented in Section 8.1.

Table 18
Groundwater Triggers – Water Quality

Site	pH		pH Trigger Range	EC		
	20th %ile	80th %ile		80th %ile (µS/cm)	Beneficial Use Category	Trigger (µS/cm)
3500B500U	7.2	9.6*	6 – 8.5	3,530	Irrigation	7,800
3500B500L	7.1	7.4		5,826	Irrigation	7,800
3500C500U	7.1	7.4		5,664	Irrigation	7,800
3500C500L	7.2	7.4		5,590	Irrigation	7,800
4500F000	6.5	6.9		6,904	Saline	22,000
5000D000	6.7	7.0		703	Potable	800
5500D000	6.4	6.9		1,570	Irrigation	7,800
6000C000U	6.4	7.1		4,984	Irrigation	7,800
6000C000L	7.0	7.2		5,474	Irrigation	7,800
6500F500U	6.8	7.0		5,778	Irrigation	7,800
6500F500M	6.9	7.2		2,804	Irrigation	7,800
6500F500L	6.5	7.0		1,526	Irrigation	7,800
6500F625	6.7	7.0		4,086	Irrigation	7,800
7000D000U	6.6	7.6		6,730	Irrigation	7,800
7000D000L	6.6	6.8		1,370	Marginal Potable	2,350
7500F000	6.7	7.6		5,918	Irrigation	7,800
WRA1U	-	-		-	-	-
WRA1L	7.2	7.7		4,496	Irrigation	7,800
WRA2U	6.7	7.0		4,108	Irrigation	7,800
WRA2L	7.0	7.3		6,086	Irrigation	7,800
WRA3U	7.1	7.5		9,020	Saline	22,000
WRA3L	6.6	6.9		16,734	Saline	22,000
WRA5U	7.1	7.4		4,772	Irrigation	7,800
WRA5L	7.1	7.8		7,034	Irrigation	7,800
WRA6U	6.8	7.0		11,240	Saline	22,000
WRA6L	7.2	7.7		5,970	Irrigation	7,800
MPBH1	6.8	7.1		590	Potable	800
MPBH2	6.8	7.1		930	Marginal Potable	930**
MPBH3	6.6	6.9		1,083	Marginal Potable	1,083**
MPBH3b	7.4	7.7		4,420	Irrigation	7,800
MPBH4 (formerly A1)^	6.9	7.0		6,220	Irrigation	7,800
MPBH5 (formerly B1)^	-	-		-	-	-
Melody Bore^	-	-		-	-	-

Notes:

* pH values for bore 3500B500S exceed the pH trigger range of 6 – 8.5 however, this bore was mined through in August 2018.

** Existing 80th percentile values have been adopted for these bores given the baseline water quality is close to potable and these sites are representative of the Hunter River alluvium.

^ Sufficient data is not yet available to develop baseline trigger ranges for new alluvial bore MPBH5, or Melody Bore. This table will be revised with the appropriate values once the data becomes available. For more information on these bores refer to Section 8.1.

8 GROUNDWATER MONITORING PROGRAM

The groundwater monitoring program will collect data on groundwater levels and quality, and groundwater inflows to the open cut pit. Groundwater monitoring bores within the MPO monitoring network cover all major hydrogeological units and are broadly distributed across the project area (Figure 5). The existing groundwater monitoring network is listed in Table 6.

8.1 AUGMENTATIONS TO THE GROUNDWATER MONITORING PROGRAM

MACH Energy reviewed the groundwater monitoring program at the MPO as a part of the assessment for the Mount Pleasant Optimisation Project. Following this review, MACH Energy established additional groundwater monitoring bores in November 2019 and January 2020, with further additions proposed (see Figure 5).

The following bores were established in November 2019 and January 2020:

- a new nested site to the north-east of the MPO that includes an alluvial and hard rock monitoring bore (i.e. MPBH6);
- two additional sites to the east of the MPO (MPBH4 and MPBH5), drilled as part of an alluvial investigation program by ENRS in February 2018 (ENRS, 2018);
- new hard rock monitoring bores at two of the existing alluvial sites to the east of the MPO (i.e. MPBH1 and MPBH2); and
- a new site to the west of the MPO (i.e. MPBH7).

The following bores will be added to the monitoring network by 31 October 2024:

- replacement bores:
    - paired set of bores on the south side of the tributary to Sandy Creek on the western side of Mount Pleasant near the perimeter of the dam work to replace WRA5U and WRA5L which were removed during the construction of a dam; and
    - paired set of bores to the west of the south-west corner of the current mine pit with depths for the two bores targeting the Mount Arthur and Vaux Seams to replace 6000C000S and 6000C000L which were destroyed in the course of mining activity;
- additional alluvial bores:
    - one to the north-east of the Mount Pleasant Operation (where greater than 2 m alluvial drawdown is predicted as a result of the Project); and
    - one to the east to monitor for drawdown in the alluvium and potential seepage;
- paired set of bores (shallow and deep) in the vicinity of the identified Type 3 terrestrial GDE, targeting the overburden and the Mount Arthur Seam (the shallowest coal seam);
- a set of three vibrating wire piezometers located along Wybong Road between the MPO and Bengalla Mine;
- a vibrating wire piezometer array to the west of the MPO to capture pressure changes in relevant Permian units[2]; and

[2] It should be noted that since the Permian strata dip downward toward the west while the land surface rises toward the west, the farther west of the current pit, the deeper the bore will need to be to intersect the target strata.

- tailings bores:
    - paired set of bores located in the drainage just north of the tailings dam and targeting the same strata as WRA3U/L to replace WRA3U/L (which have been inundated by tailings runoff); and
    - WRA2U/L (which intersect the same strata and would therefore become obsolete).

Trigger levels will be established for the new monitoring bores when sufficient monitoring data, with a minimum of two years, is available.

The groundwater monitoring bore network is outlined in Table 8 and shown in Figure 5.

It was previously proposed to include two additional sites to the east of the MPO identified during the bore census (i.e. ME11 and ME22). This is no longer considered to be necessary due to the installation of nested standpipes (sampling the alluvium, interburden and coal seam) at the nearby sites MPBH4, MPBH5 and MPBH2.

8.2 WATER LEVEL

Ongoing monitoring of groundwater bores will enable natural groundwater level fluctuations (such as responses to rainfall) to be distinguished from potential groundwater level impacts due to depressurisation resulting from mining activities. Ongoing monitoring of groundwater levels will also be used to assess the extent and rate of depressurisation against model predictions.

All non-historical bores listed in Table 8 will be monitored manually on a quarterly basis. Monitoring at bore locations within mine disturbance areas will be discontinued when mined by the advancing open cut.

The elevation at the additional monitoring bores to be established (refer Section 8.1) will be surveyed by a registered surveyor with water levels reported in Australian Height Datum and depth in the Annual Review. Electronic records of these monitoring results will be made available to DPHI upon request.

Data from the MPO monitoring program will be supplemented with data available from the Bengalla Mine monitoring bores in the region, as required for comparison.

8.3 WATER QUALITY

All non-historical bores listed in Table 8 will be sampled quarterly for pH and EC.

The potential for elevated metals to be present in groundwater seepage is considered low (Section 4.7). Notwithstanding, samples will be sent for laboratory analysis annually for the suite of parameters listed in Table 19.

Table 19
Parameters for Laboratory Analysis

Parameters			
General Parameters			
pH	EC	TDS	
Major Cations and Anions			
Sodium	Potassium	Calcium	Chloride
Sulfate as SO_4	Total Phosphorous as P	Nitrate as N	Nitrite as N
Nitrate & Nitrite as N	Ammonia as N	Total Cations	Total Anions
Ionic Balance	Acidity as $CaCO_3$	Bicarbonate Alkalinity as CaCO3	Hydroxide Alkalinity as $CaCO_3$
Total alkalinity as $CaCO_3$	Carbonate alkalinity as $CaCO_3$	Total Hardness as $CaCO_3$	Magnesium
Trace Metals			
Aluminium	Antimony	Arsenic	Barium
Beryllium	Boron	Cadmium	Chromium
Cobalt	Copper	Fluoride	Iron
Lead	Manganese	Mercury	Molybdenum
Nickel	Selenium	Silver	Strontium
Vanadium	Zinc		
Other			
Reactive Silica			

8.4 GROUNDWATER INFLOWS (PIT DEWATERING / EXTRACTION)

Groundwater extraction for mining activities from all pumping bores will be monitored by means of a flow meter attached to the bore headworks or installed in the discharge pipeline as required under the conditions of the relevant water licences. The MPO Environmental Superintendent (or delegate) will be responsible for monitoring and recording the volumes extracted.

Volumes of water pumped directly from the open cut pits will be monitored by means of flow meters fitted to pipelines or recording of pumping times and rates. Water reporting to the open cut pits may include both groundwater seepage inflows and incident rainfall and runoff.

Where accurate data are available for comparison, estimates of seepage inflows to the open cut will be compared to the modelled groundwater inflows. The rainfall runoff component estimates will also be determined where appropriate for comparison using the rainfall records and the existing site water balance model.

Operational water balance reviews will be conducted regularly, as described in the Site Water Balance.

8.5 GROUNDWATER SUPPLY OF POTENTIALLY AFFECTED LANDOWNERS

To satisfy the requirements of the *NSW Aquifer Interference Policy*, privately-owned bores (shown in Figure 8a to 8c and listed in Table 10) will be monitored regularly (subject to landholder access) to detect if mining-related drawdown of greater than 2 m occurs or is likely to occur. Bores to the east of the MPO will be monitored quarterly to obtain baseline records and to detect if initial mining is impacting water levels. Bores to the north and west of the MPO will be monitored 6-monthly to obtain baseline records, until mining progresses closer to those areas, at which time monitoring frequency may increase. The existing network of monitoring bores will also be utilised to compare drawdown extents to the groundwater model predictions.

8.6 GROUNDWATER DEPENDENT ECOSYSTEMS

As discussed in Section 8.1, an additional paired set of bores (Figure 5) will be drilled in the vicinity of the Type 3 terrestrial GDE, *Forest Red Gum Grassy Open Forest* (PCT 618). Groundwater monitoring will be undertaken as described in Sections 8.2 and 8.3, to identify any changes to groundwater level or quality that may impact vegetation health.

The condition of the Type 3 terrestrial GDE *Forest Red Gum Grassy Open Forest* (PCT 618) vegetation will be assessed twice annually during the stream health monitoring surveys (discussed in the SWMMP, Section 7.5). The vegetation will be monitored for species richness and general vegetation health (i.e. dieback) as a result of impacts on alluvial aquifers or water quality.

Groundwater monitoring of the Hunter River alluvium will be undertaken as described in Sections 8.2 and 8.3.

Bores MPBH1 and MPBH2 (Figure 5) will be monitored annually and analysed to identify the presence of any stygofauna taxa.

9 GROUNDWATER TRIGGER ACTION RESPONSE PROTOCOLS

The trigger action response protocols described below should be initiated in the event that a trigger condition defined in Section 7 is exceeded. The exceedance of a trigger condition does not necessarily indicate that an incident and/or environmental harm has occurred, or that management actions are required. The exceedance of a trigger condition will prompt an investigation to verify that an exceedance has occurred, and to determine the reason for the exceedance. If the investigation determines that an exceedance is attributable to mining activities, appropriate contingency measures and/or remedial measures may be implemented.

The results of any investigations, contingency measures and remedial measures will be reported in the Annual Review (see Section 11), and the GWMP will be reviewed and updated as required.

9.1 GROUNDWATER LEVELS

In the event that groundwater levels at the bores listed in Table 16 fall below the trigger values, the response protocol in Table 20 will be initiated.

Table 20
Groundwater Level Response Protocol

Response Protocol	
Trigger	A groundwater level measurement at a relevant alluvial monitoring bore falls below the trigger value specified in Table 16.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates an exceedance of the trigger conditions. 3. Undertake supplementary water level measurements to check if the exceedance is ongoing. 4. Conduct a preliminary investigation, including a review of site activities being undertaken at the time, baseline groundwater monitoring results, groundwater results at nearby locations, the prevailing and preceding meteorological and streamflow conditions and changes to the land use/activities being undertaken in the area, including mining/pastoral activities. If necessary, engage a suitably qualified hydrogeologist to assist with the preliminary investigation (e.g. interpretation of monitoring results). 5. Identify plausible and possible causative mechanisms and assess/quantify these against all relevant data and information to identify most likely causes. 6. Determine if private groundwater supply bores in the vicinity of the monitoring bore have experienced cumulative drawdowns in excess of 2 m and an associated reduction in groundwater yield (the minimal impact consideration for privately owned groundwater bores under the *NSW Aquifer Interference Policy* is drawdowns greater than 2 m). 7. Determine if there has been an effect on potential GDEs located along the Hunter River and/or at PCT 618 (Section 4.8). 8. Provide a preliminary investigation report to the DPHI, EPA and Department of Climate Change, Energy, the Environment, and Water - Water (DCCEEW Water) within seven days of identifying the trigger exceedance.
Response	• Implement appropriate contingency and remedial measures (including the privately-owned groundwater bores response protocol [see Section 8.3], if required). • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the GWMP and resubmit to the DPHI (if required).

9.2 GROUNDWATER QUALITY

In the event that a monitoring bore records an EC or pH value above (or outside the range of) the trigger values specified in Table 18 for three consecutive monitoring rounds, the response protocol in Table 21 will be initiated.

Table 21
Groundwater Quality Response Protocol

Response Protocol	
Trigger	A monitoring bore records an EC or pH value above (or outside the range of) the trigger values specified in Table 18 of the GWMP at three successive monitoring rounds.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data which indicates an exceedance of the trigger conditions. 3. In the event of an apparently anomalous groundwater monitoring result, conduct a resample/retest. 4. Conduct a preliminary investigation, including a review of site activities being undertaken at the time, baseline groundwater monitoring results, groundwater results at nearby locations, the prevailing and preceding meteorological and streamflow conditions and changes to the land use/activities being undertaken in the area, including mining/pastoral activities. If necessary, engage a suitably qualified hydrogeologist to assist with the preliminary investigation (e.g. interpretation of monitoring results). 5. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• Subject to the outcomes of the investigation, develop/design contingency and remedial measures. Contingency and remedial measures considered practical for implementation may include: – notification to local groundwater users; – providing an alternative water source for the duration of the water quality impact; – reviewing and refining the groundwater monitoring program, including undertaking additional specific monitoring of private landholder bores; – reviewing mine plan impacts on the alluvial groundwater source; and – repairing, replacing, or constructing new water management infrastructure. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the GWMP and resubmit to the DPHI (if required).

9.3 PRIVATELY-OWNED GROUNDWATER BORES

In the event that a groundwater-related complaint is received from a local landholder in relation to a potential mine-related impact on their groundwater supply, or an investigation undertaken in accordance with the Groundwater Level Response Protocol (Table 20) indicates a drawdown of greater than 2 m at a privately-owned bore, the response protocol in Table 22 will be initiated.

Table 22
Privately-Owned Groundwater Bores Response Protocol

Response Protocol	
Trigger	• A complaint by a local landholder regarding water supply from a groundwater bore is received; or • an investigation undertaken in accordance with the Groundwater Level Response Protocol indicates a drawdown of greater than 2 m at a privately owned bore.
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the information provided with the complaint, or the data which indicates the exceedance of the trigger conditions. 3. Conduct a preliminary investigation, including a review of site activities being undertaken at the time, baseline groundwater monitoring results, groundwater results at nearby locations, the prevailing and preceding meteorological and streamflow conditions and changes to the land use/activities being undertaken in the area, including mining/pastoral activities. If necessary, engage a suitably qualified hydrogeologist to assist with the preliminary investigation (e.g. interpretation of monitoring results). 4. Provide the preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance. 5. Where a preliminary investigation indicates a potential mining effect at the bore, conduct a detailed investigation to determine whether the MPO has contributed to a greater than 2 m cumulative drawdown or a detrimental water quality effect (change in beneficial use).
Response	• In the event that a detailed investigation conclusively attributes greater than 2 m drawdown, or a detrimental water quality effect (change in beneficial use), for an existing groundwater supply user to the MPO (or a contribution from the MPO to a cumulative 2 m drawdown or cumulative detrimental water quality effect), investigate appropriate contingency and remedial measures which may include: – deepening the affected groundwater supply bore; – construction of a new groundwater supply bore; or – provision of an alternative water supply. • Determine the exact nature of contingency/remedial measures in consultation with the affected landholder (and relevant regulatory agencies as required). Where a cumulative impact is identified, the costs associated with the contingency/remedial measures will be apportioned to the responsible parties based on their relative contribution to the identified impact. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the GWMP and resubmit to the DPHI (if required).

Where MACH Energy does not have a compensatory water agreement with the owner/s of the land where more than 2 m of drawdown has resulted from MPO activities, the following conditions (Part B, Conditions B41 to B47 [inclusive] of Development Consent SSD 10418) apply:

- MACH Energy will provide compensatory water supply to any landowner owned land whose rightful water supply is adversely and directly impacted (other than an impact that is minor or negligible) as a result of the MPO, in consultation with DCCEEW Water, and to the satisfaction of the Planning Secretary.
- The compensatory water supply measures would provide an alternative long-term supply of water that is equivalent, in quality and volume, to the loss attributable to the MPO. Equivalent water supply would be provided (at least in an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.
- If MACH Energy and the landowner cannot agree on whether the loss of water is attributed to the MPO or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.

- If MACH Energy is unable to provide an alternative long-term water supply then compensation would be provided, to the satisfaction of the Planning Secretary.
- In the event of any complaint relating to a privately-owned licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), MACH Energy would, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or the provision of an alternative long-term supply of water as required under Condition B44 of Development Consent SSD 10418, to the satisfaction of the Planning Secretary.

In accordance with Part B, Condition B48 of Development Consent SSD 10418, Part B, Conditions B41 to B47 of Development Consent SSD 10418 will not apply if MACH Energy has a compensatory water agreement with the owner/s of the land and that MACH Energy has advised DPHI in writing of the terms of this agreement. MACH Energy currently do not have any compensatory water agreement with the owner/s of the land (as at July 2024).

9.4 GROUNDWATER DEPENDENT ECOSYSTEMS

In the event that deterioration of GDEs is identified, the response protocol outlined in Table 23 will be initiated.

Table 23
Groundwater Dependent Ecosystems Response Protocol

Response Protocol	
Trigger	• Detection of deterioration of general vegetation health or decline in species richness in GDEs in the vicinity of the MPO; or • an investigation in accordance with the Groundwater Level Response Protocol indicates a potential impact on a GDE (or potential GDE)
Investigation	1. Notify the MACH Energy Environmental Superintendent within 24 hours of becoming aware of the trigger event. 2. Check and validate the data/information which indicates an impact. 3. In the event of an apparently anomalous monitoring result, conduct a resample/retest where possible. 4. Conduct a preliminary investigation, including a review of site activities being undertaken at the time, baseline groundwater monitoring results, groundwater results at nearby locations, the prevailing and preceding meteorological and streamflow conditions and changes to the land use/activities being undertaken in the area, including mining/pastoral activities. If necessary, engage a suitably qualified hydrogeologist to assist with the preliminary investigation (e.g. interpretation of monitoring results). 5. Commission an investigation by appropriate specialists (e.g. hydrogeologist and/or ecologist) into the impact, if considered appropriate by the Environmental Superintendent. 6. Provide a preliminary investigation report to the DPHI, EPA and DCCEEW Water within seven days of identifying the trigger exceedance.
Response	• Develop appropriate contingency/remedial measures based on the results of the above investigations, in consultation with the relevant authorities if or as required. • Communicate results of investigation, contingency and remedial measures to government agencies as required and summarise in the Annual Review. • Review and update the GWMP and resubmit to the DPHI (if required).

10 CONTINGENCY PLAN

In the event that any unpredicted impacts occur, MACH Energy will implement the following Contingency Plan:

- The Environmental Superintendent will report the incident in accordance with Section 12.
- MACH Energy will identify the appropriate course of action with respect to the identified impact(s), in consultation with technical specialists, DCCEEW Water and any other relevant agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 10.1.
- MACH Energy will, in the event there is a dispute over the proposed remedial course of action or if the actions conflict with current approvals, submit the appropriate course of action to the DCCEEW Water for approval.
- MACH Energy will implement the appropriate course of action to the satisfaction of the DPHI.

10.1 POTENTIAL CONTINGENCY MEASURES

Potential contingency measures will be reviewed during revisions of the GWMP. Potential contingency measures for a range of events are described in the Response Protocols tables (see Section 7).

In addition, the following measures may be implemented:

- MACH Energy will notify (in writing) the affected landowners and tenants of the exceedance as soon as practicable and provide them with regular water quality and water level monitoring results, until the results show that the MPO is complying with the water-related criteria.
- MACH Energy will investigate further water quality or water level controls if monitoring results indicate that this is required.
- MACH Energy will review the relevant procedures to prevent a reoccurrence of the exceedance, incident or non-compliance.

Potential contingency measures for loss of base flow and groundwater leakage from alluvial aquifers have been developed, as described below.

10.1.1 Loss of Baseflow

Predictions of changes to baseflow to the Hunter River, Sandy Creek and Dart Brook are described in Section 6.4. In the event that a detailed investigation concludes that water take is higher than previously predicted, MACH Energy will hold or source additional licences to account for this take. Any incidental water take from the Hunter River will be licensed in accordance with requirements of the *Water Management Act, 2000*, and the baseflow reduction for Sandy Creek and Dart Brook is negligible.

10.1.2 Groundwater Leakage from Alluvial Aquifers

As discussed in Section 6.1, the peak pit inflow is well within the water access licence allocations currently held by MACH for the Sydney Basin - North Coast Groundwater Source.

Groundwater leakage from alluvial aquifers will be licensed in accordance with requirements of the *Water Management Act, 2000*. On this basis, further measures to prevent, minimise or offset groundwater leakage from alluvial aquifers due to the MPO are not considered warranted.

In the event that a detailed investigation concludes that water take is higher than previously predicted, MACH Energy will hold or source additional licences to account for this take.

10.1.3 Drawdown Greater than 2 m at Private or Public Bore

In the event that a detailed investigation conclusively attributes greater than 2 m drawdown, or a detrimental water quality effect, for any relevant private or public groundwater bore (or a contribution from the MPO to a cumulative 2 m drawdown or cumulative detrimental water quality effect), MACH Energy will investigate appropriate contingency and remedial measures which may include:

- deepening the affected groundwater supply bore;
- construction of a new groundwater supply bore; or
- provision of an alternative water supply.

11 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

11.1 ANNUAL REVIEW

In accordance with Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the previous calendar year). The report will be submitted to the DPHI, to the satisfaction of the Planning Secretary.

In relation to water, the MPO Annual Review will:

- include a comprehensive review of the groundwater monitoring results at the MPO over the past year, which includes a comparison of the results to evaluate compliance against:
  - relevant statutory requirements, limits or performance measures/criteria (refer Sections 2 and 5);
  - monitoring results of the previous years;
  - relevant predictions in the Mount Pleasant Operation EIS and MOD 1, MOD 2, MOD 3 and MOD 4 EAs (prior to the surrender of Development Consent DA 92/97); and
  - relevant predictions in the Project EIS.
- identify any groundwater-related non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the groundwater monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual groundwater impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what groundwater-related measures will be implemented over the next year to improve the environmental performance of the MPO.

The numerical model developed and used for the Mount Pleasant Optimisation EIS Groundwater Impact Assessment (AGE Consultants, 2020) will be used as a management tool for the periodic review and calibration of predicted groundwater impacts through the life of the MPO. The numerical model will be progressively refined, with refinements informed by the results of the groundwater monitoring program. Revised outputs from the numerical model will be reported in the Annual Review, as relevant over the life of the MPO, and used to inform regular site water balance reviews. The model will be peer reviewed every three years.

The observed groundwater levels will be reviewed against the model predictions on an annual basis. A suitably qualified hydrogeologist will determine when water levels deviate significantly from that predicted by the model and the reason for this deviation. The review will consider the impact of mining, and other factors that could result in varying water levels including climatic conditions, rainfall recharge and pumping from privately-owned bores and/or other mining operations.

As mentioned in Part D, Condition D11 of Development Consent SSD 10418 (above) relating to MPO Annual Reviews, MACH Energy will include a comprehensive review of environmental performance at the MPO in accordance with Part A, Condition A2 of Development Consent SSD 10418 requires that:

A2. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) generally in accordance with the EIS and Eas;

(d) generally in accordance with the Development Layout in Appendix 2.

Copies of the MPO Annual Review will be submitted to Muswellbrook Shire Council and made available to the Community Consultative Committee and any interested person upon request, in accordance with Part D, Condition D12 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender). The MPO Annual Review will also be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/).

The MPO Annual Review will also include reporting on elevation at each bore with water levels being presented in Australian Height Datum and depth.

11.2 GROUNDWATER MAGEMENT PLAN REVISION

In accordance with Part D, Condition D7 of Development Consent SSD 10418 and Condition 4, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), this GWMP will be reviewed, and if necessary revised to the satisfaction of the Planning Secretary of the DPHI (previously DPE), within three months of the submission of:

- An MPO Annual Review (Part D, Condition D11 of Development Consent SSD 10418 and Condition 3, Schedule 5 of Development Consent DA 92/97);
- an incident report (Part D, Condition D9 or D10 of Development Consent SSD 10418 and Condition 7, Schedule 5 of Development Consent DA 92/97);
- an IEA (Part D, Condition D13 of Development Consent SSD 10418 and Condition 9, Schedule 5 of Development Consent DA 92/97);
- the approval of any modification of the conditions of Development Consent SSD 10418;
- any modification to the conditions of Development Consent DA 92/97[3]; and
- notification of a change in development phase (Part A, Condition A12 of Development Consent SSD 10418).

Prior to the surrender of Development Consent DA 92/97, within four weeks of conducting any such review, the Planning Secretary of the DPHI will be advised of the outcomes of the review and any revised documents submitted to the Planning Secretary for approval. After the surrender of Development Consent DA 92/97, in accordance with Part D, Condition D8 of Development Consent SSD 10418, within six weeks of conducting such a review the revised documents will be submitted to the Planning Secretary for approval.

In accordance with Part D, Condition D8 of Development Consent SSD 10418, MACH Energy must, if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, revise the GWMP to the satisfaction of the Planning Secretary.

[3] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3 of Development Consent DA 92/97, the latter prevails.

In accordance with Development Consent DA 92/97 and Development Consent SSD 10418, MACH Energy may submit a revised GWMP for the approval of the Planning Secretary at any time, and may also submit any revision to this GWMP required under Development Consent DA 92/97 on a staged basis.

If agreed with the Secretary of the DPHI, a revision to this GWMP required under Development Consent DA 92/97 or Development Consent SSD 10418 may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97 and/or Development Consent SSD 10418.

This GWMP will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Part D, Condition D17(iii) of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender).

During the life of the MPO, additional hydrogeological data will be collected, including details on lithology, groundwater intersection and intersection of structures (i.e. faults and dykes). The additional hydrogeological data will be stored and made available as required for future groundwater investigations and/or updates to the groundwater model. If the model is updated, the GWMP will be revised accordingly.

11.3 INDEPENDENT ENVIRONMENTAL AUDIT

Within one year of commencement of development under Development Consent SSD 10418, and every three years after, an Independent Environmental Audit (IEA) will be undertaken and submitted as required, in accordance with Part D, Condition D13 of Development Consent SSD 10418.

In accordance with Part D, Condition D14 of Development Consent SSD 10418, within three months of commencing the IEA, MACH Energy will submit a copy of the audit report to the Planning Secretary, and other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. MACH Energy will ensure that the recommendations will be implemented and the findings and compliance with the IEA will be reported in the MPO Annual Reviews.

Once Development Consent DA 92/97 is surrendered, all subsequent IEAs commissioned by MACH Energy will be in accordance with Part D, Condition D13 and D14 of Development Consent SSD 10418.

Subsequent versions of the IEA will be provided to the Planning Secretary of the DPHI and made available on the MACH Energy website. The IEA will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary of the DPHI.

11.4 ADAPTIVE MANAGEMENT

In accordance with Part D, Condition D4 of Development Consent SSD 10418, MACH Energy will assess and manage risks to comply with the criteria and/or performance measures outlined in Development Consent SSD 10418.

Where any exceedance of the criteria and/or performance measures occurs, at the earliest opportunity MACH Energy will:

- take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible remediation options (where relevant) and submit a report to DPHI describing the options and any preferred remediation measures or other course of action; and
- implement reasonable remediation measures as directed by the Planning Secretary.

12 REPORTING PROCEDURES

In accordance with Part D, Condition D5(h) of Development Consent SSD 10418 and Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in MACH Energy's Environmental Management Strategy (EMS).

In accordance with Part D, Condition D17(vi) of Development Consent SSD 10418 and Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

12.1 INCIDENT REPORTING

An incident is defined as an occurrence or a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent SSD 10418.

In the event that review of monitoring data or a complaint indicates an incident has occurred, the incident will be reported in accordance with Part D, Condition D9 of Development Consent SSD 10418. The Planning Secretary will be notified in writing via the Major Projects website immediately after MACH Energy becomes aware of an incident. The notification will identify the Project name and development application number, and set out the location and nature of the incident.

In accordance with Part D, Condition D10 of Development Consent SSD 10418, within seven days of becoming aware of a non-compliance MACH Energy will notify DPHI (previously DPE) of the non-compliance.

The notification must be made in writing via the Major Projects Website and will:

- identify the MPO (including the Development Application number and name);
- set out the condition of Development Consent SSD 10418 that the incident is non-compliant with; and
- describe the location and nature of the incident, the reason for the non-compliance (if known); and what actions have been, or will be, undertaken to address the non-compliance.

As described in Section 10.1, MACH Energy will notify (in writing) the affected landowners and tenants of the exceedance as soon as practicable and provide them with regular water quality monitoring results, until the results show that the MPO is complying with the water-related criteria.

Additionally, in accordance with Condition R4 of EPL 20850, MACH Energy will notify the EPA by telephoning the Environment Line service on 131555 immediately after becoming aware of any contravention or potential contravention of section 120 of the *Protection of the Environment Operations Act 1997*, except where expressively provided in a condition of EPL 20850. MACH Energy will provide written details of the notification to the EPA at info@epa.nsw.gov.au within seven days of the date of the notification.

12.2 COMPLAINTS

MACH Energy maintains a Community Hotline (1800 886 889), which is dedicated to the receipt of community complaints. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database.

MACH Energy has developed a procedure that outlines its commitment to receiving, responding to and maintaining a record of phone calls from the community. This procedure is supported by a Community and Stakeholder Engagement Register. This is described in MACH Energy's EMS.

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Condition 11, Schedule 5 of Development Consent DA 92/97 (prior to its surrender), a complaints register will be made available on the MACH Energy website (https://machenergyaustralia.com.au/) and updated monthly.

12.3 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of MACH Energy's EMS and is described below.

Compliance with all approval plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with MACH Energy and the Project. In accordance with Part A, Condition A2 of Development Consent SSD 10418 and Schedule 2, Condition 2 of Development Consent DA 92/97 (prior to its surrender), MACH Energy will carry out the development in accordance with:

- the conditions of Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender)[4];
- all written directions of the Planning Secretary;
- Statement of Commitments (Appendix 3 of Development Consent DA 92/97);
- the 1997 EIS, EA (MOD 1), EA (MOD 2), EA (MOD 3), EA (MOD 4), the Project EIS; and
- with the Development Layout in Appendix 2 of Development Consent SSD 10418 (Appendix D).

MACH Energy will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 12.1, MACH Energy will report incidents in accordance with Part D, Condition D9 of Development Consent SSD 10418.

A review of compliance with all conditions in Development Consent SSD 10418 and Development Consent DA 92/97 (prior to its surrender) and relevant mining leases will be undertaken prior to (and included within) each Annual Review (Section 11.1).

[4] In accordance with Part A, Condition A4 of Development Consent SSD 10418, the conditions in Development Consent SSD 10418 and directions of the Planning Secretary prevail to the extent of inconsistency, ambiguity or conflict between them and any document/s listed in condition A2(c). In the event of an inconsistency, ambiguity or conflict between any of the document/s listed in condition A2(c), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

Additionally, in accordance with Part D, Condition D13 of Development Consent SSD 10418, an IEA (Section 11.3) will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary to assess whether MACH Energy is complying with the requirements in Development Consent SSD 10418.

12.4 ACCESS TO INFORMATION

In accordance with Part D, Condition D17 of Development Consent SSD 10418 and Schedule 5, Condition 11 of Development Consent DA 92/97, the MACH Energy website will be maintained as a tool for the provision of information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information required by MACH Energy to be available on the website is outlined in MACH Energy's EMS.

13 REFERENCES

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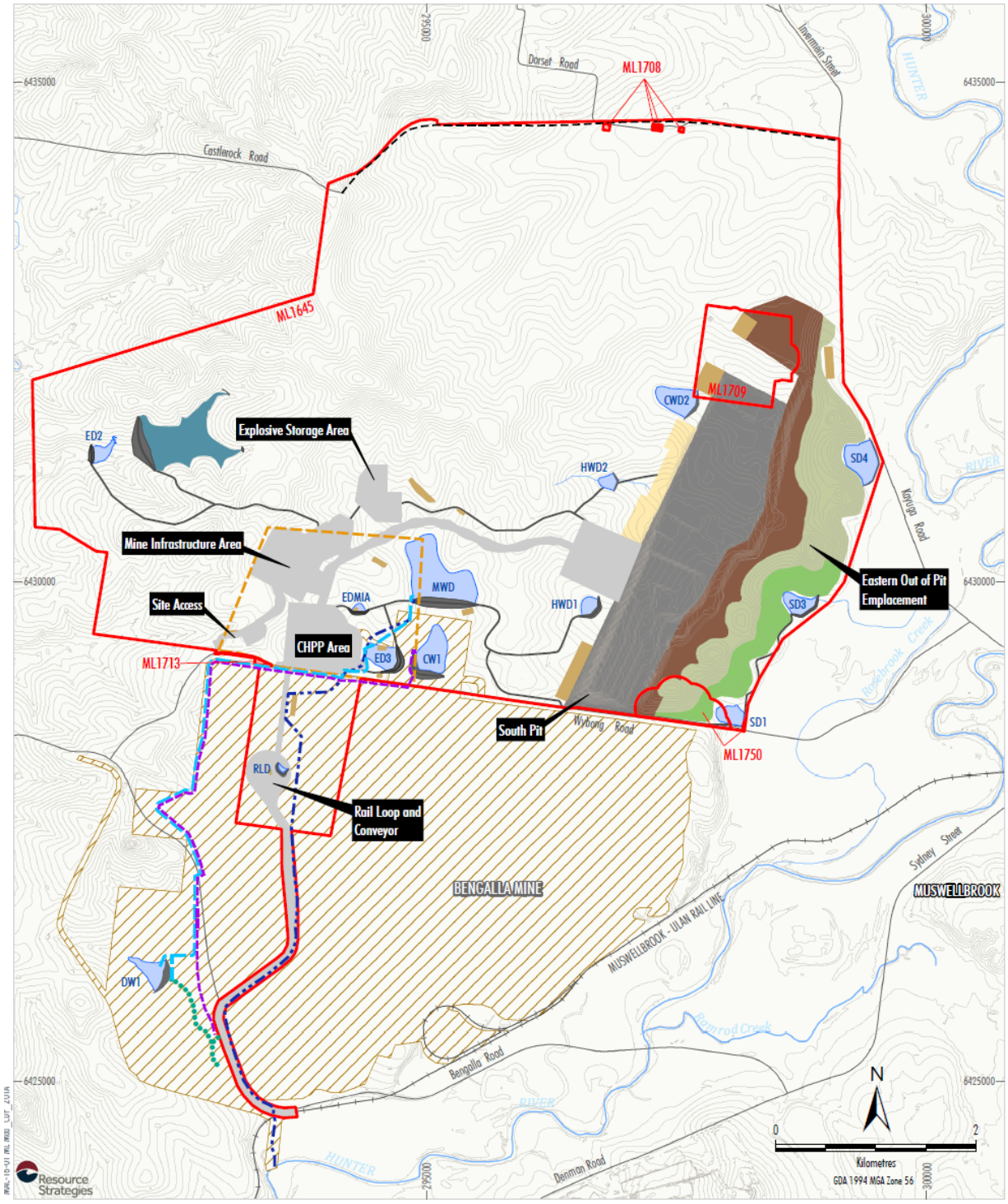
ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

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MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025

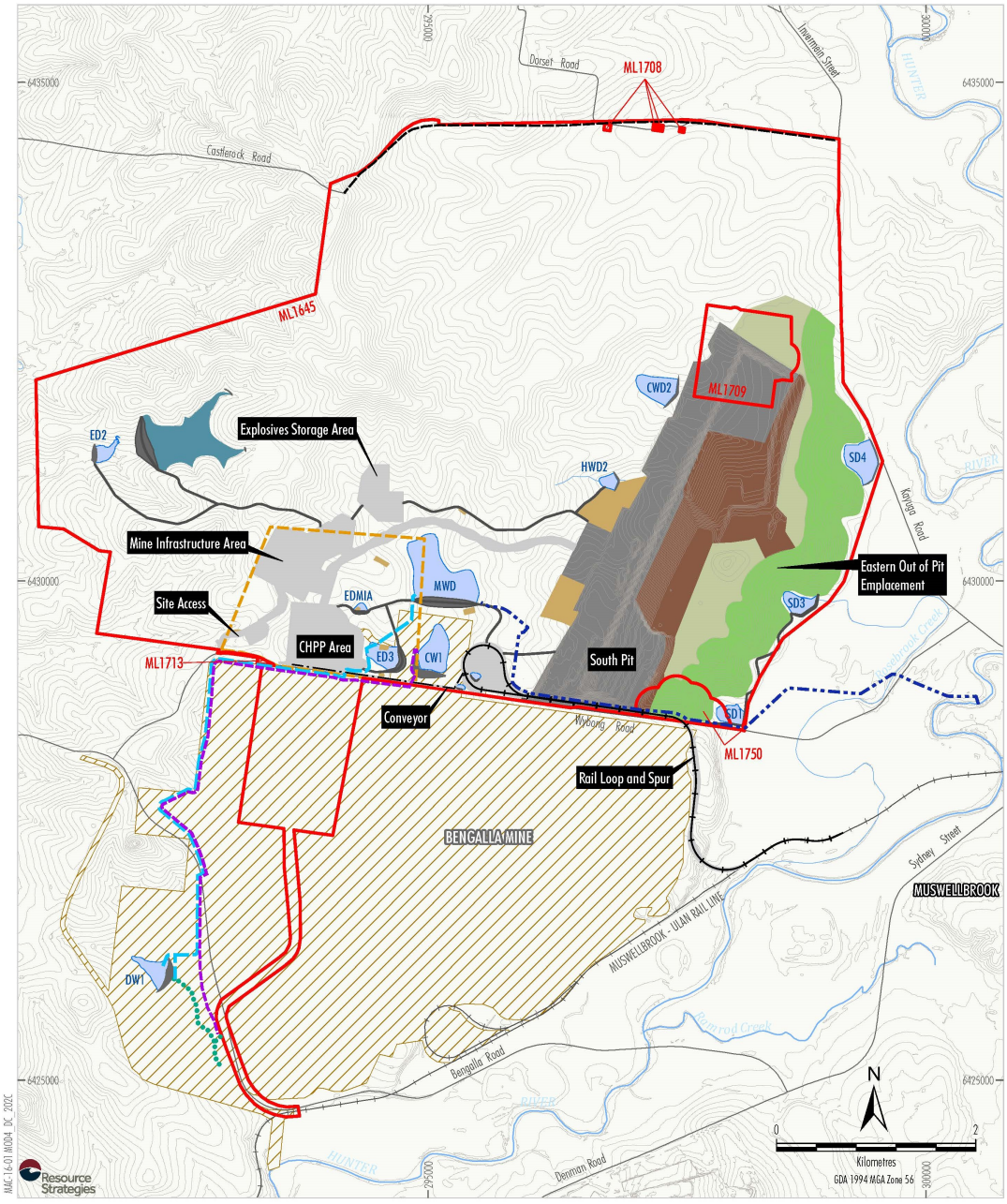
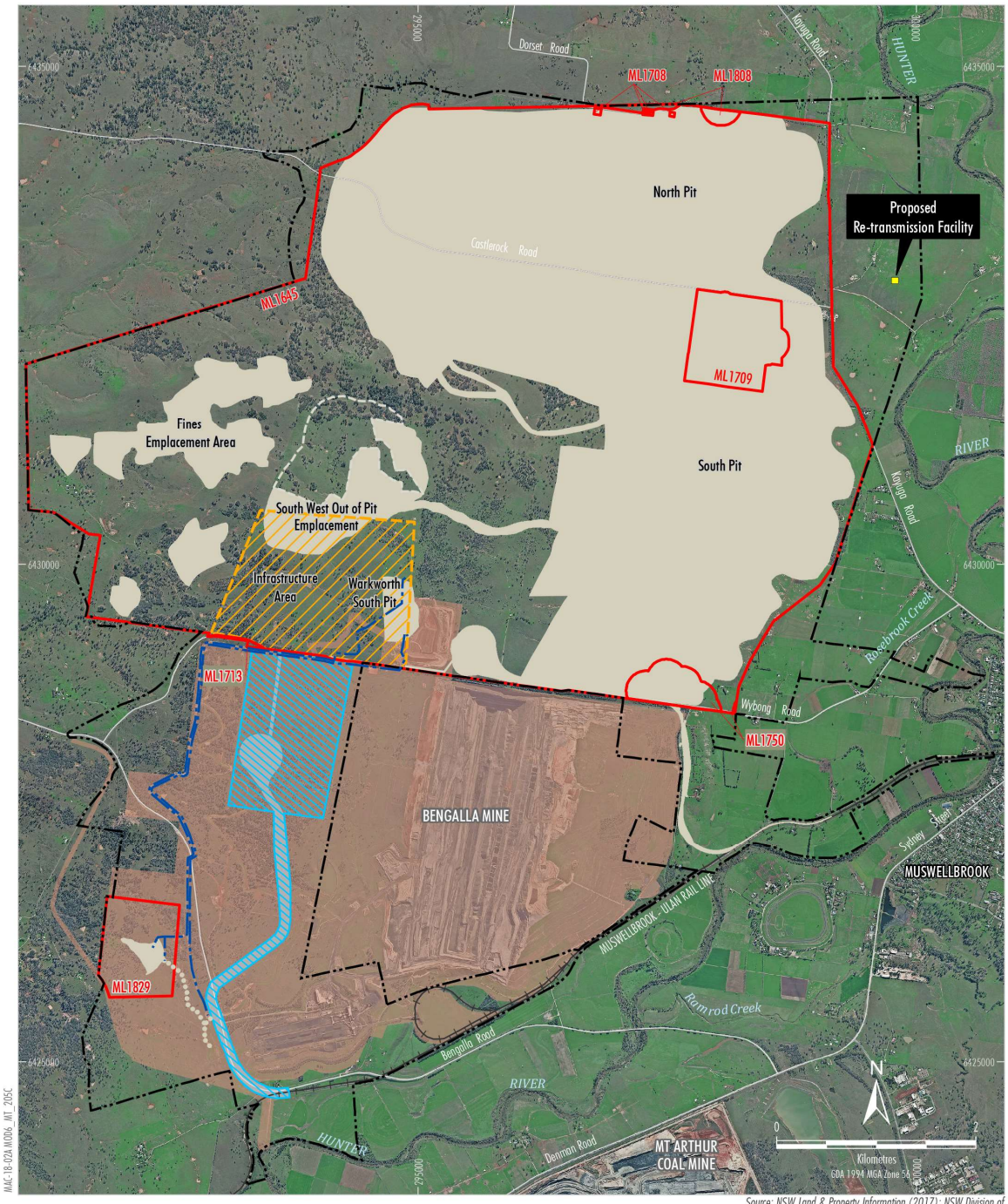


FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Development Consent Boundary (DA 92/97)
- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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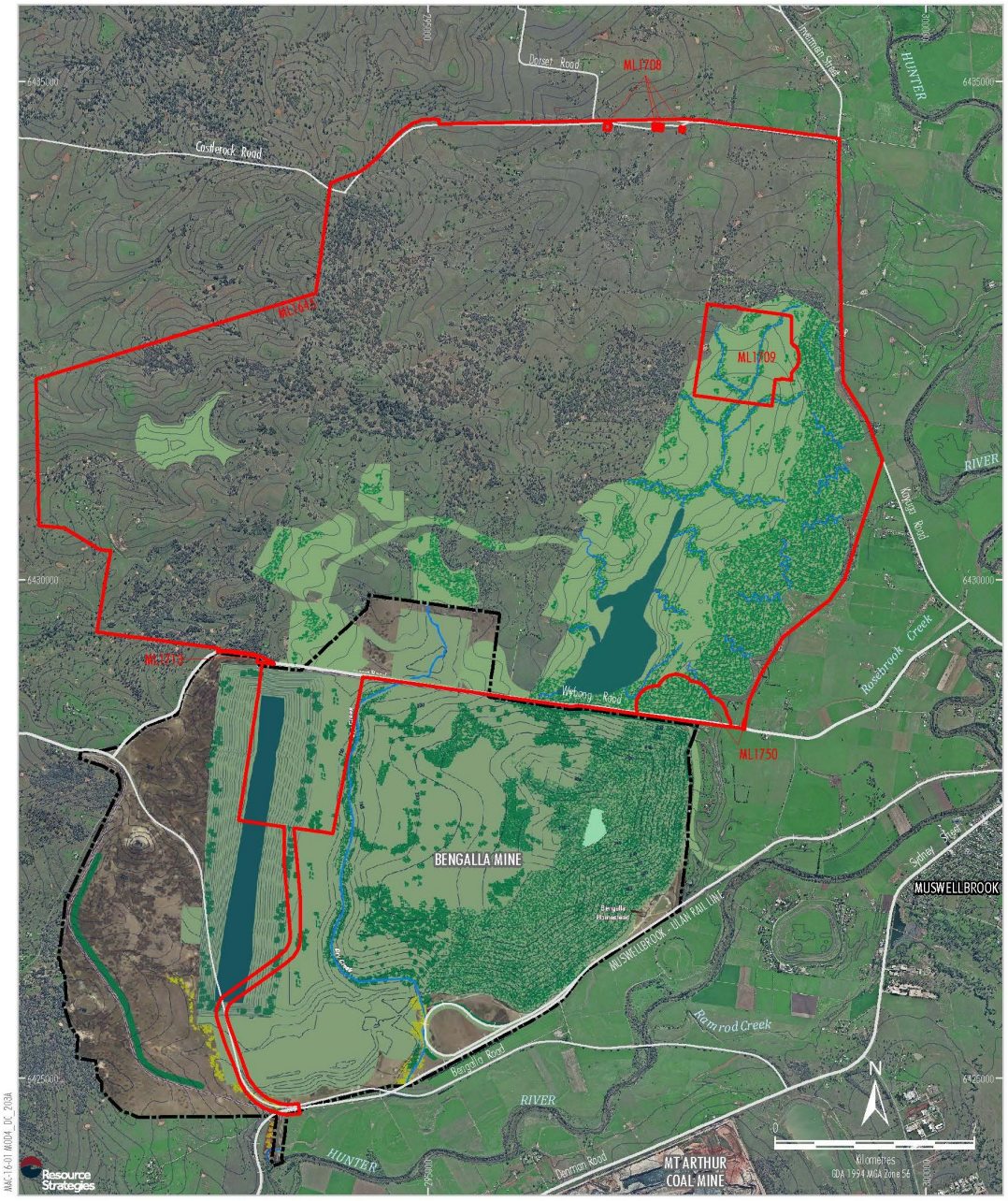
MOUNT PLEASANT OPERATION
Revised Approved Surface Disturbance Plan

FIGURE 4 - CONCEPTUAL FINAL LANDFORM



LEGEND

- Mt Pleasant Mining Lease Boundary
- Final Void
- Final Rehabilitation

Bengalla Mine Conceptual Final Landform *

- Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
- Dry Creek
- Final Void Lake
- Rehabilitation
- Rehabilitation Class III
- Indicative Tree Screens (or equivalent)
- Treed Rehabilitation
- Indicative Restorative Area

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

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Conceptual Final Landform (2026)

ATTACHMENT 2

APPENDIX 2 OF DEVELOPMENT CONSENT SSD 10418

APPENDIX 2 DEVELOPMENT LAYOUT PLANS

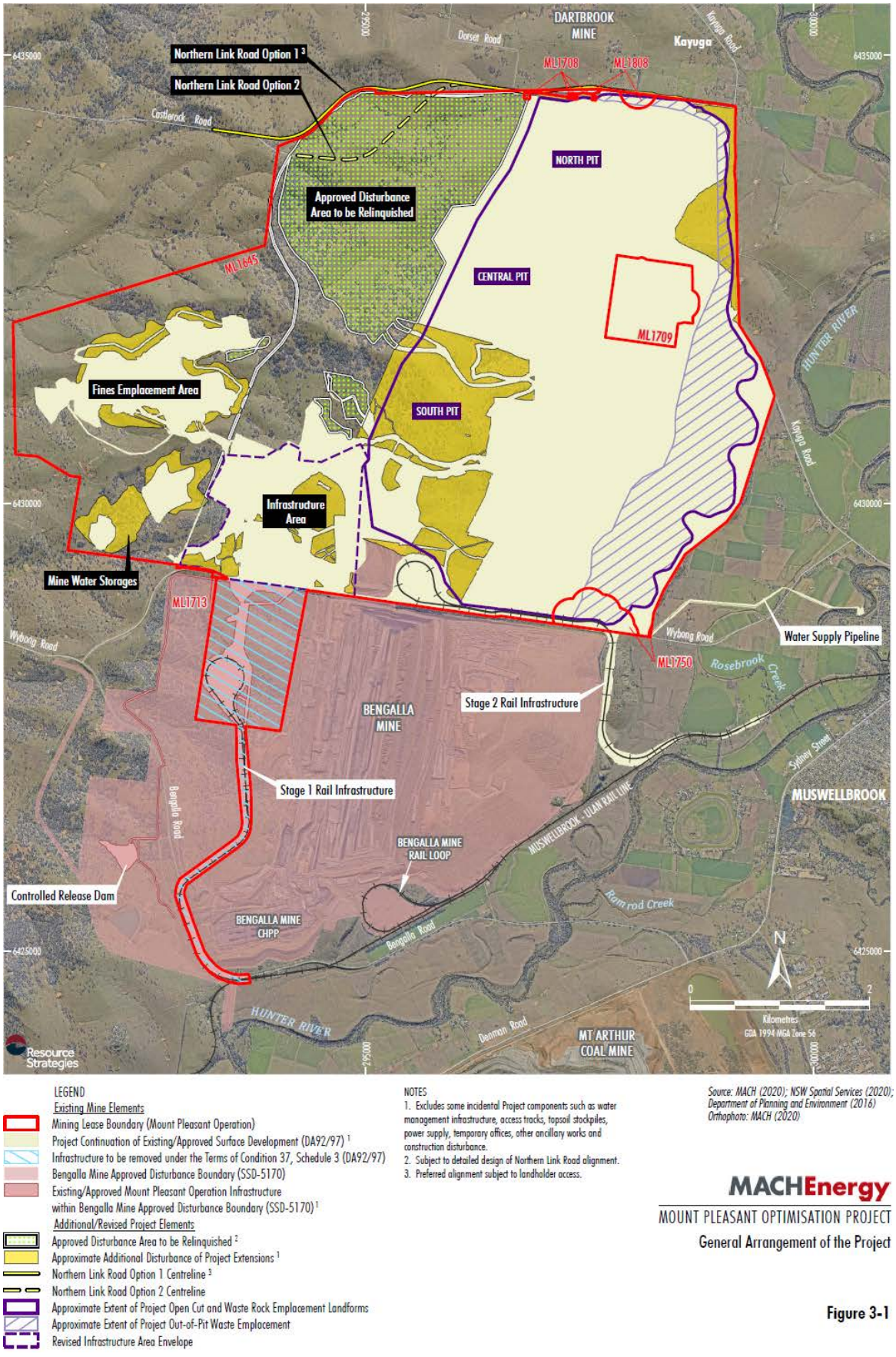


Figure 1: General Project Arrangement

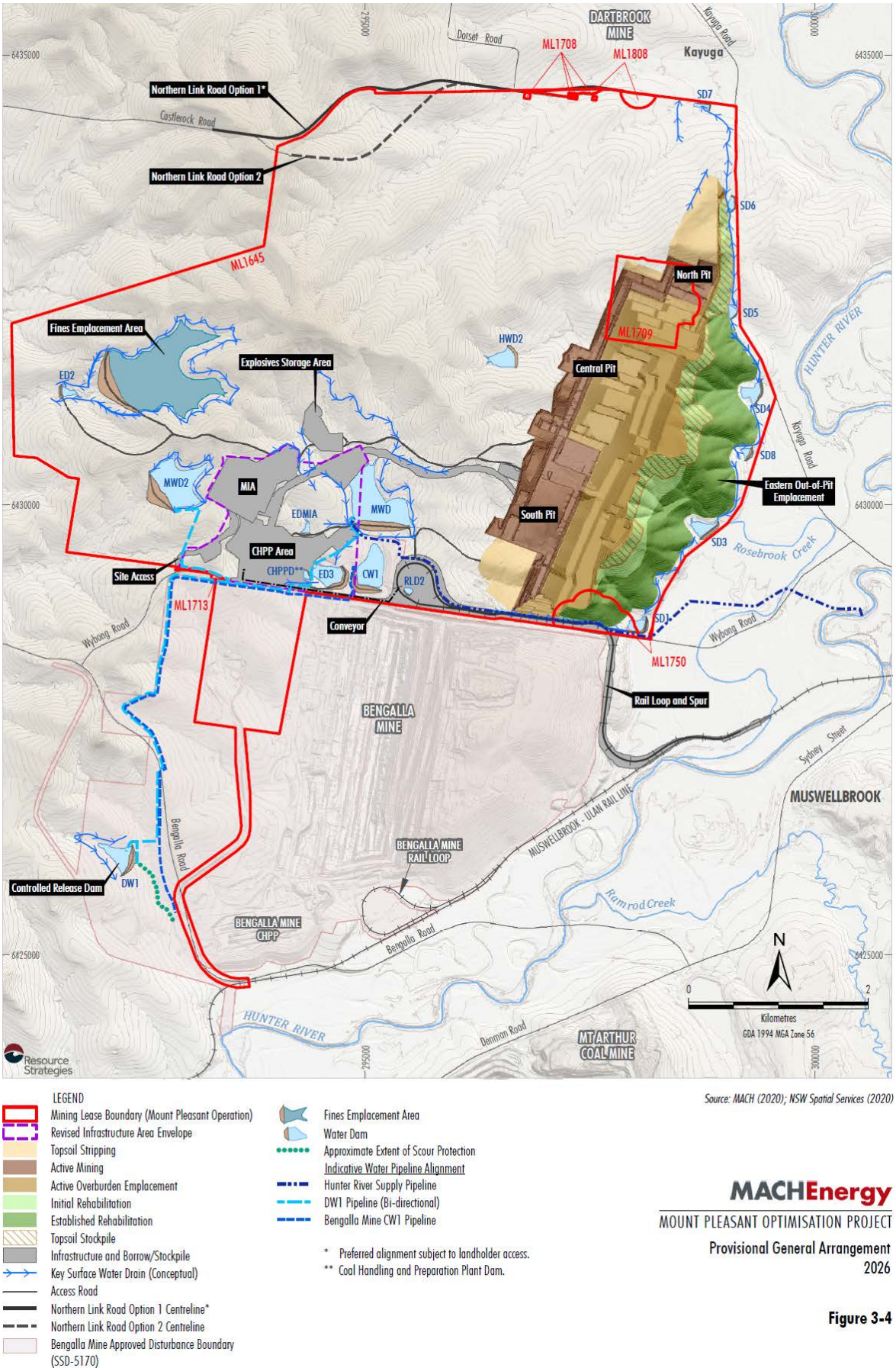
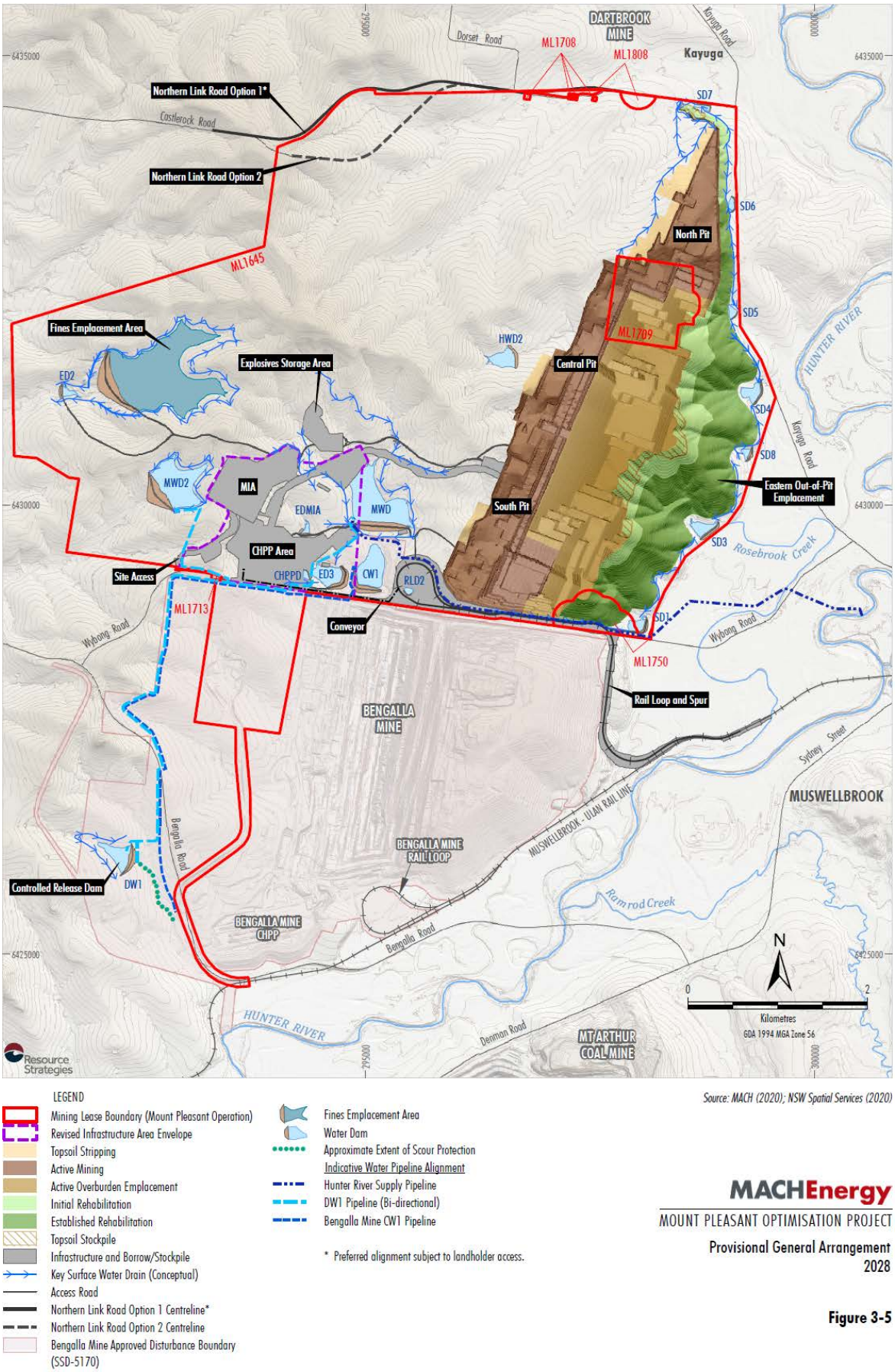


Figure 2: General Project Arrangement – 2026



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.

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

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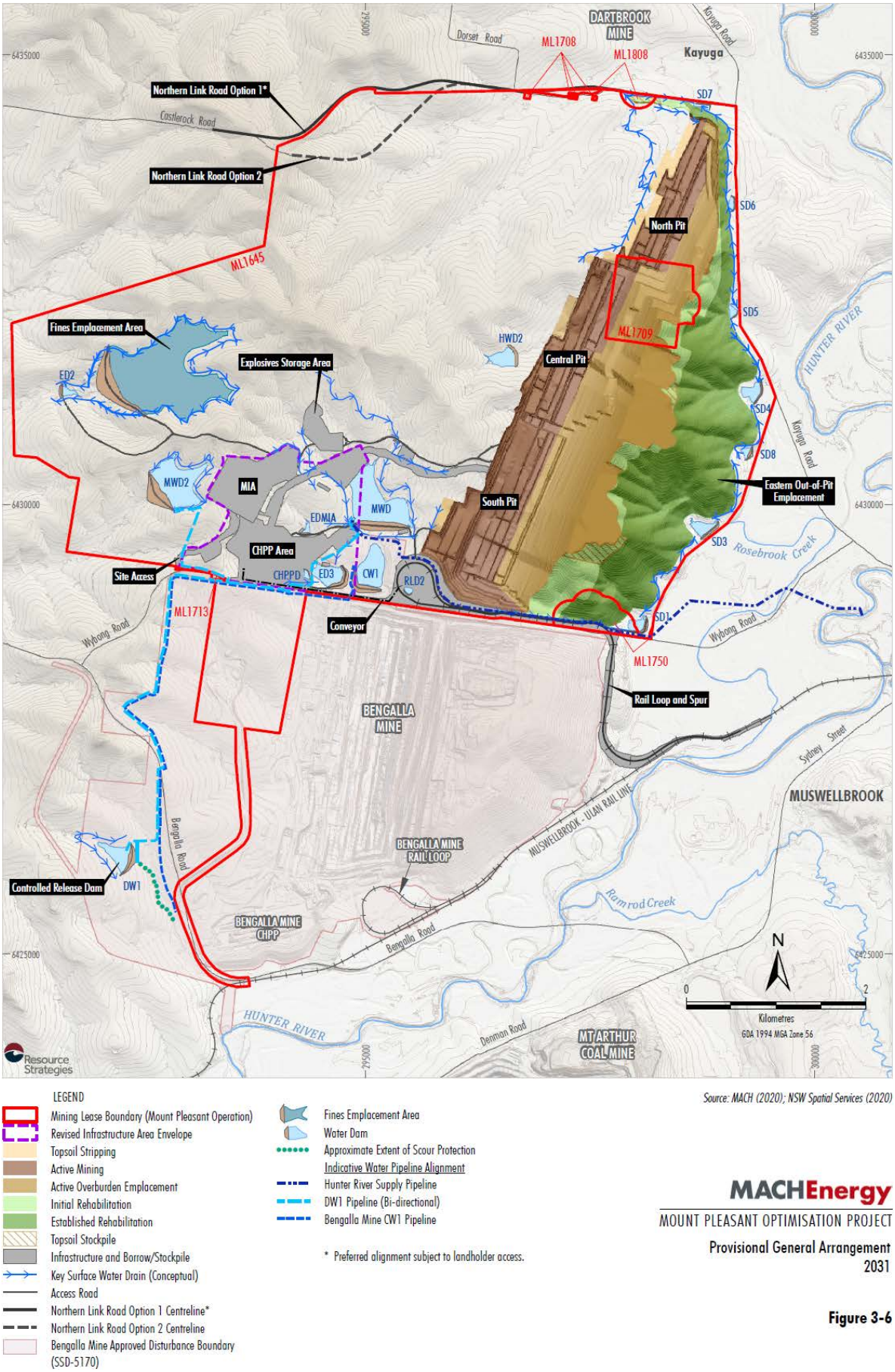
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2028

Figure 3-5

Figure 3: General Project Arrangement – 2028



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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- 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

Figure 4: General Project Arrangement - 2031

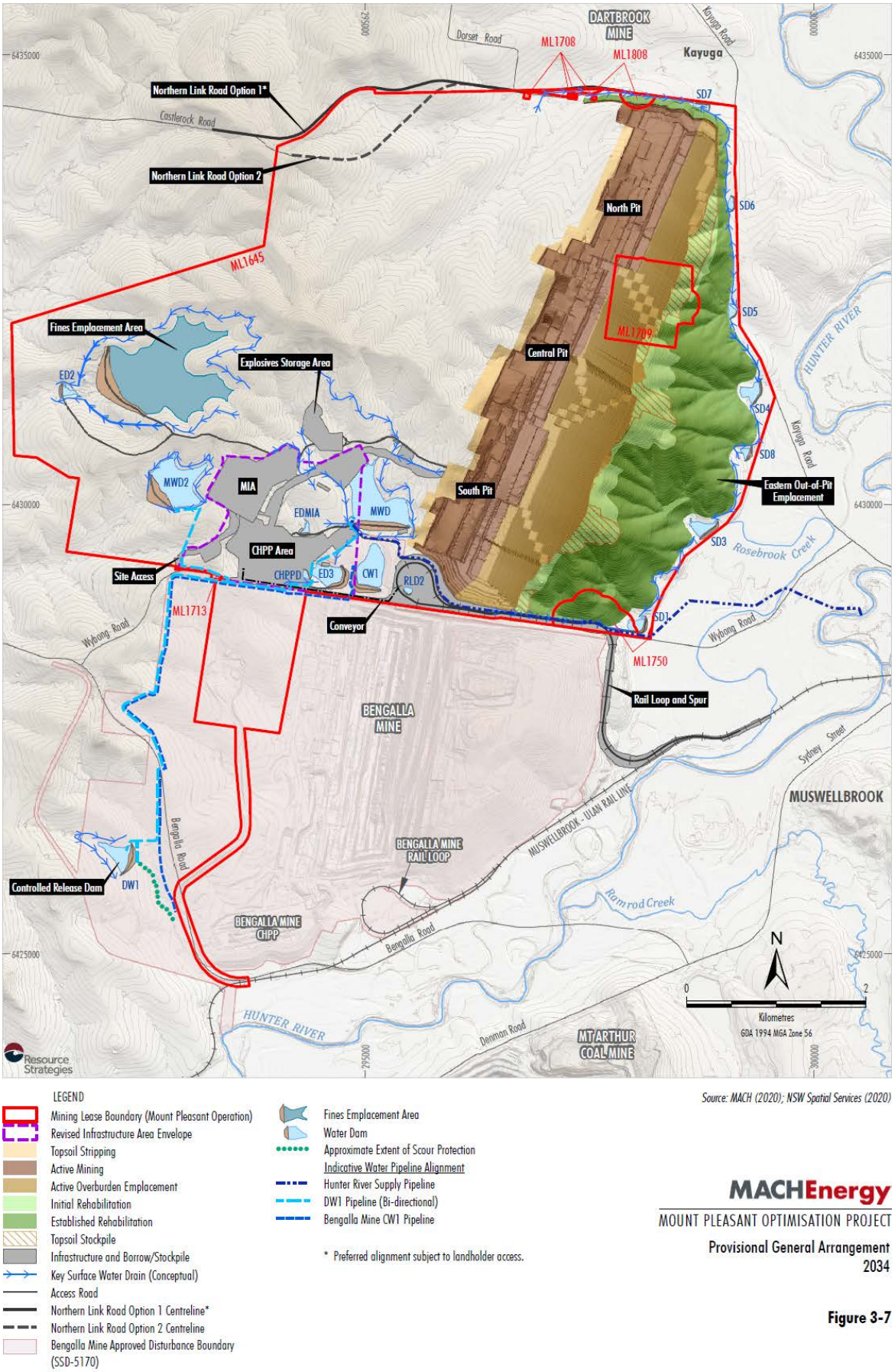


Figure 5: General Project Arrangement - 2034

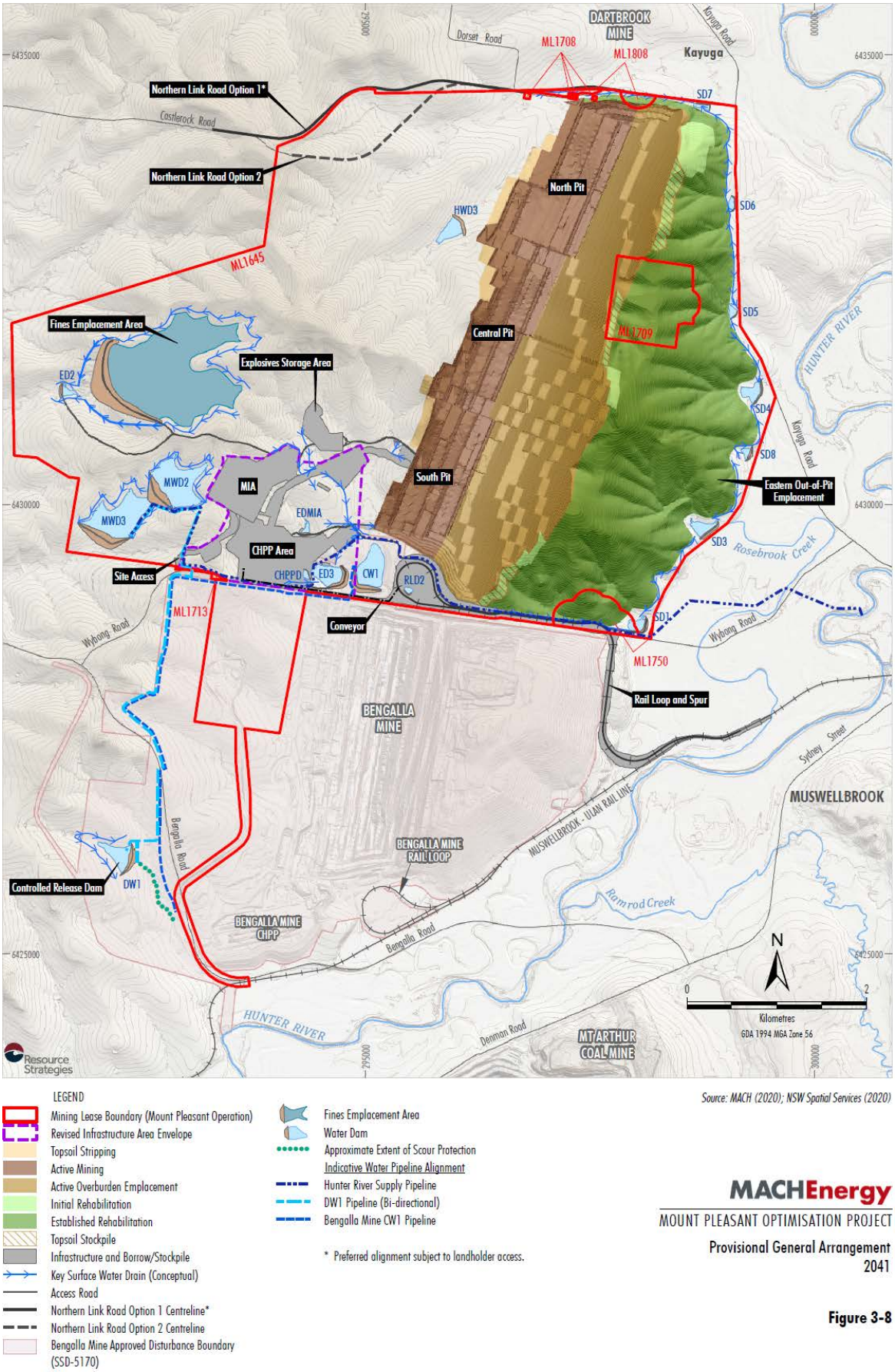
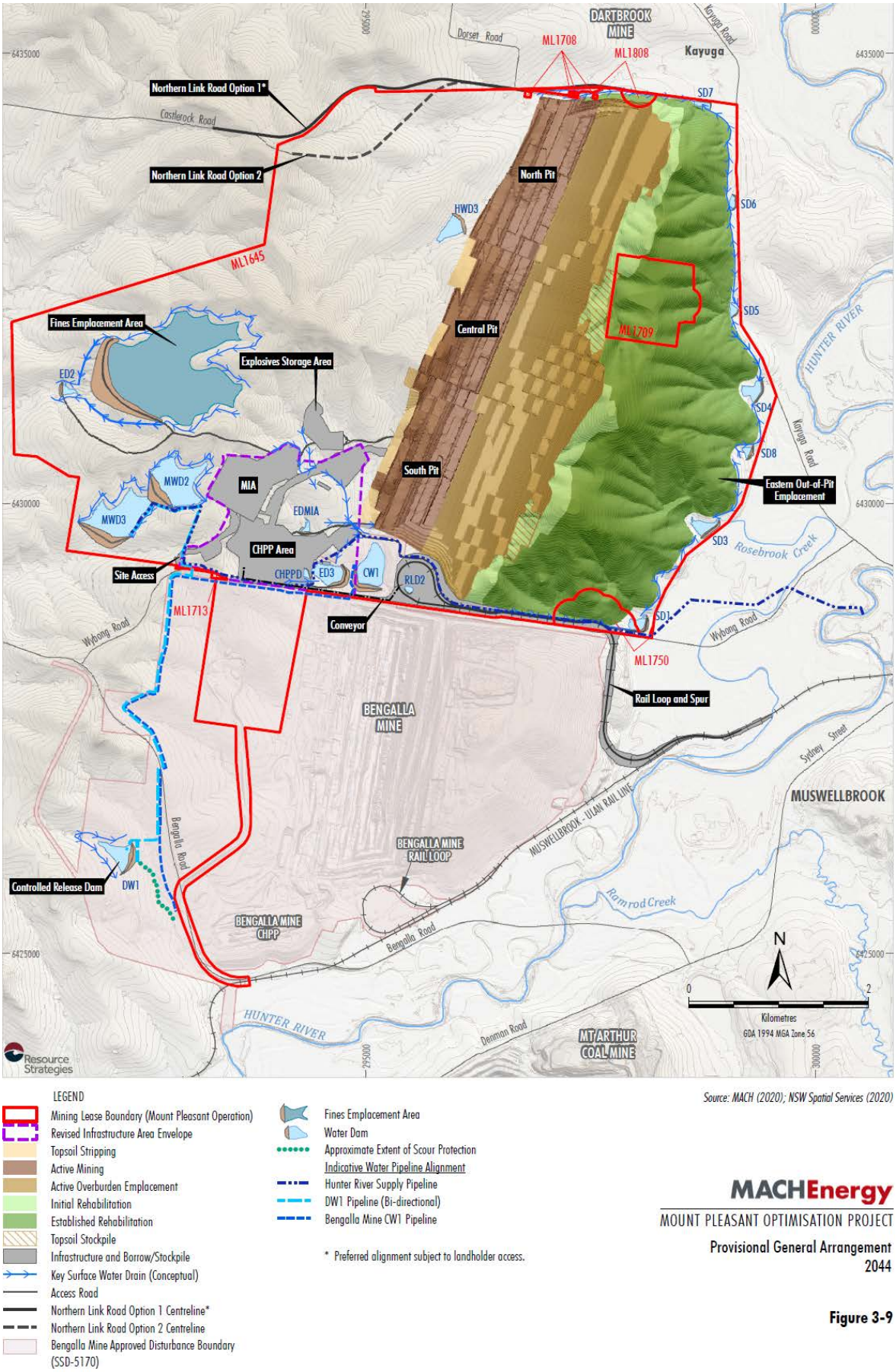


Figure 6: General Project Arrangement - 2041



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
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- Topsoil Stripping
- Active Mining
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- Initial Rehabilitation
- Established Rehabilitation
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- Key Surface Water Drain (Conceptual)
- Access Road
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- Northern Link Road Option 2 Centreline
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- 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.

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

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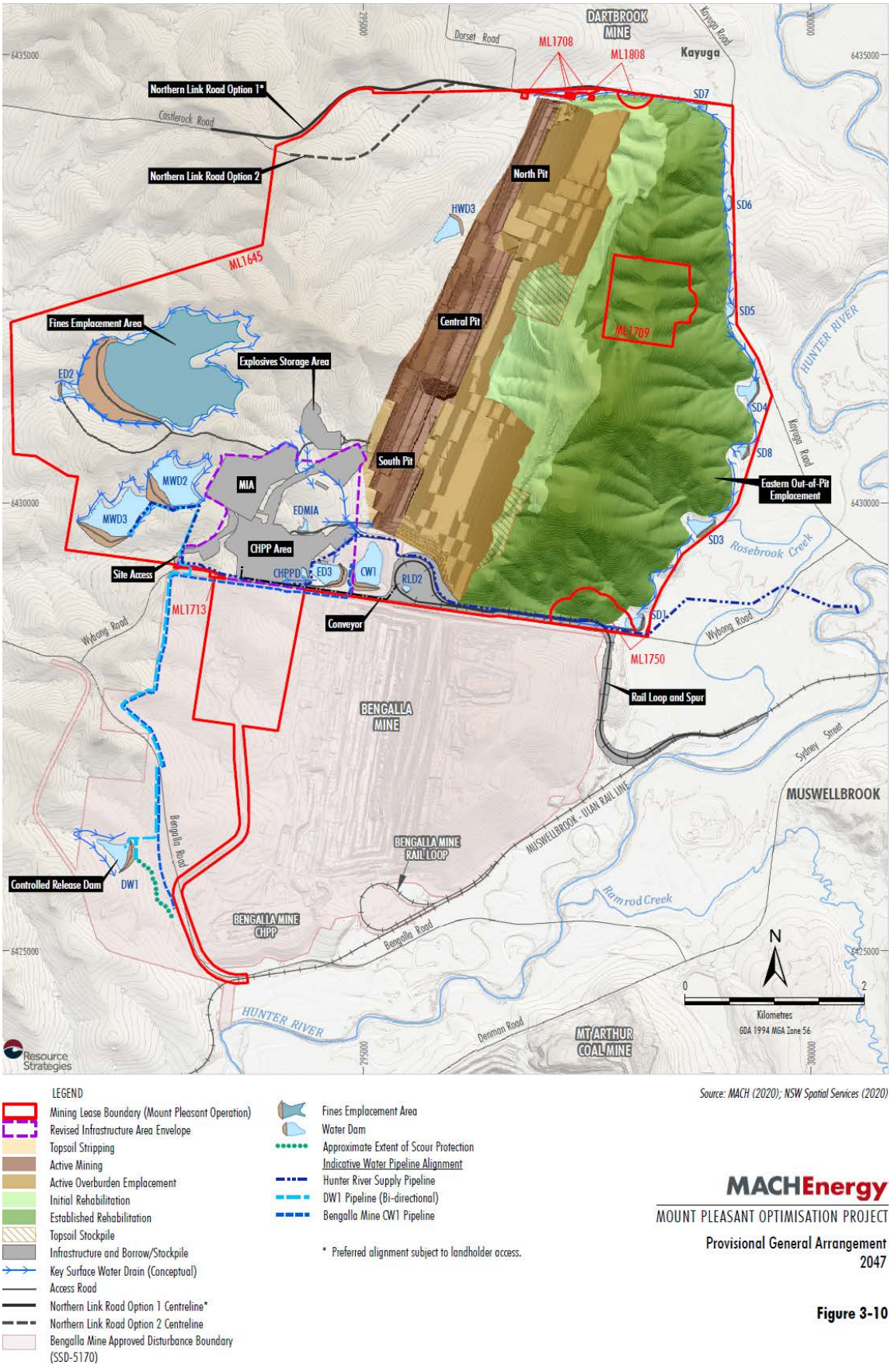
MOUNT PLEASANT OPTIMISATION PROJECT

Provisional General Arrangement 2044

Figure 3-9

Figure 7: General Project Arrangement - 2044



LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Revised Infrastructure Area Envelope
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- Active Mining
- Active Overburden Emplacement
- Initial Rehabilitation
- Established Rehabilitation
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- 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

Figure 8: General Project Arrangement – 2047

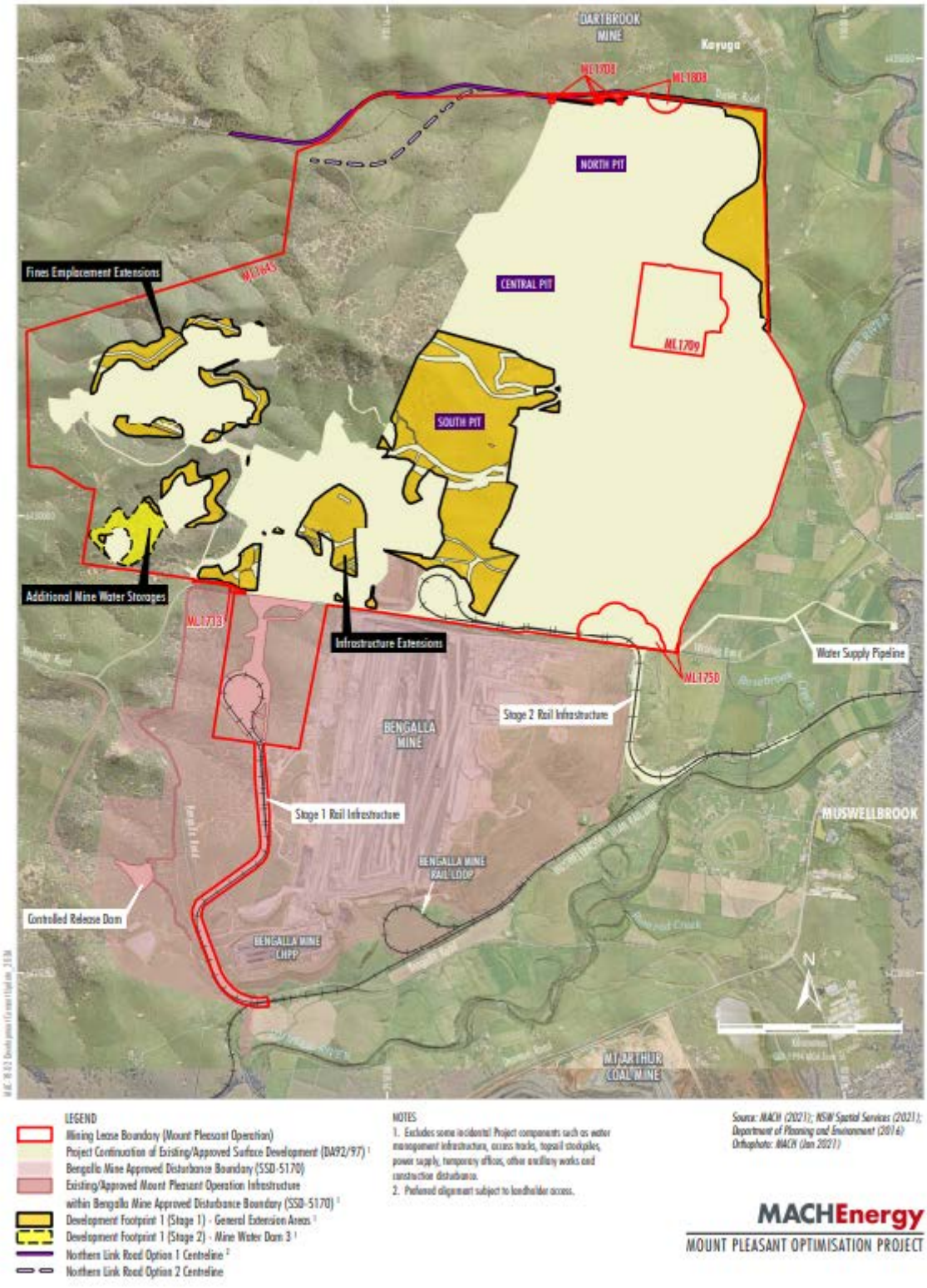


Figure 9: Staging of Project Disturbance Areas

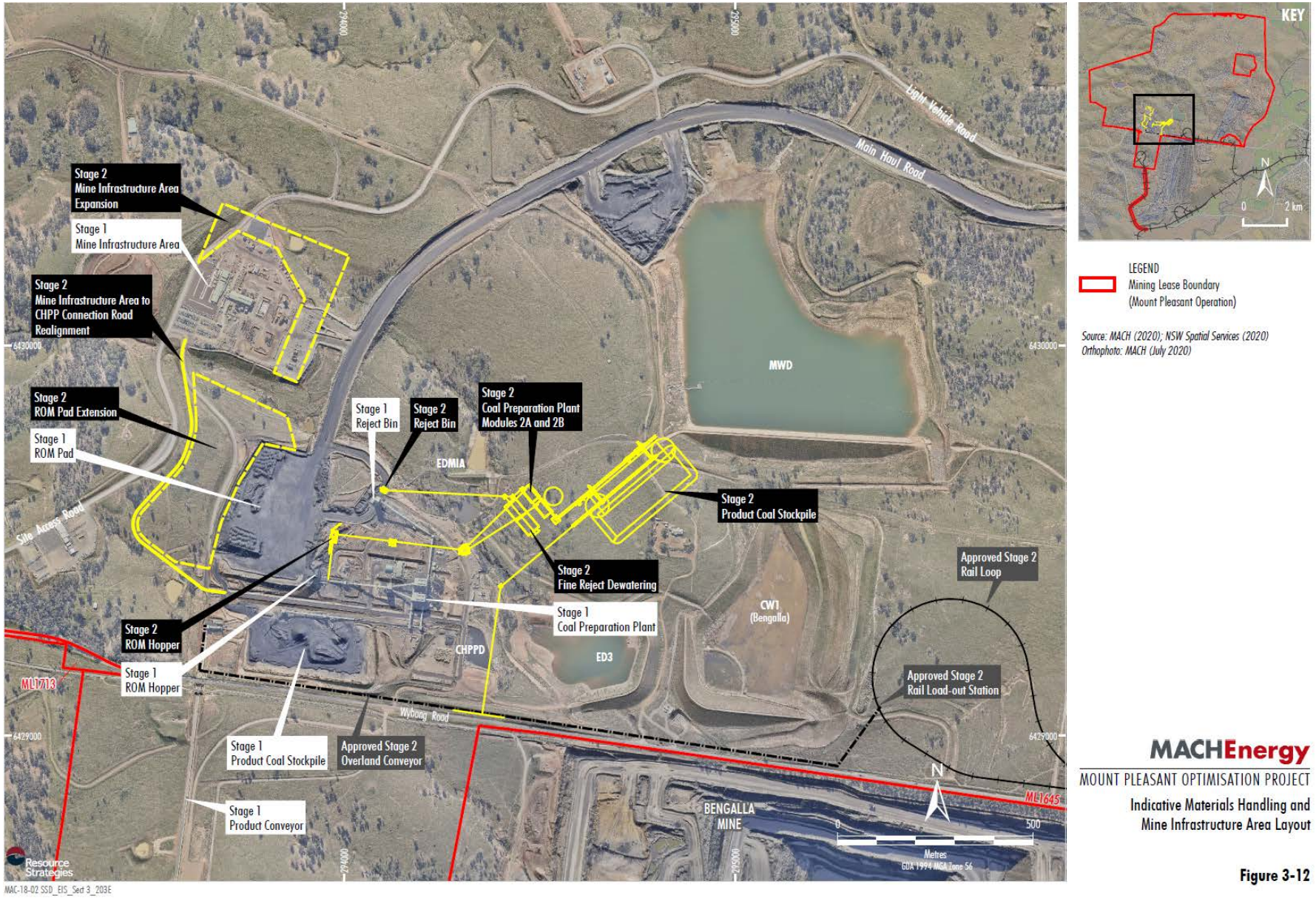


Figure 10: Indicative Mine Infrastructure Area Layout

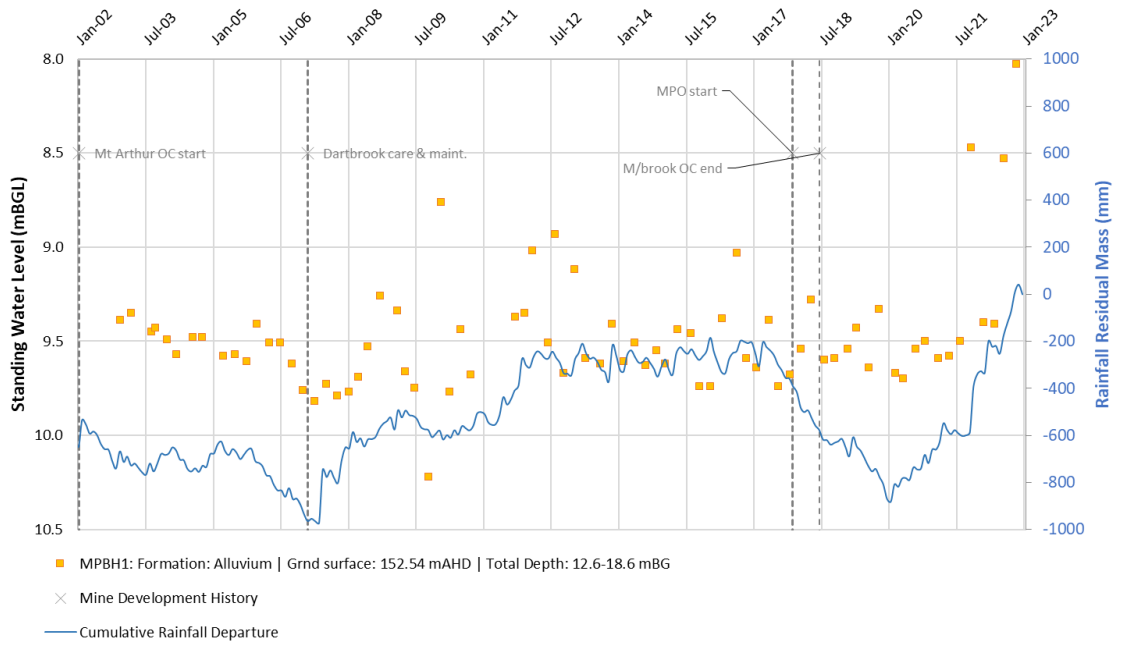
ATTACHMENT 3

GROUNDWATER HYDROGRAPHS

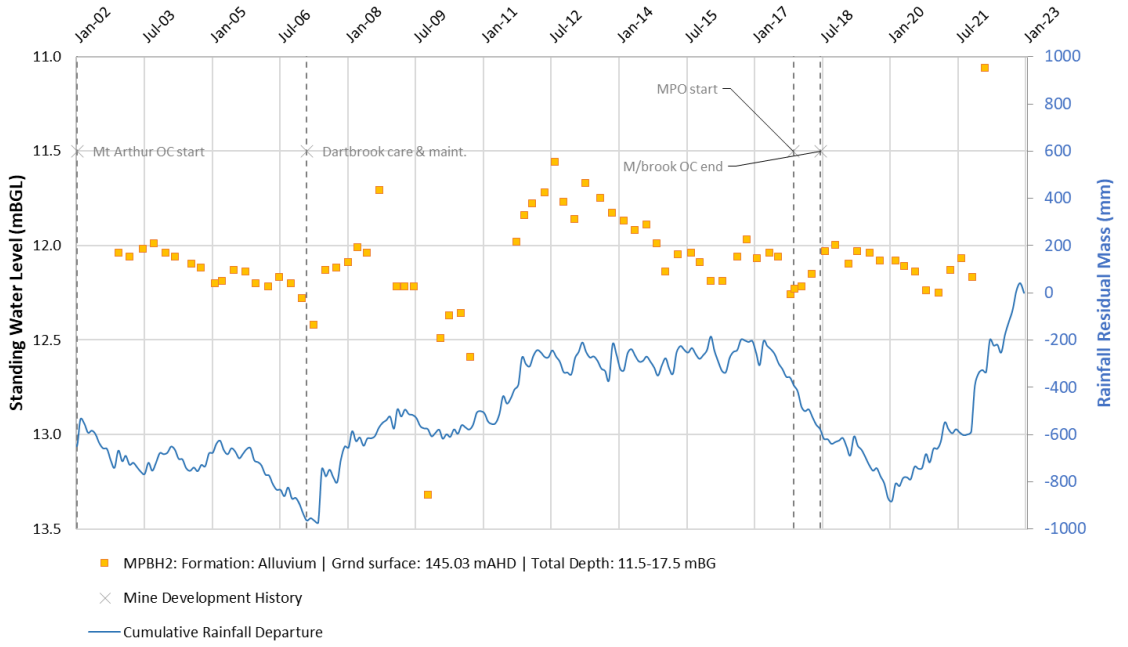
BELOW GROUND WATER LEVEL AND RAINFALL RESIDUAL MASS

Eastern Bores

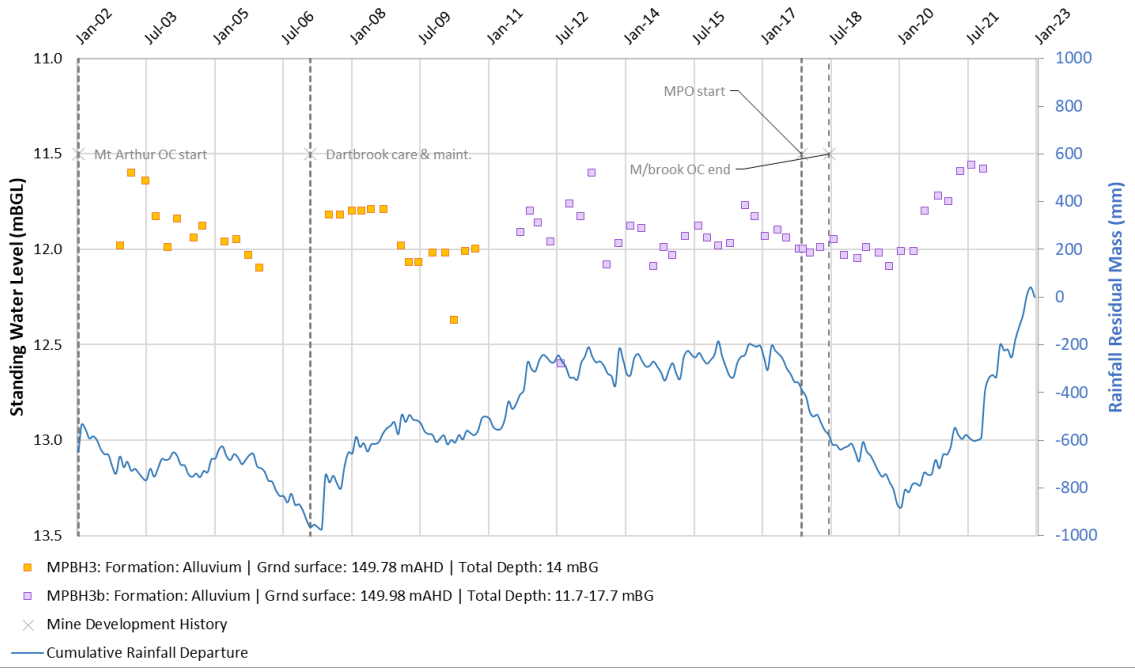
MPBH1



MPBH2



MPBH3 & MPBH3b



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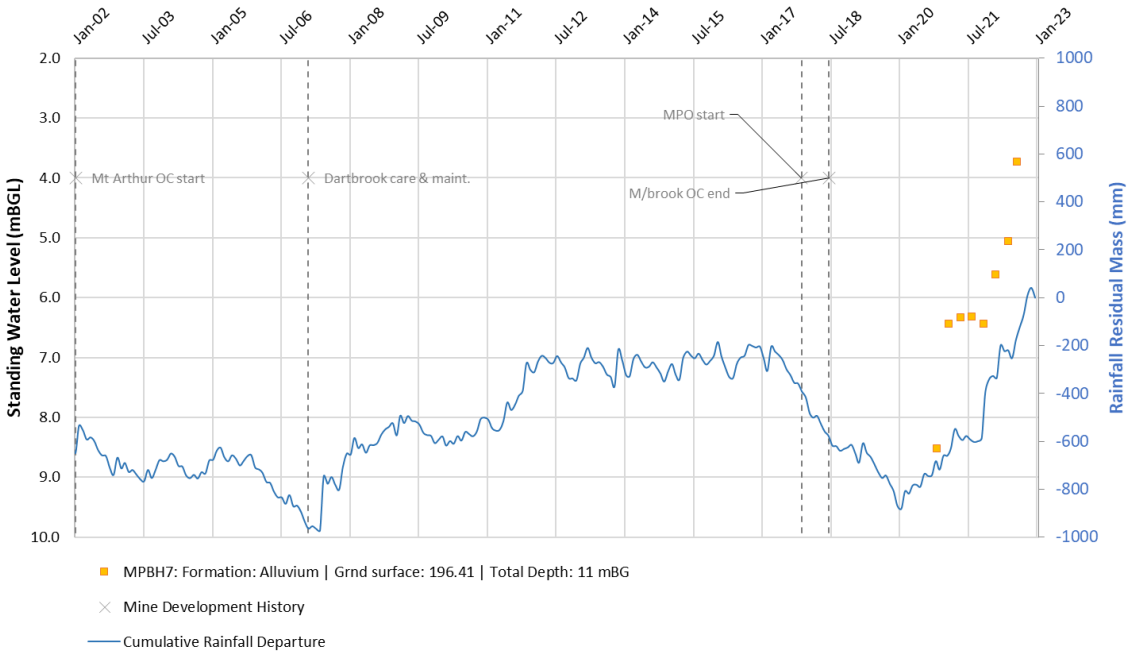
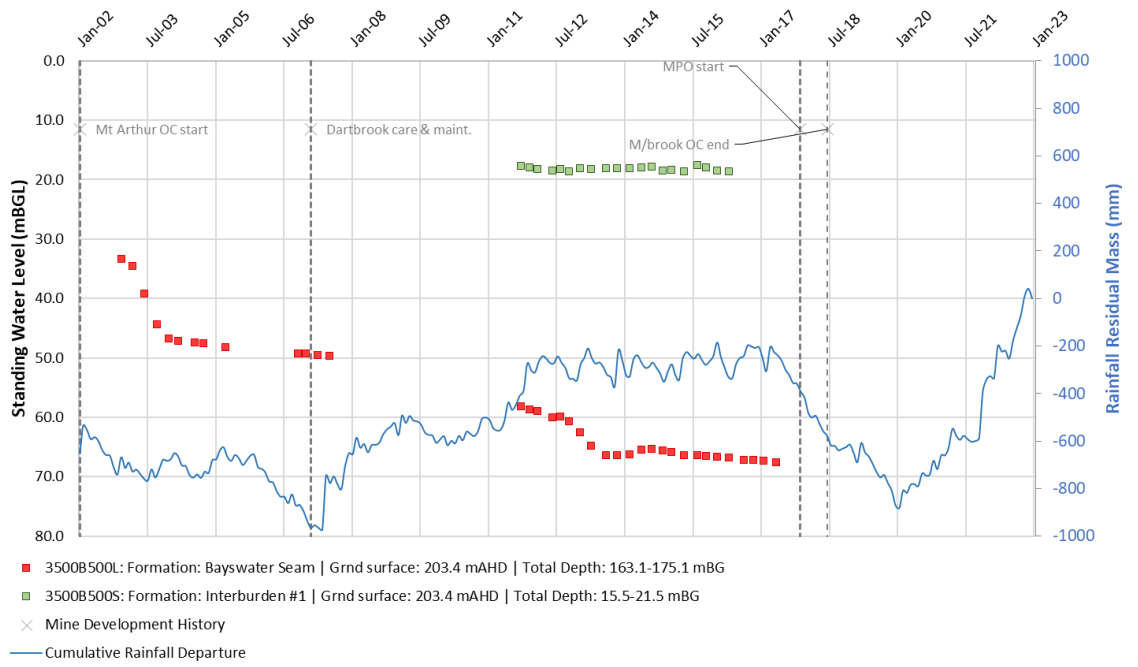


Central Bores

3500B500L & 3500B500S



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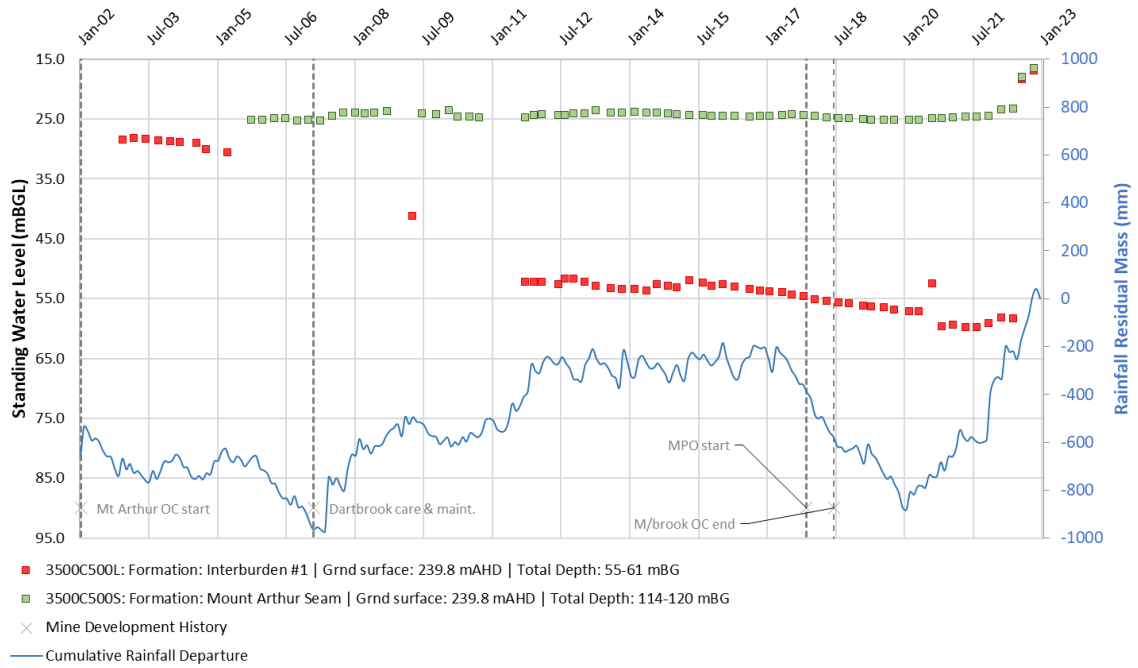

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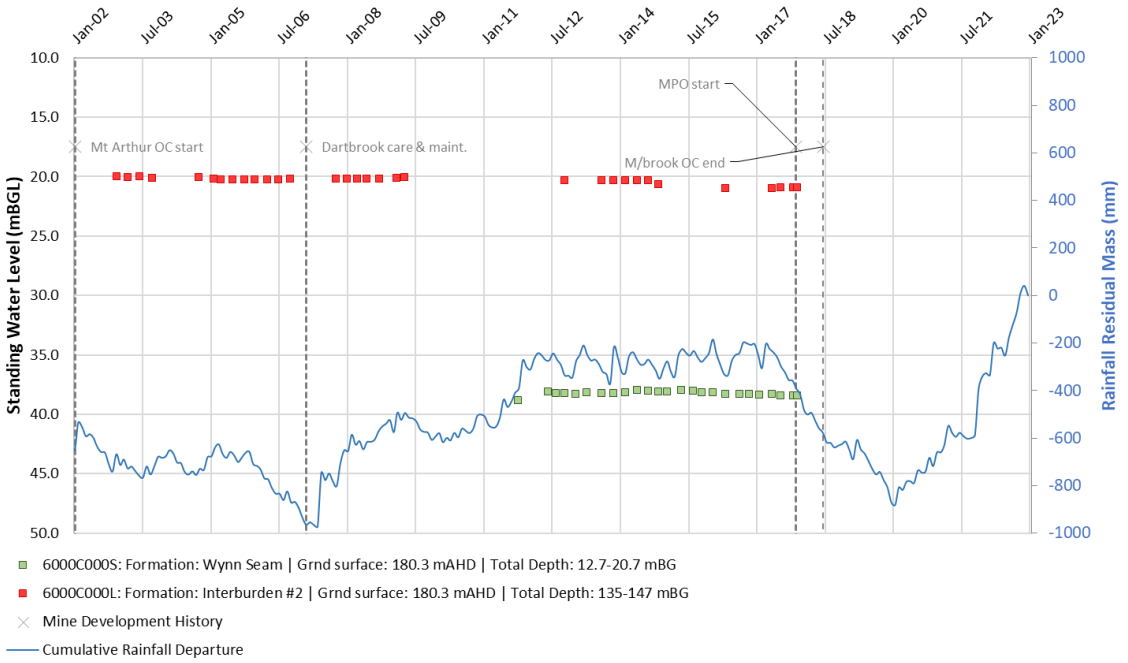
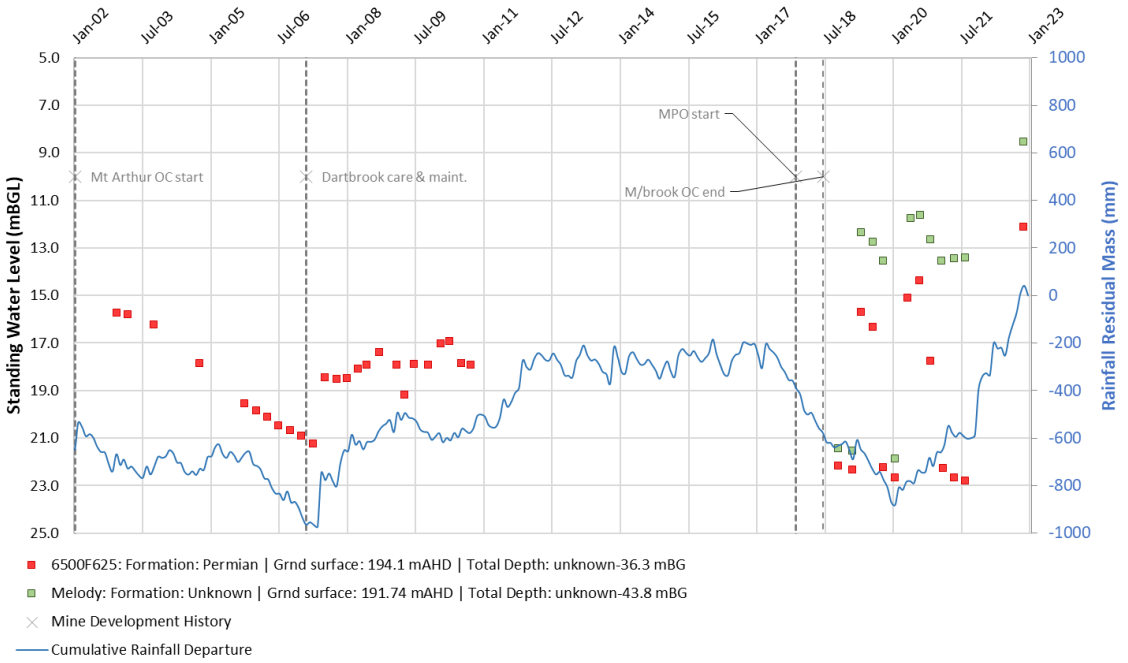


6500F625 & Melody



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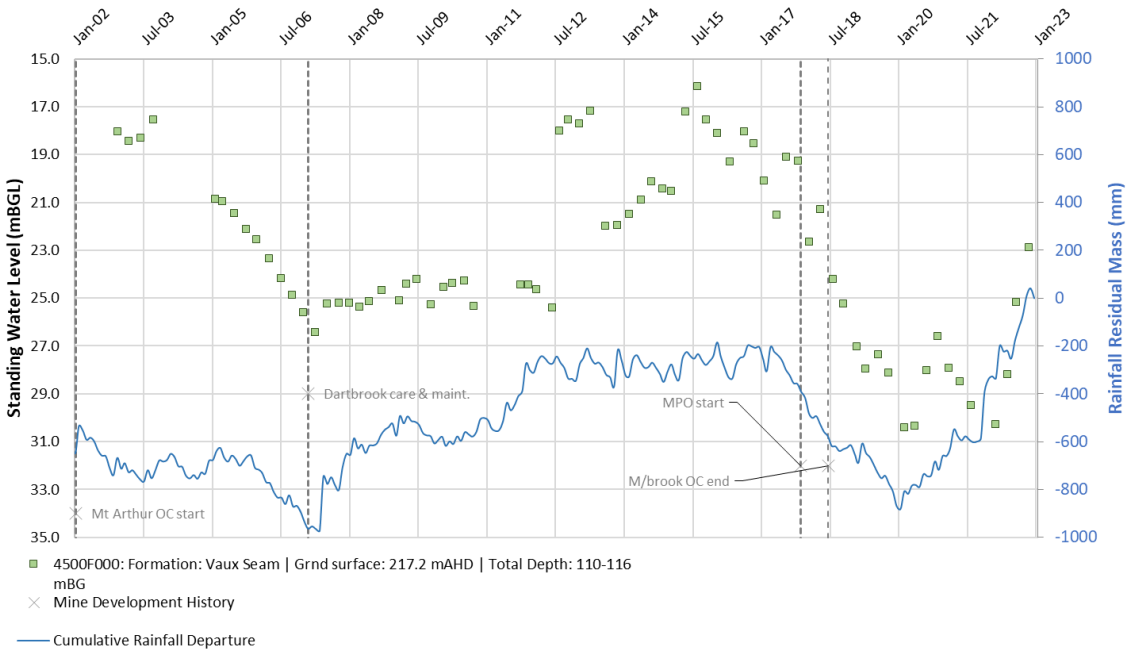

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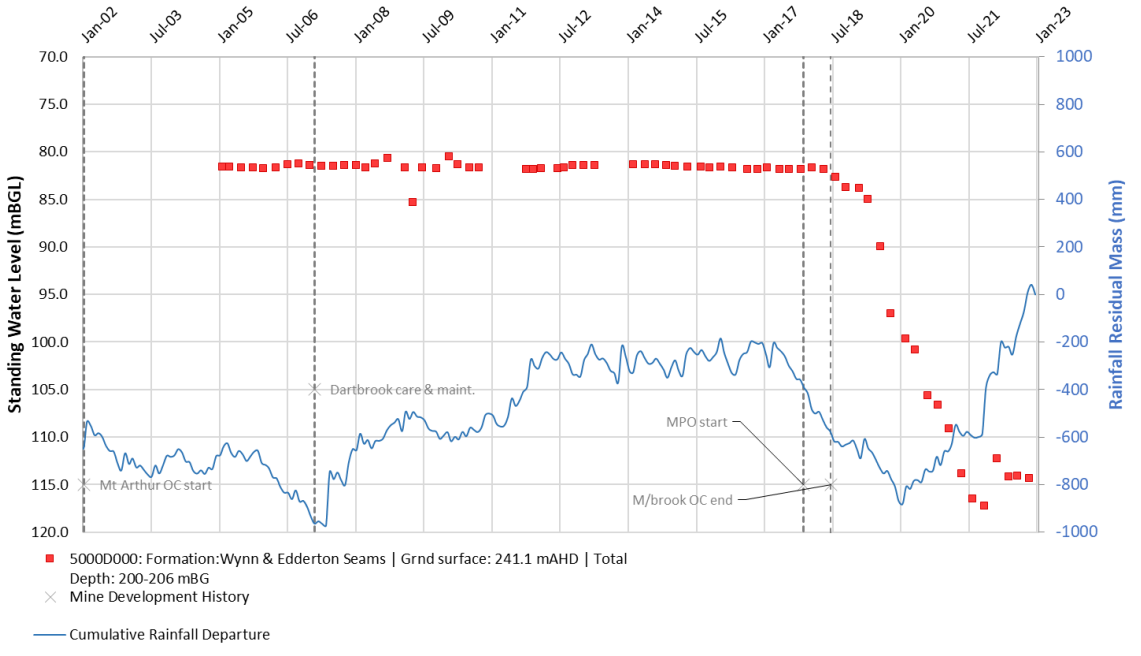

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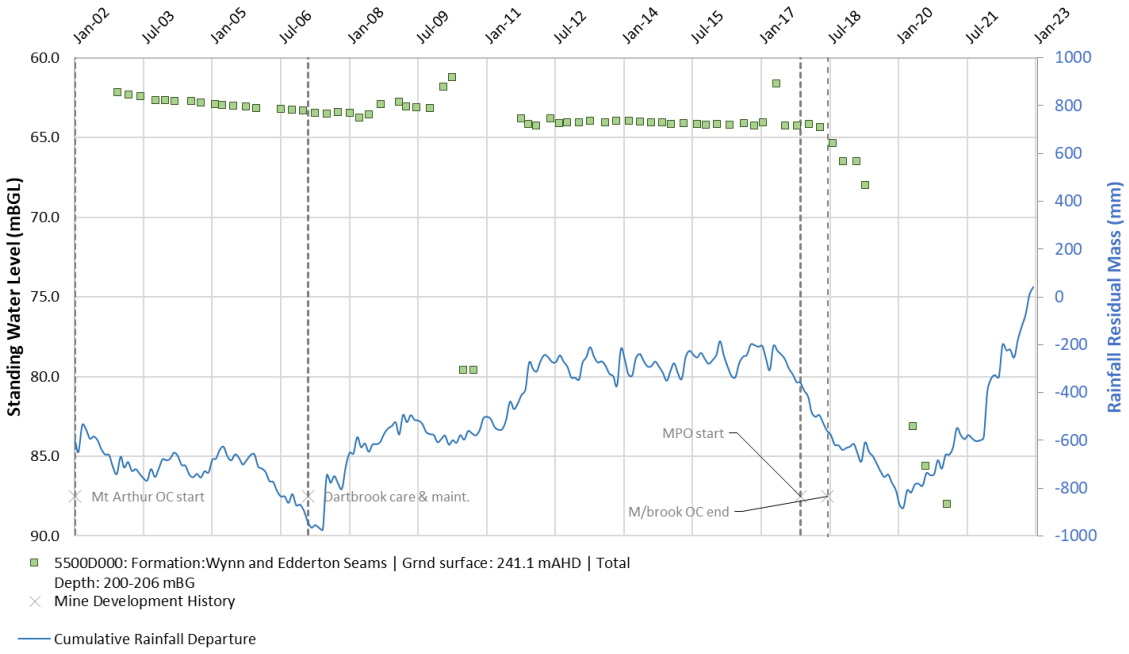
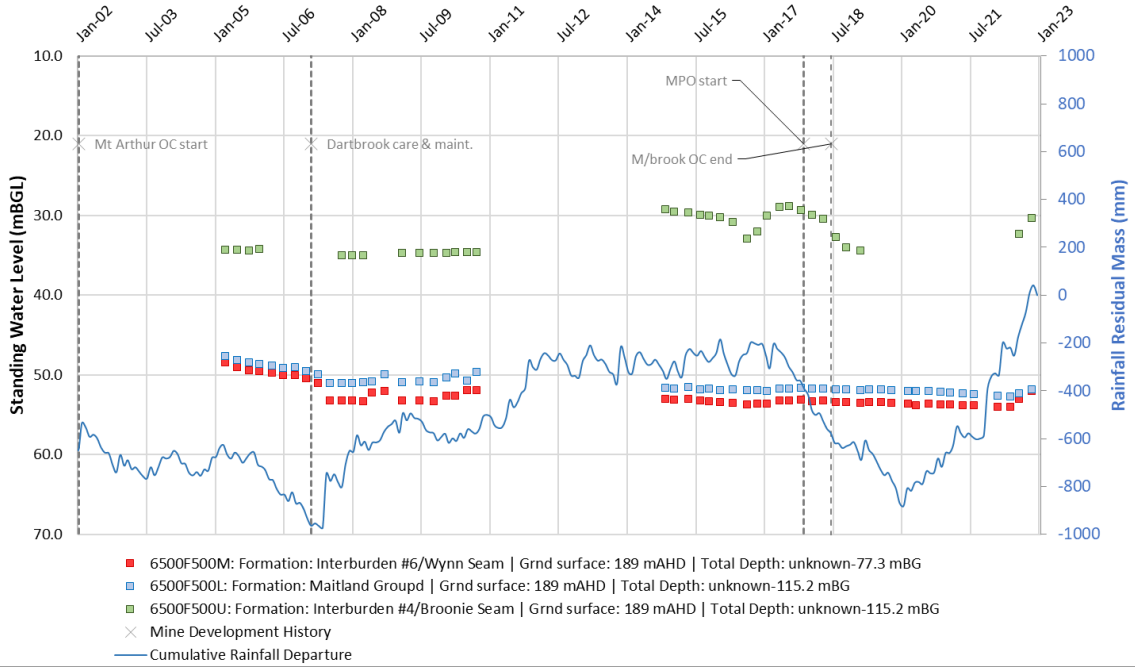


6500F500U & 6500F500M & 6500F500L



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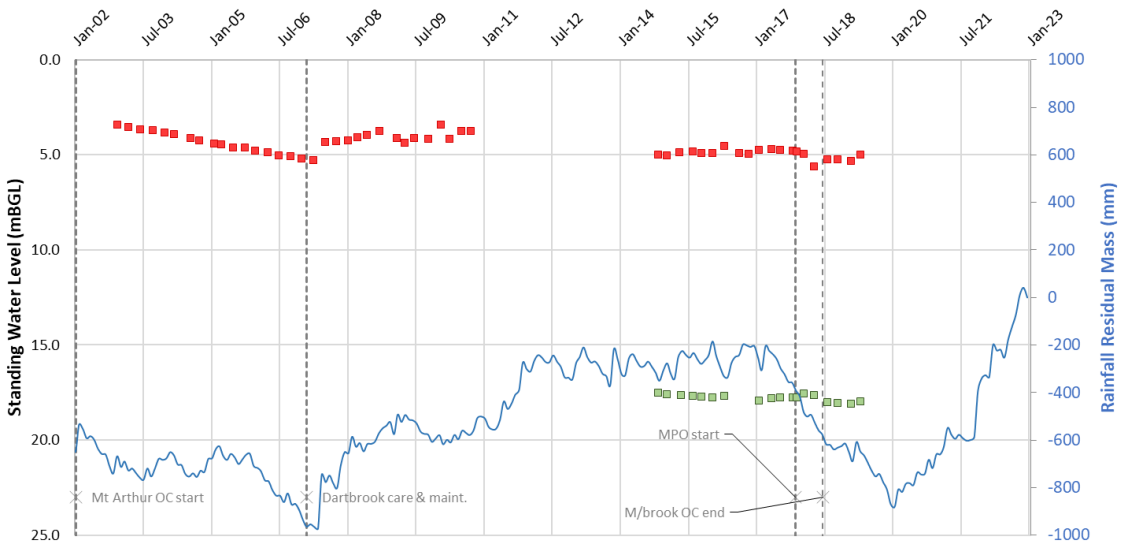

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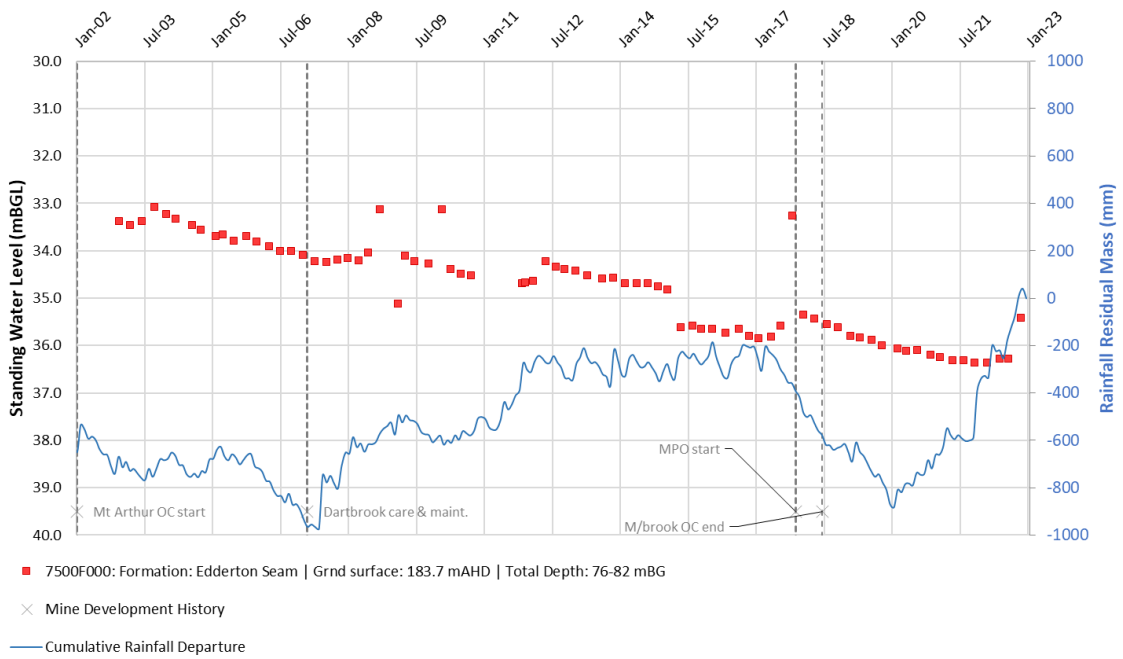
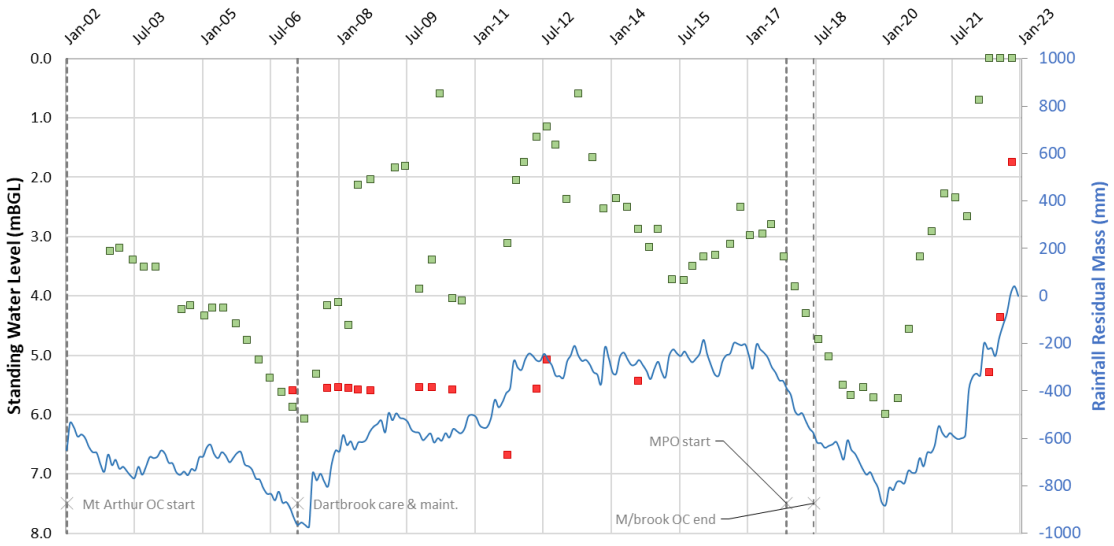
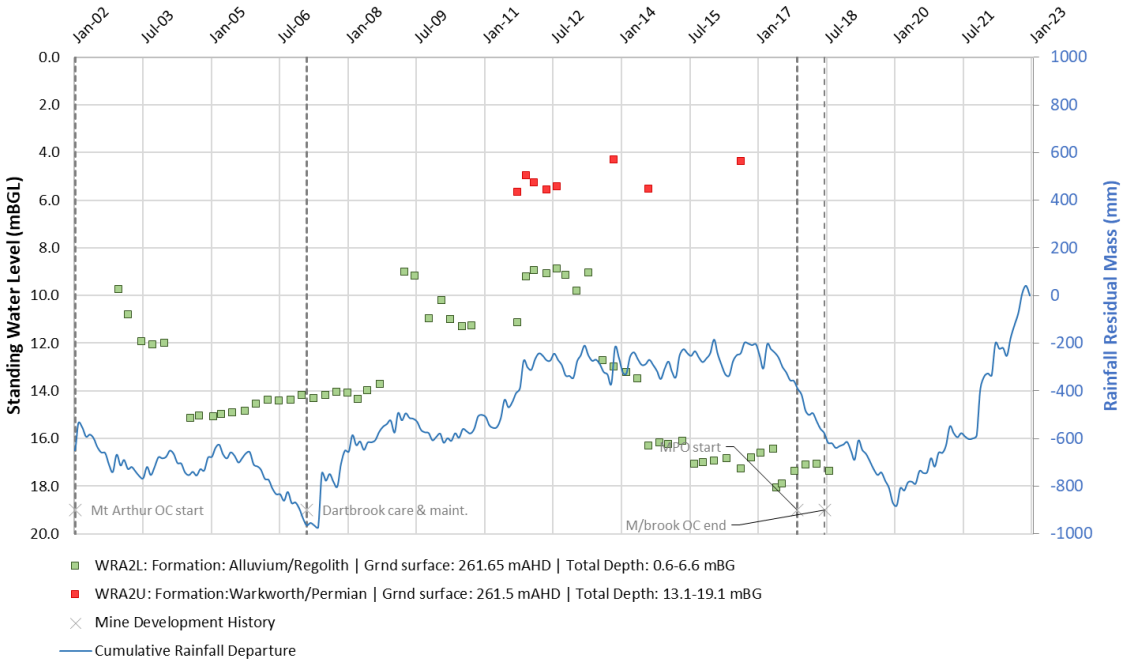


Western Bores

WRA1L & WRA1U



WRA2L & WRA2U



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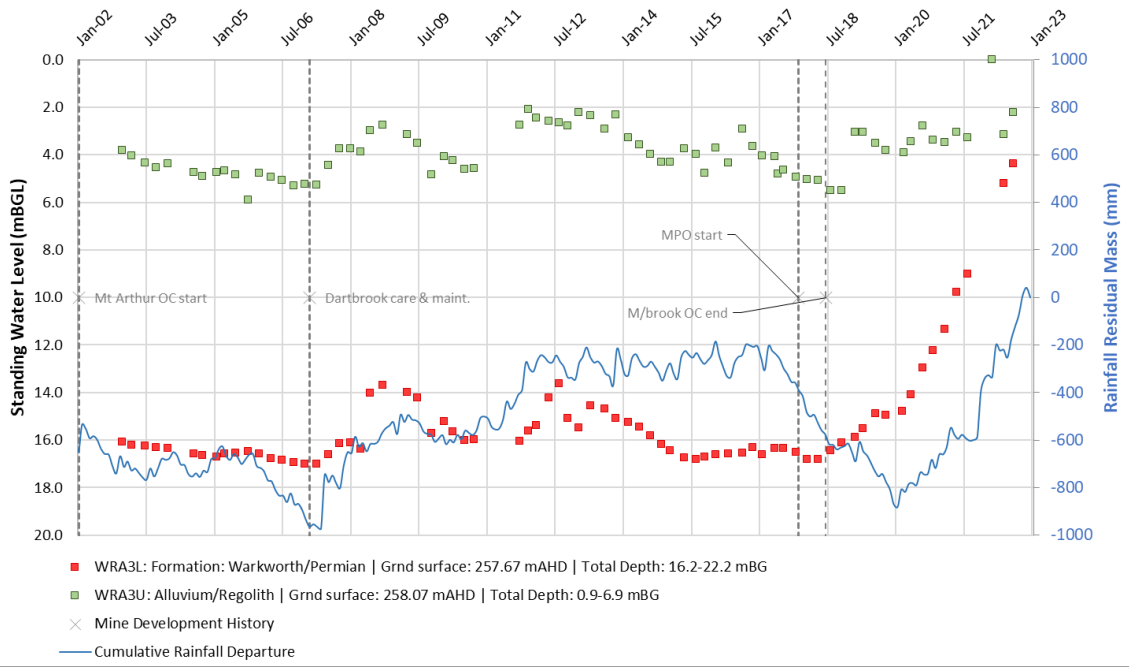
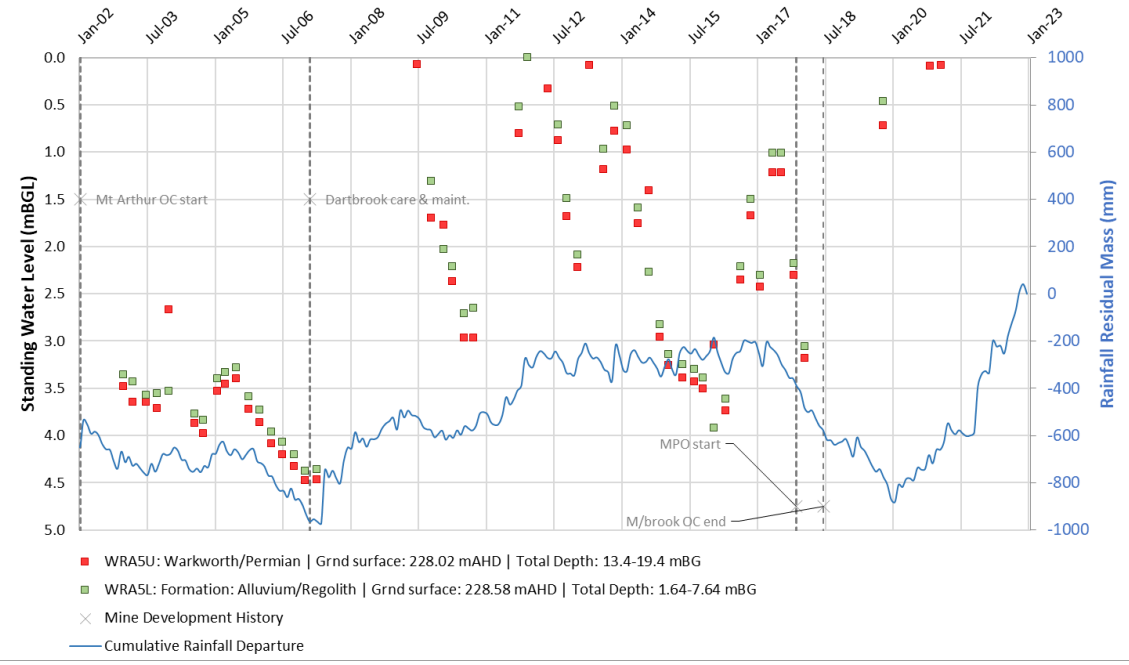
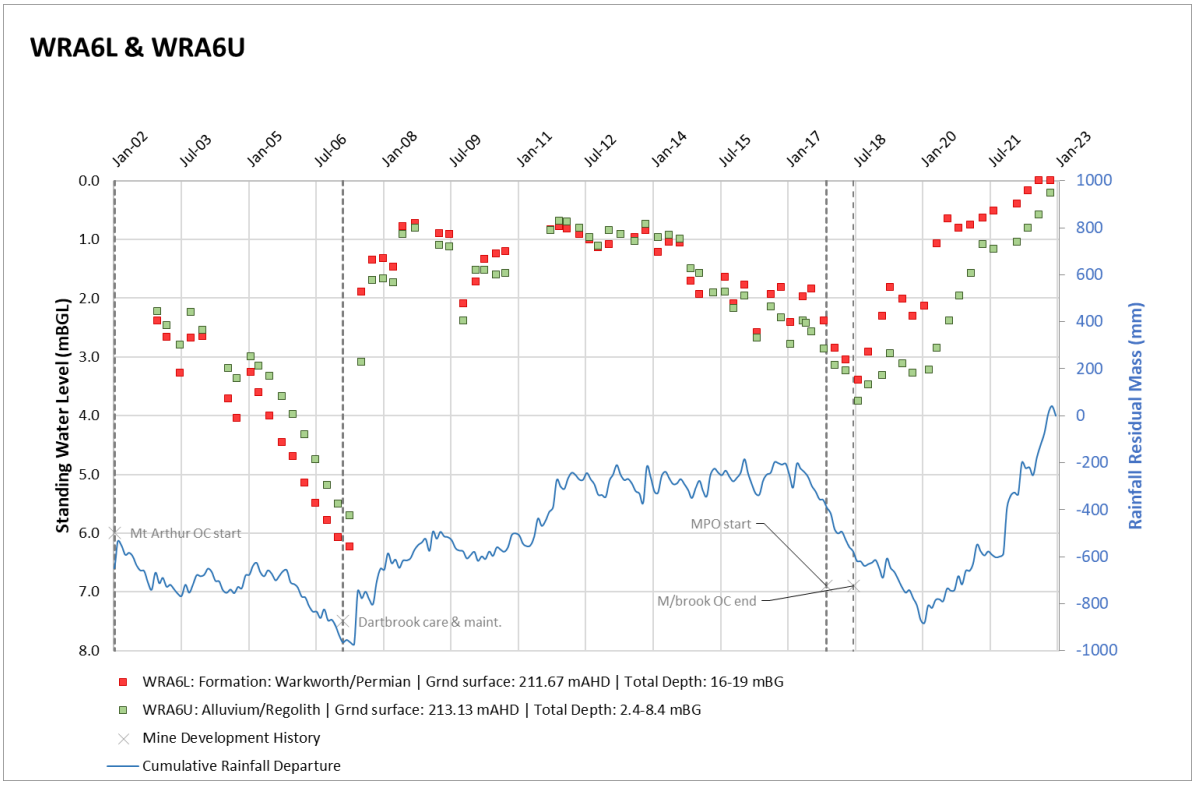


WRA5L & WRA5U




WRA6L & WRA6U
Jan-02
Jul-03
Jan-05
Jul-06
Jan-08
Jul-09
Jan-11
Jul-12
Jan-14
Jul-15
Jan-17
Jul-18
Jan-20
Jul-21
Jan-23
Standing Water Level (mBGL)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
Rainfall Residual Mass (mm)
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
Mt Arthur OC start
Dartbrook care & maint.
MPO start
M/brook OC end
WRA6L: Formation: Warkworth/Permian | Grnd surface: 211.67 mAHD | Total Depth: 16-19 mBG
WRA6U: Alluvium/Regolith | Grnd surface: 213.13 mAHD | Total Depth: 2.4-8.4 mBG
Mine Development History
Cumulative Rainfall Departure

ATTACHMENT 4

BASELINE GROUNDWATER QUALITY DATA

Table A4-1
Baseline Groundwater Quality Data – Fractured and Porous Rock Groundwater Sources

Site	Number of Samples*	Number of Dry Samples	pH					EC (µS/cm)				
			Min	20th %ile	Median	80th %ile	Max	Min	20th %ile	Median	80th %ile	Max
Central Groundwater Site												
3500B500S	30	0	7.0	7.2	9.2	9.6	9.9	1,820	2,060	2,410	3,530	4,990
3500B500L	56	0	6.8	7.1	7.3	7.4	7.7	4,350	5,454	5,600	5,826	6,930
3500C500S	40	0	6.8	7.1	7.2	7.4	7.7	726	2,708	5,130	5,664	9,320
3500C500L	39	0	6.9	7.2	7.3	7.4	7.6	3,290	4,140	4,140	5,590	7,260
4500F000	59	0	6.3	6.5	6.7	6.9	7.2	1,300	1,616	1,830	6,904	9,550
5000D000	59	2	6.2	6.7	6.8	7.0	7.3	460	522	618	703	840
5500D000	59	2	6.0	6.4	6.6	6.9	7.1	730	900	990	1,570	3,910
6000C000S	28	0	6.3	6.4	6.9	7.1	7.2	800	930	4,555	4,984	5,090
6000C000L	60	51	6.4	7.0	7.0	7.2	7.5	3,860	5,016	5,305	5,474	6,000
6500F500U	55	22	6.6	6.8	6.9	7.0	7.0	5,150	5,366	5,570	5,778	5,880
6500F500M	48	0	6.0	6.9	7.1	7.2	7.4	1,126	1,820	1,900	2,804	3,040
6500F500L	55	22	6.1	6.5	6.8	7.0	7.3	1,170	1,290	1,360	1,526	3,410
6500F625	49	0	6.4	6.7	6.9	7.0	7.4	3,490	3,890	4,026	4,086	5,200
7000D000U	53	0	6.4	6.6	6.7	7.6	12.4	830	970	6,415	6,730	7,480
7000D000L	15	0	6.6	6.6	6.8	6.8	6.9	1,045	1,115	1,243	1,370	1,480
7500F000	59	0	6.2	6.7	7.0	7.6	8.0	955	1,416	1,650	5,918	6,390
Western Groundwater Site												
WRA1U	41	40	-	-	-	-	-	-	-	-	-	-
WRA1L	57	0	7.0	7.2	7.4	7.7	8.0	2,690	3,120	3,520	4,496	4,770
WRA2U	38	34	6.7	6.7	6.8	7.0	7.2	360	850	1,586	4,108	5,790
WRA2L	58	3	6.7	7.0	7.1	7.3	8.0	4,140	5,508	5,840	6,086	7,550
WRA3U	57	1	6.8	7.1	7.3	7.5	8.0	488	3,010	5,935	9,020	11,590
WRA3L	57	0	6.3	6.6	6.8	6.9	7.0	9,740	14,802	15,830	16,734	22,690
WRA5U	61	0	5.7	7.1	7.3	7.4	7.8	2,030	2,496	2,905	4,772	5,470
WRA5L	58	0	6.9	7.1	7.5	7.8	8.2	2,250	2,854	4,160	7,034	7,530
WRA6U	58	0	6.5	6.8	6.9	7	7.1	7,260	10,110	10,735	11,240	13,290
WRA6L	57	0	6.9	7.2	7.3	7.7	7.9	4,510	5,434	5,740	5,970	6,910

Table A4-2
Baseline Groundwater Quality Data – Alluvial Groundwater Sources

Site	Number of Samples*	Number of Dry Samples	pH					EC (µS/cm)				
			Min	20th %ile	Median	80th %ile	Max	Min	20th %ile	Median	80th %ile	Max
Eastern Groundwater Site												
MPBH1	59	0	6.4	6.8	6.9	7.1	7.8	467	500	540	590	970
MPBH2	60	0	6.3	6.8	6.9	7.1	7.6	758	822	870	930	1080
MPBH3	30	17	6.2	6.6	6.8	6.9	6.9	850	970	1005	1083	1130
MPBH3b	27	0	7.1	7.4	7.6	7.7	8.1	2650	3190	3860	4420	4740

ATTACHMENT 5

BASELINE AQUIFER TESTING DATA

Table A5-1
Groundwater Testing undertaken as part of the Mount Pleasant EIS (1997)

Bore/Piezometer	Test Undertaken	Test Interval (m)	Lithology	Transmissivity (kL/day/m)	Hydraulic Conductivity (kL/day/m^2)	Hydraulic Conductivity (m/day)
3500B500L	Slug	-	-	-	0.017	-
3500B500U	Slug	-	-	-	0.0064	-
3500C500L	Injection	-	-	0.44	0.09	-
3500C500U	Injection	-	-	0.51	0.085	-
3500E000U	Slug	-	-	-	0.022	-
3500E000M	Slug	-	-	-	0.0040	-
3500E000L	Injection	-	-	0.69	0.18	-
4500F000	Injection	-	-	0.084	0.014	-
5000A500	Injection	-	-	1.35	0.15	-
5000D000	Injection	-	-	0.077	0.013	-
5500D000	Injection	-	-	0.28	0.14	-
6000C000L	Slug	-	-	-	0.0046	-
6500F500U	Injection	-	-	0.14	0.046	-
6500F500M	Injection	-	-	0.1	0.03	-
6500F500L	Slug	-	-	-	0.042	-
7000D000L	Slug	-	-	-	0.84	-
7000D000U	Slug	-	-	-	0.05	-
7500F000	Injection	-	-	0.43	0.078	-
4250F250	Packer	150.0 – 153.0	Coal – VAU	-	-	0.1479
4750C000	Packer	70.5 – 73.5	Coal – PFD	-	-	0.1415
5750D750	Packer	91.0 – 94.0	Coal – BAY			0.1132
5750D750	Packer	106.0 – 109.0	Coal – WYN	-	-	0.1029
4250F250	Packer	191.5 – 194.5	Coal – BAY	-	-	0.0958
5750D750	Packer	133.0 – 136.0	Coal – WYN	-	-	0.0801
5750D750	Packer	141.0 – 144.0	Coal – EDD	-	-	0.063
5750D750	Packer	56.0 – 59.0	Coal – BRN	-	-	0.037
4750C000	Packer	135.0 – 138.0	Coal – BRN	-	-	0.0336
4250F250	Packer	86.0 – 89.0	Coal – PFD	-	-	0.0145
5750D750	Packer	124.0 – 127.0	Interburden	-	-	0.0064
5750D750	Packer	72.0 – 75.0	Interburden	-	-	0.0062
5750D750	Packer	83.0 – 86.0	Coal and Interburden	-	-	0.0053
4750C000	Packer	153.5 – 156.5	Interburden	-	-	0.0033
5750D750	Packer	113.0 – 116.0	Interburden	-	-	0.0032
4750C000	Packer	111.0 – 114.0	Interburden	-	-	0.003
4250F250	Packer	173.5 – 176.5	Interburden and coal	-	-	0.003
4250F250	Packer	127.0 – 130.0	Interburden	-	-	0.0026
4250F250	Packer	211.0 – 214.0	Interburden	-	-	0.0024
4750C000	Packer	164.5 – 167.5	Interburden	-	-	0.0017
4750C000	Packer	52.0 – 55.0	Interburden	-	-	0.0011
4750C000	Packer	97.5 – 100.5	Interburden	-	-	0.0011

Table A5-1 (continued)
Groundwater Testing undertaken as part of the Mount Pleasant EIS (1997)

Bore/Piezometer	Test Undertaken	Test Interval (m)	Lithology	Transmissivity (kL/day/m)	Hydraulic Conductivity (kL/day/m^2)	Hydraulic Conductivity (m/day)
4750C000	Packer	77.0 – 80.0	Interburden	-	-	0.0008
5750D750	Packer	87.0 – 90.0	Interburden	-	-	<0.0001

Notes: kL/day/m = kilolitre per day per metre, kL/day/m^2 = kilolitre per day per square metre.
Source: ERM Mitchell McCotter (1997).

Table A5-2
Groundwater Testing undertaken on Coal Seams at the Mt Arthur Coal Mine

ss	Test Method	Seam	Depth (m)	Transmissivity (m^2/day)	Hydraulic Conductivity (m/day)
WT1	Packer	Vaux	25 – 35	1	0.12
		Bayswater	50 – 60	1	0.11
		Wynn	65 – 75	0.1	0.04
		Clanricard	85 – 95	0.01	0.01
		Bengalla	98 – 108	0.05	0.02
		Edinglassie	130 – 140	0.5	0.05
		U. Ramrod Creek	156 – 166	0.6	0.12
		L. Ramrod Creek	168 – 178	0.3	0.15
		Interburden	Various	<0.01	<0.01
T13 (BH403)	Packer	Piercefield	-	-	0.69
		Vaux	-	-	0.52
		Bayswater	-	-	0.35
		Wynn	-	-	0.35
		Clanricard	-	-	0.26
		Bengalla	-	-	0.15
		Edinglassie	-	-	0.16
		Ramrod Creek	-	-	0.06
T16 (BH401)	Packer	Piercefield	-	-	0.6
		Vaux	-	-	0.52
		Bayswater	-	-	0.26
		Wynn	-	-	0.17
		Clanricard	-	-	0.35
		Bengalla	-	-	0.60
		Edinglassie	-	-	0.26
		Ramrod Creek	-	-	0.1
		Interburden	-	-	5.2 x 10^{-3} to 8.6 x 10^{-5}

Source: AGC (1979) and LM&P (1982).

ATTACHMENT 6

SUMMARY OF BORE CENSUS RESULTS

Bore ID (ME No.)	PS WGS84)	Northing	Year Drilled (Census Letter)	Property	Bore ID (property & Bore No.) - Field Sheet	GW No.	Survey Sheet	Use (Y/N)	Observed Purpose	Equipment Type	Casing ID & Type
4500F000	296128	6433360	1994 & 2003	MACH	THORNDALE 1	W078628 (1994) & GW080733 (2003	20161214P1	Y	Monitoring	Piezometer (PVC)	50mm (NB)
5000D000	296664	6431370	2003	MACH	BOXFIELD	N/A	20161214P3	Y	Monitoring	Piezometer (PVC)	40mm (NB)
5500D000	297166	6431378	2003	5500D000	MACH	GW078629	20170314P4	Y	Monitoring	Steel Casing	160mm
6000F625	297642	6433994	2003	6000F625 (1)	MACH	GW080732	20170314P3	N	Monitoring	PVC Casing	PVC 96mm
6500F500	298120	6433898	2003	6500F500	GLENMORE / 6500 F500	GW080729 / 080730 / 080731	20161213P4 & 20170314P3	Y	Monitoring	Piezo (L M U nested)	40mm PVC
7000D000	298661	6431400	2003	MACH	COUNTRY VIEW	NA	20161214P3	Y	Monitoring	Piezometer (PVC)	1x40mm (D) 1x50mm (S)
7500F000	299088	6433428	2003	MACH	GLENMORE No1	GW078630 / GW080728	20161214P1	Y	Monitoring	Piezometer (PVC)	50mm (NB)
ADNUM1	300521	6429434	N/A	KAYUGA RD 51	ADNUM1	GW040531	20170316P1	Y	Domestic	Equipped	Concrete Cylinder
ASHFIELD1	289344	6428899	<50-60 YRS	ASHFIELD (JLON)	WYBONG RD 1510	GW047863	20170316P7	Y	Stock & Domestic	Concrete Cylinder	Concrete Cylinder Well [1120mm] – Pump Equipped
BARRY1	299564	6430431	N/A	BARRY	PRIVATE BARRY 1	N/A	20170315P2	Y	Stock & Domestic	Concrete Cylinder	Concrete cylinder (1200mm ID)
BE1	293476	6429036	2011	MACH	McLEAN	GW201518 & GW201519	20161215P1	Y	Monitoring	50mm PVC	50mm (PVC)
BELGRAVE	295085	6434438	N/A	LONERGAN	LONERGAN 6 (FAR WEST)	N/A	20161215P3	Y	Stock	Timber Frame	Timber Frame Well
CAS1	296503	6434654	1964	CASEY GM	CAS1	GW078985	20170313P2	N	N/A	N/A	Steel Casing 155mm
CAS2	295914	6435419	<1950s	CASEY GM	CAS2	GW078986	20170313P1	N	Monitoring - Not Equipped	Steel Casing	Steel Casing 155mm
CAS3	295821	6435484	1957	CASEY GM	CAS3	GW078987	20170313P1	N	Windmill	Steel Casing	Windmill / Steel Casing 130mm
CAS4	294928	6435957	N/A	CASEY GM	CAS4	GW078988	20170313P2	N	Monitoring	N/A	Steel Casing 155mm
COWTIME1	300330	6429753	N/A	KAYUGA RD 72	COWTIME1	N/A	20170316P1	Y	Stock	Equipped (Housing)	Steel Casing (6 inch)
GRAY1	299882	6430334	N/A	KAYUGA RD 161	GRAY1	N/A	20170316P3	Y	Domestic	Steel Casing	Steel Casing (6 inch)
GRAY2	299856	6430316	N/A	KAYUGA RD 161	GRAY2	N/A	20170316P3	Y	Stock & Domestic	Steel Casing	Steel Casing (6 inch)
GW015881	299428	6428129	1957	MACH	OVERDEEN 2	GW015881	20161214P4	N	Backfilled/Collapsed	Timber? Not located	N/A
GW028510	298649	6429099	1965	MACH	WYBONG (1)	GW028510	20161215P5	N	Monitoring, Stock & Irrigation	Concrete Cylinder	1219mm
GW037774	298661	6429086	1974	MACH	WYBONG (2)	GW037774	20161215P5	N	Monitoring, Stock & Irrigation	Concrete Cylinder	1219mm
GW038412	291568	6437714	<1950s	TONY LONERGAN	NWEST (892 DORSET RD)	GW038412	20170315P1	Y	Stock & Domestic	Pump Equipped	Timber Frame (Square 1180mm)
GW038752	294050	6436664	N/A	MACH	NW Properties (Woodburn2)	GW038752	20161212P1	N	N/A	N/A	N/A
GW042701	298568	6428634	1976 (GW Record)	MACH	SCRIVENS (1)	GW047277	20161215P4	Y	Monitoring & Stock	Concrete Cylinder	900mm
GW053007	298718	6428859	1965	MACH	SCRIVENS (2)	GW053007	20161215P4	Y	Monitoring & Stock	Concrete Cylinder	1200mm
HAYES1	299582	6430624	1930s	HAYES1	HAYES1	GW053534	20170314P1	Y	Irrigation (Lucerne) Stock & Domest	8 FT Concrete	Concrete Well (~8 ft)
HAYES2	299681	6430616	1950s-60s	HAYES2	HAYES2	N/A	20170314P2	Y	Stock & Domestic (Taps)	Concrete Cylinder	Concrete Cylinder (1200mm)
JLON.1	292407	6434333	1 Feb 1971#	JOHN LONERGAN	MARYLANDS1_GW33725	GW033725	20170315P1	Y	Stock (NB: Mill not bringing water to	Windmill / Tanks	Steel Casing [152mm OD]#
JLON.2	292320	6434393	1 Sep 1965*	JOHN LONERGAN	MARYLANDS2_GW23652	GW023652	20170315P1	N	N/A	Steel Casing	Steel Casing [127mm OD]*
JLON1	298194	6434785	1 Feb 1979# (Converted to Bore	LONERGAN	LONERGAN 5 (MARYLANDS WESTERN PADDOCK)	GW078926 & GW049015	20161215P3	Y	Monitoring & Stock (NB: Well was D	Concrete Cylinder + Bore	Concrete Cylinder Well [1200mm] with internal Bore [Steel Casing 162 mm]#
JLON2	300044	6434608	~1965-80s	LONERGAN	LONERGAN 1 (WEST OF HOUSE)	GW053282	20161215P2	N	Never Used	Steel Casing (hole)	Steel Casing 200mm
JLON3	299887	6434455	<1961	LONERGAN	LONERGAN 2 (FRONT OF HOUSE)	N/A	20161215P2	Y	Domestic	Concrete Cylinder. Well (pump equiped)	Concrete Cylinder Well [1200mm] – Pump Equipped
JLON4	299404	6434623	1932 (GW Record)	LONERGAN	LONERGAN 3 (PADDOCK)	GW037479	20161215P2	Y	Stock	Concrete Cylinder	Concrete Cylinder Well [1200mm]
JLON5	299629	6434796	1 August 1954^	LONERGAN	LONERGAN 4 (MARYLANDS BACK PADDOCK)	irrigation) and GW026137 (test bore	20161215P3	N	Irrigation (not in use)	Concrete Cylinder	Concrete Cylinder [1000mm]
KELMAN1	300925	6429305	N/A	KAYUGA RD 20	KELMAN1	GW037964	20170316P1	Y	Domestic	Equipped	Concrete Cylinder (1,828mm) *
MATHER1	299814	6430440	> 40 years old	MATHER	KAYUGA RD 175	N/A	20170316P2	Y	Domestic	Concrete Cylinder	Concrete Cylinder (750mm)
ME1 [1 Collins Ln]	299805	6430470	1970	MACH	COLLINS LANE	GW032709	20161213P2	Y	Domestic	GW Records	152mm
ME10 [Road Reserve Collins Ln]	299484	6430555	N/A	OVERGRONN SHED	MACH	N/A	20170315P3	N	N/A	N/A	N/A
ME11 [Road Reserve Collins Ln]	299495	6430656	N/A	DAMAGED	SHED	N/A	20170315P3	N	N/A	N/A	N/A
ME12 [57 Kayuga Rd]	300474	6429471	N/A	MACH	KAYUGA RD 57	GW034015	20161212P2	Y	Stock & Domestic	Surface Pump	TIMBER
ME13 [135 Kayuga Rd]	299959	6430143	N/A	KAYUGA RD 135	MACH	N/A	20170314P2	Y	Equipped	Concrete Cylinder	1200mm
ME14 [137 Kayuga Rd]	299946	6430151	N/A	KAYUGA RD 137	MACH	N/A	20170314P2	Y	Equipped	Steel Casing	5 Inch (Casing)
ME15 [141 Kayuga Rd]	299952	6430191	N/A	KAYUGA RD 141	KAYUGA RD 141	N/A	20170313P4	Y	Front Garden	Equiped (Tap)	6 Inch
ME16 [153 Kayuga Rd]	299875	6430285	N/A	KAYUGA RD 153	MACH	N/A	20170316P6	Y	Domestic	Equipped Concrete Cylinder	1000mm
ME17 [163-165 Kayuga Rd]	299874	6430370	N/A	MACH	KAYUGA RD 163-165	GW037832	20170316P3	Y	Domestic	Concrete Cylinder	4 FT
ME18 [167 Kayuga Rd]	299827	6430402	N/A	KAYUGA RD 167	KAYUGA RD 167	N/A	20170316P4	Y	Domestic	Concrete Cylinder	1200mm
ME19 [353 Wybong Rd]	299996	6429261	N/A	WYBONG RD 353	MACH	N/A	20170315P4	Y	Domestic	Equipped	5 Inch (Steel)
ME2 [1 Collins Ln]	299811	6430465	N/A	COLLINS LANE 1	T. POWELL	N/A	20170313P2	N	N/A	Equipment / Not Used	6 Inch / 5 Inch
ME20 [357 Wybong Rd]	299956	6429231	N/A	WYBONG 357	MACH	N/A	20170316P4	Y	Domestic	PVC Casing Equipped	6 Inch
ME21 [359 Wybong Rd]	299960	6429225	N/A	WYBONG 359	MACH	N/A	20170316P4	N	N/A	Steel Casing	6 Inch
ME22 [361 Wybong Rd]	299946	6429214	1953 (GW Record)	MACH	WYBONG RD 361	GW078902	20170316P5	Y	Domestic	Steel Casing	N/A
ME23 [Bimbadeen]	299456	6430443	N/A	MACH	BIMBADEEN	GW048754	20161213P2	Y	Equiped	Concrete Cylinder	1067mm (OD)
ME24 [Broomfield]	292374	6433010	N/A	MACH	BROOMFIELD (1)	N/A	20161215P4	N	N/A	Concrete Cylinder	1200mm
ME25 [Country View]	298695	6431537	N/A	MACH	COUNTRY VIEW 2	N/A	20161214P3	N	Stock	Timber	1200mm
ME26 [Glenmore]	298441	6434044	1985	MACH	GLENMORE	GW061302	20161213P3	N	N/A	Welded Steel	165mm (OD)
ME27 [Glenmore 'C']	299563	6434555	1984	MACH	GLENMORE 'C'	GW058686	20161213P3	Y	Stock	Concrete Cylinder	1219mm (1350 OD)
ME28 [Jandell]	300056	6428793	1983	MACH	JANDELL	GW060024	20161214P4	Y	Stock & Irrigation	Concrete Cylinder	1600mm
ME29 [Jandell]	299621	6428790	N/A	MACH	(NEAR 6006E)	N/A	20170317P2	Y	Stock	Equipped - Pump	Steel Casing (6Inch)
ME3 [3 Collins Ln]	299803	6430447	N/A	COLLINS LANE 3	COLLINS LANE 3	N/A	20170313P3	N	Not Used	Equiped / Pump	1000mm
ME30 [Karrabah]	299843	6434195	1981	MACH	KARRABAH	GW053783	20161213P3	Y	Irrigation (Lapsed)	Concrete Cylinder	1219mm
ME31 [Kropp]	292302	6436824	21/04/1994	MACH	NW Properties (KROPP)	N/A	20161212P1	Y	Stock	Solar Submersible	Concrete Cylinder [1m]
ME32 [Melody Farm]	297625	6434009	N/A	6500F625 (2)	MACH	N/A	20170314P4	N	Monitoring	Steel surface Casing (W PVC)	60mm (PVC)
ME33 [Overdeen]	299100	6427748	1946	MACH	OVERDEEN 1	GW015696	20161214P4	Y	Irrigation	Concrete Cylinder	1829mm (OD)
ME34 [Rosebrook 1]	299259	6429884	N/A	MACH	ROSEBROOK 1	GW034303	20161213P1	Y	Stock	Concrete Cylinder	1219mm
ME35 [Rosebrook 2]	300330	6429634	N/A	MACH	ROSEBROOK 2	GW034302	20161213P1	N	Collapsed	N/A	N/A
ME36 [Rosehill]	299550	6430090	1971 (GW Record)	MACH	ROSEHILL	GW033610	20161213P1	Y	Surface Pump	Concrete Cylinder	1800mm
ME37 [Roselyn 1]	299495	6428767	1962	MACH	ROSELYN 1	GW020305	20161215P1	Y	Stock & Irrigation	Concrete Cylinder	1219mm (OD)
ME38 [Roselyn 2]	299457	6429125	1964	MACH	ROSELYN 2	GW022223	20161215P1	Y	Stock & Domestic	Open Hole / Steel Casing	150mm (Steel)
ME39 [Scrivens]	298768	6428561	1976 (GW Record)	MACH	SCRIVENS (3)	GW071295	20161215P5	N	Stock	Concrete Cylinder	1219mm
ME4 [4 Collins Ln]	299769	6430448	N/A	COLLINS LANE 4	COLLINS LANE 4	N/A	20170313P3	Y	Domestic	Equiped / Pump	6 Inch
ME40 [Thorndale 1]	296326	6433371	2002 (GW Record)	MACH	THORNDALE 2	GW080205	20161214P1	N	Stock	Well	(1200mm) Timber
ME41 [Thorndale 2]	295772	6433898	N/A	MACH	THORNDALE	GW080206	20161214P2	N	Collapsed	Windmill / Timber Frame	N/A
ME42 [Thorndale South]	295117	6432422	2002 (GW Record)	MACH	THORNDALE SOUTH	GW080203	20161214P2	N	Collapsed	Windmill / Timber Frame	1200mm
ME43 [Warrawee]	296672	6434348	1999 (GW Record)	MACH	WARRAWEE	GW080134	20161214P2	N	Collapsed	Windmill / Timber Frame	N/A
ME5 [5 Collins Ln]	299756	6430451	N/A	COLLINS LANE 5	COLLINS LANE 5	N/A	20170313P3	Y	Domestic	Equiped / Pump	1000mm (Well)
ME6 [9 Collins Ln]	299734	6430455	N/A	COLLINS LANE 9	COLLINS LANE 9	N/A	20170313P4	N	Vacant	Equiped (Hose)	1000mm (Well)
ME7 [17 Collins Ln]	299680	6430461	N/A	COLLINS LANE 17	MACH	N/A	20170316P6	Y	Pump Raised	Concrete Cylinder	1200mm
ME8 [33 Collins Ln]	299474	6430442	N/A	COLLINS LANE 33	COLLINS LANE 33	N/A	20170315P3	Y	Domestic	Concrete Cylinder	1219mm
ME9 [Lot 3 Collins Ln]	299600	6430535	N/A	COLLINS LANE LOT 3	LOT 3	N/A	20170315P2	Y	Domestic	Steel Casing	6 Inch
MITCHELL1	299860	6430413	N/A	MITCHELL	KAYUGA RD 173	N/A	20170316P2	Y	Domestic	Steel Casing	Steel Casing (6 inch)
MOORE1	299668	6430812	1 January 1958#	KAYUGA RD 211 (MOORE)	MOORE 1	GW045435	20170314P1	Y	Domestic (Front Yard)	Concrete Cylinder	Concrete Cylinder
MOORE1S	291441	6429318	N/A	GILGAI	MOORE (S1)	N/A	20170317P1	Y	Stock (Grazing)	Spring	Spring (Pond immediately up-catchment of Moore2S)
MOORE2	299720	6430762	27 Feb 2003*	KAYUGA RD 207 (MOORE)	MOORE 2 [PREVIOUS MP-BH3]	GW080726	20170314P1	N	Previously Monitoring	PVC In Steel Mount	PVC [100mm] in Steel Monument
MOORE2S	291427	6429323	N/A	GILGAI	MOORE (S2)	N/A	20170317P1	Y	Stock (Grazing)	Spring	Spring (Pond immediately down-catchment of Moore 1S)
MOORE3S	290851	6429236	N/A	GILGAI	MOORE (S3)	N/A	20170317P1	Y	Stock (Grazing)	Spring	Spring (Pond further down-catchment of Moore 1S & Moore 2S)
MOORE4	290139	6430000	< 60 Years (1800 GW Record)	GILGAI	JB MOORE	GW019979	20170317P2	Y	Stock	Equipped - Pump	Timber Frame Well (1200mm)
MP-BH1	301149	6432563	2003	YORE / DAPKOS	MP-BH1	GW080727	20170314P3	Y	Monitoring	Steel Casing	Steel casing with PVC (4 inch) in monument
MP-BH2	299407	6428712	N/A	MP - BH2	MACH	N/A	20170313P4	Y	N/A	None	6 Inch
MP-BH3	299481	6431354	N/A	MACH	MPBH3 (BORE2)	N/A	20161213P2	Y	Monitoring	Concrete Cylinder	1200mm
PARKINSON1	288944	6427796	N/A	WYBONG RD (LEFT)	PARKINSON1	N/A	20170316P6	Y	Stock	Windmill	Well (1m diameter)
PITMAN1	300806	6429378	30 Apr 1991*	KAYUGA RD 36	PITMAN1	GW200004	20170316P7	Y	Domestic	Steel Casing	Steel Casing 190mm OD* (~7 inch)
RDH76	296343	6435365	1982	CASEY GM	RDH76	GW078941	20170313P1	N	Monitoring^	PVC Casing	PVC Casing 130mm
SIMPSON1	299906	6429198	> 50 years (Hand Dug)	WYBONG RD 365	SIMPSON1	N/A	20170316P5	Y	Stock & Domestic	Concrete Cylinder	Concrete Cylinder (900mm)
SORMAZ1	300010	6429263	1992 (GW Record)	WYBONG RD 351	SORMAZ1	GW078261 (Cancelled)	20170316P7	N	Would require reconditioning to use	Steel Casing	Steel Casing (6 inch)
TLON1	294061	6436687	7/10/1999 (Form A)	MACH	NW Properties (Woodburn1)	GW078952	20161212P1	Y	Monitoring	Windmill	100mm (ID) (5 inches)
WALTON1	290331	6428144	N/A	WYBONG RD 1431	WALTON1	N/A	20170316P5	Y	Stock	Steel Casing	Steel Casing (6 inch)
WICKS1	300534	6429472	N/A	KAYUGA RD 53	WICKS1	N/A	20170316P2	Y	Domestic	Concrete Cylinder	Concrete Cylinder (900mm)

Bore ID (ME No.)	PS WGS84)	Northing	Year Drilled (Census Letter)	Property	Bore ID (property & Bore No.) - Field Sheet	Casing Stick Up (SU)	Depth To Water (mbtoc)	Bore Depth (mbtoc)	SWL (mbgl)	SWL (mbgl)	EC (µs/Cm)	pH	Sample Source
4500F000	296128	6433360	1994 & 2003	MACH	THORNDALE 1	1.0	19.88	-	18.88	18.88	7,300	6.62	BAILER
5000D000	296664	6431370	2003	MACH	BOXFIELD	1.0	82.45	-	81.45	81.45	-	-	-
5500D000	297166	6431378	2003	5500D000	MACH	1.0	64.7	121.7	63.7	63.7	-	-	(DNF)
6000F625	297642	6433994	2003	6000F625 (1)	MACH	0.0	16.73	34.5	16.73	16.73	3,620	6.66	BAILER
6500F500	298120	6433898	2003	6500F500	GLENMORE / 6500 F500	1.0	measured from top of steel U[32.8]M[54.53]L[52.9]	114.60(L) / 76.70(M) / 35.40(U)	U[31.8] M[53.53] L[51.9]	U[31.8] M[53.53] L[51.9]	-	-	-
7000D000	298661	6431400	2003	MACH	COUNTRY VIEW	1.0	[50]=6.0[40]=18.93	-	[50]=5.0 [40]=17.93	[50]=5.0 [40]=17.93	4,650 [50mm]	6.57 [50mm]	BAILER
7500F000	299088	6433428	2003	MACH	GLENMORE No1	1.0	36.07	not measured 168-170 Check GW?	35.07	35.07	6,170	7.67	BAILER
ADNUM1	300521	6429434	N/A	KAYUGA RD 51	ADNUM1	0.9	11.52	13	10.62	10.62	918	6.66	TAP
ASHFIELD1	289344	6428899	<50-60 YRS	ASHFIELD (JLON)	WYBONG RD 1510	0.15	3.1	5.75	2.95	2.95	5,320	7.10	BAILER
BARRY1	299564	6430431	N/A	BARRY	PRIVATE BARRY 1	0.7	12.36	13.56	11.66	11.66	842	6.01	BAILER
BE1	293476	6429036	2011	MACH	McLEAN	-	-	-	-	-	-	-	-
BELGRAVE	295085	6434438	N/A	LONERGAN	LONERGAN 6 (FAR WEST)	0.2	7.25	23.85 (75ft)	7.05	7.05	6,820	7.42	BAILER
CAS1	296503	6434654	1964	CASEY GM	CAS1	0.3	11.65	28.23	11.35	11.35	8040	7.74	BAILER
CAS2	295914	6435419	<1950s	CASEY GM	CAS2	0.55	40.01	65	39.46	39.46	10,010	6.79	BAILER
CAS3	295821	6435484	1957	CASEY GM	CAS3	0.2	Dry	76.7	Dry	Dry	Dry	Dry	-
CAS4	294928	6435957	N/A	CASEY GM	CAS4	0.45	27.96	34.8	27.51	27.51	8170	6.78	BAILER
COWTIME1	300330	6429753	N/A	KAYUGA RD 72	COWTIME1	1.2	-	-	-	-	890	6.89	TAP
GRAY1	299882	6430334	N/A	KAYUGA RD 161	GRAY1	-	-	-	-	-	712	6.49	TAP
GRAY2	299856	6430316	N/A	KAYUGA RD 161	GRAY2	-	-	-	-	-	693	6.49	TAP
GW015881	299428	6428129	1957	MACH	OVERDEEN 2	-	-	-	-	-	-	-	-
GW028510	298649	6429099	1965	MACH	WYBONG (1)	1.25	12.16	14.69	10.91	10.91	1,880	6.74	BAILER
GW037774	298661	6429086	1974	MACH	WYBONG (2)	1.5	12.05	15.25	10.55	10.55	870	6.90	BAILER
GW038412	291568	6437714	<1950s	TONY LONERGAN	NWEST (892 DORSET RD)	0.5	5	7.7	4.5	4.5	1,103	6.44	TAP
GW038752	294050	6436664	N/A	MACH	NW Properties (Woodburn2)	-	-	-	-	-	-	-	-
GW042701	298568	6428634	1976 (GW Record)	MACH	SCRIVENS (1)	1.5	11.99	13.7	10.49	10.49	941	6.76	BAILER
GW053007	298718	6428859	1965	MACH	SCRIVENS (2)	0.15	11.1	12.65	10.95	10.95	881	6.67	BAILER
HAYES1	299582	6430624	1930s	HAYES1	HAYES1	0.0	11.9	15.2	11.9	11.9	-	-	-
HAYES2	299681	6430616	1950s-60s	HAYES2	HAYES2	1.2	12.7	15.5	11.5	11.5	680	6.60	TAP
JLON.1	292407	6434333	1 Feb 1971#	JOHN LONERGAN	MARYLANDS1_GW33725	0.5	-	57.9	-	-	-	-	TANK
JLON.2	292320	6434393	1 Sep 1965*	JOHN LONERGAN	MARYLANDS2_GW23652	0.5	31.04	37.4	30.54	30.54	6,650	6.13	BAILER
JLON1	298194	6434785	1 Feb 1979# (Converted to Bore)	LONERGAN	LONERGAN 5 (MARYLANDS WESTERN PADDOCK)	1.0	Dry	6 (Well) 51.8 (Bore from GW Record)	Dry	Dry	-	-	-
JLON2	300044	6434608	~1965-80s	LONERGAN	LONERGAN 1 (WEST OF HOUSE)	0.4	14.39	82	13.99	13.99	650	7.33	BAILER
JLON3	299887	6434455	<1961	LONERGAN	LONERGAN 2 (FRONT OF HOUSE)	0.2	10.4	12.83	10.2	10.2	1,730	6.99	TAP
JLON4	299404	6434623	1932 (GW Record)	LONERGAN	LONERGAN 3 (PADDOCK)	1.8	11.35	12.5	9.55	9.55	1,980	6.99	BAILER
JLON5	299629	6434796	1 August 1954^	LONERGAN	LONERGAN 4 (MARYLANDS BACK PADDOCK)	0.0	10.2	11.7	10.2	10.2	800	6.60	BAILER
KELMAN1	300925	6429305	N/A	KAYUGA RD 20	KELMAN1	0.0	-	12.4	-	-	652	6.60	TAP
MATHER1	299814	6430440	> 40 years old	MATHER	KAYUGA RD 175	0.95	11.46	13.08	10.51	10.51	742	6.44	TAP
ME1 [1 Collins Ln]	299805	6430470	1970	MACH	COLLINS LANE	-	-	12	-	-	-	-	-
ME10 [Road Reserve Collins Ln]	299484	6430555	N/A	OVERGRONN SHED	MACH	-	-	-	-	-	-	-	-
ME11 [Road Reserve Collins Ln]	299495	6430656	N/A	DAMAGED	SHED	-	-	-	-	-	-	-	-
ME12 [57 Kayuga Rd]	300474	6429471	N/A	MACH	KAYUGA RD 57	0.35	11.17	14.0 (from GW Record)	10.82	10.82	1176	6.98	BAILER
ME13 [135 Kayuga Rd]	299959	6430143	N/A	KAYUGA RD 135	MACH	1.0	12.45	14.1	11.45	11.45	945	6.50	TAP
ME14 [137 Kayuga Rd]	299946	6430151	N/A	KAYUGA RD 137	MACH	-	-	-	-	-	470	6.80	TAP
ME15 [141 Kayuga Rd]	299952	6430191	N/A	KAYUGA RD 141	KAYUGA RD 141	N/A	-	-	-	-	1,000	6.65	TAP
ME16 [153 Kayuga Rd]	299875	6430285	N/A	KAYUGA RD 153	MACH	1.0	12.12	13.42	11.12	11.12	930	6.60	TAP
ME17 [163-165 Kayuga Rd]	299874	6430370	N/A	MACH	KAYUGA RD 163-165	0.3	12.6	14.85	12.3	12.3	656	6.59	TAP
ME18 [167 Kayuga Rd]	299827	6430402	N/A	KAYUGA RD 167	KAYUGA RD 167	0.6	11.5	13.45	10.9	10.9	752	6.46	TAP
ME19 [353 Wybong Rd]	299996	6429261	N/A	WYBONG RD 353	MACH	-	-	-	-	-	1003	6.51	TAP
ME2 [1 Collins Ln]	299811	6430465	N/A	COLLINS LANE 1	T. POWELL	N/A / 0	N/A / 10.80	N/A / 11.24	10.8	10.8	N/A / 905	N/A / 6.68	N/A / BAILER
ME20 [357 Wybong Rd]	299956	6429231	N/A	WYBONG 357	MACH	-	-	-	-	-	1,027	6.78	TAP
ME21 [359 Wybong Rd]	299960	6429225	N/A	WYBONG 359	MACH	-	-	-	-	-	N/A	N/A	-
ME22 [361 Wybong Rd]	299946	6429214	1953 (GW Record)	MACH	WYBONG RD 361	-	(Equipped)	12.12m based on GW Record (Equipped)	-	-	1,025	6.72	TAP
ME23 [Bimbadeen]	299456	6430443	N/A	MACH	BIMBADEEN	0.0	11.87	14.57	11.87	11.87	1,863	6.88	BAILER
ME24 [Broomfield]	292374	6433010	N/A	MACH	BROOMFIELD (1)	0.45	3.15	4.65	2.7	2.7	4,500	8.10	BAILER
ME25 [Country View]	298695	6431537	N/A	MACH	COUNTRY VIEW 2	0.0	4.16	-	4.16	4.16	6,770	7.14	BAILER
ME26 [Glenmore]	298441	6434044	1985	MACH	GLENMORE	0.3	50.05	38.15	49.75	49.75	3,010	7.37	BAILER
ME27 [Glenmore 'C']	299563	6434555	1984	MACH	GLENMORE 'C'	0.8	10.12	11.33	9.32	9.32	1,060	6.83	BAILER
ME28 [Jandell]	300056	6428793	1983	MACH	JANDELL	1.1	11.58	11.67	10.48	10.48	-	-	DRY (MOISTURE)
ME29 [Jandell]	299621	6428790	N/A	MACH	(NEAR 6006E)	-	-	-	-	-	-	-	-
ME3 [3 Collins Ln]	299803	6430447	N/A	COLLINS LANE 3	COLLINS LANE 3	0.5	11.8	12.1	11.3	11.3	840	6.63	BAILER
ME30 [Karrabah]	299843	6434195	1981	MACH	KARRABAH	0.5	9.96	12.95	9.46	9.46	1,050	7.02	BAILER
ME31 [Kropp]	292302	6436824	21/04/1994	MACH	NW Properties (KROPP)	-	-	-	-	-	3,600	7.73	TAP
ME32 [Melody Farm]	297625	6434009	N/A	6500F625 (2)	MACH	0.4	11.98	40.46	11.58	11.58	890	6.70	BAILER
ME33 [Overdeen]	299100	6427748	1946	MACH	OVERDEEN 1	0.0	11.03	14.04	11.03	11.03	1,350	6.84	BAILER
ME34 [Rosebrook 1]	299259	6429884	N/A	MACH	ROSEBROOK 1	0.3	12.13	14.1	11.83	11.83	1016	6.88	BAILER
ME35 [Rosebrook 2]	300330	6429634	N/A	MACH	ROSEBROOK 2	-	-	12.0 (from GW Record)	-	-	-	-	-
ME36 [Rosehill]	299550	6430090	1971 (GW Record)	MACH	ROSEHILL	0.1	12.13	14.25	12.03	12.03	720	6.93	BAILER
ME37 [Roselyn 1]	299495	6428767	1962	MACH	ROSELYN 1	-	-	13.4 (GW Record)	-	-	-	-	-
ME38 [Roselyn 2]	299457	6429125	1964	MACH	ROSELYN 2	0.5	11.78	11.88	11.28	11.28	-	-	-
ME39 [Scrivens]	298768	6428561	1976 (GW Record)	MACH	SCRIVENS (3)	1.0	12.35	14.6	11.35	11.35	1,100	6.84	BAILER
ME4 [4 Collins Ln]	299769	6430448	N/A	COLLINS LANE 4	COLLINS LANE 4	N/A	N/A	-	-	-	725	7.18	BAILER
ME40 [Thorndale 1]	296326	6433371	2002 (GW Record)	MACH	THORNDALE 2	0.0	4.5	8.5	4.5	4.5	7,900	7.03	BAILER
ME41 [Thorndale 2]	295772	6433898	N/A	MACH	THORNDALE	-	-	-	-	-	-	-	-
ME42 [Thorndale South]	295117	6432422	2002 (GW Record)	MACH	THORNDALE SOUTH	0.0	5.95	19.25	5.95	5.95	3,150	7.90	BAILER
ME43 [Warrawee]	296672	6434348	1999 (GW Record)	MACH	WARRAWEE	-	-	-	-	-	-	-	-
ME5 [5 Collins Ln]	299756	6430451	N/A	COLLINS LANE 5	COLLINS LANE 5	0.6	12.37	12.85	11.77	11.77	745	6.80	BAILER
ME6 [9 Collins Ln]	299734	6430455	N/A	COLLINS LANE 9	COLLINS LANE 9	1.1	12.7	13.6	11.6	11.6	796	6.82	BAILER
ME7 [17 Collins Ln]	299680	6430461	N/A	COLLINS LANE 17	MACH	0.76	12.31	12.9	11.55	11.55	912	6.65	BAILER
ME8 [33 Collins Ln]	299474	6430442	N/A	COLLINS LANE 33	COLLINS LANE 33	0.3	12.45	14.9	12.15	12.15	1,315	6.54	BAILER
ME9 [Lot 3 Collins Ln]	299600	6430535	N/A	COLLINS LANE LOT 3	LOT 3	-	-	-	-	-	830	6.25	TAP
MITCHELL1	299860	6430413	N/A	MITCHELL	KAYUGA RD 173	0.5	-	-	-	-	664	6.64	TAP @ HOUSE
MOORE1	299668	6430812	1 January 1958#	KAYUGA RD 211 (MOORE)	MOORE 1	0.75	12.55	52-56FT (13)	11.8	11.8	740	6.60	BAILER
MOORE1S	291441	6429318	N/A	GILGAI	MOORE (S1)	-	AT SURFACE	0	0	0	12,000	8.68	GRAB SAMPLE
MOORE2	299720	6430762	27 Feb 2003*	KAYUGA RD 207 (MOORE)	MOORE 2 [PREVIOUS MP-BH3]	0.47	N/A (blocked)	-	-	-	-	-	-
MOORE2S	291427	6429323	N/A	GILGAI	MOORE (S2)	-	AT SURFACE	-	0	0	8,200	8.28	GRAB SAMPLE
MOORE3S	290851	6429236	N/A	GILGAI	MOORE (S3)	-	AT SURFACE	-	0	0	7,900	8.80	GRAB SAMPLE
MOORE4	290139	6430000	< 60 Years (1800 GW Record)	GILGAI	JB MOORE	0.25	3.1	4.5	2.85	2.85	3,670	7.40	BAILER
MP-BH1	301149	6432563	2003	YORE / DAPKOS	MP-BH1	0.35	9.99	18	9.64	9.64	510	6.60	BAILER
MP-BH2	299407	6428712	N/A	MP - BH2	MACH	0.45	12.46	17.4	12.01	12.01	856	6.56	BAILER
MP-BH3	299481	6431354	N/A	MACH	MPBH3 (BORE2)	0.3	12.22	14	11.92	11.92	2,005	7.38	BAILER
PARKINSON1	288944	6427796	N/A	WYBONG RD (LEFT)	PARKINSON1	0.7	3.75	4.7	3.05	3.05	5,160	7.35	BAILER
PITMAN1	300806	6429378	30 Apr 1991*	KAYUGA RD 36	PITMAN1	1.5	-	-	-	-	715	6.83	TAP
RDH76	296343	6435365	1982	CASEY GM	RDH76	0.0	17.36	49.4	17.36	17.36	4800	6.84	BAILER
SIMPSON1	299906	6429198	> 50 years (Hand Dug)	WYBONG RD 365	SIMPSON1	0.0	10.9	11.6	10.9	10.9	990	7.40	TAP
SORMAZ1	300010	6429263	1992 (GW Record)	WYBONG RD 351	SORMAZ1	0.6	11.55	11.61	10.95	10.95	-	-	-
TLON1	294061	6436687	7/10/1999 (Form A)	MACH	NW Properties (Woodburn1)	0.2	11.43	-	11.23	11.23	-	-	-
WALTON1	290331	6428144	N/A	WYBONG RD 1431	WALTON1	0.3	NA (Equipped)	90m Deep / 87m to Pump (From Owner)	-	-	8,290	7.10	TAP
WICKS1	300534	6429472	N/A	KAYUGA RD 53	WICKS1	0.9	11.8	12.5	10.9	10.9	1,340	6.80	BAILER

Bore ID (ME No.)	PS WGS84)	Northing	Year Drilled (Census Letter)	Property	Bore ID (property & Bore No.) - Field Sheet	Allocation (ML/Yr)	Pump Regime (Rate/Frequency)	Storage (Dam/Tank/Troughs/Vol)	Log (Y/N)	Water Sample (Y/N)	Photo (Y/N)	Date Inspected
4500F000	296128	6433360	1994 & 2003	MACH	THORNDALE 1	-	-	-	N	Y	Y	14/12/2016
5000D000	296664	6431370	2003	MACH	BOXFIELD	-	-	-	N	N	Y	14/12/2016
5500D000	297166	6431378	2003	5500D000	MACH	-	-	-	N	N	Y	14/03/2017
6000F625	297642	6433994	2003	6000F625 (1)	MACH	-	-	-	N	Y	Y	14/03/2017
6500F500	298120	6433898	2003	6500F500	GLENMORE / 6500 F500	-	-	-	N	N	Y	13/12/2016 & 14/03/2017
7000D000	298661	6431400	2003	MACH	COUNTRY VIEW	-	-	-	N	Y	Y	14/12/2016
7500F000	299088	6433428	2003	MACH	GLENMORE No1	-	-	-	N	Y	Y	14/12/2016
ADNUM1	300521	6429434	N/A	KAYUGA RD 51	ADNUM1	-	AS REQUIRED	-	N	Y	Y	16/03/2017
ASHFIELD1	289344	6428899	<50-60 YRS	ASHFIELD (JLON)	WYBONG RD 1510	-	-	Tank	N	Y	Y	16/03/2017
BARRY1	299564	6430431	N/A	BARRY	PRIVATE BARRY 1	-	-	-	N	Y	Y	15/03/2017
BE1	293476	6429036	2011	MACH	McLEAN	-	-	-	N	N (refer to BENGALLA records)	Y	15/12/2016
BELGRAVE	295085	6434438	N/A	LONERGAN	LONERGAN 6 (FAR WEST)	-	-	-	N	Y	Y	15/12/2016
CAS1	296503	6434654	1964	CASEY GM	CAS1	-	-	-	N	Y	Y	13/03/2017
CAS2	295914	6435419	<1950s	CASEY GM	CAS2	-	-	-	N	Y	Y	13/03/2017
CAS3	295821	6435484	1957	CASEY GM	CAS3	-	-	-	N	N	Y	13/03/2017
CAS4	294928	6435957	N/A	CASEY GM	CAS4	-	-	-	N	Y	Y	13/03/2017
COWTIME1	300330	6429753	N/A	KAYUGA RD 72	COWTIME1	-	AS REQUIRED	-	N	Y	Y	16/03/2017
GRAY1	299882	6430334	N/A	KAYUGA RD 161	GRAY1	-	-	-	N	Y	Y	16/03/2017
GRAY2	299856	6430316	N/A	KAYUGA RD 161	GRAY2	-	-	-	N	Y	Y	16/03/2017
GW015881	299428	6428129	1957	MACH	OVERDEEN 2	-	-	-	N	N	N	14/12/2016
GW028510	298649	6429099	1965	MACH	WYBONG (1)	-	-	-	N	Y	Y	15/12/2016
GW037774	298661	6429086	1974	MACH	WYBONG (2)	-	-	-	N	Y	Y	15/12/2016
GW038412	291568	6437714	<1950s	TONY LONERGAN	NWEST (892 DORSET RD)	-	AS REQUIRED	-	N	Y	Y	15/03/2017
GW038752	294050	6436664	N/A	MACH	NW Properties (Woodburn2)	-	-	-	N	N	Y	12/12/2016
GW042701	298568	6428634	1976 (GW Record)	MACH	SCRIVENS (1)	-	-	-	N	Y	Y	15/12/2016
GW053007	298718	6428859	1965	MACH	SCRIVENS (2)	-	-	-	N	Y	Y	15/12/2016
HAYES1	299582	6430624	1930s	HAYES1	HAYES1	22 units	EVERYDAY/SUMMER	-	N	N	Y	14/03/2017
HAYES2	299681	6430616	1950s-60s	HAYES2	HAYES2	-	-	-	N	Y	Y	14/03/2017
JLON.1	292407	6434333	1 Feb 1971#	JOHN LONERGAN	MARYLANDS1_GW33725	-	Windmill	YES	N	N	Y	15/03/2017
JLON.2	292320	6434393	1 Sep 1965*	JOHN LONERGAN	MARYLANDS2_GW23652	-	-	-	N	Y	Y	15/03/2017
JLON1	298194	6434785	1 Feb 1979# (Converted to Bore)	LONERGAN	LONERGAN 5 (MARYLANDS WESTERN PADDOCK)	-	-	-	N	N	Y	15/12/2016
JLON2	300044	6434608	~1965-80s	LONERGAN	LONERGAN 1 (WEST OF HOUSE)	-	-	-	N	Y	Y	15/12/2016
JLON3	299887	6434455	<1961	LONERGAN	LONERGAN 2 (FRONT OF HOUSE)	-	PUMPING (TIMED)	-	N	Y	Y	15/12/2016
JLON4	299404	6434623	1932 (GW Record)	LONERGAN	LONERGAN 3 (PADDOCK)	-	-	-	N	Y	Y	15/12/2016
JLON5	299629	6434796	1 August 1954^	LONERGAN	LONERGAN 4 (MARYLANDS BACK PADDOCK)	-	-	-	N	Y	Y	15/12/2016
KELMAN1	300925	6429305	N/A	KAYUGA RD 20	KELMAN1	-	AS REQUIRED	-	N	Y	Y	16/03/2017
MATHER1	299814	6430440	> 40 years old	MATHER	KAYUGA RD 175	-	AS REQUIRED	-	N	Y	Y	16/03/2017
ME1 [1 Collins Ln]	299805	6430470	1970	MACH	COLLINS LANE	-	-	-	N	N	Y	13/12/2016
ME10 [Road Reserve Collins Ln]	299484	6430555	N/A	OVERGRONN SHED	MACH	-	-	-	N	N	Y	15/03/2017
ME11 [Road Reserve Collins Ln]	299495	6430656	N/A	DAMAGED	SHED	-	-	-	N	N	Y	15/03/2017
ME12 [57 Kayuga Rd]	300474	6429471	N/A	MACH	KAYUGA RD 57	-	-	TAP	N	Y	Y	12/12/2016
ME13 [135 Kayuga Rd]	299959	6430143	N/A	KAYUGA RD 135	MACH	-	-	-	N	Y	Y	14/03/2017
ME14 [137 Kayuga Rd]	299946	6430151	N/A	KAYUGA RD 137	MACH	-	-	-	N	Y	Y	14/03/2017
ME15 [141 Kayuga Rd]	299952	6430191	N/A	KAYUGA RD 141	KAYUGA RD 141	-	-	-	N	Y	Y	13/03/2017
ME16 [153 Kayuga Rd]	299875	6430285	N/A	KAYUGA RD 153	MACH	-	AS REQUIRED	-	N	Y	Y	16/03/2017
ME17 [163-165 Kayuga Rd]	299874	6430370	N/A	MACH	KAYUGA RD 163-165	60 Units in Hunter Regulat	-	-	N	Y	Y	16/03/2017
ME18 [167 Kayuga Rd]	299827	6430402	N/A	KAYUGA RD 167	KAYUGA RD 167	-	AS REQUIRED	-	N	Y	Y	16/03/2017
ME19 [353 Wybong Rd]	299996	6429261	N/A	WYBONG RD 353	MACH	-	-	-	N	Y	Y	15/03/2017
ME2 [1 Collins Ln]	299811	6430465	N/A	COLLINS LANE 1	T. POWELL	-	-	-	N	N / Y	Y (x2)	13/03/2017
ME20 [357 Wybong Rd]	299956	6429231	N/A	WYBONG 357	MACH	-	AS REQUIRED	-	N	Y	Y	16/03/2017
ME21 [359 Wybong Rd]	299960	6429225	N/A	WYBONG 359	MACH	-	-	-	N	N	Y	16/03/2017
ME22 [361 Wybong Rd]	299946	6429214	1953 (GW Record)	MACH	WYBONG RD 361	-	-	-	N	Y	Y	16/03/2017
ME23 [Bimbadeen]	299456	6430443	N/A	MACH	BIMBADEEN	-	-	-	N	Y	Y	13/12/2016
ME24 [Broomfield]	292374	6433010	N/A	MACH	BROOMFIELD (1)	-	-	-	N	Y	Y	15/12/2016
ME25 [Country View]	298695	6431537	N/A	MACH	COUNTRY VIEW 2	-	-	-	N	Y	Y	14/12/2016
ME26 [Glenmore]	298441	6434044	1985	MACH	GLENMORE	-	-	-	N	Y	Y	13/12/2016
ME27 [Glenmore 'C']	299563	6434555	1984	MACH	GLENMORE 'C'	-	-	TANK (Concrete)	N	Y	Y	13/12/2016
ME28 [Jandell]	300056	6428793	1983	MACH	JANDELL	-	-	-	N	N	Y	14/12/2016
ME29 [Jandell]	299621	6428790	N/A	MACH	(NEAR 6006E)	-	-	-	N	N	Y	17/03/2017
ME3 [3 Collins Ln]	299803	6430447	N/A	COLLINS LANE 3	COLLINS LANE 3	-	-	-	N	Y	Y	13/03/2017
ME30 [Karrabah]	299843	6434195	1981	MACH	KARRABAH	-	-	-	N	Y	Y	13/12/2016
ME31 [Kropp]	292302	6436824	21/04/1994	MACH	NW Properties (KROPP)	-	-	-	N	Y	Y	12/12/2016
ME32 [Melody Farm]	297625	6434009	N/A	6500F625 (2)	MACH	-	-	-	N	Y	Y	14/03/2017
ME33 [Overdeen]	299100	6427748	1946	MACH	OVERDEEN 1	-	-	-	Y	Y	Y	14/12/2016
ME34 [Rosebrook 1]	299259	6429884	N/A	MACH	ROSEBROOK 1	-	On demand	TANK	N	Y	Y	13/12/2016
ME35 [Rosebrook 2]	300330	6429634	N/A	MACH	ROSEBROOK 2	-	-	-	N	N	Y	13/12/2016
ME36 [Rosehill]	299550	6430090	1971 (GW Record)	MACH	ROSEHILL	-	Timer	TROUGHS	N	Y	Y	13/12/2016
ME37 [Roselyn 1]	299495	6428767	1962	MACH	ROSELYN 1	-	-	-	N	N	Y	15/12/2016
ME38 [Roselyn 2]	299457	6429125	1964	MACH	ROSELYN 2	-	-	Plastic Tank	N	N	Y	15/12/2016
ME39 [Scrivens]	298768	6428561	1976 (GW Record)	MACH	SCRIVENS (3)	-	-	-	N	Y	Y	15/12/2016
ME4 [4 Collins Ln]	299769	6430448	N/A	COLLINS LANE 4	COLLINS LANE 4	-	AS REQUIRED	-	N	Y - At House	Y	13/03/2017
ME40 [Thorndale 1]	296326	6433371	2002 (GW Record)	MACH	THORNDALE 2	-	-	-	N	Y	Y	14/12/2016
ME41 [Thorndale 2]	295772	6433898	N/A	MACH	THORNDALE	-	-	-	N	N	Y	14/12/2016
ME42 [Thorndale South]	295117	6432422	2002 (GW Record)	MACH	THORNDALE SOUTH	-	-	-	N	Y	Y	14/12/2016
ME43 [Warrawee]	296672	6434348	1999 (GW Record)	MACH	WARRAWEE	-	-	-	N	N	Y	14/12/2016
ME5 [5 Collins Ln]	299756	6430451	N/A	COLLINS LANE 5	COLLINS LANE 5	-	AS REQUIRED	-	N	Y	Y	13/03/2017
ME6 [9 Collins Ln]	299734	6430455	N/A	COLLINS LANE 9	COLLINS LANE 9	-	-	-	N	Y	Y	13/03/2017
ME7 [17 Collins Ln]	299680	6430461	N/A	COLLINS LANE 17	MACH	-	-	-	N	Y	Y	16/03/2017
ME8 [33 Collins Ln]	299474	6430442	N/A	COLLINS LANE 33	COLLINS LANE 33	-	-	-	N	Y	Y	15/03/2017
ME9 [Lot 3 Collins Ln]	299600	6430535	N/A	COLLINS LANE LOT 3	LOT 3	-	-	-	N	Y	Y	15/03/2017
MITCHELL1	299860	6430413	N/A	MITCHELL	KAYUGA RD 173	-	AS REQUIRED	-	N	Y	Y	16/03/2017
MOORE1	299668	6430812	1 January 1958#	KAYUGA RD 211 (MOORE)	MOORE 1	-	-	-	N	Y	Y	14/03/2017
MOORE1S	291441	6429318	N/A	GILGAI	MOORE (S1)	-	-	-	Y	Y	Y	17/03/2017
MOORE2	299720	6430762	27 Feb 2003*	KAYUGA RD 207 (MOORE)	MOORE 2 [PREVIOUS MP-BH3]	-	-	-	N	N	Y	14/03/2017
MOORE2S	291427	6429323	N/A	GILGAI	MOORE (S2)	-	-	-	Y	Y	Y	17/03/2017
MOORE3S	290851	6429236	N/A	GILGAI	MOORE (S3)	-	-	-	Y	Y	Y	17/03/2017
MOORE4	290139	6430000	< 60 Years (1800 GW Record)	GILGAI	JB MOORE	-	-	-	N	Y	Y	17/03/2017
MP-BH1	301149	6432563	2003	YORE / DAPKOS	MP-BH1	-	-	-	N	Y	Y	14/03/2017
MP-BH2	299407	6428712	N/A	MP - BH2	MACH	-	-	-	N	Y	Y	13/03/2017
MP-BH3	299481	6431354	N/A	MACH	MPBH3 (BORE2)	-	-	TROUGHS	N	Y	Y	13/12/2016
PARKINSON1	288944	6427796	N/A	WYBONG RD (LEFT)	PARKINSON1	-	-	-	N	Y	Y	16/03/2017
PITMAN1	300806	6429378	30 Apr 1991*	KAYUGA RD 36	PITMAN1	-	-	-	N	Y	Y	16/03/2017
RDH76	296343	6435365	1982	CASEY GM	RDH76	-	-	-	N	Y	Y	13/03/2017
SIMPSON1	299906	6429198	> 50 years (Hand Dug)	WYBONG RD 365	SIMPSON1	-	-	-	N	Y	Y	16/03/2017
SORMAZ1	300010	6429263	1992 (GW Record)	WYBONG RD 351	SORMAZ1	-	-	-	N	N	Y	16/03/2017
TLON1	294061	6436687	7/10/1999 (Form A)	MACH	NW Properties (Woodburn1)	-	-	-	N	N	Y	12/12/2016
WALTON1	290331	6428144	N/A	WYBONG RD 1431	WALTON1	-	-	-	N	Y	Y	16/03/2017
WICKS1	300534	6429472	N/A	KAYUGA RD 53	WICKS1	-	-	-	N	Y	Y	16/03/2017

Bore ID (ME No.)	PS WGS84)	Northing	Year Drilled (Census Letter)	Property	Bore ID (property & Bore No.) - Field Sheet	Comments
4500F000	296128	6433360	1994 & 2003	MACH	THORNDALE 1	4500F000
5000D000	296664	6431370	2003	MACH	BOXFIELD	5000D000
5500D000	297166	6431378	2003	5500D000	MACH	MONITORING BORE 5500D000 (2003). [UNABLE TO LOCATE 500E000]
6000F625	297642	6433994	2003	6000F625 (1)	MACH	6500F625 "MELODY FARM". ABOVE DAM. STAR PICKET
6500F500	298120	6433898	2003	6500F500	GLENMORE / 6500 F500	UPPER=32.8MID=54.53LOWER=52.9TRIPLE NESTED PIEZOMETERS
7000D000	298661	6431400	2003	MACH	COUNTRY VIEW	TOP OF STEEL7000D0002X PIEZOS. DEEP(40MM) SHALLOW (50MM)BESIDE DAM. PVC DISCONNECTED IN THE MONUMENT [CABLE TIES]
7500F000	299088	6433428	2003	MACH	GLENMORE No1	7500 F000NB: LOCATION ALIGNED WITH GW078629 + GW078630
ADNUM1	300521	6429434	N/A	KAYUGA RD 51	ADNUM1	SERVICES BTH. HOUSES ON ADNVM (4-51)
ASHFIELD1	289344	6428899	<50-60 YRS	ASHFIELD (JLON)	WYBONG RD 1510	SANDY CREEK WINDMILL. LOCATION ALIGNS WITH GW047863 HOWEVER DEPTH & YR CORRESPONDS WITH GW014135
BARRY1	299564	6430431	N/A	BARRY	PRIVATE BARRY 1	BACK OF PROPERTY.
BE1	293476	6429036	2011	MACH	McLEAN	VWP (WITH LOGGER) + OPEN HOLE. BE1
BELGRAVE	295085	6434438	N/A	LONERGAN	LONERGAN 6 (FAR WEST)	75FT DEPTH. "BELGRAVE". ANGLO AMERICAN. MONITORING SITE
CAS1	296503	6434654	1964	CASEY GM	CAS1	CAS1. OFF DIRECT RD (CRN OF PROPERTY)
CAS2	295914	6435419	<1950s	CASEY GM	CAS2	ADJACENT TO DWELLING [S-E] DARTBROOK MONITORING SITE DATA
CAS3	295821	6435484	1957	CASEY GM	CAS3	WINDMILL - WEST OF DWELLING [IN 1975 USED @ 2 GALLONS/MIN]
CAS4	294928	6435957	N/A	CASEY GM	CAS4	DARTBROOK MONITORING SITE [CAS4]
COWTIME1	300330	6429753	N/A	KAYUGA RD 72	COWTIME1	GREEN HOUSING AT BACK OF HOUSE. OPERATING AT TIME - FOR CATTLE TROUGH
GRAY1	299882	6430334	N/A	KAYUGA RD 161	GRAY1	FRONT OF HOUSE. EQUIPPED. GREEN SHADE CLOTH.
GRAY2	299856	6430316	N/A	KAYUGA RD 161	GRAY2	FEEDS HORSE TROUGH. NEW SLAB LAID
GW015881	299428	6428129	1957	MACH	OVERDEEN 2	BACKFILLED NOT LOCATED
GW028510	298649	6429099	1965	MACH	WYBONG (1)	(BENGALLA). 28510. NEAREST HOUSE TO WEST.
GW037774	298661	6429086	1974	MACH	WYBONG (2)	(BENGALLA). 37774. MIDDLE OF PADDOCK
GW038412	291568	6437714	<1950s	TONY LONERGAN	NWEST (892 DORSET RD)	ANGLOAMERICAN GW038412. SOLAR PANELS. OLD WINDMILL
GW038752	294050	6436664	N/A	MACH	NW Properties (Woodburn2)	NO CASING VISIBLE
GW042701	298568	6428634	1976 (GW Record)	MACH	SCRIVENS (1)	42701 (BENGALLA). MONITOR.
GW053007	298718	6428859	1965	MACH	SCRIVENS (2)	53007 (BENGALLA). MONITOR.
HAYES1	299582	6430624	1930s	HAYES1	HAYES1	9 HORSE POWER METER (WEIDEMAN'S DIARY). FIRBRE GLASS MESH. GW RECORD ASSIGNED BASED ON PROXIMITY
HAYES2	299681	6430616	1950s-60s	HAYES2	HAYES2	FRONT YARD (TAPS)
JLON.1	292407	6434333	1 Feb 1971#	JOHN LONERGAN	MARYLANDS1_GW33725	EQUIPPED & OPERATING (NO MEASUREMENTS OBTAINED). OLD WINDMILL
JLON.2	292320	6434393	1 Sep 1965*	JOHN LONERGAN	MARYLANDS2_GW23652	JLON.2
JLON1	298194	6434785	1 Feb 1979# (Converted to Bore)	LONERGAN	LONERGAN 5 (MARYLANDS WESTERN PADDOCK)	WINDMILL. ANGLO AMERICAN. JLON1. BORE+WELL. DARTBROOK MONITORING SITE
JLON2	300044	6434608	~1965-80s	LONERGAN	LONERGAN 1 (WEST OF HOUSE)	NORTH EAST OF HOUSE. GW ASSIGNED BASED ON SIMILAR DEPTH. DEEPENED 1981
JLON3	299887	6434455	<1961	LONERGAN	LONERGAN 2 (FRONT OF HOUSE)	FRONT OF HOUSE
JLON4	299404	6434623	1932 (GW Record)	LONERGAN	LONERGAN 3 (PADDOCK)	PADDOCK. CONCRETE CYLINDERS REPLACED TIMBER CIRCA 1976
JLON5	299629	6434796	1 August 1954^	LONERGAN	LONERGAN 4 (MARYLANDS BACK PADDOCK)	NO LONGER USED
KELMAN1	300925	6429305	N/A	KAYUGA RD 20	KELMAN1	GREEN SHED AT RD FRONT NEAR WORKSHOP. METAL GRILL IN WELL (PREVENTED ACCESS FOR DIPPING)
MATHER1	299814	6430440	> 40 years old	MATHER	KAYUGA RD 175	BACK OF HOUSE. PUMP AT 1955 FLOOD LEVEL (1.6MAGL)
ME1 [1 Collins Ln]	299805	6430470	1970	MACH	COLLINS LANE	CORNER HOUSE. COLLINS LANE
ME10 [Road Reserve Collins Ln]	299484	6430555	N/A	OVERGRONN SHED	MACH	SHED - OVERGROWN OVER BACK OF LOT 3.
ME11 [Road Reserve Collins Ln]	299495	6430656	N/A	DAMAGED	SHED	SHED COLLAPSED. FLOOD PROTECTION.
ME12 [57 Kayuga Rd]	300474	6429471	N/A	MACH	KAYUGA RD 57	TENANTED
ME13 [135 Kayuga Rd]	299959	6430143	N/A	KAYUGA RD 135	MACH	FRONT OF HOUSE (NE). TAP SAMPLE
ME14 [137 Kayuga Rd]	299946	6430151	N/A	KAYUGA RD 137	MACH	FRONT OF HOUSE. TAP SAMPLE. RAINWATER TANK (INFLUENCE)
ME15 [141 Kayuga Rd]	299952	6430191	N/A	KAYUGA RD 141	KAYUGA RD 141	-
ME16 [153 Kayuga Rd]	299875	6430285	N/A	KAYUGA RD 153	MACH	BACK OF HOUSE. DOGS LOCKED UP.
ME17 [163-165 Kayuga Rd]	299874	6430370	N/A	MACH	KAYUGA RD 163-165	SERVICES BOTH 163-165 DWELLINGS. GW RECORD ASSIGNED BASED ON LOCATION AND CONSTRUCTION
ME18 [167 Kayuga Rd]	299827	6430402	N/A	KAYUGA RD 167	KAYUGA RD 167	BACK OF HOUSE .
ME19 [353 Wybong Rd]	299996	6429261	N/A	WYBONG RD 353	MACH	-
ME2 [1 Collins Ln]	299811	6430465	N/A	COLLINS LANE 1	T. POWELL	GW LEVEL (UNABLE TO USE) *ALSO INSPECTED ROUND 1 DEC2016. TWO BORES LOCATED 10M APART
ME20 [357 Wybong Rd]	299956	6429231	N/A	WYBONG 357	MACH	BACK OF SHED.
ME21 [359 Wybong Rd]	299960	6429225	N/A	WYBONG 359	MACH	NOT USED. OVERGROWN.
ME22 [361 Wybong Rd]	299946	6429214	1953 (GW Record)	MACH	WYBONG RD 361	BACK OF HOUSE. COVERED BLACK SEMI-CIRCLE. GW RECORD ASSIGNED BASED ON LOCATION.
ME23 [Bimbadeen]	299456	6430443	N/A	MACH	BIMBADEEN	BIMBADEEN. CASED HOLE ADJACENT
ME24 [Broomfield]	292374	6433010	N/A	MACH	BROOMFIELD (1)	WINDMILL. CREEK NEAR CONFLUENCE
ME25 [Country View]	298695	6431537	N/A	MACH	COUNTRY VIEW 2	DISUSED WINDMILL AT BASE OF DAM
ME26 [Glenmore]	298441	6434044	1985	MACH	GLENMORE	WINDMILL DISMANTLED. DOWNSLOPE OF DAM
ME27 [Glenmore 'C']	299563	6434555	1984	MACH	GLENMORE 'C'	WINDMILL
ME28 [Jandell]	300056	6428793	1983	MACH	JANDELL	GW060025 WAS BACKFILLED NEARBY
ME29 [Jandell]	299621	6428790	N/A	MACH	(NEAR 6006E)	BACK OF YARDS (JANDELL). [6006E NO BORES. HORNE NO BORES]
ME3 [3 Collins Ln]	299803	6430447	N/A	COLLINS LANE 3	COLLINS LANE 3	-
ME30 [Karrabah]	299843	6434195	1981	MACH	KARRABAH	IRRIGATION INFRASTRUCTURE
ME31 [Kropp]	292302	6436824	21/04/1994	MACH	NW Properties (KROPP)	KUMINANDI 21/4/19994R. KROPP
ME32 [Melody Farm]	297625	6434009	N/A	6500F625 (2)	MACH	"MELODY FARM" BESIDE 6500F625 (1). (BUCKET ON TOP).
ME33 [Overdeen]	299100	6427748	1946	MACH	OVERDEEN 1	IRRIGATION. PUMPING AT TIME OF MEASUREMENT
ME34 [Rosebrook 1]	299259	6429884	N/A	MACH	ROSEBROOK 1	HORSES.BORE PUMPING WHEN MEASURED.MAIN SUPPLY SOURCE
ME35 [Rosebrook 2]	300330	6429634	N/A	MACH	ROSEBROOK 2	FRONT PADDOCK. COLLAPSED
ME36 [Rosehill]	299550	6430090	1971 (GW Record)	MACH	ROSEHILL	BACK OF HOUSE AT SHED
ME37 [Roselyn 1]	299495	6428767	1962	MACH	ROSELYN 1	ROSEBROOK CREEK CHANNEL. PADLOCKED
ME38 [Roselyn 2]	299457	6429125	1964	MACH	ROSELYN 2	BACK OF HOUSE. INSUFFICIENT WATER TO SAMPLE.
ME39 [Scrivens]	298768	6428561	1976 (GW Record)	MACH	SCRIVENS (3)	OVERGROWN. CORNER NEAR ROSEBROOK CREEK. GW RECORD ASSIGNED BASED ON PROXIMITY & SIMILAR DEPTH
ME4 [4 Collins Ln]	299769	6430448	N/A	COLLINS LANE 4	COLLINS LANE 4	-
ME40 [Thorndale 1]	296326	6433371	2002 (GW Record)	MACH	THORNDALE 2	WINDMILL TIMBER FRAME
ME41 [Thorndale 2]	295772	6433898	N/A	MACH	THORNDALE	FENCED OFF AREA. TREE GROWING IN WELL. NO MEASUREMENT
ME42 [Thorndale South]	295117	6432422	2002 (GW Record)	MACH	THORNDALE SOUTH	COLLAPSED. ONE SAMPLE MEASURED. WINDMILL DERELICT
ME43 [Warrawee]	296672	6434348	1999 (GW Record)	MACH	WARRAWEE	COLLAPSED. NO MEASUREMENT. WINDMILL DERELICT
ME5 [5 Collins Ln]	299756	6430451	N/A	COLLINS LANE 5	COLLINS LANE 5	-
ME6 [9 Collins Ln]	299734	6430455	N/A	COLLINS LANE 9	COLLINS LANE 9	VACANT MACH PROPERTY
ME7 [17 Collins Ln]	299680	6430461	N/A	COLLINS LANE 17	MACH	NOT USED AT MOMENT. PUMP TOO HIGH.
ME8 [33 Collins Ln]	299474	6430442	N/A	COLLINS LANE 33	COLLINS LANE 33	-
ME9 [Lot 3 Collins Ln]	299600	6430535	N/A	COLLINS LANE LOT 3	LOT 3	EQUIPPED. DOMESTIC
MITCHELL1	299860	6430413	N/A	MITCHELL	KAYUGA RD 173	MATHER ACCESS (KEY). MITCHELL VACANT
MOORE1	299668	6430812	1 January 1958#	KAYUGA RD 211 (MOORE)	MOORE 1	FRONT OF HOUSE. GW RECORD ASSIGNED BASED ON PROXIMITY AND SIMILAR DEPTH.
MOORE1S	291441	6429318	N/A	GILGAI	MOORE (S1)	TWO SPRINGS ADJACENT. UPSTREAM POND
MOORE2	299720	6430762	27 Feb 2003*	KAYUGA RD 207 (MOORE)	MOORE 2 [PREVIOUS MP-BH3]	OLD C&A (SITE) BLOCKED LIKELY WITH TREE ROOTS
MOORE2S	291427	6429323	N/A	GILGAI	MOORE (S2)	DOWNSTREAM POND
MOORE3S	290851	6429236	N/A	GILGAI	MOORE (S3)	TWO DAMS / PONDS
MOORE4	290139	6430000	< 60 Years (1800 GW Record)	GILGAI	JB MOORE	WELL WITH OLD/DERELICT WINDMILL. CORRUGATED IRON OVER COVER. GW RECORD ASSINGED BASED ON PROXIMITY AND SIMILAR CONSTRUCTION
MP-BH1	301149	6432563	2003	YORE / DAPKOS	MP-BH1	MP-BH1 (NEAR POWER BOX TOP OF BANK). KEITH YORE/DAPKOS. SPOKE TO PROPERTY MANAGER
MP-BH2	299407	6428712	N/A	MP - BH2	MACH	MACH
MP-BH3	299481	6431354	N/A	MACH	MPBH3 (BORE2)	ENV. MONITORING SITE. MPBH3.
PARKINSON1	288944	6427796	N/A	WYBONG RD (LEFT)	PARKINSON1	BEHIND PROPERTY. ELECTRIC FENCE. WINDMILL.
PITMAN1	300806	6429378	30 Apr 1991*	KAYUGA RD 36	PITMAN1	HOUSING ABOVE FLOOD LEVEL. IN CORNER OF PROPERTY.
RDH76	296343	6435365	1982	CASEY GM	RDH76	DARTBROOK MONITORING SITE [RDH76] - PHOTO TAKEN OF NEARBY VENTURI HOLE AS WELL
SIMPSON1	299906	6429198	> 50 years (Hand Dug)	WYBONG RD 365	SIMPSON1	BACK OF HOUSE. HAND DUG
SORMAZ1	300010	6429263	1992 (GW Record)	WYBONG RD 351	SORMAZ1	BACK OF PROPERTY. SHED. LAID CONCRETE UP NEXT DOOR. GW RECORD ASSINGED BASED ON LOCATION.
TLON1	294061	6436687	7/10/1999 (Form A)	MACH	NW Properties (Woodburn1)	TLON1. CHECK FOR DARTBROOK /ANGLO AMERICAN RECORDS
WALTON1	290331	6428144	N/A	WYBONG RD 1431	WALTON1	BACK OF SHED - FRONT PROPERTY. STAR PICKETS. SALTY/CORROSION. GW080272 LOCATED 300M WEST UPHILL
WICKS1	300534	6429472	N/A	KAYUGA RD 53	WICKS1	WELL IN THE HOUSE. 53 KAYUGA

APPENDIX 5

CONSULTEE FEEDBACK ON PREVIOUS SURFACE WATER MANAGEMENT PLAN – KEY CORRESPONDENCE

NSW GOVERNMENT | Department of Industry

Contact: Ellie Randall
Phone: 02 4275 9308
Email: ellie.randall@nrar.nsw.gov.au

Chloe Annandale
Environmental Advisor
MACH Energy
1100 Wybong Road
Muswellbrook NSW 2333

Our ref: OUT19/12901

email: Chloe.Annandale@machenergyaustralia.com.au

Dear Chloe

25 September 2019

Mount Pleasant Operation – Water Management Plans

Thank you for giving the Department of Planning, Industry and Environment – Water (DPIE-Water) formerly DoI Water the opportunity to comment on the Water Management Plans, including the Site Water Balance, Erosion and Sediment Control Plan, Surface Water Management Plan, Groundwater Management Plan and the Surface and Ground Water Response Plan. DPIE-Water has reviewed the plans and provides the following comments:

1. Mount Pleasant Operation hold appropriate groundwater entitlement prior to take. A shortfall in entitlement held versus modelled mine inflow is predicted by year 6 of the mine plan for the Sydney Basin North Coast Groundwater Source.
2. The additional monitoring bores proposed to be constructed within the alluvial aquifers are to be amalgamated into the nominated impact bores network as soon as practical.
3. The elevation at each bore should be surveyed (by a registered surveyor) with water levels presented in Australian Height Datum as well as depth in the annual report and provided electronically in an excel/csv format if requested.
4. Reporting on Hunter Regulated River Alluvial Water Source groundwater flow direction is to be included within the annual report.
5. The Aquifer Interference Policy outlines that the drawdown impact consideration is a cumulative impact and not that by a sole activity. Therefore, if Mount Pleasant Operation contributes to the exceedance albeit not the full 2m or greater, Mount Pleasant Operation remains accountable. The wording of the Surface and Ground Water Response Plan protocol should reflect this intent.

Should you have any further queries in relation to this submission please do not hesitate to contact Ellie Randall on (02) 4275 9308. Please note the generic email address for correspondence is nrar.servicedesk@industry.nsw.gov.au.

Yours sincerely

Alison Collaros
Licensing and Approvals Manager (East)
Natural Resources Access Regulator
Department of Planning, Industry and Environment

APPENDIX 6

CONSULTEE FEEDBACK ON CURRENT WATER MANAGEMENT PLAN – KEY CORRESPONDENCE

Department of Climate Change, Energy, the Environment and Water

Our ref: OUT24/498

Mariah Lane

Email: mariah.lane@machenergyaustralia.com.au

19 January 2024

Subject: **Mount Pleasant Optimisation Project SSD-10418-PA-11 Water Management Plan**

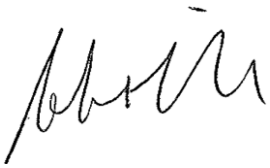
Dear Mariah Lane,

I refer to your request for advice sent on 21 November 2023 to the Department of Planning and Environment (DPE) Water, now the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Water Group about the above matter.

The DCCEEW Water Group provides recommends recommendations relating to water licensing and the trigger action response plan. Further details are provided in **Attachment A.**

Should you have any further queries in relation to this submission please do not hesitate to contact DCCEE Water Assessments at water.assessments@dpie.nsw.gov.au

Yours sincerely,



Robert Brownbill
Manager, Assessments, Knowledge Division
Department of Climate Change, Energy, the Environment and Water

Attachment A

Detailed advice regarding the Mount Pleasant Optimisation Project SSD-10418-PA-11 Water Management Plan

1.0 Water Licensing Requirements

1.1 Recommendation – pre-approval

The proponent should clarify the maximum volume of water take for all water sources and compare with the share components held for all water sources to ensure licensing requirements are fulfilled.

Explanation

The proponent should provide a summary table comparing maximum potential water take, both during operation and post closure stages, against held entitlement be for surface water and groundwater sources. This has not been provided for surface water take - the WMP should be updated to include this.

The Groundwater Management Plan (Appendix 4) includes Table 14 which compares entitlement held with predicted take. The table recorded an expected take during mining of 247 ML/year from the Sydney Basin GWS which is less than the maximum of 303 ML/year in 2034/2035 stated elsewhere in the report. This should be clarified.

1.2 Recommendation – pre-approval

The proponent should provide water access licence references for the held entitlement in the Dart Brook Water Source.

Explanation

Table 14 indicates the proponent holds 20 shares in the Dart Brook Water Source however the other tables which list water access licences do not include WAL references in this source. The tables should be updated to include this WAL number.

1.3 Recommendation – post approval

The proponent should update the Miscellaneous Work Approval (20MW065043) in the Sydney Basin-North Coast Groundwater Source.

Explanation

The Miscellaneous Work (20MW065043) in the Sydney Basin-North Coast Groundwater Source for excavation linked to both WAL 41437 and WAL 40298 will expire on 22/12/2026 (aligned with the approval period for DA92/97). The proponent should provide DCCEEW Water with details demonstrating duration of approval for SSD-10418 so the miscellaneous work details expiry date may be updated.

2.0 Groundwater Impacts

2.1 Recommendation – post approval

The proponent should confirm if trigger action response levels for the alluvial aquifer monitoring bores are set to manage groundwater drawdown risks to water users (bores), or Groundwater Dependent Ecosystems (GDEs), and revise those levels as required.

Explanation

The design criteria for the alluvial bores managing drawdown risks to GDE's appears based upon criteria provided in the NSW Aquifer Interference Policy (AIP, 2012) for assessing impact risks to water works (bores) i.e. "*A maximum of a 2 m decline cumulatively at any water supply work*".

However, the water table drawdown limits to manage risks to GDE's in the AIP requires "*Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any:*

(a) high priority groundwater dependent ecosystem; or

(b) high priority culturally significant site;"

Hence a trigger level which is set at "2 m below the 80th percentile of observed groundwater levels" is too low for the purpose of managing drawdown risks to GDEs.

2.2 Recommendation – post approval

The proponent should review and redesign trigger action response levels so they are not below the depths and screen intervals of the monitoring bores.

Explanation

The design process for determining trigger reaction response levels has resulted in levels below the depth of the monitoring bore MPBH3b, and below the depth of the screen interval of bore MPBH7.

Both trigger levels for these two bores are not considered satisfactory. Reassessment of site-specific trigger levels in the alluvial aquifer monitoring bores is advised to ensure these are meaningful and related purpose of the monitoring bores.

End Attachment A