# BENGALLA MINE

# ANNUAL REVIEW 2022


*Prepared by:*

**BENGALLA MINING COMPANY PTY LIMITED**

LOCKED BAG 5

MUSWELLBROOK NSW 2333


April 2023

## Annual Review Title Block

| | |
|---|---|
| **Name of operation** | Bengalla Mine |
| **Name of operator** | Bengalla Mining Company Pty Limited |
| **Development consent** | SSD-5170 (as modified) |
| **Name of holder of development consent** | Bengalla Mining Company Pty Limited |
| **Mining Leases** | See **Table 6** |
| **Name of holder of mining leases** | Bengalla Mining Company Pty Limited |
| **Water licences** | See **Table 6** |
| **Name of holder of water licences** | Bengalla Mining Company Pty Limited and the Bengalla Joint Venturers (New Hope Bengalla Pty Limited in 8/10 share and Taipower Bengalla Pty Limited in 2/10 share) |
| **MOP start date** | 8 November 2017 (Approval date) |
| **MOP end date** [1] | 2 July 2022 |
| **Annual Review start date** | 1 January 2022 |
| **Annual Review end date** | 31 December 2022 |

**I, Cam Halfpenny, certify that this audit report is a true and accurate record of the compliance status of Bengalla Mining Company Pty Limited for the period 1 January 2022 to 31 December 2022 (as described in Section 1 of this report) and that I am authorised to make this statement on behalf of Bengalla Mining Company Pty Limited.**

***Note:***

*a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

*b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications / information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*

| | |
|---|---|
| **Name of authorised reporting officer** | Cam Halfpenny |
| **Title of authorised reporting officer** | General Manager |
| **Signature of authorised reporting officer** | Cam Halfpenny |
| **Date** | 28-4-2023 |

1. *MOP not required from 2 July 2022 – replaced by requirement for Rehabilitation Management Plan (RMP) under statutory mining lease conditions in Part 2 of Schedule 8 of Mining Regulation 2016 NSW (the Mining Regulation). A new RMP was prepared by 1 August 2022 as required under the Regulation.*

## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF APPENDICES

## ACRONYMS

| | |
|---|---|
| **ACARP** | **Australian Coal Association Research Programme** |
| **ACHMP** | Aboriginal Cultural Heritage Management Plan |
| **AEISG** | Australasian Explosive Industry Safety Group |
| **AGE** | Australasian Groundwater and Environmental Consultants Pty Limited |
| **ANZECC** | Australian and New Zealand Environment Conservation Council |
| **AQMP** | Air Quality Management Plan |
| **ARD** | Acid Rock Drainage |
| **AS/NZS** | Australian/New Zealand Standard |
| **BDMP** | Biodiversity Management Plan |
| **Bengalla** | Bengalla Mine |
| **BJV** | Bengalla Joint Venture |
| **BMC** | Bengalla Mining Company Pty Limited |
| **BMP** | Blast Management Plan |
| **BOMP** | Biodiversity Offset Management Plan |
| **BTOC** | Below Top of Casing |
| **CCC** | Bengalla Community Consultative Committee |
| **CDF** | Community Development Fund |
| **CER** | Clean Energy Regulator |
| **CHPP** | Coal Handling Preparation Plant |
| **CO2-e** | Carbon Dioxide Equivalent |
| **CST** | Community Support Team |
| **CW1** | Clean Water Dam 1 |
| **DCCEEW** | Commonwealth Department of Climate Change, Energy, the Environment and Water |
| **DoEE** | Department of Environment and Energy |
| **DoI - Water** | NSW Department of Primary Industries – Lands and Water |
| **DPE** | NSW Department of Planning and Environment |
| **DW1** | Bengalla Discharge Dam (Existing), also referred to as EPA26 under EPL6538 |
| **EC** | Electrical Conductivity |
| **ED3** | Mt Pleasant Environmental Dam 3 |
| **EIS** | Environmental impact statement titled *Continuation of Bengalla Mine, Environmental Impact Statement* (6 volumes), dated September 2013, as modified by the *Response to Submissions* dated March 2014 |
| **EMS** | Environment Management Strategy |
| **EP&A Act** | Environmental Planning and Assessment Act 1979 |
| **EPA** | NSW Environment Protection Authority |
| **EPBC** | Environment Protection Biodiversity Conservation Approval |
| **EPL 6538** | Environment Protection Licence 6538 |
| **ERT** | Emergency Response Team |
| **FY** | Financial Year (1 July - 30 June) |
| **GDP** | Ground Disturbance Permit |
| **GHG** | Greenhouse Gas |
| **GIS** | Geographical Information System |

| | |
|---|---|
| **GJ** | Gigajoule |
| **Ha** | Hectare |
| **HDWV** | High Density Woody Vegetation |
| **HHMP** | Historic Heritage Management Plan |
| **HRSTS** | Hunter River Salinity Trading Scheme |
| **HVAS** | High Volume Air Sampler |
| **IBC** | Intermediate Bulk Container |
| **IEA** | Independent Environmental Audit |
| **INP** | Industrial Noise Policy (EPA,2000) |
| **IR** | Infrared |
| **LETA** | Low Emissions Technology Australia |
| **LLS** | NSW Local Land Services |
| **MAC** | Mt Arthur Coal |
| **MACH Energy** | MACH Energy Australia Pty Ltd |
| **Mbcm** | Million Bank Cubic Meters |
| **MEG** | Department of Regional NSW, Mining Exploration and Geoscience |
| **Mining Regulation** | *Mining Regulation 2016* (NSW) |
| **ML** | Mining Lease (Followed by Number) |
| **ML** | Mega Litres (Preceded by Number) |
| **MOD4** | SSD-5170 Modification 4 |
| **MOP** | Bengalla Mine Mining Operations Plan 2017 - 2022 |
| **MSC** | Muswellbrook Shire Council |
| **Mt** | Mega Tonnes |
| **Mtpa** | Mega Tonnes per annum |
| **NGER** | National Greenhouse and Energy Reporting |
| **NMP** | Noise Management Plan |
| **NPfI** | Noise Policy for Industry (EPA, 2017) |
| **NPI** | National Pollutant Inventory |
| **NPWS** | National Parks and Wildlife Services |
| **NSW** | New South Wales |
| **OEA** | Overburden Emplacement Area |
| **Orica** | Orica Australia Pty Limited |
| **PIN** | Penalty Infringement Notice |
| **PIRMP** | Pollution Incident Response Management Plan |
| **$PM_{10}$** | Particulate Matter less than 10 micrograms |
| **$PM_{2.5}$** | Particulate Matter less than 2.5 micrograms |
| **POEO Act** | Protection of Environment Operations Act 1997 |
| **PPV** | Peak Particle Velocity |
| **RAP** | Registered Aboriginal Party |
| **Reporting Period** | 1 January 2021 - 31 December 2021 |
| **RFS** | Rural Fire Service |
| **RL** | Relative Level |
| **RMP** | Rehabilitation Management Plan |

| | |
|---|---|
| **RMS** | NSW Roads and Maritime Services |
| **ROM** | Run of Mine |
| **RR** | NSW Resources Regulator |
| **RTEMS** | Real Time Environment Management System |
| **Safeguard Mechanism** | National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 Cth |
| **SDD** | Stage Discharge Dam (Decommissioned) |
| **SEE (MOD1)** | Statement of Environmental Effects titled 'Bengalla Mine Development Consent Modification Statement of Environmental Effects' dated August 2015 and prepared by Hansen Bailey, including the Response to Submissions document dated October 2015 |
| **SEE (MOD2)** | Statement of Environmental Effects titled 'Bengalla Mine Development Consent Modification Statement of Environmental Effects' dated April 2016 and prepared by Hansen Bailey, including the Response to Submissions document dated June 2016 |
| **SEE (MOD3)** | Statement of Environmental Effects titled 'Bengalla Mine Development Consent Modification 3 Statement of Environmental Effects' dated September 2016 and prepared by Hansen Bailey, including the Response to Submissions document dated November 2016 |
| **SEE (MOD4)** | Statement of Environmental Effects titled 'Bengalla Mine Development Consent Modification 4 Statement of Environmental Effects' dated December 2017 and prepared by Hansen Bailey, including the Response to Submissions document dated May 2018 and additional information dated July 2018 and November 2018 |
| **SSD-5170 (as modified)** | State Significant Development 5170 |
| **SWL** | Standing Water Level |
| **t** | Tonnes |
| **TDS** | Total Dissolved Solids |
| **TEOM** | Tapered Element Oscillating Microbalance |
| **TSP** | Total Suspended Particulates |
| **TSS** | Total Suspended Solids |
| **VIMP** | Visual Impact Mitigation Plan |
| **VPA** | Voluntary Planning Agreement |
| **WAL** | Water Access Licence |
| **WMP** | Water Management Plan |

# 1 STATEMENT OF COMPLIANCE

## 1.1 INTRODUCTION

This Annual Review has been prepared to provide a summary of the environmental performance of Bengalla Mine (Bengalla) over the period 1 January 2022 – 31 December 2022 (Reporting Period). The compliance status of Bengalla against relevant approvals for the Reporting Period is summarised in **Table 1**.

Any non-compliances recorded during the Reporting Period were ranked according to the risk matrix included in **Table 2** and a brief description of each is provided in **Table 3**. Further information about the non-compliances is provided in **Section 11**.

The compliance status described in this Annual Review (**Section 1** and **Section 11**) relates to the conditions of the relevant approvals listed in **Table 1** during the Reporting Period.

**Table 1: Statement of Compliance**

| Were all conditions of the relevant approvals complied with? | Yes/No |
|---|---|
| State Significant Development consent (SSD-5170 (as modified)) | No |
| Mining Lease (ML) 1397 | Yes |
| ML 1450 | Yes |
| ML 1469 | Yes |
| ML 1711 | Yes |
| ML 1728 | Yes |
| ML 1729 | Yes |
| ML 1796 | Yes |
| MOP 2017-2022 (Amendment D)*<br>Approved 6 December 2021** | See Note below |
| Rehabilitation Management Plan and Forward Program***<br>Prepared by 1 August 2022 | See Note below |
| Environment Protection Biodiversity Conservation (EPBC) Approval 2012/6378 | No |

** Compliance with an approved MOP was a condition of BMC's mining leases until 2 July 2022.*

*** MOP not required from 2 July 2022 - replaced by requirement for Rehabilitation Management Plan (RMP) under statutory mining lease conditions in Part 2 of Schedule 8 of the Mining Regulation. A new RMP was prepared by 1 August 2022 as required under the Mining Regulation.*

**** Statutory mining lease conditions in Part 2 of Schedule 8 of the Mining Regulation require the mining lease holder to implement the RMP and if the Forward Program specifies implementation timeframes, comply with those timeframes.*

NOTE – During the Reporting Period, BMC transitioned from the MOP to the new RMP and Forward Program in accordance with the new regulatory requirements. The first version of the Forward Program was submitted to the RR on 1 August 2022. The reporting periods for BMC's mining leases were subsequently changed with approval of the RR and the second version of the Forward Program was submitted to the RR on 31 March 2023. Rehabilitation at Bengalla is undertaken in accordance with the current RMP and Forward Program.

**Table 2: Non-Compliance Risk Matrix**

| Risk Level | Risk Level | Description |
|---|---|---|
| **High** | **High** | Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence |
| **Medium** | **Medium** | Non-compliance with:<br>• potential for serious environmental consequences, but is unlikely to occur; or<br>• potential for moderate environmental consequences, but is likely to occur |
| **Low** | **Low** | Non-compliance with:<br>• potential for moderate environmental consequences, but is unlikely to occur; or<br>• potential for low environmental consequences, but is likely to occur |
| **Administrative non-compliance** | **Administrative non-compliance** | Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions). |

Source: *Annual Review Guideline, Post-approval requirements for State significant mining developments. (NSW Government, October 2015)*

**Table 3: Non- Compliances in the Reporting Period**

| Approval | Cond. # | Condition Description (Summary) | Non-compliance Status* | Comment | Section described in this Annual Review |
|---|---|---|---|---|---|
| EPBC Approval 2012/6378 | Condition 4 | The approval holder must secure the lands identified as the Offset Areas at Schedule 2 (Figures 1-6) of this notice as a biodiversity offset, in accordance with NSW Approval condition 28. | Administrative non-compliance | All Biodiversity Offset Areas identified in Schedule 2 (Figures 1-6) of the EPBC Approval are owned by the Bengalla Joint Venturers (BJV) and managed by BMC. All Biodiversity Offset Areas are managed in accordance with the BOMP.<br><br>By letter dated 6 October 2020, the Secretary agreed to an extension of time until 30 June 2022 to finalise the long-term security of the Biodiversity Offset Areas under Schedule 3 Condition 28 of SSD-5170 (Condition 28). At this stage, the DPE has not granted a further extension in which to comply with Condition 28.<br><br>BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing the offsets. Following that correspondence, BMC is taking steps to progress Biodiversity Stewardship Agreements for the offset areas. In the meantime, the offset areas continued to be owned by the BJV an managed by BMC in accordance with the BOMP. | See **Section 11** for further comments |

| Approval | Cond. # | Condition Description (Summary) | Non-compliance Status* | Comment | Section described in this Annual Review |
|---|---|---|---|---|---|
| | | | | BMC notified the non-compliance with Condition 28 to DCCEEW on 7 September 2022. By letter dated 12 October 2022, DCCEEW advised that it had reviewed the matter and "*concluded that the issuing of an infringement notice would not be an appropriate course of action in this case. Consequently, no further action will be taken regarding this matter*". | |
| | Condition 6 | Approval holder must undertake management and monitoring of water resources in accordance with NSW approval conditions 23 to 25 | Non-compliant (Low Risk) | **Condition 23**<br><br><u>Requirement</u><br><br>Schedule 3 Condition 23 of SSD-5170 (Condition 23) requires BMC to comply with section 120 of the *Protection of the Environment Operations Act 1990* NSW (POEO Act) and the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* NSW (unless an EPL or the EPA authorises otherwise).<br><br><u>Discharge 16 August 2022</u><br><br>During the Reporting Period BMC notified DCCEEW, DPE and the NSW Environment Protection Authority (EPA) of a potential non-compliance relating to Condition 23. This involved an elevated Total Suspended Solids (TSS) concentration recorded for a discharge event on 16 August 2022.<br><br>The matter was investigated, and a report provided to DCCEEW, DPE and EPA. The DPE and EPA subsequently issued further correspondence to BMC, to which BMC responded as requested.<br><br>By letter dated 10 March 2023, the EPA advised BMC that it "*has reasonable grounds to believe that* [BMC] *committed an offence under section 64(1) of the* [POEO Act] *by the alleged non-compliance with EPL condition L2.1, by exceeding the concentration limits specified in condition L2.4, which occurred on 16 August 2022 … the EPA has given consideration to this matter and in these circumstances … considers it appropriate to issue* [BMC] *with this Official Caution for the alleged offence*".<br><br><u>Hourly Volume Discharge Limit 6-7 July 2022</u> | See **Section 11** for further comments |

| Approval | Cond. # | Condition Description (Summary) | Non-compliance Status* | Comment | Section described in this Annual Review |
|---|---|---|---|---|---|
| | | | | During the Reporting Period BMC notified EPA of a potential breach of Conditions L1 and E1.3 of EPL 6538 regarding hourly volume discharge limits under the Hunter River Salinity Trading Scheme (HRSTS) on 6-7 July 2022.<br><br>This arose from a revised HRSTS River Register that was issued by Water NSW at 23:41 on 6 July 2022 during a HRSTS discharge being performed at Bengalla. The HRSTS register provided for an unexpected change to the maximum permitted hourly discharge rate under the HRSTS. It resulted in a period of 3-4 hours where the discharge from Bengalla's licensed discharge point exceeded the maximum discharge rate calculated under Condition E1.3 of the EPL.<br><br>The matter was investigated, and an expert report provided to the EPA. The report concluded the exceedance of the allowable discharge limit was negligible and unlikely to have any significant environmental consequence. BMC did not receive a response from the EPA to the report. | |
| | Condition 13 | Non-compliance with conditions of approval must be reported to DCCEEW within 2 business days | Administrative Non-Compliance | On 23 August 2022 (following receipt of water monitoring results on 19 August 2022 with those results not being viewed by BMC staff until 22 August 2022 due to a Mine Infrastructure Area evacuation associated with blasting that occurred nearby on 19 August 2022), BMC notified DCCEEW of a potential non-compliance relating to Schedule 3 Condition 23 of SSD-5170 in respect of a discharge event that occurred on 16 August 2022 (see further comments above).<br><br>On 7 September 2022, BMC notified DCCEEW of a non-compliance relating to Schedule 3 Condition 28 of SSD-5170 which requires provision of appropriate long-term security for the offset areas (see further comments above). This followed correspondence from DPE on 17 August 2022 advising that an extension of time to comply with Condition 28 would not be granted. As described above, BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing | |

| Approval | Cond. # | Condition Description (Summary) | Non-compliance Status* | Comment | Section described in this Annual Review |
|---|---|---|---|---|---|
| | | | | the offsets and Biodiversity Stewardship Agreements are being progressed.<br><br>BMC will separately notify DCCEEW of the non-compliance with Condition 6 of the EPBC Approval which relates to hourly volume discharge limits under the HRSTS (relevant to Schedule 3 Condition 23 of SSD-5170) on 6-7 July 2022, which was identified in preparing this Annual Review. | |
| SSD-5170 | Schedule 3 Condition 23 | Comply with s120 of the *Protection of the Environment Operations Act 1990* NSW and the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* NSW (unless an EPL or the EPA authorises otherwise). | Non-compliance Low Risk | <u>Discharge 16 August 2022</u><br><br>During the Reporting Period BMC notified DCCEEW, DPE and EPA of a potential non-compliance relating to Condition 23. This involved an elevated Total Suspended Solids (TSS) concentration recorded for a discharge event on 16 August 2022.<br><br>The matter was investigated, and a report provided to DCCEEW, DPE and EPA. The DPE and EPA subsequently issued further correspondence to BMC, to which BMC responded as requested.<br><br>By letter dated 10 March 2023, the EPA advised BMC that it "*has reasonable grounds to believe that* [BMC] *committed an offence under section 64(1) of the* [POEO Act] *by the alleged non-compliance with EPL condition L2.1, by exceeding the concentration limits specified in condition L2.4, which occurred on 16 August 2022 … the EPA has given consideration to this matter and in these circumstances … considers it appropriate to issue* [BMC] *with this Official Caution for the alleged offence*".<br><br><u>Hourly Volume Discharge Limit 6-7 July 2022</u><br><br>During the Reporting Period BMC notified EPA of a potential breach of Conditions L1 and E1.3 of EPL 6538 regarding hourly volume discharge limits under the Hunter River Salinity Trading Scheme (HRSTS) on 6-7 July 2022.<br><br>This arose from a revised HRSTS River Register that was issued by Water NSW at 23:41 on 6 July 2022 during a HRSTS discharge being performed at Bengalla. The HRSTS register provided for an unexpected change to the maximum permitted hourly discharge rate under the HRSTS. It resulted | See **Section 11** for further comments |

| Approval | Cond. # | Condition Description (Summary) | Non-compliance Status* | Comment | Section described in this Annual Review |
|---|---|---|---|---|---|
| | | | | in a period of 3-4 hours where the discharge from Bengalla's licensed discharge point exceeded the maximum discharge rate calculated under Condition E1.3 of the EPL.<br>The matter was investigated, and an expert report provided to the EPA. The report concluded the exceedance of the allowable discharge limit was negligible and unlikely to have any significant environmental consequence. BMC did not receive a response from the EPA to the report. | |
| | Schedule 3 Condition 28 | Implementation for long term security for biodiversity offsets | Administrative non-compliance | All Biodiversity Offset Areas identified in Schedule 2 (Figures 1-6) of the EPBC Approval are owned by the Bengalla Joint Venturers (BJV) and managed by BMC. All Biodiversity Offset Areas are managed in accordance with the BOMP.<br>By letter dated 6 October 2020, the Secretary agreed to an extension of time until 30 June 2022 to finalise the long-term security of the Biodiversity Offset Areas under Schedule 3 Condition 28 of SSD-5170 (Condition 28). At this stage, the DPE has not granted a further extension in which to comply with Condition 28.<br>BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing the offsets. Following that correspondence, BMC is taking steps to progress Biodiversity Stewardship Agreements for the offset areas. In the meantime, the offset areas continued to be owned by the BJV and managed by BMC in accordance with the BOMP. | See **Section 11** for further comments |

# 2 INTRODUCTION

*This section provides an overview of Bengalla, outlines the purpose of this Annual Review, and provides contact details for relevant BMC personnel.*

## 2.1 BACKGROUND

Bengalla Mining Company Pty Limited (BMC) operates Bengalla in the Upper Hunter Valley of New South Wales (NSW), approximately 130 km north-west of Newcastle and 4 km west of the township of Muswellbrook, as illustrated in **Figure 1** and **Figure 2**.

On 7 August 1995, the then Minister for Urban Affairs and Planning granted Development Consent DA 211/93 for the construction and operation of a surface coal mine, coal preparation plant, rail loop, loading facilities and other associated infrastructure (which was subsequently modified on various occasions). DA 211/93 was surrendered to the NSW Department of Planning and Environment (DPE) in December 2016 following the grant of SSD-5170.

On 3 March 2015, the Secretary of what is now the DPE, as delegate for the Minister for Planning, granted SSD-5170 for the continuation of Bengalla to 2039 at a rate of up to 15 Mtpa Run of Mine (ROM) coal production. BMC commenced operations under SSD-5170 on 1 October 2015. Since 2015, five modifications to SSD-5170 have been approved (Mod 5 was approved in February 2023, after the end of the Reporting Period).

The approved Bengalla layout is shown on **Figure 3**, mining leases held by BMC are shown on **Figure 4** and an overview of the Bengalla environmental monitoring network is shown on **Figure 5**. The location of the approved Biodiversity Offset Areas in relation to Bengalla is shown on **Figure 9**.

## 2.2 DOCUMENT PURPOSE

This Annual Review summarises the environmental performance of Bengalla for the Reporting Period. Subject to comments below, the requirements of SSD-5170 and mining leases held by BMC relevant to the preparation of this Annual Review and where they have been addressed in the document are included in **Table 4**.

The structure and content of this Annual Review was prepared in accordance with the '*Annual Review Guideline, Post-Approval requirements for State significant mining developments'* (NSW Government, October 2015) (Guidelines).

This Annual Review no longer functions as the Annual Environmental Management Report/Rehabilitation Report (AEMR) under conditions of BMC's mining leases. From 2 July 2022, the requirement for an AEMR was replaced by the requirement for an Annual Rehabilitation Report (ARR) under the statutory mining lease conditions in Part 2 of Schedule 8 of the Mining Regulation. On 31 March 2023, BMC submitted an ARR to the RR covering the period 27 June 2022 to 31 December 2022 as required by the RR. For completeness and consistency with the Guidelines, this Annual Review for the Reporting Period addresses the reporting requirements under mining lease conditions in **Table 4** that applied until 2 July 2022.

On 20 March 2023, the DPIE granted an extension of time in which to submit this Annual Review until 28 April 2023.

**Table 4: Development Consent and Mining Lease Requirements for Annual Review**

| Document | Where Addressed |
|---|---|
| **SSD-5170 (Schedule 5, Condition 4)** | |
| 4. By the end of March each year (or as otherwise agreed by the Secretary), the Applicant must review the environmental performance of the development for the previous calendar year to the satisfaction of the Secretary. This review must: | This document |

| Document | Where Addressed |
|---|---|
| a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; | **Sections 2, 4**, **8** and **12** |
| b) include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against:<br>• relevant statutory requirements, limits or performance measures/criteria;<br>• monitoring results of previous years;<br>• relevant predictions of the EIS; | **Sections 6** to **9** |
| c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; | **Sections 1 and 11** |
| d) identify any trends in the monitoring data over the life of the development; | **Sections 6** to **8** |
| e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and | **Sections 6** to **8** |
| f) describe what measures will be implemented over the next year to improve the environmental performance of the development. | **Section 12** |
| **ML1450 and ML1469 (Condition 3) – until 2 July 2022** | |
| 1. Within 12 months of the commencement of mining operations and thereafter annually or at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) (now referred to as the Annual Review) with the Director-General. | This document |
| 2. The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:<br>a) the accepted Mining Operations Plan;<br>b) development consent requirements and conditions;<br>c) Environmental Protection Authority and Department of Land and Water Conservation licences and approvals;<br>d) any other statutory environmental requirements;<br>e) details of any variations to environmental approvals applicable to the lease area; and<br>f) where relevant, progress towards final rehabilitation objectives. | This document<br><br>**Sections 3**, **4** and **8** |
| 3. After considering an AEMR the Director-General may, by notice in writing, direct the leaseholder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice. | **-** |
| 4. The leaseholder shall, as and when directed by the Minister, cooperate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies. | **-** |
| **ML 1450 (Condition 7) – until 2 July 2022** | |
| a) The lease holder shall each year once operations have commenced, submit for the Minister's approval an "Annual Environmental Management Report" relating to the operations of the leaseholder on the subject area. | This document |
| b) The date by which the Report must be submitted will be determined by the Minister after consulting with the lease holder. | |
| c) The Report shall comprise: | |
| i. a plan showing short, medium and long term mining plans; | **Section 4** |

| Document | | Where Addressed |
|---|---|---|
| ii. | a rehabilitation report (in respect of open cut operations) and/or a surface environmental management report (in respect of underground operations); | **Section 8** |
| iii. | a review of performance in terms of Environment Protection Authority and Department of Water Resources licence and approval conditions (related to the Clean Air Act 1961, the Clean Waters Act 1970, the Noise Control Act 1975, the Environmentally Hazardous Chemical Act 1985, the Pollution Control Act 1970 and the Water Act 1912) applicable to the subject area; | **Sections 6** to **8** |
| iv. | a review of performance in terms of Development Consent conditions for the subject area; | **Sections 1** and **11** and **Sections 6** to **8** |
| v. | a listing of any variations obtained to approvals applicable to the subject area during the previous year. | **Section 3.3** |
| **MLs 1397, 1711, 1728, 1729 and 1796 (Condition 3(f)) – until 2 July 2022** | | |
| The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:<br>i. provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;<br>ii. be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and<br>iii. be prepared in accordance with any relevant annual reporting guidelines published on the Department's website […]<br>*Note: The Rehabilitation Report replaces the Annual Environmental Management Report.* | | **Section 8** |

## 2.3 BMC CONTACTS

The relevant contacts for environmental management at Bengalla are outlined in **Table 5**.

**Table 5: BMC Contacts**

| Contact | Contact Details |
|---|---|
| Cam Halfpenny<br>General Manager | Phone: 02 6542 9500<br>Email: cam.halfpenny@newhopegroup.com.au |
| Craig White<br>Environment Superintendent | Phone: 02 6542 9500<br>Email: craig.white@newhopegroup.com.au |
| BMC Website<br>(Copies of public notices, environmental management documents, monitoring results and other information relating to Bengalla's operations) | https://newhopegroup.com.au |
| Phone | Bengalla General Enquiries 02 6542 9500; or<br>Community Complaints Hotline 1800 178 984. |


**Figure 1: Regional Locality**

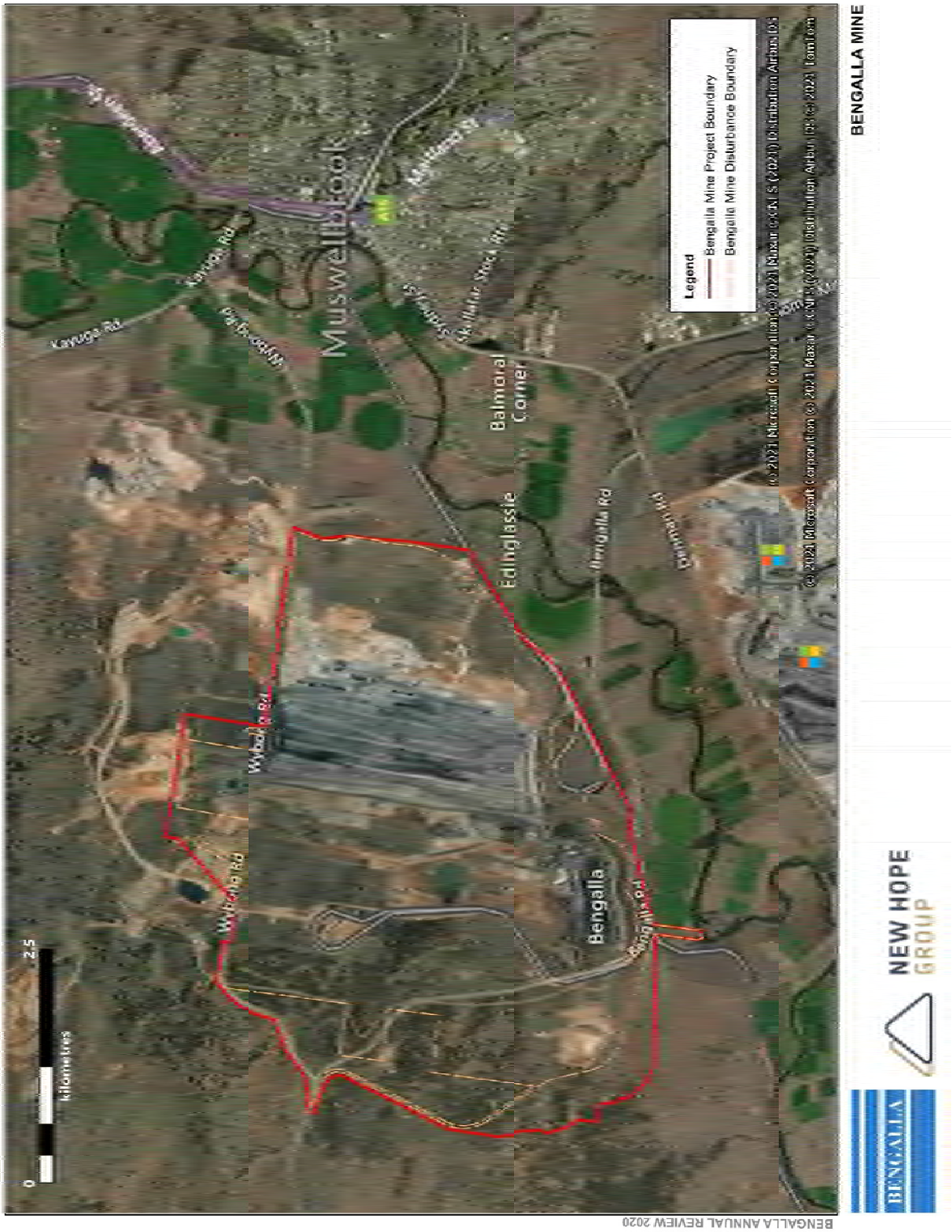



**Figure 2: Muswellbrook Locality**


**Figure 3: Approved Site Layout**

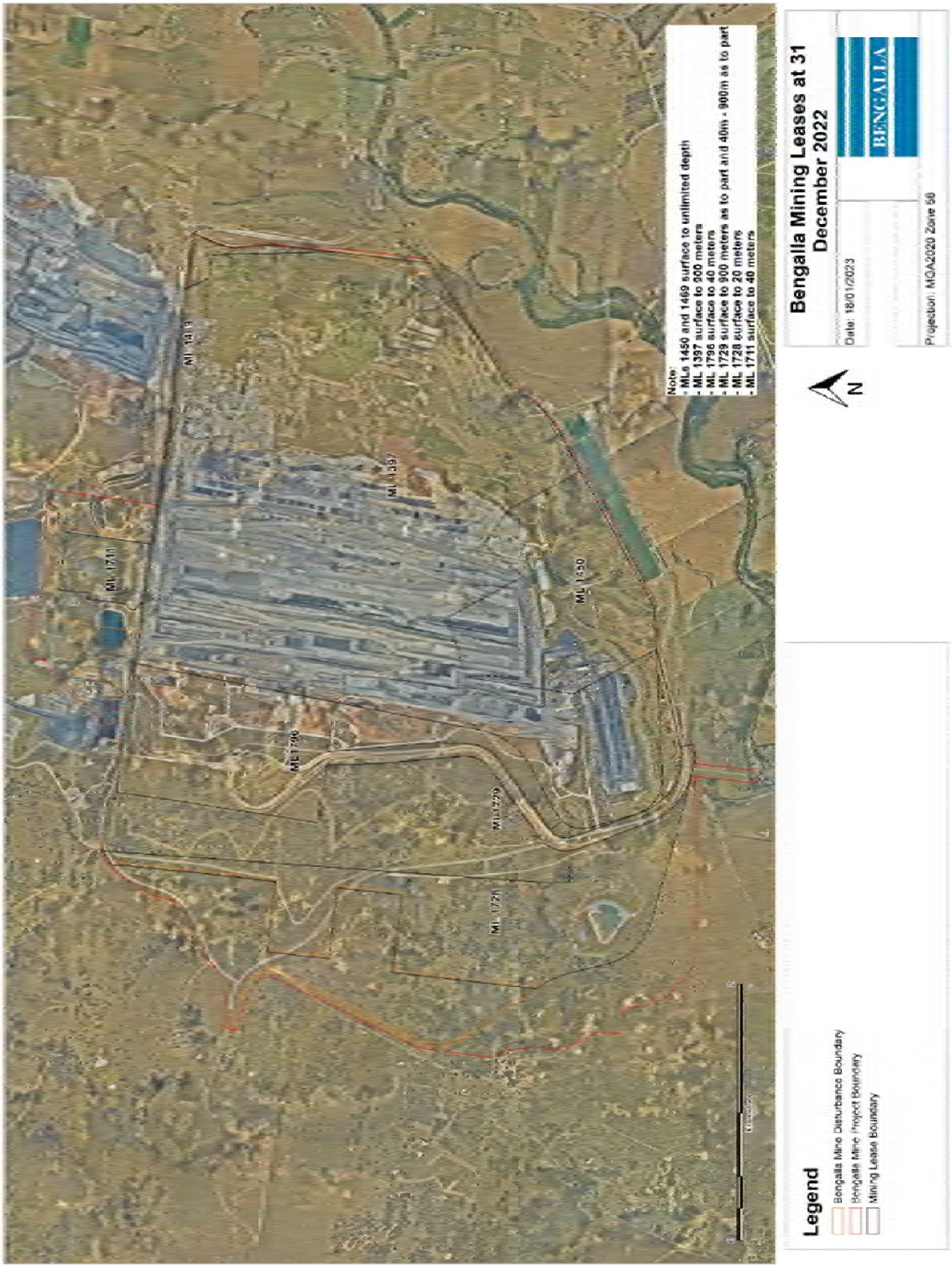



**Figure 4: Mining Leases**

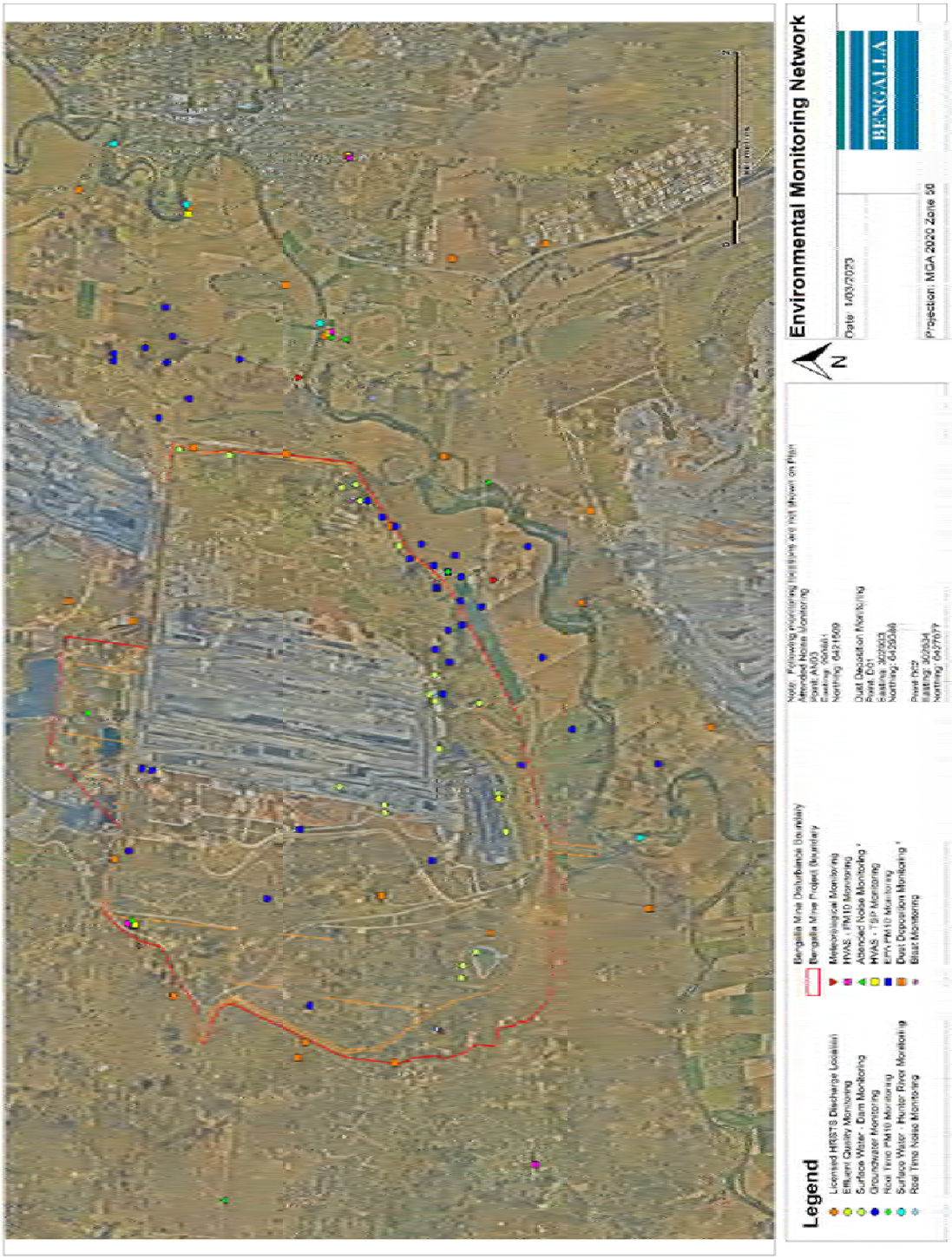



**Figure 5: Environmental Monitoring Network[1]**

[1] ***Figure 5*** *shows HVAS – PM10, HVAS – TSP and Dust Deposition Monitoring locations as shown in AQMP 2017. A new air quality monitoring network is in the process of being installed in accordance with AQMP 2022 (approved on14 December 2022).*

# 3 APPROVALS

*This section provides a summary of leases, licences and approvals that regulate operations at Bengalla.*

## 3.1 OVERVIEW

A summary of the key mining leases, licences and approvals for activities at Bengalla during the Reporting Period is provided in **Table 6**. Copies of the Bengalla approvals and supporting documentation are available on the BMC website: https://newhopegroup.com.au/

**Table 6: Bengalla Approvals Summary**

| Document | Approval Period(s) | Authority |
|---|---|---|
| Development Consent SSD-5170 (as modified) | 03/03/2015 – 28/02/2039* | DPE |
| Development Consent SSD-5170<br>MOD 1 – approved 16 December 2015 | 03/03/2015 – 28/02/2039 | DPE |
| Development Consent SSD-5170<br>MOD 2 – approved 1 July 2016 | 03/03/2015 – 28/02/2039 | DPE |
| Development Consent SSD-5170<br>MOD 3 – approved 23 December 2016 | 03/03/2015 – 28/02/2039 | DPE |
| Development Consent SSD-5170<br>MOD 4 – approved 19 December 2018<br>(Note: MOD 5 application lodged on 28 November 2021 and approved after end of Reporting Period on 24 February 2023) | 03/03/2015 – 28/02/2039 | DPE |
| DA 273/2006 – Explosives Facility | 06/09/2006 – Perpetuity | Muswellbrook Shire Council (MSC) |
| EPBC Act 1999 Cth<br>Approval 2012/6378 | 27/05/2015 – 31/12/2050 | Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) |
| Mining Lease (ML) 1397** | 27/06/1996 – 27/06/2038 | Department of Regional NSW, Mining Exploration and Geoscience (MEG) |
| ML 1450 | 10/06/1999 – 09/06/2020***<br>(renewal application lodged 6 June 2019) | MEG |
| ML 1469 | 05/06/2000 – 04/06/2021***<br>(renewal application lodged 30 May 2020) | MEG |
| ML 1711 | 29/09/2015 – 17/12/2031 | MEG |
| ML 1728 | 10/02/2016 – 10/02/2037 | MEG |
| ML 1729 | 10/02/2016 – 10/02/2037 | MEG |
| ML 1796 | 30/03/2021 – 17/12/2031 | MEG |
| Exploration Licence (EL) 9431 | 04/07/2022 – 04/07/2028 | MEG |

| Document | Approval Period(s) | Authority |
|---|---|---|
| EPL 6538 | Anniversary Date 11 September | NSW Environment Protection Authority (EPA) |
| MOP 2017 – 2021 | 08/11/2017 –11/04/2019 | NSW Resources Regulator (RR) |
| MOP 2017 – 2021 Amendment A | 11/04/2019 – 28/10/2020 | RR |
| MOP 2017 – 2021 Amendment B | 28/10/2020 – 26/07/2021 (MOP Amendment B addendum approved 22/12/2020) | RR |
| MOP 2017 – 2021 Amendment C | 26/07/2021 – 06/12/2021 | RR |
| MOP 2017 – 2022 Amendment D**** | 06/12/2021 – 02/07/2022 | RR |
| Water Access Licence (WAL) 1106***** | Tenure Continuing | Water NSW |
| WAL 41547 (formerly 20BL169798)***** | Tenure Continuing | Water NSW |
| 20PE001354 (Hunter Pump River Permit) | 01/05/1997 – Annual Renewal | Water NSW |
| XSTR100151 (Licence to Store Explosives) | Expiry date: 10/01/2023 | SafeWork NSW |
| XSTR200130 (Licence to Store Explosives) | 10/08/2022 – 07/08/2027 | SafeWork NSW |
| 5061036 (Radiation Management Licence) | Expiry date: 08/08/2023 | EPA |

** Schedule 2, Condition 5 of SSD-5170 provides that mining operations may be carried out until 28 February 2039. The consent continues to apply in all other respects other than the right to conduct mining operations until rehabilitation and other relevant obligations have been carried out satisfactorily.*

*** Application for ancillary mining activities condition to attach to ML 1397 lodged 15 November 2017.*

**** Renewal sought – authority continues to have effect over area to which renewal application relates until finally determined (section 117 of Mining Act).*

***** MOP not required from 2 July 2022 - replaced by requirement for Rehabilitation Management Plan (RMP) under statutory mining lease conditions in Part 2 of Schedule 8 of the Mining Regulation. A new RMP was prepared by 1 August 2022 as required under the Mining Regulation.*

****** WAL 1106 is for the Hunter Regulated River Water Source (High Security with 1,449 units). WAL 41547 is for the Sydney Basin-North Coast Groundwater Source (category aquifer with 365 units) authorising extraction of groundwater from the pit. These are the main WALs used in connection with take of water for mining operations at Bengalla. The Bengalla Joint Venturers (BJV) and BMC also hold other WALs for various water sources.*

## 3.2 PENDING APPLICATIONS AT END OF REPORTING PERIOD

The following applications were made during the Reporting Period and were pending as at 31 December 2022:

(a) application for part transfer of ML 1728 from BMC to MACH Energy Australia Pty Ltd (MACH) and J.C.D. Australia Pty Ltd (JCDA) – lodged with MEG on 4 April 2022;

(b) application for Minister's approval for sublease of ML 1711 from BMC to MACH and JCDA – lodged with MEG on 16 December 2022; and

(c) application to vary the Bengalla Colliery Holding following expiry of subleases of ML 1796 and ML 1729 (see **Section 3.3** below) and to adjust the colliery holding boundary around the proposed ML 1711 sublease area – lodged with MEG on 25 November 2022.

Other applications were made before the Reporting Period and were still pending at the end of the Reporting Period (refer to **Table 6** above). Please also refer to **Table 7** below for comments on the RMP and Forward Program lodged with the RR during the Reporting Period.

### 3.3 VARIATIONS

The following new or varied approvals were issued during the Reporting Period:

(a) EL 9431 granted to BMC by the Minister administering the Mining Act on 4 July 2022; and

(b) subleases of parts of ML 1796 and 1729 from BMC to MACH/JCDA expired on 31 October 2022; and

(c) conditions of all BMC's mining leases varied by the delegate of the Minister administering the Mining Act on 17 October 2022 following commencement of new statutory mining lease conditions under Part 2 of Schedule 8A of the Mining Regulation from 2 July 2022.

### 3.4 STATUS OF MANAGEMENT PLANS

**Table 7** outlines the environmental management plans and the approval status of each at the end of the Reporting Period.

**Table 7: Status of BMC Management Plans**

| Management Strategy / Plan | Regulatory Approval |
|---|---|
| Aboriginal Cultural Heritage Management Plan (ACHMP) | 18 August 2017 |
| Air Quality Management Plan (AQMP) ^ | 14 December 2022 |
| Biodiversity Management Plan (BDMP) | 18 August 2017 |
| Biodiversity Offset Management Plan (BOMP) | 18 August 2017 |
| Blast Management Plan (BMP) | 18 August 2017 |
| Environmental Management Strategy (EMS) | 3 April 2020 |
| Historic Heritage Management Plan (HHMP) | 18 August 2017 |
| MOP 2017-2021 Amendment D* | 6 December 2021 |
| Rehabilitation Management Plan (RMP) | 2 August 2022** |
| Forward Program | Lodged with RR on 1 August 2022*** |
| Noise Management Plan (NMP) | 27 May 2019 |
| Visual Impact Mitigation Plan (VMP) | 14 June 2016 |
| Water Management Plan (WMP) | 1 February 2019 |

** MOP ceased on 2 July 2022.*
*** RMP not subject to approval of the Secretary except for certain elements of it (Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan) which were pending approval at the end of the Reporting Period.*
*BMC proposed in a letter to the RR and DPE dated 10 February 2023 to take the following steps to address the requirements of the Mining Regulation and SSD-5170 regarding preparation and implementation of an RMP:*

*(a) update its RMP having regard for the comments received from the RR so far and the applicable guidelines and then place the updated RMP on the BMC website;*

*(b) further revise the RMP after the RR approves the RO, RCC and FLRP (to incorporate and reflect those approved documents);*

*(c) provide the RMP (incorporating the approved RO, RCC and FLRP) to relevant stakeholders for comment;*

*(d) if necessary, revise the RMP in response to any feedback from stakeholders;*

*(e) submit the RMP to the RR for approval; and*

*(f) if necessary, revise the RMP following determination of MOD 5 (to reflect any updated Consent conditions relating to the RMP).*

*The above approach is subject to the requirements of the Mining Regulation and SSD-5170 (as modified) as they apply at the time that each step would occur.*

**** Forward Program is not subject to approval of the Secretary.*

During the Reporting Period, the plans delineated by ^ were submitted for review by DPE.

# 4 OPERATIONS SUMMARY

*This section provides a summary of exploration, mining and other activities undertaken at Bengalla during the Reporting Period. It also includes a summary of operations proposed for 2023.*

## 4.1 MINING OPERATIONS

During 2022, mining operations at Bengalla continued to progress to the west as approved by SSD-5170.

**Table 8** provides actual waste rock, ROM coal, reject material and saleable product volumes for 2021 and 2022 and forecast volumes for 2023.

**Table 8: Production and Waste Summary**

| Material | Unit | Approved Limit | Previous Reporting Period (2021 Actual) | This Reporting Period (2022 Actual) | Next Reporting Period (2023 Plan) |
|---|---|---|---|---|---|
| Waste Rock / Overburden | Mbcm | - | 50.7 | 48.2 | 56.8 |
| ROM Coal | Mt | 15 | 12.87 | 10.72 | 12.59 |
| Reject Material | Mt | - | 3.36 | 2.79 | 2.83 |
| Saleable Product | Mt | - | 10.26 | 8.30 | 9.91 |

*Notes:*
*1. Forecast data sourced from Forecast Plans.*
*2. Waste Rock/Overburden is prime waste.*
*3. Reject material includes fine and coarse material.*

## 4.2 OTHER OPERATIONS

Mining operations at Bengalla occur 24 hours a day except Christmas Day and Boxing Day. Rail activities operate 24 hours a day dependent upon rail schedules.

Other operations at Bengalla during the Reporting Period included:

- ***Exploration (in ML areas):*** During the calendar year of 2022 in ML 1729 and ML 1796 a total of 35 boreholes were drilled for structure and coal quality analysis.
- ***Coal Transport***: During the Reporting Period, 8,304,920 tonnes (t) of product coal were transported via rail to the Port of Newcastle.

  The total number of train movements during the Reporting Period was 1,055 with a maximum of 7 train movements per day.
- ***Infrastructure, Construction and Management***: The following projects were commenced, progressed or completed during the Reporting Period:
  - Construction of the new reload facility was completed in 2022.
  - The subleases of ML 1729 and ML 1796 from BMC to MACH/JCDA (for the Mount Pleasant rail and associated infrastructure south of Wybong Road) expired during the Reporting Period. The infrastructure was removed by MACH other than items

the parties agreed would remain in situ and the area will be used for BMC's mining operations.

### 4.3 EMPLOYMENT AND OTHER DETAILS

At 31 December 2022, BMC employed 570 permanent employees and 128 contractors on a full-time equivalent basis. Approximately 89 per cent of BMC employees resided in the local government areas of Muswellbrook, Upper Hunter and Singleton.

### 4.4 NEXT REPORTING PERIOD

Forecast mining operations and related activities for the next reporting period include:

- Continue mining westward.
- Relocation and construction of various infrastructure (that is anticipated to include the tyre bay, crib huts, north water fill point, clean water diversion infrastructure and maintenance pad) to facilitate the progression of mining.
- Pre-production drilling.
- Rehabilitation according to the RMP and Forward Program.
- Decommissioning of the old reload facility.
- CHPP upgrades.

A summary of key environmental approval and management activities proposed for 2023 is provided in **Section 12**.

# 5 ACTION REQUIRED FROM PREVIOUS ANNUAL REVIEW

BMC received a request for additional information in connection with the 2021 Annual Review from the DPE dated 25 August 2022. BMC responded to that information request on 30 September 2022. DPE accepted the 2021 Annual Review in a letter to BMC dated 15 November 2022.

The 2021 Annual Review (Table 29) identified various actions for 2022. Information about those actions and current status is provided in **Table 9** below.

**Table 9: Actions Required from 2021 Annual Review**

| Type of Action | Action Required from 2021 Annual Review | Requested By | Action Taken by BMC | Where discussed in Annual Review |
|---|---|---|---|---|
| Air Quality | Implementation of updated Air Quality monitoring network (subject to approval of submitted AQMP) | Operator | AQMP approved 14 December 2022. Updated air quality monitoring network will be implemented throughout 2023 in accordance with AQMP. | **Sections 3.1** and **6.4.3** |
| Regulatory | Development of new Rehabilitation Management Plan and associated documents to comply with rehabilitation reforms to the Mining Act/Regulation (current term of MOP expires 2 July 2022) | Operator/RR | A new Rehabilitation Management Plan and associated documents including a Forward Program were developed by 2 August 2022 as required under Part 2 of Schedule 8A of Mining Regulation. | **Sections 3.1, 3.4** and **8.2** |
| Regulatory | Lodgement of SSD-5170 Modification Application (Mod 6) | Operator | Mod 6 being prepared. BMC focused on finalising Mod 5 during the Reporting Period (approved on 24 February 2023). | **Sections 8.3.2** and **12** |
| Audit | Commission and undertake Independent Environmental Audit | Operator/DPE | BMC submitted auditor details to DPE on 28 September 2022, 14 October 2022, 16 January 2023 and 27 January 2023. The DPE approved the audit team on 31 January | **Section 10** |

| Type of Action | Action Required from 2021 Annual Review | Requested By | Action Taken by BMC | Where discussed in Annual Review |
|---|---|---|---|---|
| | | | 2023. An audit team member has resigned from RPS, so BMC is seeking approval of a new audit team member. | |
| Audit | Review and update Operating and Management Manuals, Emergency Plans and Dam Safety Management System in accordance with Dams Safety audit | Operator | Manuals, Plans and System documents revised. | **Section 10** |
| Management Plans | Undertake reviews of management plans in accordance with SSD-5170 | Operator | BMC will review management plans likely following approval of SSD-5170 Mod 5. | **Sections 3.4** and **12** |
| Tree Screening | Progress Denman Road tree screening (Schedule 3, Condition 40 of SSD-5170) | Operator/DPE | DPE granted an extension to 31 December 2022. Tree screen planting has been undertaken on sections of Wybong Road (September 2019) and Roxburgh Road (March 2019 and July 2020). | **Sections 6.13.2** and **12** |
| Offsets | Progress long-term security of biodiversity offset areas (Schedule 3, Condition 28 of SSD-5170) | Operator/DPE | DPE granted an extension to 30 June 2022. BMC corresponded with relevant NSW government departments during 2022 about this matter. Following that correspondence, BMC is taking steps to progress Biodiversity Stewardship Agreements. In the meantime, offset areas remain owned by BJV and managed by BMC in accordance with the approved BOMP. | **Sections 1.1, 11** and **12** |

| Type of Action | Action Required from 2021 Annual Review | Requested By | Action Taken by BMC | Where discussed in Annual Review |
|---|---|---|---|---|
| Rehabilitation | Undertake new rehabilitation and installation of HDWV into existing rehabilitation according to the MOP (now RMP) | Operator/RR | No new rehabilitation and 25 Ha of HDWV has been installed over existing rehabilitation as of 31 December 2022. | **Section 8** |
| Groundwater Bores | Installation of groundwater bores | Operator | Groundwater bore installation finalised in April 2022. Sampling commenced September 2022 after safety concerns of gas emitting from groundwater bore were allayed. | **Section 7.3** |

# 6 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

*This section describes BMC's environmental monitoring, management and performance during the Reporting Period. Environmental management actions planned to be implemented in 2023 are also described.*

*Surface water and groundwater environmental management and performance are discussed in* ***Section 7.2*** *and* ***Section 7.3****, respectively. Rehabilitation is discussed in* ***Section 8.***

## 6.1 METEOROLOGY

### 6.1.1 Environmental Management

BMC operates a meteorological station and inversion tower in accordance with the requirements of SSD-5170 and EPL 6538 (see **Figure 5**).

Maintenance and calibration activities were completed on the meteorological station on 22/03/2022, 19/05/2022, 14/09/2022 and 29/11/2022.

### 6.1.2 Environmental Performance

Wind speed, wind direction, air temperature, relative humidity, solar radiation, rainfall and evapotranspiration are recorded at the meteorological station. A summary of monthly rainfall, temperatures and wind roses being part of the 2022 meteorological data is included as **Appendix A**.

### 6.1.3 Further Actions

There are no additional actions planned for 2023 regarding meteorological monitoring.

## 6.2 NOISE

### 6.2.1 Environmental Management

BMC manages noise in accordance with the approved NMP, which describes measures for monitoring and managing noise from Bengalla.

Three methods of noise monitoring are utilised at Bengalla being:

- compliance attended noise monitoring;
- supplementary attended monitoring; and
- unattended (real-time) monitoring.

### 6.2.2 Environmental Performance

***Compliance Attended Noise Monitoring***

During the Reporting Period, compliance attended monitoring was undertaken by an appropriately qualified acoustic consultant nominally once per calendar month (but at least two weeks apart) during the night period (10 pm to 7 am) at three locations representative of the nearest private residences being AN01, AN03 and AN04 (see **Figure 6**).

The NMP outlines the applicable criterion for each of the three monitoring locations. Bengalla noise was measured at each monitoring location and assessed against the applicable criterion (see **Appendix B**).

***Supplementary Attended Monitoring***

Supplementary attended monitoring continued to be undertaken during the Reporting Period for night periods. Measurements are recorded by BMC personnel at the same locations as for compliance attended monitoring.

Results from the supplementary attended monitoring are not used to determine compliance.

***Unattended (Real-time) Monitoring***

BMC operates two continuous, unattended real-time noise monitoring units as a management tool. The locations of the two real-time noise monitoring units are shown on **Figure 6**.

The noise levels recorded at the real-time monitors are not used to determine compliance.

***Noise Monitoring Results***

Compliance with noise criteria in SSD-5170 was assessed via the compliance attended noise monitoring program. No exceedances of the noise monitoring criteria were recorded during the Reporting Period. A summary of the compliance criteria and compliance attended noise monitoring results for 2022 is provided in **Appendix B**.

***Trend over Life of Project***

Average noise levels at AN01, AN03 and AN04 during the Reporting Period had generally increased from the previous two years, however, the noise levels remained within the noise compliance criteria (see **Table 10**).

**Table 10: 2020-2022 Noise Trends**

| Location | Noise Criteria dBA | BMC Only LAeq dBA | | |
|---|---|---|---|---|
| | | 2022 | 2021 | 2020 |
| **AN01** | 35 | 30.4[1] | 28.6[4] | 27 |
| **AN03** | 40 | IA[2] | 36.0[5] | 30 |
| **AN04** | 35 | 32.0[3] | 32.7[6] | 34 |

*1 Seven readings within meteorological range averaged.*
*2 Seven readings within meteorological range with seven inaudible.*
*3 Seven readings within metrological range averaged with five readings inaudible.*
*4 Five readings within meteorological range averaged.*
*5 One reading within meteorological range with four readings inaudible.*
*6 Three readings within meteorological range averaged with three readings inaudible.*

***Comparison to Assessment Predictions***

Noise monitoring results recorded during the Reporting Period were generally consistent with the predictions in the Environmental Impact Statement for the Bengalla Continuation of Mining Project (EIS).

***Private Residence Mitigation***

In accordance with Schedule 3, Condition 3 of SSD-5170, BMC is required to implement reasonable and feasible noise mitigation measures upon receiving a written request from the owner of relevant residences listed in SSD-5170. No such noise mitigation requests were received during the Reporting Period.

### 6.2.3 Further Actions

BMC will continue to review the NMP in accordance with SSD-5170. If amendments to the NMP are required, BMC will lodge the revised NMP with relevant regulatory agencies for comment and then with the DPE for approval.

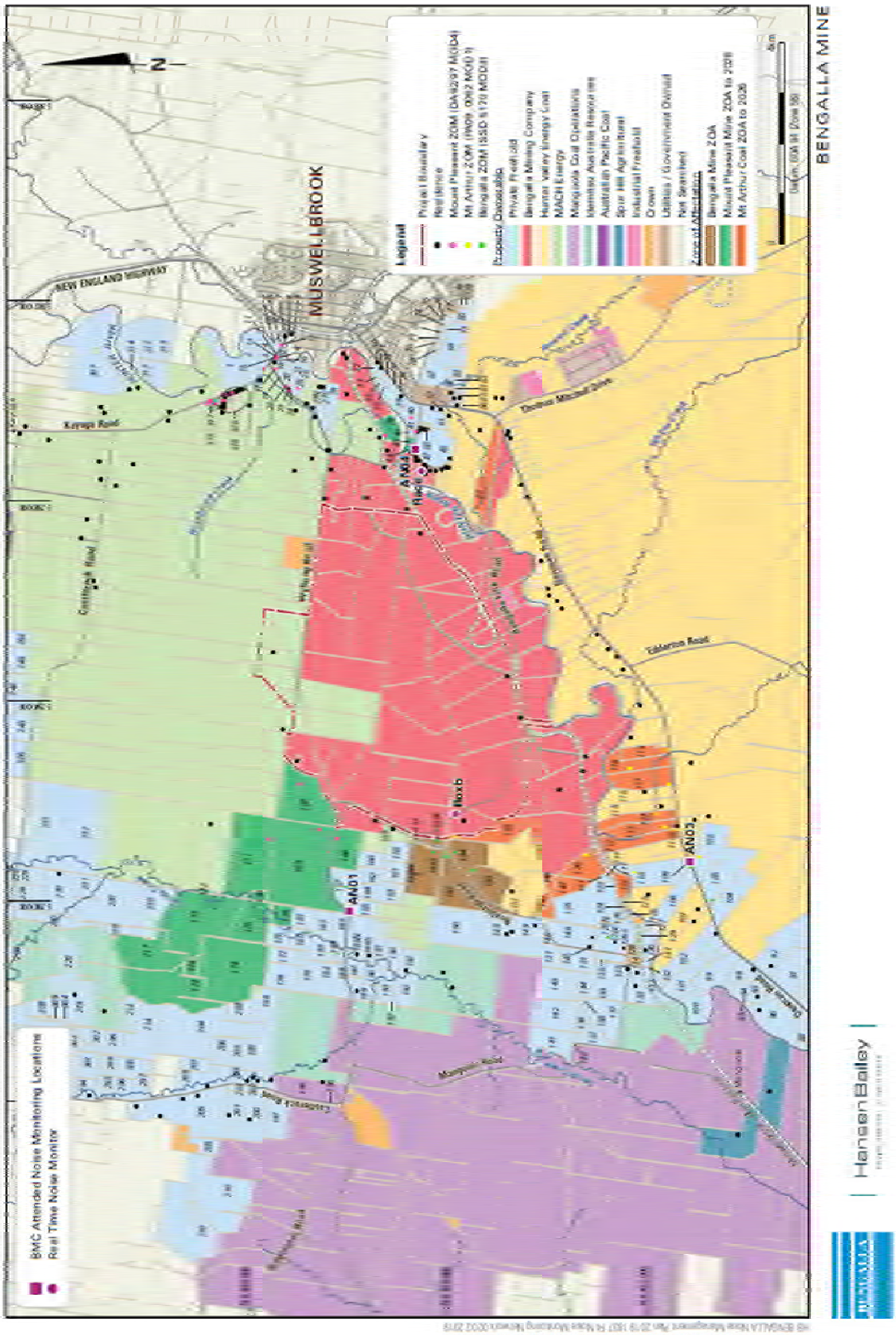



**Figure 6: Noise Monitoring Network**

## 6.3 BLASTING

### 6.3.1 Environmental Management

BMC manages blasting according to the approved BMP, which describes measures for blast monitoring and management at Bengalla. Fume generation is managed in accordance with BMC's Blast Fume Management and Post Blast Assessment.

### 6.3.2 Environmental Performance

***Blast Monitoring Program***

Schedule 3, Condition 10 of SSD-5170 allows a maximum of 2 blasts per day and 6 blasts per week, averaged over a calendar year (except in certain circumstances). A blast refers to a single blast event, which may contain a number of individual blasts.

A total of 165 blast events comprising 172 individual blasts occurred during the Reporting Period with no more than 2 blasts per day and 6 blasts per week when averaged over a calendar year. Blast overpressure and vibration criteria are presented in **Table 11**, with monitoring locations shown on **Figure 7**.

In accordance with the BMP, blast monitoring is undertaken at 11 blast monitors that record the following data for each blast event:

- Time and date;
- Peak vector sum (mm/s);
- Air overpressure peak (dB Linear Peak); and
- Waveform trace, where applicable.

Assessment of compliance with blast criteria for privately owned residences and public infrastructure is undertaken at three blast monitors located on non-mine owned land being MRE, SCH and BLK in EPL 6538 (see **Table 11**)**.**

***Blast Monitoring Results***

A summary of performance against the applicable blasting criteria for the Reporting Period is provided in **Table 12** with monitoring results for locations representative of private receivers included in **Appendix C**. During the Reporting Period, results from the compliance blast monitors in EPL 6538 on non-mine owned land (MRE, SCH and BLK) did not exceed relevant criteria for overpressure or ground vibration.

Eight fume events occurred at Bengalla during the Reporting Period, all categorised as Level 3 events (i.e. no fume events rated over Level 3C against the Australasian Explosive Industry Safety Group (AEISG) fume rating system).

***Trend and Comparison to Assessment Predictions***

**Table 12** details the 2022 blast performance as compared to 2021 and 2020. A review of blast monitoring measurements over the period 2020 – 2022 indicates that results have remained generally consistent throughout that period.

The EIS predicted that blasting at Bengalla is unlikely to exceed relevant ground vibration and overpressure criteria. The blasting results in **Appendix C** show no exceedances of the blast criteria for compliance monitors.

**Table 11: Blast Monitoring Locations and Criteria**

| Location | Blast Monitoring ID | Criteria | |
|---|---|---|---|
| | | Vibration | Overpressure |
| **Private Receivers** | | | |
| Moore | MRE | 10 mm/s and 5% ≥ 5mm/s | 120 dB (linear Peak) and 5% ≥ 115dB (linear Peak) |
| St James School | SCH | | |
| Blake | BLK | | |
| **Mine Owned Historic Heritage Site Monitoring Locations** | | | |
| Edinglassie Homestead | EGL | 10 mm/s | 120 dB (linear Peak) and 5% ≥ 115 dB (linear Peak) |
| Bengalla Homestead | BHS | | |
| **ARTC Infrastructure** | | | |
| Wantana | WAN | 100 mm/s | - |

**Table 12: Blast Performance Summary 2020-2022**

| | 2022 | | 2021 | | 2020 | |
|---|---|---|---|---|---|---|
| **Blast Summary** | **Number of Blasts** | **% of Blasts** | **Number of Blasts** | **% of Blasts** | **Number of Blasts** | **% of Blasts** |
| Total blasts | 172 | | 198 | | 195 | |
| Average number of blasts per week | 3.2 | | 3.8 | | 3.75 | |
| Days with 2 blast events | 25 | 15 | 21 | 10.6 | 4 | 2 |
| Days with 3 blast events | 0 | 0 | Not reported | | | |
| Number of road closures – Wybong Road | 40 | 23 | 37 | 18.7 | 30 | 15 |
| Number of road closures – Bengalla Road | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of rail loop closures | 0 | 0 | 1 | 0.5 | 7 | 3 |
| Number of blast events within Stage Discharge Dam (SDD) Notification Area (1) | 0 | 0 | 0 | 0 | 49 | 25 |
| Number of blast events within Clean Water Dam 1 (CW1) Notification Area | 60 | 35 | 55 | 27.8 | 66 | 34 |
| Number of blast events within Mt Pleasant Environmental Dam 3 (ED3) Notification Area (2) | 60 | 35 | 55 | 27.8 | 55 | 35 |
| Exceedances of applicable vibration and overpressure criteria | | | | | | |
| • Private Receivers Monitoring Locations Vibration (10 mm/sec) | 0 | 0 | 0 | 0 | 0 | 0 |
| • Private Receivers Monitoring Locations Vibration (5 % ≥5mm/sec)) (3) | 0 | 0 | 1 | 0.5 | 1 | <0.01 |
| • Private Receivers Monitoring Locations Overpressure (120dB) | 0 | 0 | 0 | 0 | 0 | 0 |
| • Private Receivers Monitoring Locations Overpressure (5% ≥115dB) (3) | 5 | 3 | 4 | 2 | 3 | 2 |
| • Historic Heritage Site Monitoring Locations Vibration (10 mm/sec) | 0 | 0 | 0 | 0 | 0 | 0 |
| • Historic Heritage Site Monitoring Locations Vibration (5% ≥5 mm/sec)) | 0 | 0 | 0 | 0 | 0 | 0 |
| • Historic Heritage Site Monitoring Locations | 0 | 0 | 0 | 0 | 0 | 0 |

| Blast Summary | 2022 | | 2021 | | 2020 | |
|---|---|---|---|---|---|---|
| | **Number of Blasts** | **% of Blasts** | **Number of Blasts** | **% of Blasts** | **Number of Blasts** | **% of Blasts** |
| Overpressure (120 dB) | | | | | | |
| • Historic Heritage Site Monitoring Locations Overpressure (5% ≥115dB) (3) | 1 | 1 | 1 | 0.5 | 2 | 0.1 |
| • ARTC Infrastructure (100 mm/sec) | 0 | 0 | 0 | 0 | 0 | 0 |
| Blast result capture rate, all non-mine owned monitors | 172 | 100 | 198 | 100 | 195 | 100 |
| Fume events (≥ Rating 3) | 8 | 5 | 5 | 2.5 | 2 | 0.01 |

*(1) SDD was decommissioned in June 2020.*

*(2) Monitoring of ED3 commenced on 11 March 2020.*

*(3) The blasting criteria in Schedule 3, Condition 8 of SSD-5170 are 0% allowable exceedance for 120 dB (Lin Peak) overpressure and 10 mm/s ground vibration and 5% allowable exceedance (of the total number of blasts over a period of 12 months) for 115 dB (Lin Peak) overpressure and 5 mm/s ground vibration at any residence on privately owned land.*

### *Property Investigation Report*

Schedule 3, Condition 12 of SSD-5170 requires a property investigation to be commissioned within 2 months of receiving a claim by the owner of privately-owned land that buildings and/or structures on the land have been damaged as a result of blasting on site.

BMC did not receive a written request for a property investigation from any property owners during 2022.

### 6.3.3 Further Actions

Any additional blasting actions planned for implementation in 2023 will be in accordance with the BMP and interactions with other mines.

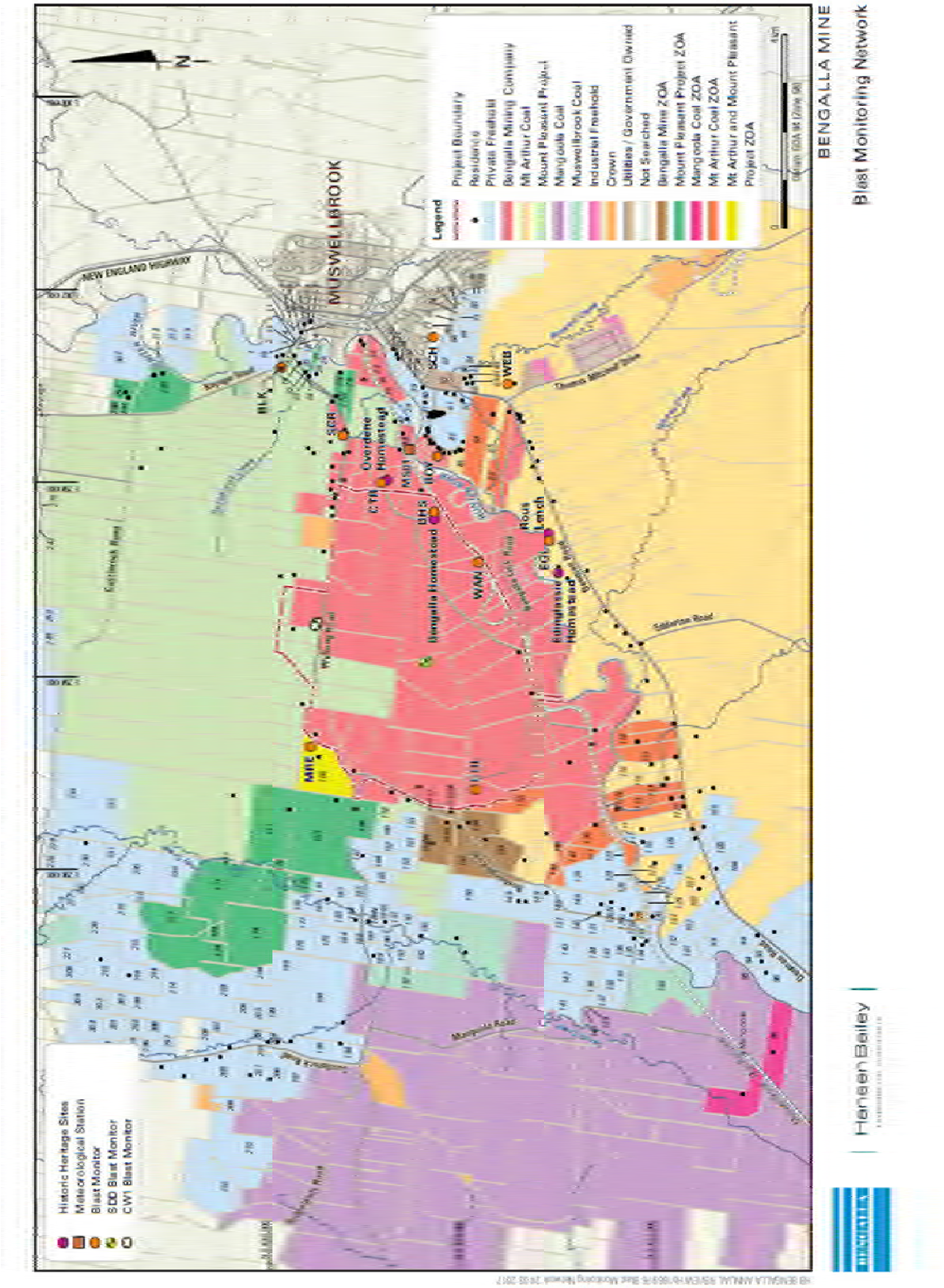



**Figure 7: Blast Monitoring Network**

## 6.4 AIR QUALITY

### 6.4.1 Environmental Management

BMC manages air quality according to the approved AQMP, which sets out procedures for the management of odour, dust and greenhouse gas emissions at Bengalla.

### 6.4.2 Environmental Performance

***Air Quality Monitoring Program***

SSD-5170 sets out air quality criteria for Particulate Matter less than 10 microns ($PM_{10}$), Particulate Matter less than 2.5 microns ($PM_{2.5}$), Total Suspended Particulates (TSP) and deposited dust. Compliance with these criteria is assessed via BMC's air quality monitoring network approved under the AQMP. As described further below, EPL 6538 also requires air quality monitoring for $PM_{10}$ at certain locations.

The Secretary of DPE approved a new AQMP near the end of the Reporting Period (on 14 December 2022). Upon approval of the new AQMP, redundant monitors in the existing air quality monitoring network were decommissioned or changed status from compliance monitors to real-time monitors (i.e. used as a management tool) in accordance with section 6.2.2 of the AQMP. The remaining monitors will continue to operate until the new air quality network has been installed and is operational. The description of air quality management during the Reporting Period in **Section 6.4** of this Annual Review relates to the air quality network as it was before 14 December 2022.

During the Reporting Period, Bengalla's air quality monitoring network is shown in **Figure 8** and comprises:

- One meteorological station and an inversion tower.
- Six real-time air quality monitors (four E-Bam monitors and two DustTrak monitors), linked to the Real Time Environment Management System (RTEMS). These monitors are used as a management tool.
- Nine High Volume Air Samplers (HVAS) with five measuring TSP and four measuring $PM_{10}$. One HVAS (PM3) is located on land owned by Hunter Valley Energy Coal Pty Limited, the operator of Mt Arthur Coal (MAC). The HVAS monitors are used to measure compliance against the relevant criteria in SSD-5170 (as modified). Measurements are sampled every six days for a continuous 24-hour period.
- 27 Deposition Dust Gauges of which 14 are used to measure compliance against the relevant criteria in SSD-5170.

$PM_{2.5}$ is monitored through the Upper Hunter Air Quality Monitoring Network – Muswellbrook monitor.

BMC is also required to monitor $PM_{10}$ at EPA22 and EPA24 in accordance with EPL 6538. Monitoring points EPA22 and EPA24 remain in place and are located near the primary wind axis relative to Bengalla. The EPA allowed for removal of monitoring point EPA23 from EPL

6538 by email to BMC dated 1 November 2021 (the formal licence variation was subsequently issued on 28 February 2023).

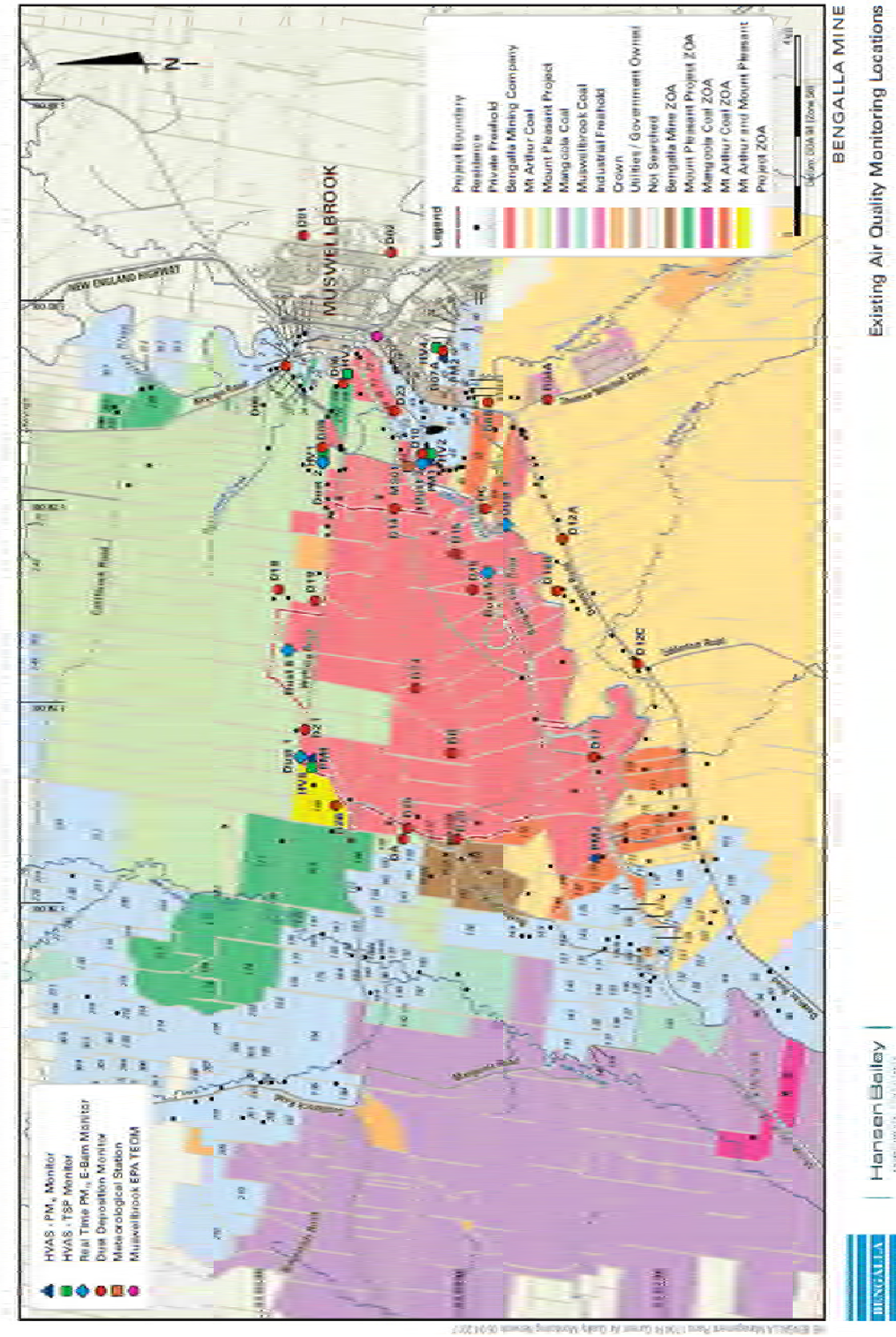



**Figure 8: Air Quality Monitoring Locations**
**Figure source: AQMP (2017)**

### *Air Quality Monitoring Results*

There were no exceedances of the annual average air quality criteria for TSP, $PM_{10}$, $PM_{2.5}$ or deposited dust under Schedule 3, Condition 16 of SSD-5170 for calendar year 2022.

Elevated $PM_{10}$ 24 hour all source measurements were recorded at PM-4 on various dates during the Reporting Period. DPE was notified on each occasion and an air quality expert was engaged to prepare an investigation report. In all cases, the expert concluded that BMC had complied with Schedule 3, Condition 16. Further details about the $PM_{10}$ 24 hour investigation reports are provided in **Section 11.2**.

Detailed air quality monitoring results for 2022 are included in **Appendix D**.

- Deposited Dust

**Table 13** details annual average deposited dust monitoring results for the Reporting Period (and for the previous two years). All compliance dust gauges recorded results for 2022 that are compliant with the applicable criteria for annual average total deposited dust (4g/m$^2$/month) and the maximum annual increase in deposited dust levels (2g/m$^2$/month).

**Table 13: Summary of Deposited Dust Annual Average Monitoring Results**

| Site | Annual Average Deposited Dust Criteria (g/m²/month) | 2022 Annual Average Deposited Dust (g/m²/month) | 2021 Annual Average Deposited Dust (g/m²/month) | 2020 Annual Average Deposited Dust (g/m²/month) |
|---|---|---|---|---|
| **D01** | 4.0 | 1.0 | 0.9 | 1.2 |
| **D02** | 4.0 | 1.1 | 1.2 | 2.4 |
| **D04A** | 4.0 | 1.5 | 2.1 | 3.0 |
| **D05** | 4.0 | 1.9 | 2.1 | 2.5 |
| **D06** | 4.0 | 1.4 | 2.8 | 2.7 |
| **D07A** | 4.0 | 1.2 | 1.3 | 2.6 |
| **D08** | 4.0 | 1.4 | 1.5 | 1.8 |
| **D09** | 4.0 | 2.4 | 2.9 | 3.0 |
| **D10** | 4.0 | 1.6 | 2.8 | 3.5 |
| **D20** | 4.0 | 3.5 | 3.0 | 4.5(1) |
| **D23B** | 4.0 | 1.6 | 1.5 | 2.0 |
| **D25** | 4.0 | 2.1 | 2.2 | 3.2 |
| **D26** | 4.0 | 1.5 | 1.4 | 3.2 |
| **DA** | 4.0 | 2.6 | 1.8 | 3.7 |

*(1) As notified to DPE by BMC on 14/1/2021 after receipt of air quality monitoring results for the 2020 calendar year. NOTE – All dust deposition gauges in **Table 13** other than D06, D10 and D26 were decommissioned at 14/12/2022. D06, D10 and D26 will be used as compliance monitors for deposited dust until the new air quality network is fully commissioned and operational in accordance with the new AQMP. Results for 2022 are calendar year.*

- TSP

**Table 14** details annual average TSP monitoring results for the Reporting Period (and for the previous two years). All TSP compliance monitors recorded results for 2022 that are compliant with the applicable criterion for annual average TSP (90 µg/m$^3$). This criterion excludes

extraordinary events, however the occurrence of extraordinary events was not examined for the Reporting Period as the monitoring results were already below 90 µg/m³.

**Table 14: Summary of Annual Average TSP Monitoring Results**

| Site | Annual Average TSP Criteria (µg/m³) | Period | 2022 Annual Average TSP (µg/m³) | 2021 Annual Average TSP (µg/m³) | 2020 Annual Average TSP (µg/m³) |
|---|---|---|---|---|---|
| HV1(2) | 90 | All run days | 50.4(3) | 64.1 | 74.0 |
| | | Excluding extraordinary events | - | - | 69.1 |
| HV2 | 90 | All run days | 48.2 | 55.3 | 70.2 |
| | | Excluding extraordinary events | - | - | 62.6 |
| HV3 | 90 | All run days | 34.5 | 41.7 | 50.9 |
| | | Excluding extraordinary events | - | - | 45.1 |
| HV4(2) | 90 | All run days | 37.8(3) | 44.7 | 58.8 |
| | | Excluding extraordinary events | - | - | 53.2 |
| HV6(2) | 90 | All run days | 80.4(3) | 76.0 | 96.5(1) |
| | | Excluding extraordinary events | - | - | 87.7 |

*(1) As notified to DPE by BMC on 14/1/2021 after receipt of air quality monitoring results for the 2020 calendar year. As noted in the expert's report, an invalid reading on 3 January 2020 was excluded and the measured annual average data for HV6 was 91.7 ug/m3.*

*(2) At 14/12/2022, HV1 and HV4 were decommissioned. HV6 changed status from compliance monitor to real-time monitor.*

*(3) Annual Average TSP readings at 12/12/2022.*

- $PM_{10}$

**Table 15** presents $PM_{10}$ annual average monitoring results for the Reporting Period and the previous two years. The cumulative annual average $PM_{10}$ concentration for the Reporting Period was below the annual average criterion (25 µg/m³) at all compliance monitoring sites.

The annual average criteria for $PM_{10}$ excludes extraordinary events, however the occurrence of extraordinary events was not examined for the Reporting Period as the monitoring results were already below 25 µg/m³.

**Table 15: Summary of Annual Average $PM_{10}$ Monitoring Results**

| Site | Annual Average PM10 Criteria (µg/m³) | Period | 2022 Annual Average $PM_{10}$ (µg/m³) | 2021 Annual Average $PM_{10}$ (µg/m³) | 2020 Annual Average $PM_{10}$ (µg/m³) |
|---|---|---|---|---|---|
| PM-1 | | All Run days | 16.5 | 20.1 | 25.7 |

| Site | Annual Average PM10 Criteria (µg/m³) | Period | 2022 Annual Average $PM_{10}$ (µg/m³) | 2021 Annual Average $PM_{10}$ (µg/m³) | 2020 Annual Average $PM_{10}$ (µg/m³) |
|---|---|---|---|---|---|
| | 25 | Excluding extraordinary events | - | - | 21.9 |
| PM-2(2) | 25 | All Run days | 15.6(3) | 17.0 | 22.7 |
| | | Excluding extraordinary events | - | - | 20.0 |
| PM-3 | 25 | All Run days | 16.0 | 15.6 | 26.5 |
| | | Excluding extraordinary events | - | - | 23.8 |
| PM-4(2) | 25 | All Run days | 22.6(3) | 24.1 | 32.0(1) |
| | | Excluding extraordinary events | - | - | 27.3 |

*(1) As notified to DPE by BMC on 14/1/2021 after receipt of air quality monitoring results for the 2020 calendar year. As noted in the expert's report, an invalid reading on 3 January 2020 was excluded and the measured annual average data for monitor PM10-4 was 29.3 ug/m3.*
*(2) At 14/12/2022, PM10-2 decommissioned. PM10-4 changed status from compliance monitor to real-time monitor.*
*(3) Annual Average $PM_{10}$ readings at 12/12/2022.*

- $PM_{2.5}$

As detailed in the approved AQMP (2017), during the Reporting Period BMC relied upon the Upper Hunter Air Quality Monitoring Network to record and monitor $PM_{2.5}$ concentrations. The monitor utilised by BMC is the Muswellbrook monitor located approximately 5 km east of Bengalla. The cumulative annual average $PM_{2.5}$ concentration for the Reporting Period at the Muswellbrook monitor was 6.2 µg/m³, below the criterion of 8 µg/m³.

The annual average criteria for $PM_{2.5}$ excludes extraordinary events, however the occurrence of extraordinary events was not examined for the Reporting Period as the monitoring results were already below 8 µg/m³.

The trend for $PM_{2.5}$ is decreasing over 2021 and the Reporting Period.

***Trend and Comparison to Assessment Predictions***

**Table 13, Table 14** and **Table 15** present the annual average air quality monitoring results for deposited dust, TSP and $PM_{10}$ respectively against the criteria over the 2020 – 2022 period. The cumulative measurements have generally decreased over the three-year period. The decrease may be attributed to increased rainfall in 2020, 2021 and 2022 compared to drought conditions which were experienced previously.

***Private Residence Mitigation***

In accordance with Schedule 3, Condition 3 of SSD-5170, BMC is required to implement reasonable and feasible air quality mitigation measures upon receiving a written request from the owner of relevant residences listed in SSD-5170.

BMC did not receive a written mitigation request for implementation of air quality control measures during 2022.

***Independent Review***

Schedule 4, Condition 4 of SSD-5170 provides for an independent review of impacts from the development on privately-owned land to be carried out where requested by a landowner and agreed to by the Secretary of DPE.

There were no requests made for an independent review of impacts from Bengalla (for air quality or otherwise) during 2022.

### 6.4.3 Further Actions

The new AQMP was approved by the Secretary of DPE on 14 December 2022. As described above, some monitors in the existing air quality monitoring network were decommissioned or changed status on approval of the new AQMP. BMC will continue the implementation of the new air quality monitoring network during 2023 and until it is fully commissioned and operational will operate under the interim monitoring network described in the new AQMP.

## 6.5 SPONTANEOUS COMBUSTION

Occurrences of spontaneous combustion are relatively infrequent at Bengalla.

### 6.5.1 Environmental Management

If spontaneous combustion occurs in the pit, the affected area is capped with inert material where reasonable and feasible to minimise smoke or odour generation. If spontaneous combustion occurs on the Coal Handling Preparation Plant coal stockpiles sprays can be activated and the affected material can be removed and capped where reasonable and feasible.

### 6.5.2 Environmental Performance

No spontaneous combustion incidents were recorded at Bengalla during the Reporting Period.

### 6.5.3 Further Actions

There are no additional actions planned for 2023 regarding the management of spontaneous combustion.

## 6.6 GREENHOUSE GAS

### 6.6.1 Environmental Management

SSD-5170 requires BMC to implement reasonable and feasible measures to minimise the release of greenhouse gas (GHG) emissions from Bengalla.

BMC contributes to research and development initiatives that investigate GHG minimisation (see **Table 16**).

**Table 16: Greenhouse Gas Emission Reduction Research and Development Initiatives**

| Program | Outcomes |
|---|---|
| Low Emissions Technology Australia (LETA) | Certain Australian black coal producers contribute a voluntary levy on a quarterly basis to the LETA Fund to support the development of low emission coal technology in Australia. |
| Australian Coal Association Research Programme (ACARP) | Certain Australian black coal producers contribute five cents per tonne of product coal to fund research and the development of technologies that lead to the safe, sustainable production and utilisation of coal. |

### 6.6.2 Environmental Performance

At the end of each Financial Year (FY) BMC reports on the emissions of certain substances to the National Pollutant Inventory (NPI). GHG emissions, energy consumption and production data are also reported under the National Greenhouse and Energy Reporting (NGER) Scheme requirements. The *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* Cth (Safeguard Mechanism) also applies to emissions at Bengalla.

***National Pollutant Inventory***

For the 2021 – 2022 FY reporting period BMC reported on 27 of the 31 reportable substances.

***National Greenhouse and Energy Reporting***

During the 2021 – 2022 FY reporting period Bengalla reported total emissions of 787,295 t Carbon Dioxide Equivalent ($CO_{2}$-e) (Scope 1 and Scope 2).

The results for FYs 2020 – 2022 are presented in **Table 17** and **Table 18**.

**Table 17: Energy Consumed and Produced FY 2020 to 2022**

| Energy | FY 2021-2022 | FY 2020-2021 | FY 2019-2020 |
|---|---|---|---|
| Consumed Gigajoule (GJ) | 2,636,980 | 2,808,053 | 2,819,739 |
| Produced (GJ) | 259,316,316 | 260,612,775 | 279,633,222 |

**Table 18: GHG Emissions FY 2020 to 2022**

| Greenhouse Gas Emissions | FY 2021-2022 | FY 2020-2021 | FY 2019-2020 |
|---|---|---|---|
| Scope 1 (t $CO_2$-e) | 725,774 | 449,399 | 538,857 |
| Scope 2 (t $CO_2$-e) | 61,521 | 53,694 | 61,929 |
| **Total (t $CO_2$-e)** | **787,295** | **503,093** | **600,786** |

### *GHG Emissions for Calendar Years 2022-2022 and Comparison to Predictions*

Annual GHG emissions (Scope 1 and Scope 2) for calendar years 2020, 2021 and 2022 (the latter being the Reporting Period) are presented in **Table 19,** with a comparison against the predictions in the *Air Quality and Greenhouse Gas Impact Assessment Continuation of Bengalla Mine* (AQIA) being Appendix G to the EIS. The method used to calculate Scope 1 and Scope 2 emissions is the method that was used in the EIS.

Overall, the annual Scope 1 and Scope 2 GHG emissions estimated for the 2020, 2021 and 2022 calendar years are lower than the AQIA predictions for Years 4 to 13 primarily due to reduced materials movement compared to the EIS.

**Table 19: Summary of Scope 1 and Scope 2 GHG Emissions (CO2-e t/yr)**

| Year | Fugitive Emissions | Diesel Fuel | Electricity | Explosives | Total |
|---|---|---|---|---|---|
| | Scope 1 | Scope 1 | Scope 2 | Scope 1 | Scope 1 + 2 |
| AQIA Years 4 to 13 | 486,000 | 212,291 | 82,885 | 4,317 | 785,493 |
| 2020 | 390,657 | 172,620 | 59,916 | 6,204 | 629,396 |
| 2021 | 416,909 | 163,903 | 69,515 | 5,375 | 655,703 |
| 2022 | 347,409 | 161,082 | 64,662 | 5,201 | 578,354 |

NOTES

1. *AQIA Years 4 to 13 means for each of Years 4 to 13 of the Project (Bengalla).*
2. *As required, Table 19 calculates actual greenhouse gas emissions using the same methodology for calculating estimated emissions in the AQIA. This methodology is different to that required for reporting under the NGER Scheme and Safeguard Mechanism.*

### *Reasonable and feasible steps undertaken during the Reporting Period to improve energy efficiency and reduce greenhouse gas emissions generated by the mine*

BMC has continued to undertake activities to reduce greenhouse gas emissions from Bengalla being:

- Use of fuel efficient machinery, electric motors and energy efficient lighting systems.

- Efficient fuel use by optimising mine design, for example, haul road distances and optimisation of resource extraction.
- Commissioning of a study to:
  - identify high level emission reduction opportunities, leveraging existing work, and prioritise them based on emission reduction potential; and
  - develop a high level implementation road map with net present value positive components.

### 6.6.3 Further Actions

BMC will review its emissions against its Production Adjusted Baseline under the Safeguard Mechanism and determine next steps as required.

## 6.7 NON-MINERAL WASTE

### 6.7.1 Environmental Management

Non-mineral waste generated at Bengalla during 2022 was 1,916 t. A total of 1,474 t was recycled, representing 77% of the total waste. These figures remained generally consistent with 2020 and 2021. **Table 20** details non-mineral waste tonnes for the period 2020 to 2022.

**Table 20: Non-mineral Waste Management**

| | 2022 | 2021 | 2020 |
|---|---|---|---|
| Total (t) | 1,916 | 1,827 | 1,834 |
| Recycled (t) | 1,474 | 1,422 | 1,408 |

### 6.7.2 Environmental Performance

A total of 1,916 t of non-mineral waste was disposed of in 2022 being predominantly general waste, oily rags and hydraulic hoses.

The major waste streams recycled at Bengalla in 2022 were 541 t waste oil, 20 t grease, 20 t batteries, 28 t oil filters, 20 t coolant, 743 t scrap metal and 62 t timber.

Several waste streams are re-used where practicable such as intermediate bulk containers. Some filters and batteries are also recycled where possible, however are not returned to Bengalla.

***Comparison to Assessment Predictions and Trends***

The EIS Volume 1 Table 84 contains predictions for waste streams. Relative to the two major waste streams:

- the waste oil volume of 541t is slightly above the EIS prediction of 526t; and
- the scrap metal volume of 743t is well below the EIS prediction of 1902t.

### 6.7.3 Further Actions

There are no additional actions planned for 2023 regarding the management of non-mineral waste. Normal waste management practice will continue.

## 6.8 MINERAL WASTE

### 6.8.1 Environmental Management

Management of mineral waste at Bengalla in 2022 was undertaken in accordance with the BMC Acid Rock Drainage (ARD) and Mineral Waste Management Plan.

### 6.8.2 Environmental Performance

In accordance with the BMC ARD and Mineral Waste Management Plan, BMC maintains a mineral waste inventory of the volumes of inert and potentially acid forming waste disposed of on site and the disposal locations.

The volumes of total mineral waste generated and stored at Bengalla in 2022 (and the previous calendar year) are summarised in **Table 8**.

***Comparisons to Assessment Predictions and Trends***

The trends for waste rock are influenced by operational decisions. It is anticipated that increased volumes will occur for 2023 relative to 2022.

The EIS predicted at Year 8 overburden removal of 55 Million Bank Cubic Meters[1].

The waste rock/overburden volume referenced in **Table 8** for 2022 is below the EIS prediction.

### 6.8.3 Further Actions

There are no additional actions other than normal practices planned for 2023 regarding the management of mineral waste.

[1] *Bengalla EIS Volume 1, Table 10.*

## 6.9 ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE

### 6.9.1 Environmental Management

The management of Aboriginal archaeology and cultural heritage at Bengalla is undertaken in accordance with the approved Aboriginal Cultural Heritage Management Plan (ACHMP).

### 6.9.2 Environmental Performance

All relevant Aboriginal heritage artefacts within the Bengalla Disturbance Boundary were salvaged in 2016.

Activities involving ground disturbance in 2022 were subject to desktop assessment for potential impacts to Aboriginal archaeology as part of Bengalla's Ground Disturbance Permit (GDP) process.

During the Reporting Period, no additional Aboriginal artefacts were discovered.

### 6.9.3 Further Actions

Should any amendments to the ACHMP be required, BMC will lodge the revised plan with the relevant regulatory agencies and stakeholders for comment and then for approval by DPE.

## 6.10 NON-ABORIGINAL HERITAGE

### 6.10.1 Environmental Management

BMC has developed and implements the approved Historic Heritage Management Plan (HHMP), which describes the requirements for ongoing management and conservation of the existing non-Aboriginal heritage sites identified in the EIS. Four sites are located within the Project Boundary and five are located adjacent to the Project Boundary. Photos of the sites are presented in **Appendix J**.

### 6.10.2 Environmental Performance

Annual inspections are undertaken at each site. Annual dilapidation surveys and structural assessments were conducted at the two most significant heritage sites, Bengalla Homestead and Overdene Homestead. These were conducted on 12 September 2022. The results of the inspections and surveys are summarised below.

***Bengalla Homestead***

The 2022 dilapidation survey of Bengalla Homestead and associated buildings concluded that there appeared to be no further major degradation since the 2021 survey.

Externally the condition of the homestead and service wing remained stable, and the building was generally in good repair. Minor cracks were observed in the wall plaster and the ceiling in both the main building and the service wing at isolated locations.

Full renovation of the interior of the bookkeepers' cottage has been undertaken and externally the building is generally in a good state of repair.

The renovated cottage service building and garden shed were in a good state of repair and have not deteriorated since the 2021 inspection.

The condition of the other remaining structures is consistent with the previous inspection including the tool shed, steel water tower and stable.

All buildings and repair work should continue to be monitored for any signs of cracks caused by foundation movement or mine workings nearby. Regular inspections should be carried out to ensure there is no termite activity in the vicinity of the buildings.

***Overdene Homestead***

The 2022 dilapidation survey of Overdene Homestead concluded that there appeared to be no further major degradation since the 2021 inspection.

Works carried out in previous years have been successful. The replacement of the roof sheeting and diversion of stormwater away from the building and the previous restoration of the sandstone and brickwork has stabilised the deterioration.

The remaining outstanding items for the external part of the building included the replacement of missing pipe props from the tie rod ends to assist in continually stabilising the structure. The veranda flooring and roof framing, sheeting and flashings still require reinstatement.

Internally the condition of the cottage appears stable. Installation of a new floor system, restoration of windows, doors and internal walls is still outstanding. The external downpipe next to the entry door needs to be fixed to ensure no further degradation of this wall occurs.

Access to Overdene Homestead was restricted during 2022 due to the construction and testing of the Mount Pleasant Mine rail project.

A summary of the 2022 maintenance and preservation works completed by BMC at the Bengalla and Overdene Homesteads is presented in **Table 21**.

Appendix J contains photos from the 2022 inspections at Bengalla and Overdene Homesteads.

***Keys Family Private Cemetery***

An annual inspection was undertaken on the Keys Family Private cemetery in February and May 2022. The cemetery was in good condition with headstones remaining in good condition with no evidence of vandalism or deterioration. New fencing is being undertaken in 2023 at the cemetery.

***Stockyards***

An annual inspection was undertaken of the Stockyards in May 2022. The area was in good repair with a maintenance program being implemented for ongoing ground maintenance. The stockyards remain in good condition.

***Old Bengalla***

An annual inspection was undertaken of Old Bengalla in May 2022. The existing sandstone wall remains in good condition. The area was fenced and signage still present.

***House Site 1***

An annual inspection was undertaken of House Site 1 in May 2022. The site was fenced and signage erected.

***House Site 2***

An annual inspection was undertaken of House Site 2 in May 2022. The site was fenced and signage erected. No further work was required.

***Blunts Butter Factory***

An annual inspection was undertaken of Blunts Butter Factory in May 2022. Fencing around the site remained in good condition. Signage was erected. No further works were required.

## Table 21: Short Term Maintenance of the Bengalla and Overdene Homesteads 2022

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| **OVERDENE HOMESTEAD** | | | |
| HHMP Appendix D, Section 6.5 | Repair internal render all rooms | Being quoted to repair in 2023 -2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Repair remaining damage caused by termites (i.e. that determined not to be integral to structural integrity). | Bait station system installed around house and maintained as per termite management plan<br>Damage is being quoted to repair in 2023 -2024 | Ongoing |
| HHMP Appendix D, Section 6.5 | Reinstate verandah. | Restoration is being designed and planned 2023-2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Reinstate veranda flooring, including repair of sandstone dwarf wall supporting veranda joists and eastern veranda slab. | Restoration is being designed and planned 2023-2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Restore or replace woodwork around external openings and paint. | Restoration is being designed and planned 2023-2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Replace steel vent grate or block from under Door 7. | This was carried out in 2018 repair works | Completed |
| HHMP Appendix D, Section 6.5 | Replace floor boards with like for like. | Restoration is being designed and planned 2023-2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Replace ceiling boards with like for like. | Restoration is being designed and planned 2023-2024 | Upcoming |
| HHMP Appendix D, Section 6.5 | Repair remaining cracks in brick and stonework (D7). | This was carried out in 2018 repair works | Completed |
| HHMP Appendix D, Section 6.5 | External | This was carried out in 2018 repair works | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| | - Raked cracking in mortar about sandstone lintels above doorways D1, D3 and D5, and Doorway D7 with erosion of sandstone blocks<br>- Eastern chimney: brickwork collapsed<br>- Steel vent under W3 dislodged | | |
| HHMP Appendix D, Section 6.5 | Internal<br>- Room R1 – large amount of cracking to render in walls, worst above fireplace<br>- Room R2 – render cracking adjacent fireplace, doors D1 and D2 to ceiling and corners of room<br>- Room R3 – cracks at W3, previous termite damage, concrete hearth dropped further since last inspection (2014) to 40 mm, crack in brickwork of northern wall at 15 mm, doorway cracking at D12, ceiling loose at D6 and above fireplace<br>- Room R4 – old water damage, cracking at W2 and separation of ceiling, some mortar fallen down<br>- Room R5 – cracking of render, loose in various areas, south-western corner full height of wall with separating at the corner, and above window W1; and mortar missing in bottom 3 courses<br>- Hallway – extensive cracking to render in walls, and at #8 and D9, render at D3 and D9 leaning out and should be removed, erosion of mortar with cracks above D12 and skirting board at D7 | Restoration is being designed and planned 2023-2024 | Upcoming |
| **BENGALLA HOMESTEAD** | | | |
| HHMP Appendix C, Section 6.5 | **Building 1** – Homestead and Service Wing | | |
| HHMP Appendix C, Section 6.5 | Maintain Homestead to ensure stability and prevent further damage to all features * | All works carried out in 2019 | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| HHMP Appendix C, Section 6.5 | Remediate external faults to service wing including, but not limited to the following *:<br>- Repoint/repair mortar in lower courses of brickwork to northern face of service wing;<br>- Repoint/repair mortar between Window 19 and Door 30;<br>- Fix gap on northern side of Window 18 between window frame and brickwork;<br>- Loss of mortar and brickwork to single lead brick projections on eastern side;<br>- Damaged air vent grate on eastern elevation; - Loose mortar joints above Window 17;<br>- Address D30 frame deterioration;<br>- Replace missing brickwork on high window on the southern side of service wing;<br>- Minor cracking to brickwork in various locations; and<br>- Remove earthen bund from western wall adjacent to Window 7 as this is preventing water drainage and has caused damage to the plinth. Fix damage to plinth. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Investigate the cause of separation, splitting and warping of ceiling planks in Rooms 3 and 4. Repair or replace, if necessary, ceiling planks* | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate external damage caused by footing defects, including, but not limited to the following *:<br>- Cracking above Door 14;<br>- Cracking above Window 10;<br>- Cracking above Window 7;<br>- Cracking above and below Window 17. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 1, including, but not limited to the following:<br>- Repair cracking in brickwork where exposed by missing plaster;<br>- Repair plaster missing or removed; | All works carried out in 2019 | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| | - Reinstate/replace tiles in fireplace; and<br>- Repair crack in metal plinth*. | | |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 2, including, but not limited to the following:<br>- Cracking in render above archway between Rooms 2 and 3;<br>- Cracking in render above Door 4 and above and below W3;<br>- Cracking in render in southern wall; and<br>- Cracking in brickwork where exposed by removed plaster | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 3, including, but not limited to the following:<br>- Cracking in render above Door 3;<br>- Cracked brickwork in south eastern corner;<br>- Cracking below Window 2. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 4, including, but not limited to the following:<br>- Render on southern side of Window 1;<br>- Refix skirting board; and<br>- Cracking between ceiling cornice and western wall. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 5, including, but not limited to the following:<br>- Cracking in render above Doors 2,3,4,5,7 and 8;<br>- Cracking of archway and cracking of ceiling between archway and ceiling;<br>- Cracking between Doors 7 and 8; and<br>- Cracking around air vent | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 7, including, but not limited to the following: | All works carried out in 2019 | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| | - Cracking below Window 12; and<br>- Cracking above and adjacent to Door 10. | | |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 9, including, but not limited to the following:<br>- Cracking above Door 9 | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 25, including, but not limited to the following:<br>- Active moisture erosion of brick work, possibly rising damp;<br>- Mortar loss to southern wall; and<br>- Loose brickwork below Window 18. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 26, including, but not limited to the following:<br>- Cracks in brickwork above Door 33 and 34;<br>- Ceiling vent dropped; and<br>- Cracking above Window 14, Window 20 and below 14. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 27, including, but not limited to the following:<br>- Cracks in brickwork on southern and eastern walls;<br>- Loss of mortar in western wall, investigate active moisture erosion and possible rising damp;<br>- Replace missing brick adjacent to Door 28; and<br>- Repair/replace damp floor boards, if not already remediated as part of rising damp assessment. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 28, including, but not limited to the following:<br>- Thinning mortar on western wall;<br>- Missing brickwork adjacent to Door 33;<br>- Cracking in brickwork above Doors 32 and 33; | All works carried out in 2019 | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| | - Investigate cause and remediate of concrete floor crack;<br>- Cracking above Window 15. | | |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 29, including, but not limited to the following:<br>- Cracking above Doors 31 and 32 and western wall;<br>- Replace missing doorframe; and<br>- Cracking in brickwork above and below Window 16. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 30, including, but not limited to the following:<br>- Cracking above Door 31 and extending to western wall;<br>- Cracking above Window 17 and 18;<br>- Replace removed skirting boards;<br>- Termite damage in northern wall and Door 31 woodwork, if not already remediated. | All works carried out in 2019 | Completed |
| HHMP Appendix C, Section 6.5 | **Building 2 – 1960 addition**<br>Remove if this addition is impacting on integrity of the 1895 section of the Homestead, with due care that potential archaeological deposits relating to an earlier timber structure are not impacted or are archaeologically investigated* | Garage maintained and refurbished for storage and toilet amenities | Completed |
| HHMP Appendix C, Section 6.5 | **Building 3 – Underground cistern**<br>Maintain as required to ensure cistern does not deteriorate | Maintained as per maintenance schedule | Ongoing |
| HHMP Appendix C, Section 6.5 | **Building 4 – Garden Lodge**<br>The Garden Lodge has been assessed as being unsafe and is recommended for removal (Archaeology Australia, 2009) | Restored to original condition 2019 | Completed |
| HHMP Appendix C, Section 6.5 | **Building 5 – Toilet/Shower**<br>Undertake required maintenance to ensure long-term stability of building* | Repointed and roofed to maintain building integrity | Completed |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| HHMP Appendix C, Section 6.5 | **Building 6 - Gazebo**<br>Undertake on-going maintenance* | Repointed and roofed to maintain building integrity | Completed |
| HHMP Appendix C, Section 6.5 | **Building 7 – Laundry**<br>The current structure has been archivally recorded and is earmarked for demolition due to termite damage (Archaeology Australia, 2009) | Restored to original condition 2019 | Completed |
| HHMP Appendix C, Section 6.5 | **Building 8 – Book-keeper's Cottage**<br>Maintain Book-keeper's Cottage to ensure stability and prevent further damage to all features* | Restored and improved to liveable condition 2022 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 6, including, but not limited to the following:<br>- termite damage to northern walls;<br>- loss of mortar to fireplace brickwork;<br>- ceiling collapse in south-west corner; and<br>- remove wallpaper, using non damaging techniques, if impacting on the integrity of the walls. | Restored and improved to liveable condition 2022 | Completed |
| HHMP Appendix C, Section 6.5 | Remediate internal damage to Room 7, including, but not limited to the following:<br>- buckling of ceiling lining. | Restored and improved to liveable condition 2022 | Completed |
| HHMP Appendix C, Section 6.5 | **Building 9 – Tennis Court**<br>Maintain in current condition | Maintained as per maintenance schedule | Ongoing |
| HHMP Appendix C, Section 6.5 | **Building 10 – Water-tower**<br>The water tower has been slated for removal (Archaeology Australia, 2009 | Fell over in 2018 storm and was removed because of safety concerns | Completed |
| HHMP Appendix C, Section 6.5 | **Building 11 – Machinery shed**<br>Undertake on-going maintenance. | Maintained as per maintenance schedule | Ongoing |

| Reference | Maintenance | Response | Status |
|---|---|---|---|
| HHMP Appendix C, Section 6.5 | **Building 12 – Modern Water-Tower**<br>Undertake on-going maintenance. | Maintained as per maintenance schedule | Ongoing |
| HHMP Appendix C, Section 6.5 | **Building 13 – Stockyards**<br>Maintain in current condition | Maintained as per maintenance schedule | Ongoing |
| HHMP Appendix C, Section 6.5 | **Building 14 – Stables (archaeological site)**<br>No works required. Ensure the area is not impacted by works – fence if necessary. | Removed in 2022 because of safety concerns | Completed |
| HHMP Appendix C, Section 6.5 | **Building 15 – Hay-shed**<br>The hay-shed has been earmarked for removal and an archival recording has been completed (Archaeology Australia, 2009) | Removed in 2022 because of safety concerns | Completed |
| HHMP Appendix C, Section 6.5 | **Building 16 – Shed and Yard**<br>The shed has been earmarked for removal and an archival recording has been completed (Archaeology Australia, 2009). | Removed in 2022 because of safety concerns | Completed |

### 6.10.3 Further Actions

Should any amendments to the HHMP be required, BMC will lodge the revised HHMP with relevant regulatory agencies for comment and then with DPE for approval.

BMC will continue to implement the program of inspections, maintenance and preservation works as identified by the HHMP in the next Reporting Period.

## 6.11 BIODIVERSITY

### 6.11.1 Environmental Management

SSD-5170 and EPBC Approval 2012/6378 (the EPBC Approval) require BMC to manage biodiversity at Bengalla and its Biodiversity Offset Areas (BOAs).

**Appendix E** includes an annual compliance report for 2022 against the conditions of EPBC Approval 2012/6378 (EPBC Compliance Report).

During the Reporting Period, there were two non compliances with EPBC Approval conditions reported to DCCEEW. These related to Condition 6 (discharge event on 16 August 2022) and Condition 4 (provision of long-term security for offset properties). Refer to **Appendix E** for details. Please also refer to **Section 1.1** and **Section 11** for further details about compliance matters.

### 6.11.2 Environmental Performance

***Onsite Biodiversity Management and Mitigation***

Biodiversity management at Bengalla is undertaken in accordance with the approved Biodiversity Management Plan (BDMP).

The EPBC Compliance Report contains a summary of commitments from the BDMP against activities undertaken during the Reporting Period. There were no non-compliances with these commitments.

The management, monitoring and performance of rehabilitation at Bengalla during the Reporting Period is described in **Section 8**.

During 2022, the presence of an isolated Cymbidium canaliculatum (species of Tiger Orchid) was identified during Stage 1 pre-clearing surveys. This individual was translocated to a donor tree prior to Stage 2 tree clearing activities in December 2022.

***Offsite Biodiversity Management and Mitigation***

Biodiversity management at the offset properties is undertaken in accordance with the approved Biodiversity Offset Management Plan (BOMP).

The EPBC Compliance Report includes a summary of commitments from the BOMP against activities undertaken during the Reporting Period. There were no non-compliances with these commitments.

BMC manages approximately 6,215 ha of offset land. There are three distinct BOAs being Kenalea, Black Mountain and Merriwa River. The location of the BOAs in relation to Bengalla is illustrated on **Figure 9.**

During the Reporting Period, BMC undertook management programs on the BOAs including but not limited to:

- weed inspections and weed spraying;
- dog baiting and trapping;

- feral pig management;
- preparation works for hazard reduction burns across all BOAs;
- fire trail maintenance at Kenalea; and
- summer and winter ecological surveys.

BMC attended various meetings with stakeholders including adjoining private neighbours, NSW Local Land Services and various Wild Dog Associations.

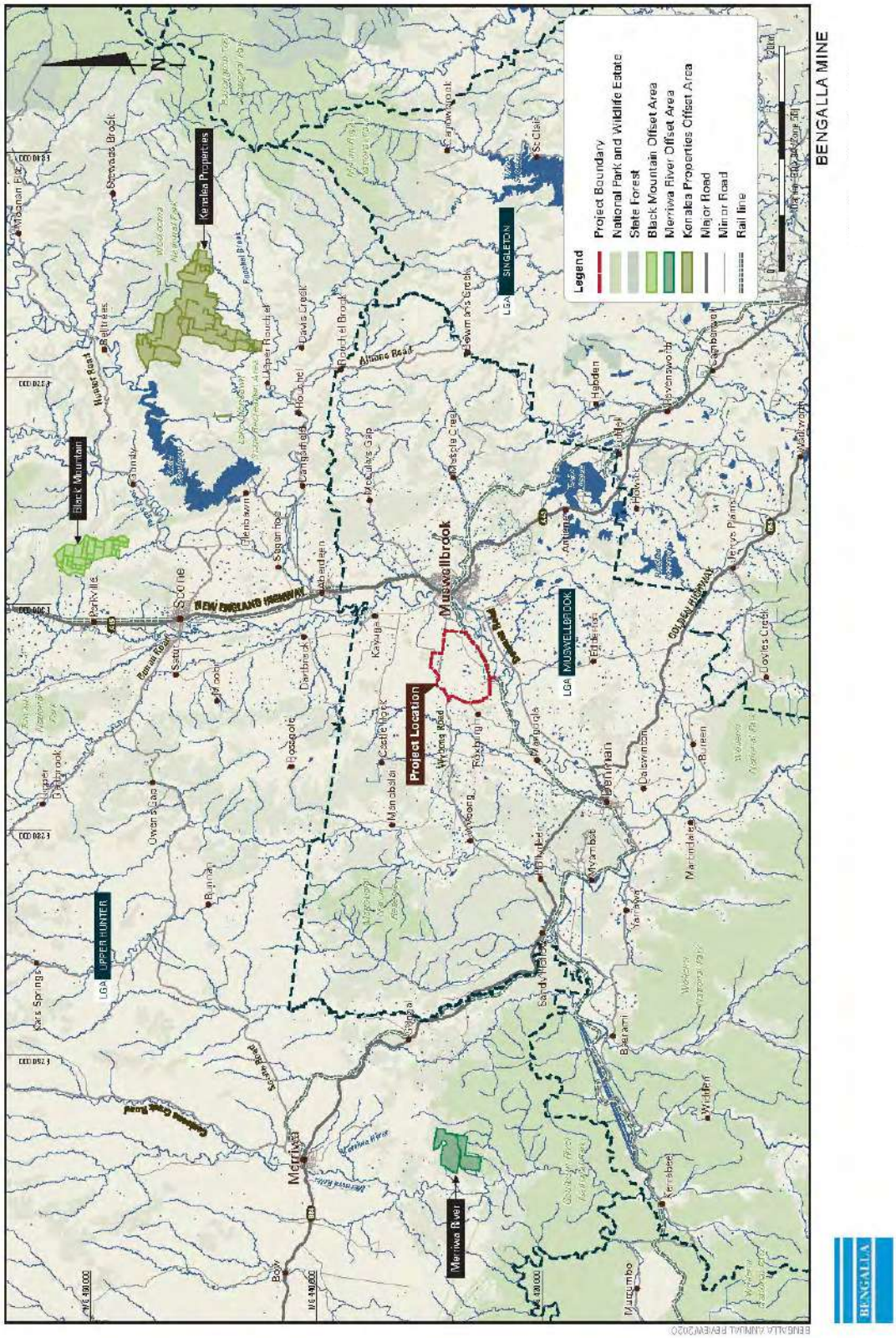



**Figure 9: Biodiversity Offset Areas**

### *Biodiversity Offset Area Ecological Surveys*

A total of 28 permanent flora monitoring sites were surveyed. A suite of additional surveys by a suitably qualified expert were undertaken, including bird census, terrestrial infra-red (IR) camera surveys for the Spotted-tailed Quoll and feral animals, arboreal IR camera surveys for the Squirrel Glider, ultrasonic bat detection and opportunistic observations.

The BOMP contains measurable indicators and completion criteria for Years 5, 10 and 20 of the Project. **Table 22** compares the measurable indicators and performance criteria for Year 10 against the results of Year 6 (2022) annual monitoring.

**Table 22: Assessment Against Performance Criteria**

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| **Vegetation Management Zones** | | |
| **Zone 1 - Existing Forest and Woodland (Maintain condition of vegetation within benchmark)** | | |
| Total native species richness (NPS) | Maintenance or increase in native species richness | Thirteen (13) of 19 monitoring sites recorded an equal or greater native plant species richness compared to baseline. Of the six sites where native species richness was below baseline numbers, none are below benchmark values. |
| % Native over-store cover (NOS) | Increase to at least 20% of lower benchmark | Two (2) of 19 monitoring sites recorded an equal or greater native over storey cover compared to baseline. Of the 17 sites where native over storey was below baseline numbers, only two were below benchmark values. Of the two monitoring sites below benchmark values, both were above 20% of the lower benchmark value. |
| % Native mid-storey cover (NMS) | Increase to at least 20% of lower benchmark | Fourteen (14) of 19 monitoring sites recorded an equal or greater native mid-storey cover compared to baseline. Nine (9) of the 19 monitoring sites were also below benchmark values. Of the nine monitoring sites below benchmark values, six were above 20% of the lower benchmark value. |
| % Native ground cover (grasses) (NGCG) | Maintenance of cover above lower benchmark | Four (4) of 19 monitoring sites recorded an equal or greater native ground cover (grasses) compared to baseline. Of the 15 sites where native ground cover (grasses) was below baseline, none were below benchmark values. |
| % Native ground cover (shrubs) (NGCS) | Increase to at least lower benchmark | Six (6) of 19 monitoring sites recorded an equal or greater native ground cover (shrubs) compared to baseline. Of the thirteen sites where native ground cover (shrubs) was below baseline numbers, five are also below benchmark values. |
| % Native ground cover (other natives) (NGCO) | Maintenance of current cover above lower benchmark | Five (5) of 19 monitoring sites recorded an equal or greater native ground cover (other natives) compared to baseline. All 19 monitoring sites are above lower benchmark for native ground cover (other natives). |
| % Exotic plant cover | Weed cover not increased above baseline | Nine (9) of 19 monitoring sites recorded an equal or lower exotic plant cover compared to baseline. |

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| % overstorey regeneration (OR) | 100% | Twelve (12) of 19 monitoring sites have 100% regeneration of all canopy species present, and 15 of 19 monitoring sites have the same or higher levels of regeneration compared to baseline. |
| Number of trees with hollows (NTH) | Maintenance of number of trees with hollows | Nine (9) of 19 monitoring sites recorded an equal or greater number of trees with hollows compared to baseline. |
| Total length (m) of fallen logs (FL) | Maintenance of length (m) of fallen logs | Fifteen (15) of 19 monitoring sites recorded an equal or greater length of fallen logs compared to baseline. |
| **Zone 2 - Derived Native Grasslands (Maintain and improve through assisted natural regeneration. Aim to increase to benchmark condition)** | | |
| Total native species richness (NPS) | Increase to at least 80% of lower benchmark. | Two (2) of six monitoring sites recorded native species richness at least 80% of lower benchmark. |
| % Native over-storey cover (NOS) | Increase to at least 20% of lower benchmark | Native over-storey cover absent from monitoring sites. |
| % Native mid-storey cover (NMS) | Increase to at least 80% of lower benchmark. | Native mid-storey cover absent from monitoring sites. |
| % Native ground cover (grasses) (NGCG) | Maintenance of cover within benchmark range. | All six monitoring sites are within benchmark range for native ground cover (grasses), and five of the six also exceed the upper benchmark. |
| % Native ground cover (shrubs) (NGCS) | Increase to at least 80% of lower benchmark. | One (1) of six monitoring sites with native ground cover (shrubs) at least 80% of lower benchmark. |
| % Native ground cover (other natives) (NGCO) | Increase to at least 80% of lower benchmark. | Four (4) of six monitoring sites with native ground cover (other natives) at least 80% of lower benchmark. |
| % Exotic plant cover | 50% reduction in baseline EPC value | Four (4) of six monitoring sites recorded an equal or decreased weed cover compared to baseline, while only one of the six monitoring sites recorded a 50% reduction in EPC compared to baseline. |
| % overstorey regeneration (OR) | Increase to 50% | Overstorey regeneration absent from monitoring sites. |
| Number of trees with hollows (NTH) | No change expected in 10 years. Maintenance of trees with hollows and increase in trees that can eventually produce hollows | No significant change observed. No trees with hollows recorded during baseline or in year six (2022) monitoring. |
| Total length (m) of fallen logs (FL) | Maintenance or increase in length (m) of fallen logs | Four (4) of six monitoring sites recorded a greater or equal length of fallen logs compared to baseline. |
| **Zone 3 – Riparian (Rebuild/improve riparian corridors; protect waterways. Aim to increase to benchmark condition)** | | |
| Total native species richness (NPS) | Increase to at least 80% of lower benchmark | All three monitoring sites at least 80% of lower benchmark for native species richness. |

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| % Native over-storey cover (NOS) | Increase to at least 20% of lower benchmark | All three monitoring sites at least 20% of lower benchmark range for native overstorey cover. |
| % Native mid-storey cover (NMS) | Increase to at least 80% of lower benchmark | One (1) of three monitoring sites at least 80% of lower benchmark for native mid-storey cover. All three monitoring sites maintained or increased native mid-storey cover compared to baseline. |
| % Native ground cover (grasses) (NGCG) | Increase to at least 80% of lower benchmark | All monitoring sites at least 80% of lower benchmark for native ground cover (grasses). |
| % Native ground cover (shrubs) (NGCS) | Increase to at least 80% of lower benchmark | Two (2) of three monitoring sites at least 80% of lower benchmark for native ground cover (shrubs). |
| % Native ground cover (other natives) (NGCO) | Increase to at least 80% of lower benchmark | All monitoring sites at least 80% of lower benchmark for native ground cover (other natives). |
| % Exotic plant cover | 50% reduction in baseline EPC value | Zero (0) of three monitoring sites recorded a 50% reduction in EPC compared to baseline. Two (2) of three monitoring sites decreased weed cover compared to baseline. |
| % overstorey regeneration (OR) | Increase to 50% | All monitoring sites recorded at least 50% overstorey regeneration. |
| Number of trees with hollows (NTH) | No change expected in 10 years. Maintenance of trees with hollows, and increase in trees that can eventually produce hollows | Two (2) of three monitoring sites maintained or increased number of trees with hollows. |
| Total length (m) of fallen logs (FL) | Maintenance or increase in length (m) of fallen logs | All three monitoring sites recorded an equal or increased total length of fallen logs compared to baseline. |
| **Box Gum Woodland and Derived Native Grassland** | | |
| **Box Gum Woodland** | | |
| Increase in site condition value | Native over-storey cover to increase to at least 20% of lower benchmark | All monitoring sites recorded native over-storey cover of at least 20% of lower benchmark. |
| | Native mid-storey cover to increase to at least 20% of lower benchmark | Eleven (11) of 14 monitoring sites recorded native mid-storey cover of at least 20% of lower benchmark. |
| | Native ground cover (shrubs) to increase to at least lower benchmark | Ten (10) of 14 monitoring sites recorded native ground cover (shrubs) meeting lower benchmark. |
| Increase in site context value | Connectivity within biodiversity offset areas increased as a result of management activities | No significant change observed. Changes expected over a longer timeframe. |

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| | Increased security of biodiversity offset areas through formal conservation arrangement | Refer to comments at **Section 1.1** and **Section 11**. |
| **Derived Native Grassland** | | |
| Increase in site condition value | Native species richness to increase to at least 80% of lower benchmark. | Two (2) of six monitoring sites with native species richness at least 80% of lower benchmark. |
| | Native over-storey cover to increase to at least 20% of lower benchmark | Native over-storey cover absent from monitoring sites. |
| | Native mid-storey cover to increase to at least 50% of lower benchmark | Native over-storey cover absent from monitoring sites. |
| | Native ground cover (shrubs) to increase to at least 80% of lower benchmark. | One of six monitoring sites with native ground cover (shrubs) at least 80% of lower benchmark. |
| | Native ground cover (other natives) to increase to at least 80% of lower benchmark. | Four (4) of six monitoring sites with native ground cover (other natives) at least 80% of lower benchmark. |
| | Reduction in exotic plant cover by 50% | One (1) of six monitoring sites recorded a 50% reduction in EPC compared to baseline. |
| | Over-storey regeneration increased to 50% | Over-storey regeneration absent from monitoring sites. |
| | Potential increase in total length of fallen logs | Four (4) of six monitoring sites maintained length of fallen logs compared to baseline, while one of six monitoring sites increased the length of fallen logs. |
| Increase in site context value | Connectivity within biodiversity offset areas increased as a result of management actions | No significant change observed. Changes expected over a longer timeframe. |
| | Increased security of biodiversity offset areas through formal conservation arrangement | Refer to comments at **Section 1.1** and **Section 11**. |
| **Threatened Species** | | |
| **Tiger Orchid:**<br>- Maintenance of resident species populations and existing habitat for species. | Increase in the extent and condition of habitat | Species not detected during surveys.<br>No obvious increase in area and condition. Changes expected over a longer timeframe. |

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| - Increase in suitable habitat and increase in species populations and area of occupancy. | | |
| **Squirrel Glider:**<br>- Maintenance of resident species populations and existing habitat for species.<br>- Increase in suitable habitat and increase in species populations and area of occupancy. | - Increase in the extent and condition of habitat<br>- Continued detection of the species | No obvious increase in area and condition. Changes expected over a longer timeframe. |
| **Spotted-tailed Quoll:**<br>- Maintenance of resident species populations and existing habitat for species.<br>- Increase in suitable habitat and increase in species populations and area of occupancy. | - Increase in the extent and condition of habitat<br>- Continued detection of the species | Species recorded at three locations within the Kenalea Properties on numerous occasions.<br>No obvious increase in area and condition. Changes expected over a longer timeframe. |
| **Threatened Microbats:**<br>- Maintenance of resident species populations and existing habitat for species.<br>- Increase in suitable habitat and increase in species populations and area of occupancy. | - Increase in the extent and condition of habitat<br>- Continued detection of the species | Threatened microbat species were recorded within Kenalea, Black Mountain and Merriwa, with further threatened species possibly occurring.<br>No obvious increase in area and condition. Changes expected over a longer timeframe. |
| **Woodland Birds:**<br>- Maintenance of resident species populations and existing habitat for species.<br>- Increase in suitable habitat and increase in species populations and area of occupancy. | - Increase in the extent and condition of habitat<br>- Continued detection of the species | Three (3) threatened woodland birds recorded within Kenalea and Merriwa River.<br>No obvious increase in area and condition, although the occurrences of the Speckled Warbler and the Dusky Woodswallow do appear to have consistently increased in recent years. Changes expected over a longer timeframe. |
| **Regent Honeyeater and Swift Parrot:**<br>- Maintenance of resident species populations and existing habitat for species.<br>- Increase in suitable habitat and increase in species populations and area of occupancy. | Increase in the extent and condition of habitat | Species not detected during surveys.<br>No obvious increase in area and condition. Changes expected over a longer timeframe. |

| KPI / Measurable Indicators | Year 10 Performance Criteria | Results of Year 6 (2022) Monitoring |
|---|---|---|
| **Weeds** | | |
| Weed density and distribution | 50% reduction in baseline EPC value | Changes to exotic species richness variable across the Biodiversity Offset Areas. Primarily an increase in weed density was observed compared to baseline. |
| Weed diversity | Downward trend in weed diversity | No significant changes to weed species diversity observed. |
| Significant target weed infestations | Downward trend in abundance and distribution of significant target weed infestations | Significant weed infestations not mapped as part of annual monitoring. Some changes in occurrences of target species at monitoring sites observed. |
| **Feral Animals** | | |
| Feral animal abundance | Downward trend in feral animal abundance | Changes in species occurrences observed, including detections of some previously recorded species and absence of previously recorded species at specific sites. Changes expected over a longer timeframe. However, impacts likely to persist as animals move from adjoining areas into the Biodiversity Offset Areas. No significant increase in abundance of all feral species as a whole observed. |
| Habitat disturbance by feral animals | Downward trend in habitat disturbance by feral animals | No significant disturbance observed at the monitoring sites. |

The data collected in 2022 represented the sixth year of annual monitoring. This assessment is intended to continue the annual monitoring program of the BOAs. Given that the monitoring program is still in its early stages, few measurable changes in survey results were detected in Year six annual monitoring surveys. Nevertheless, it is notable that most woodland sites are within or above benchmark for most values and the majority of Performance Criteria have consistently been met by many of the monitoring sites. It is expected that greater changes will be observed over time due to a combination of the implementation of management activities and natural regeneration.

The results of monitoring undertaken in Year 6 has been assessed based on the Year 10 performance criteria outlined in the BOMP. Currently no canopy species regeneration is occurring within the derived native grasslands sites that comprise Zone 2. A plan will be developed and implemented to address increasing the presence of canopy species.

Additionally, an increase in the abundance of weed species compared to baseline has been recorded. It is noted that this increase in weed species abundance is likely the result of the previous several years of above average rainfall and favourable growth conditions that has resulted in the proliferation of all ground layer species, both native and exotic, throughout the BOAs. Additional weed management will be undertaken where practicable to prevent further infestation.

***Bushfire Hazard Reduction Burns***

No hazard reduction burns occurred in the Reporting Period.

During April 2022, an assessment of fuel loads and fuel characteristics for each of the BOAs was undertaken following extensive rainfall experienced in recent years to determine BMC's exposure to bushfire hazards. As a result of this assessment, plans for hazard reduction burns plans were developed and were scheduled to occur at Black Mountain, Kenalea properties (Echo and Kenalea) and Merriwa River during Spring 2022. Ongoing rainfall again prevented these burns from occurring in 2022, however they are now re-scheduled to occur if optimal conditions prevail in 2023. Results of these burns will be reported in the 2023 Annual Review.

### 6.11.3 Further Actions

Should any amendments to the BDMP or BOMP be required, BMC will review and submit a revised version of the BDMP or BOMP to the relevant regulatory agencies and stakeholders for comment and then approval to DPE and DCCEEW. A study will be commenced on assessing actions required to meet the Year 10 Performance Criteria.

## 6.12 WEEDS AND PEST MANAGEMENT

### 6.12.1 Environmental Management

Weed and pest management at Bengalla and its BOA's is undertaken in accordance with the BDMP and BOMP, respectively.

Inspections are undertaken for weeds and pests, as required. Weed and pest control at Bengalla and on the BOA's is undertaken through targeted chemical, baiting and shooting applications.

### 6.12.2 Environmental Performance

**Weed Management**

Weeding is undertaken using boom spray, spot spraying or stem application dependent upon the weed and the terrain.

- ***Bengalla***

During 2022, approximately 255 ha was treated for the management of weeds. Target weed species primarily included African boxthorn, galenia, St John's wort and other environmental weeds. Priority areas for treatment included the pre-clearing areas, rehabilitation areas and topsoil stockpiles. Chemicals used during 2022 include Glyphosate with metsulfuron, Grazon Extra and Garlon 600.

Observations during the weed treatment program and follow up inspections indicate that treatment methods used during the Reporting Period have generally been effective in reducing the presence of weeds in target areas.

Weed management areas at Bengalla are shown on **Figure 10**.

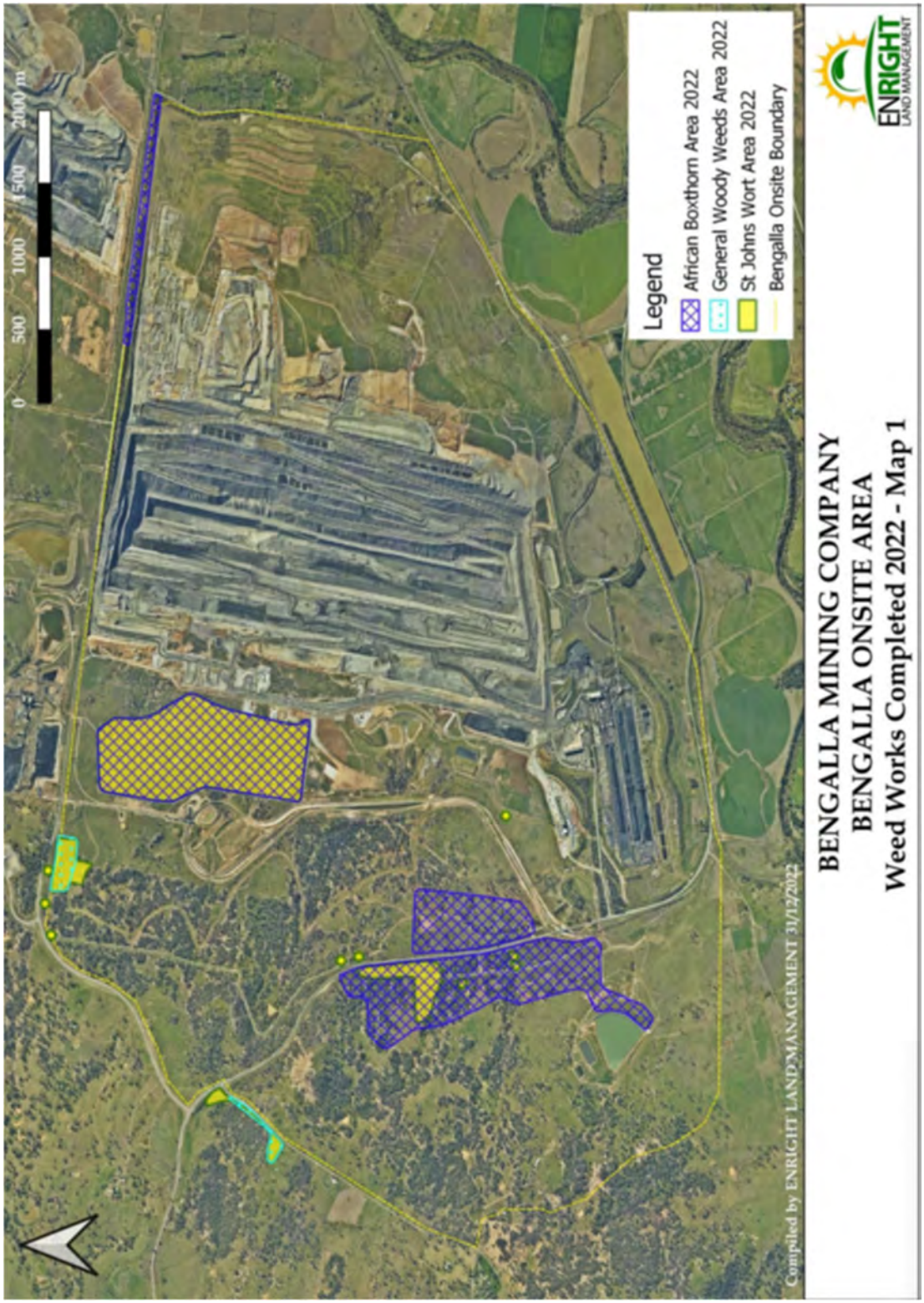



**Figure 10: Bengalla Weed Management Locations 2022**

- ***Biodiversity Offset Areas***

Weed management across the BOA's involves quarterly inspections and weed control programs.

Quarterly inspections are undertaken to determine weed control required for each quarter in each of the BOAs. Following identification, weed control commences.

The chemicals to be utilised are based on their effectiveness depending on the type of weeds present. Chemicals used during 2022 include Glyphosate with metsulfuron, Grazon Extra and Garlon 600.

The weeds controlled during the Reporting Period included prickly pear, Paterson's curse, blue heliotrope, African boxthorn, lantana and several environmental weeds across each BOA.

St John's Wort was also addressed on Black Mountain utilising ground controls whist on Kenalea a combination of ground control and aerial spraying was undertaken.

Regional rainfall was above the long-term average for 2022 which contributed to the increase of several weed populations and the ensuing level of control required. Access to some areas proved difficult in 2022 due to flooding of creeks and access crossings.

**Figure 11 - Figure 14** show locations of weed control in 2022 at the Black Mountain and Kenalea BOA's. The Merriwa River BOA had minimal weed control undertaken due to ongoing wet conditions impacting on safe access.

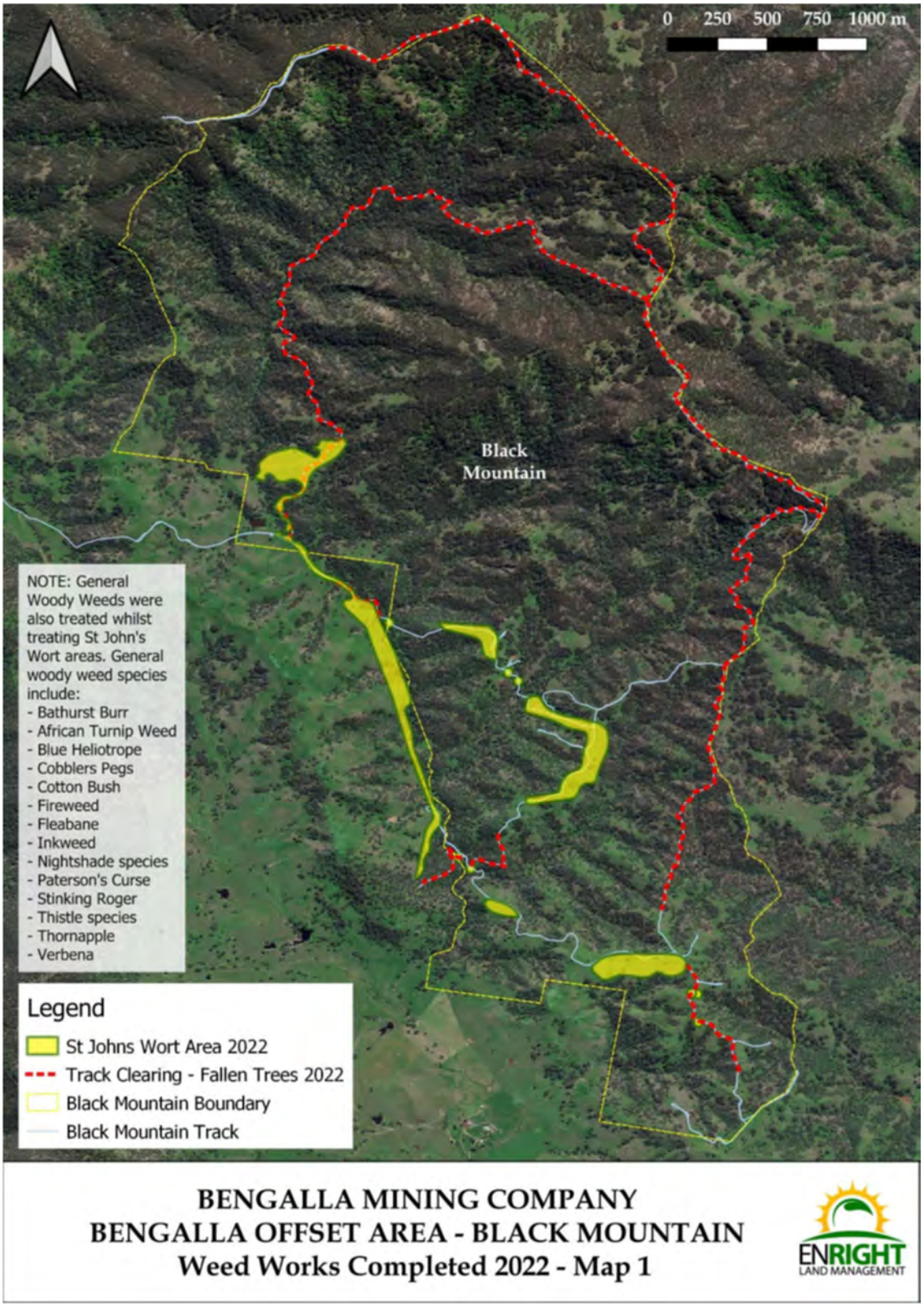



**Figure 11: Black Mountain Weed Management Locations 2022**

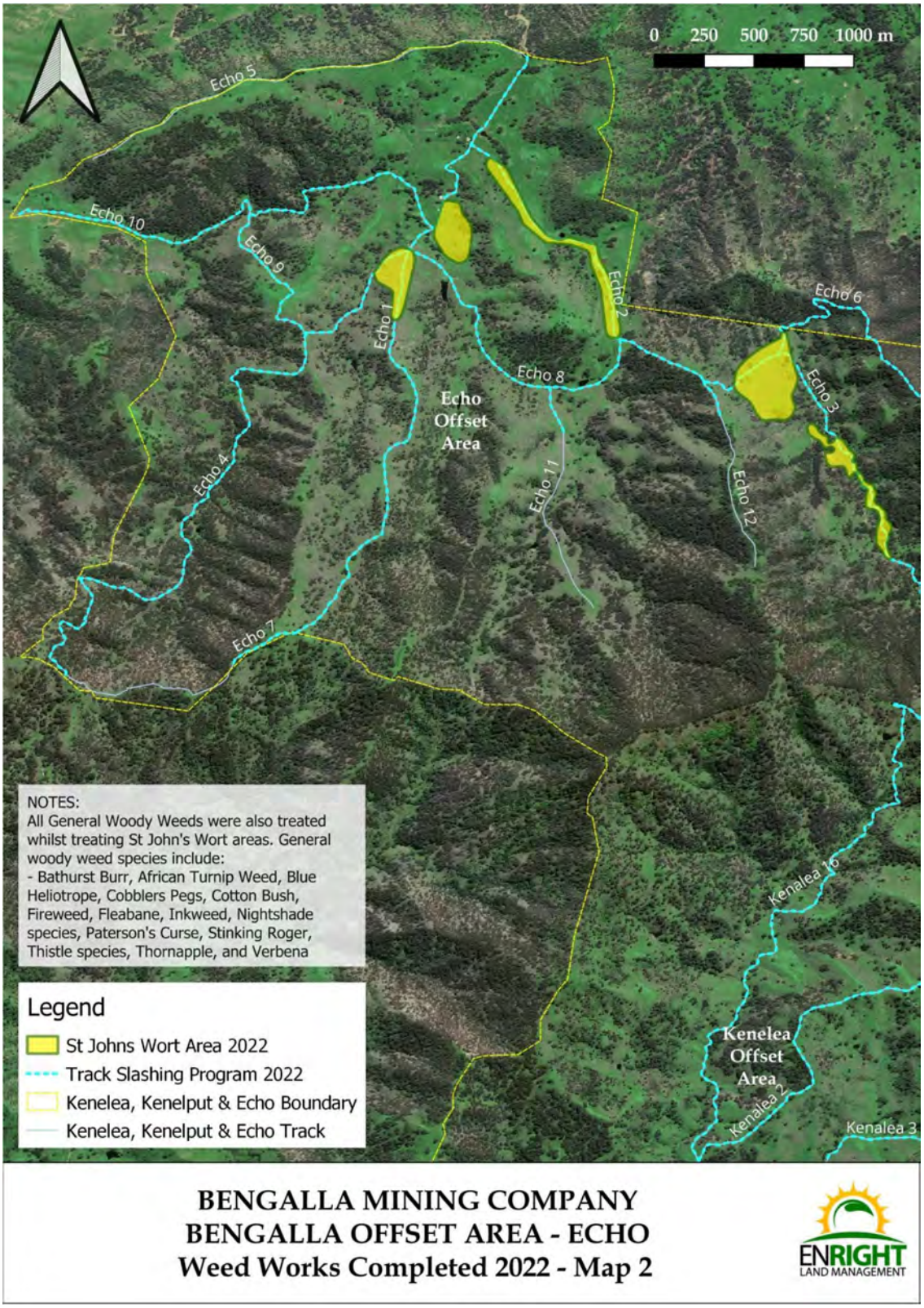



**Figure 12: Kenalea (Echo) Weed Management Locations 2022**

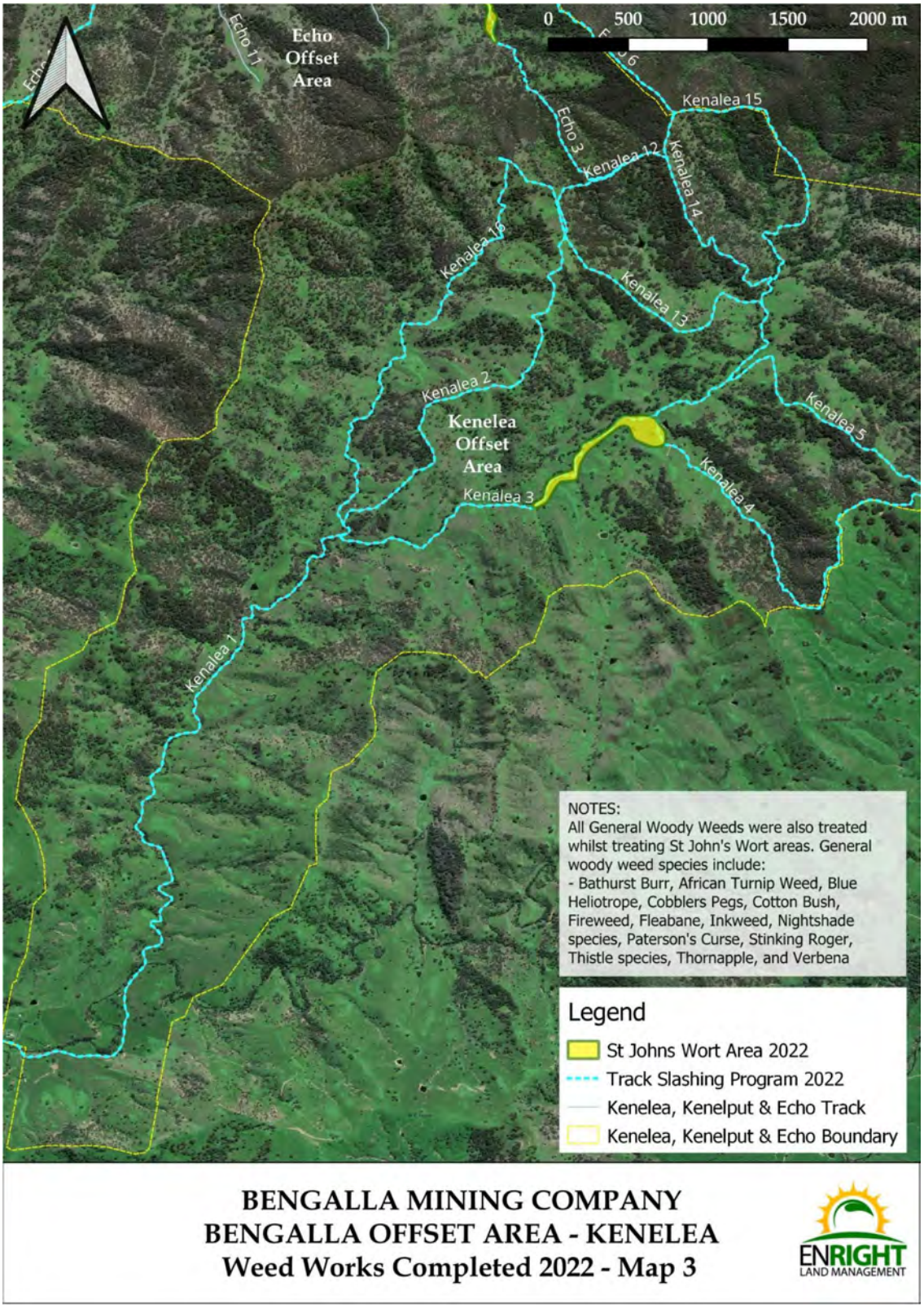



**Figure 13: Kenalea Weed Management Locations 2022**

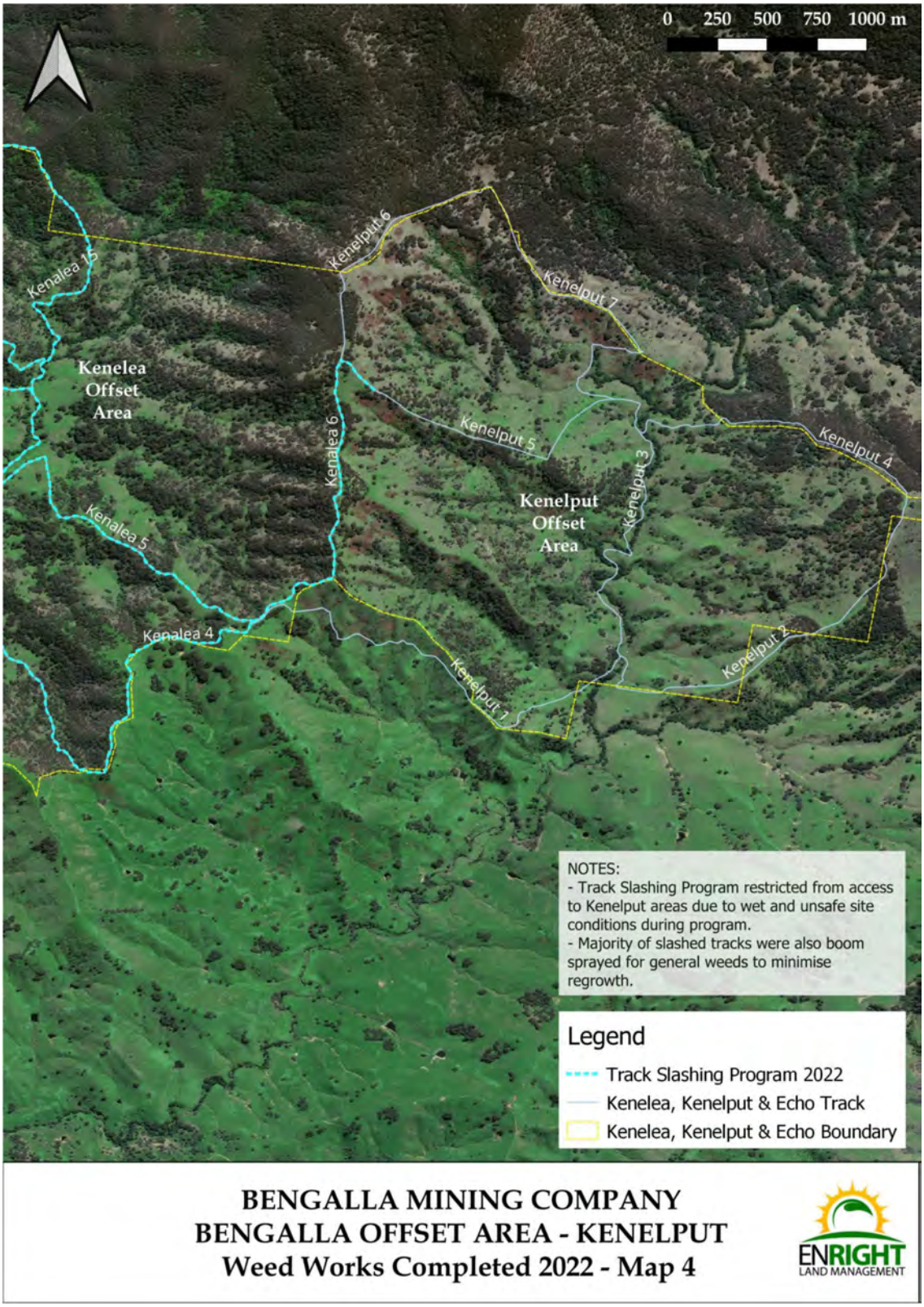



**Figure 14: Kenalea (Kenelput) Weed Management Locations 2022**

## Pest Management

- ***Bengalla***

A pig control program was conducted throughout 2022 at various locations across Bengalla, however this was impacted by continued access issues due to continued rainfall. This utlised both trapping and baiting using sodium nitrate. A total of 10 pigs were trapped and culled in 2022.

Feral pigs were trapped utilising a penning system using grain and molasses as the main attractant. Once trapped, all pigs were disposed of humanely.

The culling program will continue into 2023 across Bengalla.

Dog baiting programs at Bengalla occurred in the Autumn and Spring 2022. Each program was undertaken in conjunction with LLS and local wild dog associations and additionally forms part of a broader scale baiting program targeting foxes and wild dogs in the Hunter Valley. Baiting included utilising 1080 poison baits in addition to ejector capsule baits and each baiting program extended for three weeks during each period.

**Figure 15** shows the location of wild dog bait stations utilised at Bengalla. The distribution of bait locations covered both buffer land west of the mine site and rehabilitation areas.

During the autumn baiting program, 25 bait stations were laid over a three week period with a total of 87 baits. Results indicate 42 takes of which 17 takes were by target species being foxes. No wild dog takes were recorded. Bait shyness was detected at some locations.

During the spring baiting program, 25 stations were laid over a three week period with a total of 65 baits. Results indicate 27 takes of which 18 takes were by target species being foxes. 2 wild dog takes were recorded. No evidence of bait shyness was detected. Trail cameras were used in conjunction with the baiting program to record species taking the baits.

- ***Offset Properties***

During the Reporting Period, BMC undertook two 4-week dog ground baiting programs across the BOA's, including aerial dog baiting in Autumn and Spring in consultation with Local Land Services. **Figure 16**, **Figure 17** and **Figure 18** show locations of wild dog baiting locations on each BOA in 2022.

A total of 614 baits were placed during the 2022 ground baiting program targeting foxes and wild dogs. A total of 104 baits were taken during the program. Results indicated that 38% of baits were taken by wild dogs and 62% by foxes. Trends over 5 years indicate that wild dog takes have varied from 67 in 2016, 29 takes in 2017, 33 takes in 2018. 88 takes in 2019, 29 in 2020, 28 in 2021 and 39 in 2022. This suggests that dog numbers have risen during 2022, possibly due to an increase in food supply or migration from other areas where food supply was lower.

Opportunistic feral animal control was also undertaken during weed control works targeting 17 pigs and 2 deer.

### *Further Actions*

Ongoing management of weeds and feral animals at Bengalla and BOA's will continue during 2023.

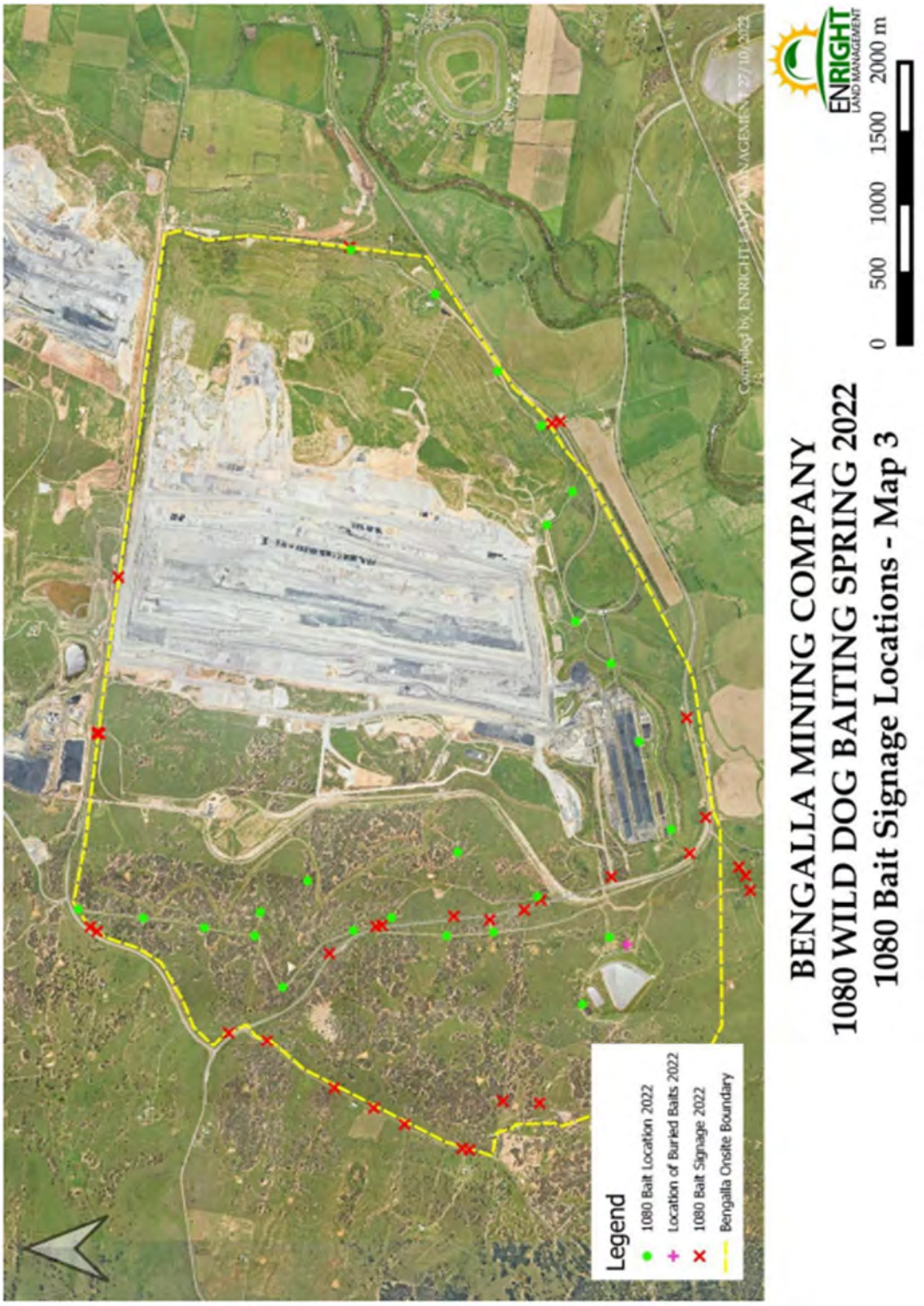



**Figure 15: 1080 Wild Dog Baiting Locations at Bengalla Mine**

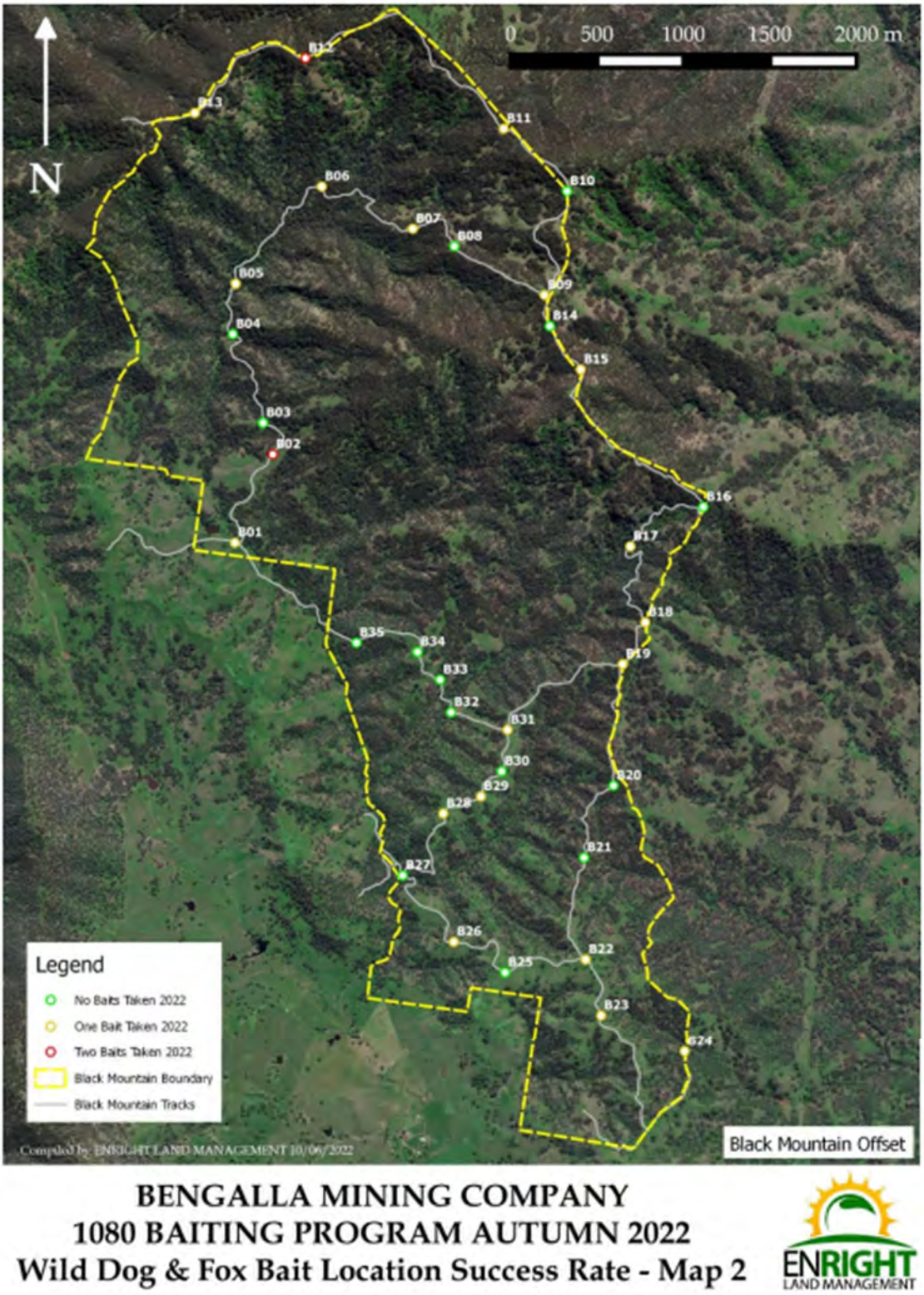



**Figure 16: 1080 Wild Dog Bait Locations at Black Mountain Offset**

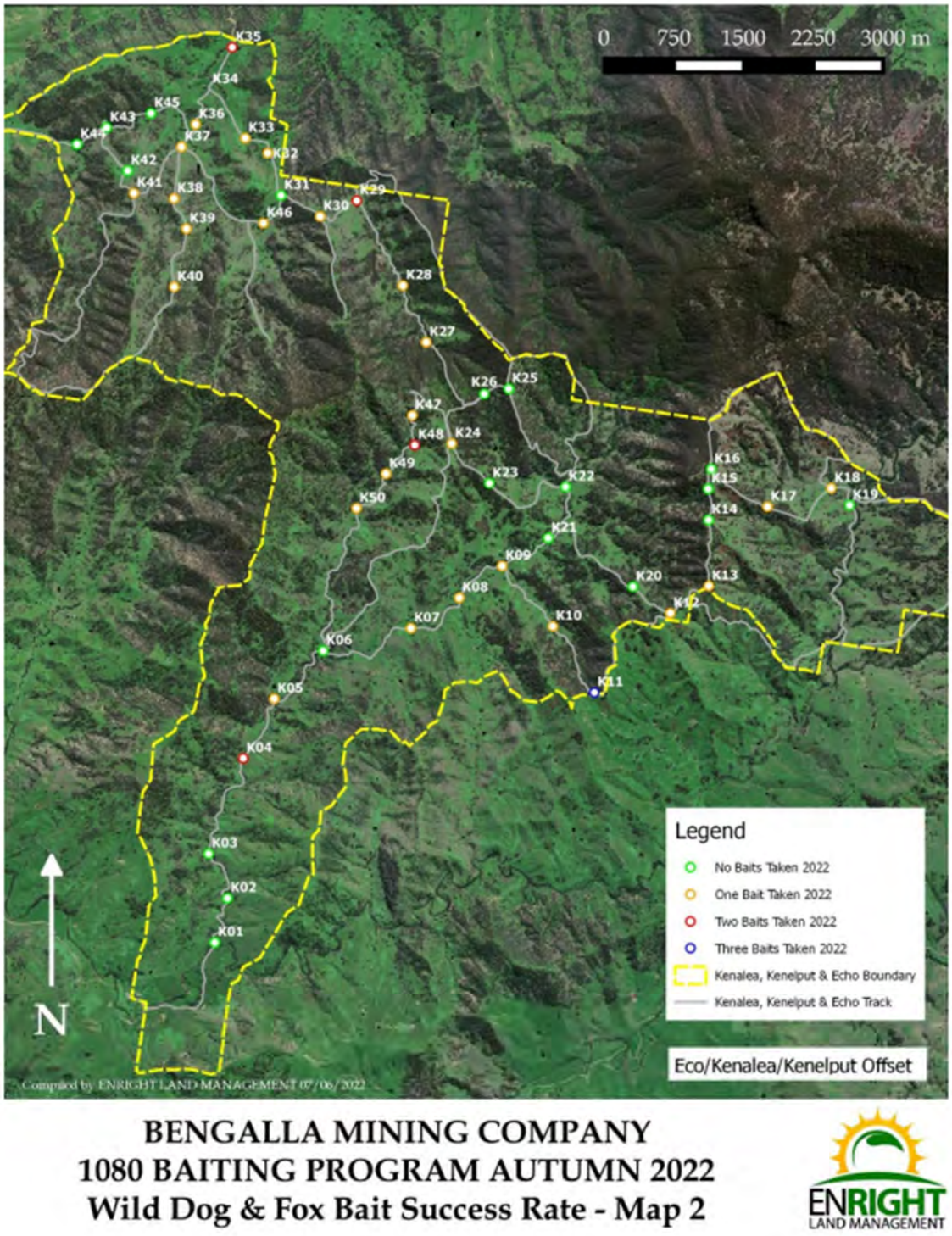



**Figure 17: 1080 Wild Dog Bait Locations at Kenalea Properties Offset**

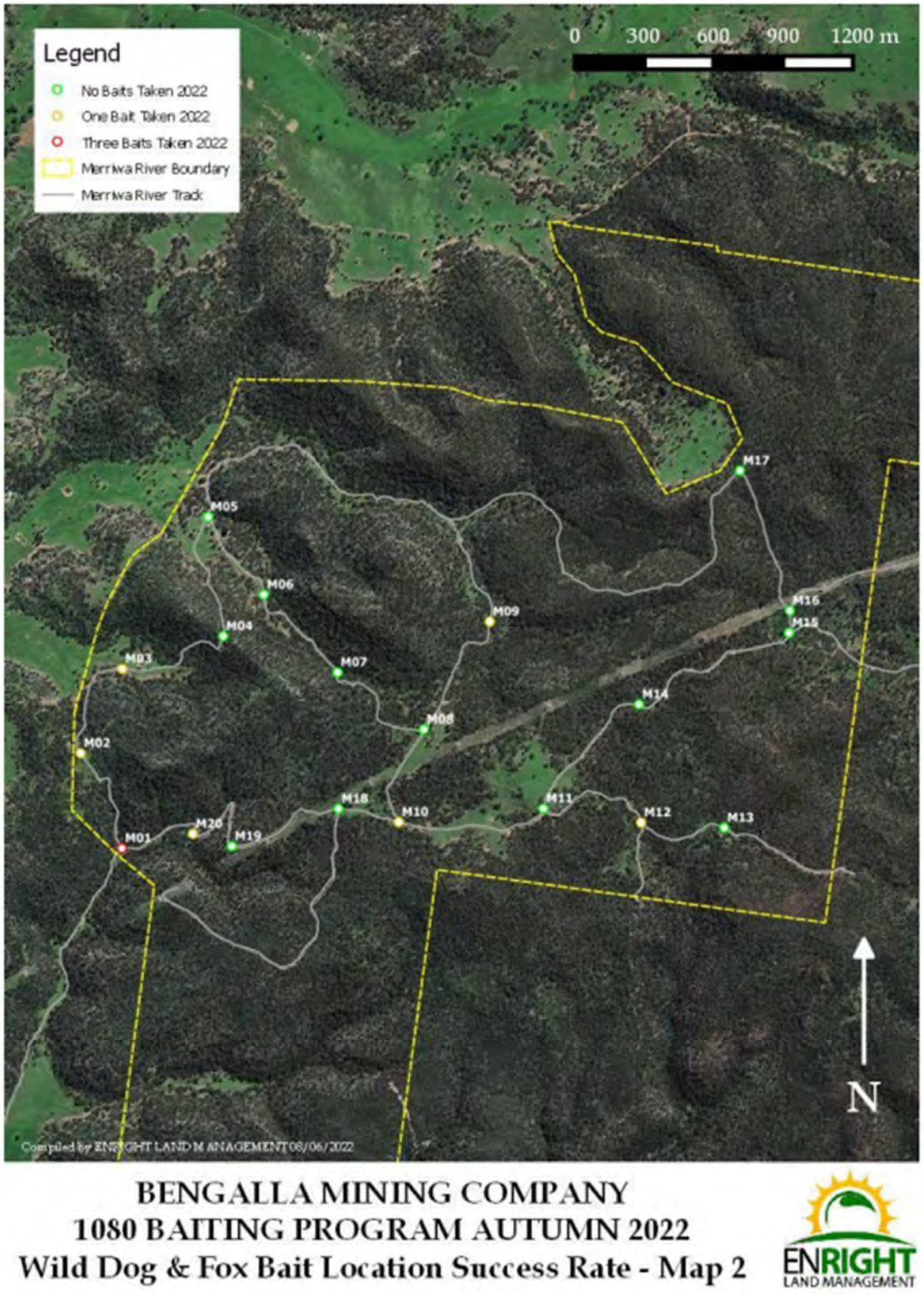



**Figure 18: 1080 Wild Dog Bait Locations at Merriwa River Offset**

## 6.13 VISUAL AMENITY AND LIGHTING

### 6.13.1 Environmental Management

BMC is required to implement reasonable and feasible measures to mitigate the visual and offsite lighting impacts of the development in accordance with SSD-5170.

### 6.13.2 Environmental Performance

***Tree Screening Along Public Roads***

Schedule 3, Condition 40 of SSD-5170 requires BMC to plant trees along sections of Denman Road, Roxburgh Road and Wybong Road that will have direct views of Bengalla in consultation with Council (and where relevant the RMS (now TfNSW)). This condition was modified on 24 February 2023 (Mod 5) so as to require the tree screening (or alternative visual screening measure such as visual bunding) to be completed within 12 months of approval of Mod 5. Condition 41A of Schedule 3 (inserted by Mod 5) provides that tree screening may not be required where BMC can demonstrate, to the satisfaction of the Planning Secretary, that the screening works are not possible due to constraints.

BMC has undertaken tree screen planting on Wybong Road (in September 2019) and Roxburgh Road (in March 2019 and July 2020). Ongoing maintenance work on the trees will consist of replacement of failed plantings where significant and replacement of guards.

BMC is progressing an application for the required consent under section 138 of the *Roads Act 1993* NSW to complete tree screen planting along Denman Road. Some sections of Wybong Road can now be accessed after the Mount Pleasant Mine rail and associated infrastructure was removed (that occurred 31 October 2022). The Secretary of DPE has granted an extension to complete tree screen planting until 31 December 2022. BMC requested an extension of time to meet its obligations by letter to DPE dated 30 December 2022. Mod 5 contained amended and new conditions regarding tree screening along public roads.

### 6.13.3 Further Actions

Plantings in road reserves or adjacent areas that have views of Bengalla will be progressed as required following further consideration of the Mod 5 conditions.

## 6.14 EMERGENCY RESPONSE PREPAREDNESS

BMC has an Emergency Response Team which is trained to respond to emergencies and conducts simulated emergency exercises. BMC have developed a Pollution Incident Response Management Plan (PIRMP) as required under the *Protection of the Environment Operations Act 1997* NSW (POEO Act).

The BMC Environment Department conducted a pollution incident response test exercise on 7 December 2022. The simulated scenario was an uncontrolled discharge from Bengalla Discharge Dam (DW1) impacting the Muswellbrook / Ulan rail line and Bengalla Link Road.

The exercise confirmed that the response procedure included in the PIRMP is appropriate and that the required response from BMC was effective.

# 7 WATER MANAGEMENT

*This section describes the Bengalla water management objectives and performance during the Reporting Period.*

## 7.1 WATER BALANCE

The take of water associated with mining operations at Bengalla during the Reporting Period is summarised in **Table 23**. An overview of the site water balance is presented in **Table 24**.

A discussion of surface water and groundwater monitoring and management during the Reporting Period is provided in **Section 7.2** and **Section 7.3**, respectively.

**Table 23: Site Water Take 2022**

| Water Licence | Water Sharing Plan, Source and Management Zone | Entitlement | Passive Take / Inflows (ML) | Active Pumping (ML) | Total (ML) |
|---|---|---|---|---|---|
| WAL1106 (High Security) | Hunter Regulated River Water Source (Zone 1A) *Water Sharing Plan for the Hunter Regulated River Water Source 2016* NSW | 1449 units[1] | - | 555 | 555 |
| WAL41547 (Aquifer) | Sydney Basin-North Coast Groundwater Source *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016* NSW | 365 units | 150[3] | - | 150 |
| Harvestable Rights | Muswellbrook Water Source *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* NSW | 109 ML[2] | 0 | - | 0 |
| **Total** | | | | | **705** |

*[1] Permanent entitlement to a share of the water source per water year (1 July to 30 June) which generates water allocation based on available water determinations made by the Minister for Water (generally at the start of each water year).*
*[2] Harvestable rights entitlement calculation (EIS).*
*[3] Groundwater inflow to open cut pit estimated by WSP Report dated 1 February 2023.*

**Table 24: Site Water Balance 2022**

| Aspect | Volume (ML) |
|---|---|
| **Water Inputs** | |
| Raw water sourced from Hunter River (ML/yr) | 555 |
| Rainfall and catchment runoff (ML/yr) | 2,421 |
| Groundwater inflow to open cut pits (ML/yr) | 150 |
| Water entrained in ROM coal processed (ML/yr) | 958 |
| Total Inputs | ***4,084*** |
| **Outputs** | |
| Water entrained in product coal | 1,749 |

| Aspect | Volume (ML) |
|---|---|
| Other CHPP plant losses | 36 |
| Dust suppression (stockpiles and haul roads) | 696 |
| Vehicle wash-down losses | 133 |
| Hunter River Salinity Trading Scheme (HRSTS) discharge | 1904 |
| Other offsite discharges from mine water management system | 0 |
| Evaporation from dams | 199 |
| Total outputs | **4,717** |
| **Water Balance for 2022** | **+633 ML** |

During the Reporting Period, BMC discharged a total of 1,904 ML of saline water from DW1 to the Hunter River (from 62 discharge events) under the Hunter River Salinity Trading Scheme (HRSTS). An overview of the discharge events is presented in **Table 25**.

**Table 25: Discharge Events 2022**

| Block Number | Start Date | Start Time | End Date | End Time | Total Volume (ML) |
|---|---|---|---|---|---|
| 2022-066 | 5/03/2022 | 5:46 | 6/03/2022 | 3:32 | 38.25 |
| 2022-067 (1 and 2) | 6/03/2022 | 5:01 | 7/03/2022 | 3:33 | 43.62 |
| 2022-068 (1 and 2) | 7/03/2022 | 4:37 | 8/03/2022 | 3:29 | 97.64 |
| 2022-069(1) | 8/03/2022 | 5:03 | 9/03/2022 | 3:45 | 147.01 |
| 2022-070(1) | 9/03/2022 | 4:29 | 10/03/2022 | 1:12 | 155.63 |
| 2022-071(1) | 10/03/2022 | 7:40 | 10/03/2022 | 12:14 | 30.25 |
| 2022-072(1) | 11/03/2022 | 12:00 | 12/03/2022 | 3:32 | 27.10 |
| 2022-073(1) | 12/03/2022 | 8:08 | 13/03/2022 | 3:33 | 51.10 |
| 2022-074(1) | 13/03/2022 | 8:00 | 14/03/2022 | 3:33 | 27.67 |
| 2022-075(1) | 14/03/2022 | 7:54 | 14/03/2022 | 10:34 | 2.20 |
| 2022-092(1) | 31/03/2022 | 16:19 | 31/03/2022 | 23:25 | 2.96 |
| 2022-093(1) | 1/04/2022 | 7:37 | 2/04/2022 | 2:30 | 32.54 |
| 2022-094(1) | 2/04/2022 | 9:41 | 3/04/2022 | 2:05 | 18.59 |
| 2022-095(1) | 3/04/2022 | 7:23 | 4/04/2022 | 3:22 | 18.07 |
| 2022-096(1) | 4/04/2022 | 7:43 | 5/04/2022 | 3:29 | 11.17 |
| 2022-097(1) | 5/04/2022 | 7:28 | 6/04/2022 | 3:30 | 4.11 |
| 2022-187(1) | 4/07/2022 | 11:24 | 5/07/2022 | 3:31 | 13.12 |
| 2022-188(1) | 5/07/2022 | 5:32 | 5/07/2022 | 16:58 | 5.68 |
| 2022-188(2) | 5/07/2022 | 16:59 | 6/07/2022 | 3:23 | 23.17 |
| 2022-189(1) | 6/07/2022 | 4:45 | 6/07/2022 | 9:26 | 17.57 |
| 2022-189(2) | 6/07/2022 | 9:27 | 7/07/2022 | 3:25 | 135.58 |
| 2022-190(1) | 7/07/2022 | 4:49 | 7/07/2022 | 10:07 | 5.36 |
| 2022-190(2) | 7/07/2022 | 10:08 | 8/07/2022 | 3:29 | 51.73 |
| 2022-191(1) | 8/07/2022 | 4:40 | 9/07/2022 | 3:32 | 81.01 |
| 2022-192(1) | 9/07/2022 | 5:49 | 10/07/2022 | 3:32 | 95.95 |
| 2022-193(1) | 10/07/2022 | 4:49 | 11/07/2022 | 3:31 | 33.84 |
| 2022-194(1) | 11/07/2022 | 5:06 | 12/07/2022 | 3:30 | 29.21 |

| | | | | | |
|---|---|---|---|---|---|
| 2022-195(1) | 12/07/2022 | 4:33 | 13/07/2022 | 3:30 | 22.85 |
| 2022-203(2) | 20/07/2022 | 12:30 | 20/07/2022 | 22:56 | 3.51 |
| 2022-208(1) | 25/07/2022 | 8:25 | 25/07/2022 | 23:17 | 8.86 |
| 2022-209(1) | 26/07/2022 | 4:48 | 27/07/2022 | 3:22 | 27.38 |
| 2022-210(1) | 27/07/2022 | 5:13 | 28/07/2022 | 3:25 | 28.00 |
| 2022-211(1) | 28/07/2022 | 4:47 | 29/07/2022 | 3:11 | 10.67 |
| 2022-212(1) | 29/07/2022 | 4:25 | 29/07/2022 | 23:22 | 5.73 |
| 2022-213(1) | 30/07/2022 | 4:41 | 31/07/2022 | 3:29 | 14.71 |
| 2022-214(1) | 31/07/2022 | 4:59 | 1/08/2022 | 3:24 | 14.32 |
| 2022-215(1) | 1/08/2022 | 4:42 | 2/08/2022 | 3:11 | 21.98 |
| 2022-216(1) | 2/08/2022 | 4:27 | 3/08/2022 | 3:14 | 24.69 |
| 2022-217(1) | 3/08/2022 | 4:29 | 4/08/2022 | 3:15 | 12.35 |
| 2022-218 (1) | 4/08/2022 | 4:42 | 4/08/2022 | 20:32 | 5.92 |
| 2022-224 (1) | 10/08/2022 | 9:20 | 11/08/2022 | 3:29 | 34.92 |
| 2022-225 (1) | 11/08/2022 | 5:45 | 12/08/2022 | 3:30 | 31.68 |
| 2022-226 (1) | 12/08/2022 | 5:24 | 12/08/2022 | 19:00 | 9.66 |
| 2022-230 (1) | 16/08/2022 | 8:10 | 16/08/2022 | 8:31 | 0.48 |
| 2022-263(1) | 18/09/2022 | 7:22 | 18/09/2022 | 23:15 | 16.10 |
| 2022-264(1) | 19/09/2022 | 6:04 | 19/09/2022 | 23:24 | 24.10 |
| 2022-265(1) | 20/09/2022 | 7:04 | 20/09/2022 | 23:23 | 9.80 |
| 2022-268(2) | 23/09/2022 | 14:13 | 23/09/2022 | 15:02 | 1.04 |
| 2022-268(3) | 23/09/2022 | 15:03 | 24/09/2022 | 3:26 | 49.80 |
| 2022-269(1) | 24/09/2022 | 8:00 | 24/09/2022 | 11:16 | 7.60 |
| 2022-268(3) | 24/09/2022 | 11:17 | 24/09/2022 | 23:32 | 57.90 |
| 2022-270(1) | 25/09/2022 | 7:24 | 25/09/2022 | 23:31 | 10.40 |
| 2022-271(1) | 26/09/2022 | 6:59 | 26/09/2022 | 23:28 | 12.20 |
| 2022-272(1) | 27/09/2022 | 6:40 | 27/09/2022 | 23:28 | 21.30 |
| 2022-273(1) | 28/09/2022 | 6:39 | 28/09/2022 | 15:09 | 3.00 |
| 2022-300(1) | 25/10/2022 | 12:13 | 25/10/2022 | 23:26 | 26.90 |
| 2022-301(1) | 26/10/2022 | 6:22 | 26/10/2022 | 23:23 | 98.70 |
| 2022-302(1) | 27/10/2022 | 6:32 | 27/10/2022 | 10:37 | 17.40 |
| 2022-302(2) | 27/10/2022 | 10:38 | 27/10/2022 | 14:56 | 29.30 |
| 2022-322(1) | 16/11/2022 | 7:17 | 16/11/2022 | 8:29 | 1.20 |
| 2022-322(2) | 16/11/2022 | 8:30 | 16/11/2022 | 15:03 | 39.20 |

## 7.2 SURFACE WATER

### 7.2.1 Environmental Management

BMC has an approved Water Management Plan (WMP) which describes the surface water management infrastructure and procedures in place at Bengalla.

### 7.2.2 Environmental Performance

***Surface Water Use***

During the Reporting Period, BMC pumped 555 ML from the Hunter River. The Bengalla site water balance for 2022 is provided in **Section 7.1**.

***Surface Water Monitoring Program***

Surface water monitoring is undertaken in accordance with the approved WMP. Surface water monitoring locations are shown on **Figure 19.**

***Surface Water Monitoring Results***

A comparison of the 2022 surface water monitoring results with the results for previous years for the Hunter River is presented in **Table 26**.


**Figure 19: Surface Water Monitoring Locations**

**Table 26: Summary of Surface Water Monitoring Results (2020 – 2022)**

| Year | Site W01 Average[1] | | | Site W02 Average[2] | | | Site W03 Average[3] | | | Site W04 Average[4] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pH | TSS | EC | pH | TSS | EC | pH | TSS | EC | pH | TSS | EC |
| 2020 | 7.9 | 178 | 474 | 7.9 | 193 | 454 | 7.9 | 203 | 490 | 7.9 | 168 | 536 |
| 2021 | 7.9 | 110 | 503 | 8.1 | 60 | 635 | 8.0 | 76 | 574 | 7.9 | 47 | 552 |
| 2022* | 8.0 | 177 | 487 | 8.1 | 180 | 530 | 8.1 | 104 | 487 | 8.0 | 97 | 592 |

** 15 sampling events*

1. *One sampling event not sampled due to no safe access.*
2. *Five sampling events not sampled due to no safe access.*
3. *Five sampling events not sampled due to no safe access.*
4. *Three sampling events not sampled due to no safe access.*

***Trends Over the Life of the Project***

The Hunter River water quality trigger values in the WMP are used to investigate potential surface water impacts from operations at Bengalla. Trigger values for the surface water parameters monitored monthly include:

- pH: 6.5 – 8.1;
- Total Suspended Solids (TSS): 40 mg/L; and
- Electrical Conductivity (EC): 650 µS/cm.

Bengalla recorded several rain events[1] during 2022 (January, March, July, August, September, October and November) which resulted in elevated TSS levels in the Hunter River which significantly impacted the annual average at all Hunter River sites (see **Appendix F**). No exceedances of the trigger values were recorded in pH or EC for the Reporting Period at the four Hunter River water monitoring sites.

***Comparison to Assessment Predictions***

The EIS predicted that downstream impacts on surface water quality would be negligible provided discharge from Bengalla is conducted according to the HRSTS.

Surface water monitoring of pH, TSS and EC at the four Hunter River water monitoring sites in 2022 confirmed that water quality remains generally within the relevant WMP impact criteria for pH and EC however there were elevated results for TSS which created an overall average in excess of the trigger values.

An overview of the Bengalla site water balance for 2022 is provided in **Section 7.1**. In comparing the 2022 water balance results to the EIS, Year 8 average results were selected as the most appropriate. It should be noted that the Year 8 water balance also assumed a production rate of up to 15 Million tonnes per annum of product coal.

The EIS predicted a gross water balance deficit of 89 ML for Year 8[2] however a surplus of approximately 632 ML occurred in 2022. The discrepancy between the EIS prediction and the

[1] *Rain Event is defined as 25mm rainfall in 24-hour period in the WMP.*

[2] *Bengalla EIS Volume 1 Table 51.*

measured and modelled 2022 water balance is likely due to above average rainfall for the Reporting Period.

### 7.2.3 Further Actions

Should any amendments to the WMP be required, BMC will lodge the revised plan with relevant regulatory agencies for comment and then with DPE for approval.

## 7.3 GROUNDWATER

### 7.3.1 Environmental Management

BMC has an approved WMP which describes groundwater management at Bengalla.

***Groundwater Monitoring***

The groundwater monitoring network (shown on **Figure 20**) targets two aquifers being an alluvial aquifer associated with the Hunter River floodplain and a Permian aquifer system.

The alluvium, shallow bedrock and deep bedrock bores are all sampled for Standing Water Level, pH, EC, and Total Dissolved Solids at various frequencies. A chemical analysis including sulphate and metals is also undertaken on several bores annually according to the WMP.

The final development of the new nested bore (located north of BG3) was completed in April 2022. However, sampling of the nested bore was delayed due to safety concerns related to methane gas emissions from the bore. Following several tests of methane levels emitting from the bore, BMC were able to determine the risk is low and sampling commenced in September 2022.

***Monitoring Results for Groundwater Levels, Quality and Baseline Data***

During 2022, BMC undertook investigations into groundwater triggers as per Appendix E of WMP, of which all investigations concluded no environmental harm had occurred. BMC undertook a Groundwater Validation Review (AGE, 2022) in accordance with Condition 25 of Schedule 3 of SSD-5170 in 2022.

**Appendix G** (see **Section 9**) reviews the trends via a summary of the 2022 groundwater monitoring results and comparison with EIS predictions for selected bore groundwater levels and EC in certain locations.

### 7.3.2 Further Actions

BMC will consider the groundwater monitoring and management recommendations identified in **Appendix G** (see **Section 10**) and if reasonable and feasible implement the relevant 2023 actions.

The WMP will be reviewed and updated as required in 2023 according to SSD-5170, including the new trigger levels recommended from the Groundwater Validation Review (AGE, 2022).

BMC will lodge the revised plan with relevant regulatory agencies for comment and then with DPE for approval.

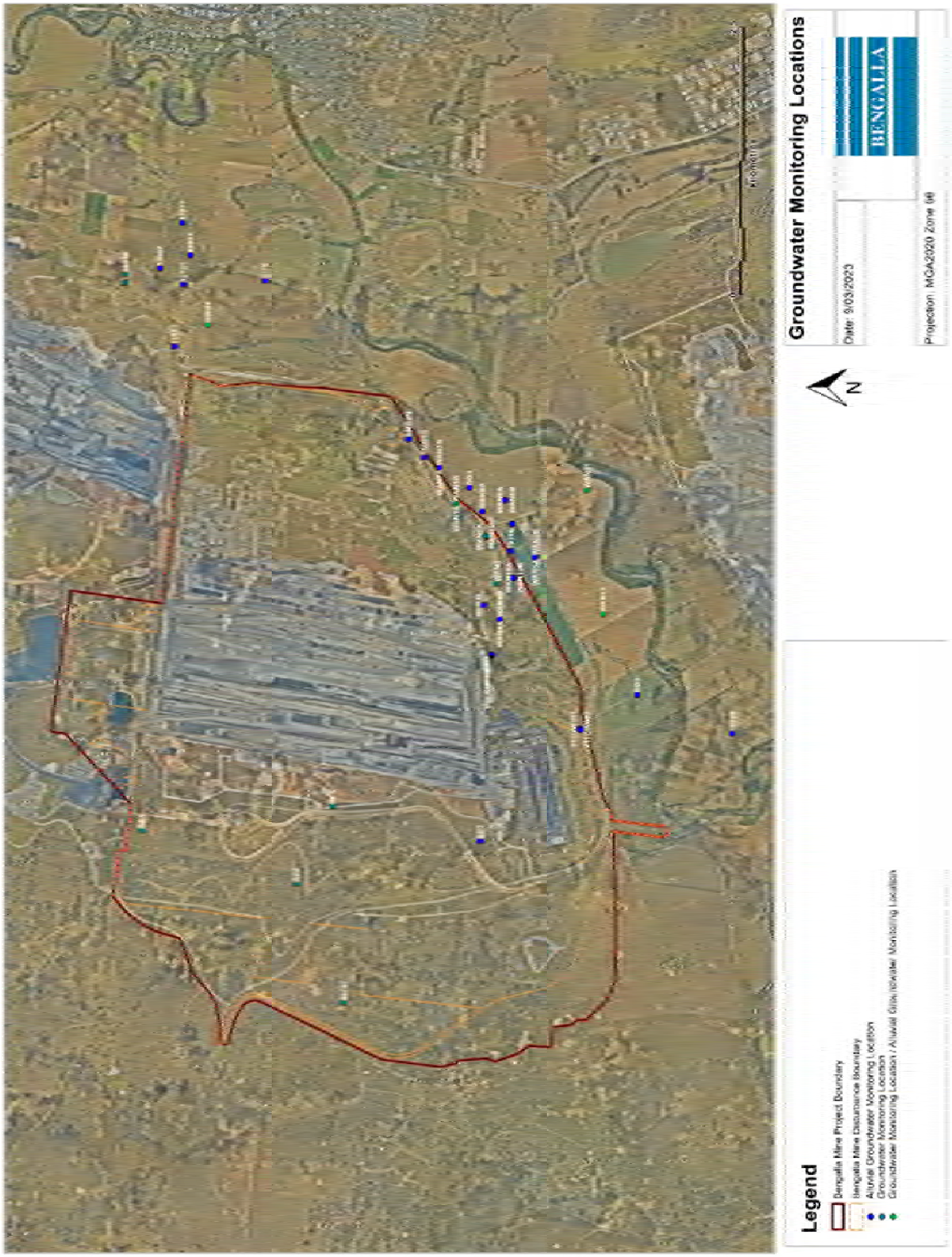



**Figure 20: Groundwater Monitoring Locations**

# 8 REHABILITATION

*This section describes the Bengalla rehabilitation objectives and performance during 2022. Rehabilitation activities planned for the next Reporting Period are also discussed.*

## 8.1 REHABILITATION OBJECTIVES AND FINAL LAND USE

The rehabilitation objectives for Bengalla as described in Schedule 3 Condition 44 of SSD-5170 and the status of each is provided in **Table 27**.

**Table 27: Bengalla Rehabilitation Objectives (from SSD-5170 (as modified))**

| Feature | Objective | Status |
|---|---|---|
| Mine site (as a whole) | • Safe, stable and non-polluting | • Ongoing. See **Section 6.8.1** for a description of Bengalla mineral waste management during 2022. |
| | • Final landforms designed to incorporate natural micro-relief and natural drainage lines, which, where reasonable and feasible, further avoid straight run drainage drop structures, to integrate with surrounding landforms | • Overburden emplacement and rehabilitation activities are undertaken with the objective of achieving the conceptual final landform approved under SSD-5170 (as modified), Forward Program and Rehabilitation Management Plan. |
| Overburden Emplacement Area – exposed to Muswellbrook and Denman | • Rehabilitate the entire face with high density woody vegetation as soon as practicable following the completion of mining operations[1] | • Ongoing. Rehabilitation Management Plan describes implementation of HDWV. |
| Final void | • Designed as a long-term groundwater sink and to maximise groundwater flows across back-filled pits to the final void<br>• Minimise to the greatest extent practicable:<br>o the size and depth of the final void;<br>o the drainage catchment of the final void;<br>o any high wall instability risk; and<br>o risk of flood interaction (flows in and out of the void)<br>• Maximise to the greatest extent practicable the final void landform to be in keeping with the natural terrain features of the surrounding landscape | • Final void designs approved under SSD-5170 to be reviewed at least five years from closure of Bengalla. |
| Agricultural land | • Restore or maintain land capability generally as described in the EIS and | • Ongoing. Rehabilitation activities are undertaken with the objective of |

[1] This part of Schedule 3 Condition 44 was modified in February 2023 by Mod 5 to state "*Rehabilitate the entire face with high density woody vegetation comprising of species commensurate with the surrounding native vegetation communities as soon as practicable following the completion of mining operations*".

| Feature | Objective | Status |
|---|---|---|
| | shown conceptually in Appendix 9 of SSD-5170. | achieving the land capability approved under SSD-5170 and the Rehabilitation Management Plan. |
| Revegetation areas | • Restore a minimum 10% treed coverage at the mine site<br>• Higher density planting along the riparian zone of the Dry Creek reinstatement, and around the final void | • Noted per Appendix 9 of SSD-5170.<br>• The rehabilitation of riparian areas along Dry Creek and the final void are not within the current Forward Program period. |
| Dry Creek reinstatement | • No net loss of creek length;<br>• Restore, maintain and/or improve hydrological and ecological function, quality and geomorphic stability;<br>• Incorporate erosion control measures based on vegetation and engineering revetments; and<br>• Revegetate with suitable native species | • Dry Creek reinstatement planned to commence from around 2030 subject to operational progress. |
| Surface infrastructure | • To be decommissioned and removed, unless RR agrees otherwise | • During 2022 Bengalla decommissioned the ORICA Reload Facility and the BMC Magazine. |
| Community | • Ensure public safety;<br>• Minimise the adverse socio-economic effects associated with mine closure | • Areas restricted to BMC personnel and contractors;<br>• Socio-economic impacts to be reviewed at least five years from closure of Bengalla. |

As described in Section 8.21.5 of the EIS, a mixture of native bushland and cattle grazing have been identified as the most suitable post-mining land uses for most of the land within the Project Boundary except for the eastern face of the OEA (which will be re-vegetated to contain higher density natural woodland). Grazing and native bushland regeneration has therefore been adopted as the preferred post-mining land use in suitable areas of the site.

## 8.2 REHABILITATION MANAGEMENT

### *Rehabilitation Status*

Rehabilitation at Bengalla is undertaken in accordance with SSD-5170 and MOP Amendment D (up until 1 July 2022), the Bengalla Mine Forward Program (post 2 July 2022) and the Rehabilitation Management Plan (RMP) (post 2 July 2022).

The proposed area for new rehabilitation in 2022 was approximately 20ha consisting of Class IV pasture rehabilitation (8.7ha) and High Density Woody Vegetation (HDWV) 11.3ha, focussing on the southern face and crest of the Overburden Emplacement Area (OEA). Additionally, approximately 42ha of retrofitted HDWV tubestock was proposed on the eastern face of the OEA.

During the Reporting Period, no areas of new rehabilitation were completed due to ongoing meteorological conditions impacting the delivery of bulk material for reshaping and final rehabilitation. This is scheduled to be finalised in the current Forward Program period.

During the Reporting Period, BMC continued retrofitting of HDWV tubestock over previously rehabilitated lands. During May 2022, 25ha of tubestock were planted on the eastern face of the OEA. This area was different from what was planned as 27ha of a treed area was previously planted when the original rehabilitation was installed.

The rehabilitation completed for 2021 (previous reporting period), 2022 (this Reporting Period) and the predicted rehabilitation activities for 2023 is summarised in **Table 28**.

**Table 28: Bengalla Rehabilitation Status Summary**

| Mine Area Type | Previous Reporting Period 2021 (ha) | This Reporting Period 2022 (ha) | Next Reporting Period 2023 (ha)[6] |
|---|---|---|---|
| **A. Total mine footprint[1]** | 1,252 | 1,355 | 1,556 |
| **B. Total Active Disturbance[2]** | 946 | 1,047 | 1,229 |
| **C. Land being prepared for rehabilitation[3]** | 0 | 0 | 0 |
| **D. Land Under Active Rehabilitation[4]** | 306[7] | 307 | 327 |
| **E. Completed Rehabilitation[5]** | 0 | 0 | 0 |

***Notes:***

*1. Total mine footprint includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands.*

*2. Includes all areas ultimately requiring rehabilitation including exploration areas, stripped areas ahead of mining, infrastructure and water management areas, sewage treatment facilities, access tracks and haul roads, topsoil stockpiles, active mining areas, overburden emplacements, tailings dams, etc.*

*3. Disturbed land that is under decommissioning, landform establishment and growth medium development.*

*4. Areas under rehabilitation that are being managed to achieve relinquishment.*

*5. Areas of rehabilitation that have been formally signed off by the RR as having successfully met agreed land use objectives and rehabilitation completion criteria.*

*6 Data presented for "Next Reporting Period 2023" is consistent with Bengalla Mine Forward Program and RMP.*

*7 Area miscalculated in Annual Review 2021. Correct area of land under active rehabilitation is 307ha. Note, no rehabilitation has been undertaken in 2022 Reporting Period.*

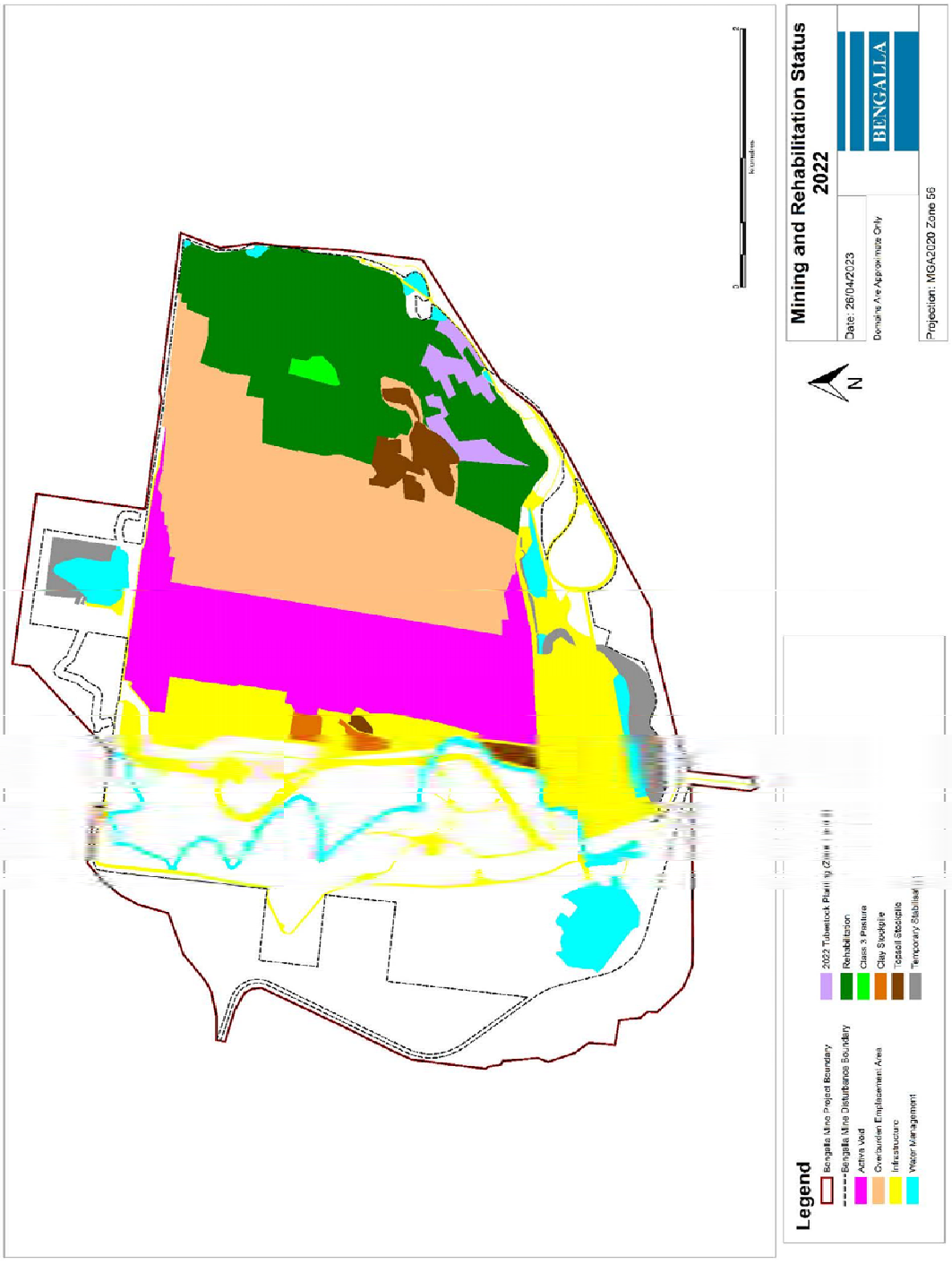



**Figure 21: Mining and Rehabilitation Status 2022**

## 8.3 REHABILITATION MONITORING PROGRAM

Rehabilitation monitoring at Bengalla is undertaken annually through the implementation of the following:

- a transect-based monitoring program; and
- a rehabilitation audit.

During the Reporting Period, rehabilitation monitoring was undertaken during December 2022 and assessed 40 existing rehabilitation sites.

The transect based monitoring conducted during 2022 is presented in **Table 29**, with the locations of each transect shown on Figure 2 of Appendix H. HDWV 35 - 42 were established and monitored following progressive installation of HDWV during the Reporting Period.

**Table 29: Bengalla Rehabilitation Monitoring Program Transects (2022)**

| Transect Name | Description | Rehabilitation Established | Transect Established |
|---|---|---|---|
| Class III | Grazing Pasture | 2012 | 2014 |
| NW1 (HDWV 1) | High density woodland on Class IV or V land | 2005 | 2009 |
| NW2 (HDWV 2) | High density woodland on Class IV or V land | 2004 | 2009 |
| NW3 (HDWV 3) | High density woodland on Class IV or V land | 2008 | 2012 |
| NW4 (HDWV 4) | High density woodland on Class IV or V land | 2007 | 2017 |
| NW6 (HDWV 6) | High density woodland on Class IV or V land | 2014 | 2017 |
| NW7 (HDWV 7) | High density woodland on Class IV or V land | 2015 | 2017 |
| NW8 (HDWV 8) | High density woodland on Class IV or V land | 2016 | 2018 |
| NW9 (HDWV 9) | High density woodland on Class IV or V land | 2016 | 2018 |
| NW10 (HDWV 10) | High density woodland on Class IV or V land | 2006 | 2018 |
| NW11 (HDWV 11) | High density woodland on Class IV or V land | 2004 | 2018 |
| NW14 (HDWV 14) | High density woodland on Class IV or V land | 2020 | 2020 |
| NW15 (HDWV 15) | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV16 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV17 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV18 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV19 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV20 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV21 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV22 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV23 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV24 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV25 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV26 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV27 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV28 | High density woodland on Class IV or V land | 2020 | 2020 |
| HDWV29 | High density woodland on Class IV or V land | 2021 | 2021 |

| Transect Name | Description | Rehabilitation Established | Transect Established |
|---|---|---|---|
| HDWV30 | High density woodland on Class IV or V land | 2021 | 2021 |
| HDWV31 | High density woodland on Class IV or V land | 2021 | 2021 |
| HDWV32 | High density woodland on Class IV or V land | 2021 | 2021 |
| HDWV33 | High density woodland on Class IV or V land | 2021 | 2021 |
| HDWV34 | High density woodland on Class IV or V land | 2021 | 2021 |
| HDWV35 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV36 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV37 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV38 | High density woodland on Class IV or V land (Direct seeding) | 2021 | 2022 |
| HDWV39 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV40 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV41 | High density woodland on Class IV or V land (tubestock) | 2022 | 2022 |
| HDWV42 | High density woodland on Class IV or V land (Aerial seeding) | 2021 | 2022 |

*Source: Koru Environmental Pty Limited, 2022*

### 8.3.1 Rehabilitation Monitoring Results

Following three years of severe drought between 2016-2019, above average rainfall was received during 2020, 2021 and 2022.

During 2022 rehabilitation monitoring continued to focus on rehabilitated areas of the OEA.

The Class III pasture rehabilitation overall showed a satisfactory performance condition in 2022, with high vegetative cover dominated by productive and palatable tropical pasture grasses, high biomass and feed quality, and minimal weed incidence.

Areas of historic HDWV rehabilitation are well established and showed minimal change from the last few years.

Ground layer throughout historic areas remained largely dominated by exotic pasture species – with *Megathyrsus maximus* (Guinea grass) being particularly widespread and abundant; and consistently with previous years the incidence of native ground cover species was overall limited. This however still conforms with the final land use defined for areas of HDWV which are intended to include a component of grazing and therefore needs to include productive and palatable species.

Areas of recent HDWV rehabilitation (established since 2020) were variable in condition.

Soil sampling and analysis was undertaken with testing results generally indicating no key deficiencies in the various growth media.

Weed incursion remained a key issue in 2022, with most problematic species including Galenia, Golden Wreath Wattle and African boxthorn. Galenia has responded rapidly to the

increased rainfall with an increased abundance recorded at many locations. Additionally African boxthorn has also increased. For all these species ongoing management will continue.

Erosion on part of the rehabilitation area was identified including breached contour banks, localised gully erosion and an eroded rock-lined drainage channel. Erosion repairs will be undertaken in some key areas in 2023 on identified eroded areas.

Key observations and actions of the rehabilitation monitoring program are detailed in **Appendix H**.

### 8.3.2 ACTIONS FOR THE NEXT REPORTING PERIOD

Rehabilitation activities for 2023 will be carried out generally in accordance with the Forward Program and Rehabilitation Management Plan subject to operational progress.

Weed control measures will be implemented prior to HDWV establishment in previously rehabilitated land and weed management will continue over the remaining areas of previous rehabilitation.

Remediation works identified in geofluv structures will occur during 2023.

BMC will undertake the recommended actions detailed in **Appendix H** for 2023 where reasonable and feasible that have been identified as part of the 2022 rehabilitation monitoring program.

BMC is considering a modification application of SSD-5170 partly related to the landform. If that modification application is progressed long term stability of the landform will be examined.

# 9 COMMUNITY RELATIONS

*This section includes a summary of the environmental complaints received at Bengalla and community engagement and support activities undertaken during the Reporting Period.*

## 9.1 COMMUNITY ENGAGEMENT

BMC undertook a range of community engagement activities during 2022:

- Bengalla Community Consultative Committee (CCC) meetings. The meetings were held in February, May, August, and November 2022. Minutes of each of these meetings are available at the Muswellbrook Library, Denman Library and on the BMC website. The CCC provides a forum for constructive dialogue and discussion enhancing the relationship between the community and Bengalla. The CCC representatives act as a point of contact to provide feedback between Bengalla and the community.
- Near neighbour consultation regarding impacts, sale of land and other interactions.

During 2022, two Upper Hunter Mining Dialogue School Mines Tours were held with a total of 39 students from Muswellbrook High School and St Joseph's Primary School Denman participating.

## 9.2 COMMUNITY CONTRIBUTIONS

BMC contributes to programs identified by, and preferably in partnership with, the local community. The BMC Community Support Team (CST) meets regularly to assess requests from the local community for donations, sponsorship, and in-kind contributions. Many projects and events have been developed and supported through sponsorship funding and assistance from the BMC CST who provide their time and expertise towards these initiatives. During the Reporting Period some of the groups, schools and clubs supported through the CST include:

- Denman Pony Club
- Muswellbrook Cats AFL Club
- Upper Hunter Community Services
- Muswellbrook High School
- Upper Hunter Youth Services
- Upper Hunter Stock Dog Challenge
- Westpac Charity Golf Day
- Muswellbrook and District Camera Club

During 2022, BMC contributed to the education and career development of students from Muswellbrook, Aberdeen, and Scone High Schools with the provision of undergraduate scholarships. BMC awarded eight (8) scholarships to local students pursuing an

undergraduate degree in 2023, and four full scholarships for students pursuing a career in engineering which includes vacation work at Bengalla. BMC will continue to support local students with scholarship programs again being made available in 2023. In addition, each year in partnership with MIGAS, BMC takes on local apprentices so that at any one time there are 16 apprentices employed by BMC. In 2022, five apprentices were employed, and they will be undertaking their mechanical and electrical studies whilst also working onsite.

The work experience/placement program with local High Schools and TAFE continued in 2022, offering 23 placements to local students and the opportunity to experience the various careers in the mining industry.

The BMC Community Development Fund (CDF) provides funding that is allocated by BMC to support the local community to build community capacity, address development challenges and to take advantage of emerging opportunities. Some of the organisations and projects funded from the CDF in 2022 included:

- The Polly Farmer Foundation - Muswellbrook Follow the Dream Program.
- Scone Charity Rodeo
- Wanaruah Local Aboriginal Lands Council Elders Group
- The Great Cattle Dog Muster
- Merriwa Volunteer Rescue Association
- Upper Hunter Country Tourism Association
- PCYC Muswellbrook Mini Movers Program
- Muswellbrook Shire Council's Rock'n the Brook Music Event

BMC will continue to focus on ensuring the long-term sustainability of the community and target issues, needs and opportunities which are a priority to the local community through the CDF.

In 2022, BMC sponsored and partnered with local community groups including:

- Muswellbrook Shire Council (MSC) Blue Heeler Film Festival and the Easter Family Fun Day
- the Upper Hunter Show
- Muswellbrook Race Club Bengalla Race Day
- Muswellbrook PCYC Fitness Resource
- Upper Hunter Conservatorium of Music
- Upper Hunter Education Fund
- Group 21 Rugby League Competition Naming Rights
- Muswellbrook Chamber of Commerce and Industry Business Awards

- Muswellbrook Netball Association 2022 Major Sponsor
- Muswellbrook Touch Football Association Major Sponsor
- Sponsorship of School Presentation Days in Muswellbrook, Aberdeen, Scone, and Denman

BMC provides funds to MSC according to the Voluntary Planning Agreement (VPA). A total of $867,594 was provided under the VPA to MSC during the Reporting Period.

In addition, BMC provides funds towards events, organisations, clubs, and charities in the local community. The following funds were allocated/provided during the Reporting Period:

- CDF: $264,575
- Scholarships: $74,000
- CST and Sponsorships: $391,525

## 9.3 COMMUNITY COMPLAINTS

BMC maintains a register of complaints and a complaints hotline (1800 178 984) which operates 24 hours, 7 days per week. BMC received 33 complaints during the Reporting Period, a decrease compared to the 68 complaints received in 2021 and 51 complaints in 2020.

During the Reporting Period, the most common environmental complaints raised by complainants related to blasting - 22, noise - 7 and air quality - 2. A summary of complaints received during the Reporting Period is provided in **Figure 22**.

The environmental complaints for 2022 were less than complaints received during 2021 which comprised of blasting - 41, noise - 16 and air quality – 7. During 2020 complaints comprised of blasting - 24, noise - 9 and air quality – 5 due to drought conditions.

BMC responds to complaints by assessing whether any action is required. If action is undertaken those actions are generally recorded and displayed in the complaints register displayed on the BMC website.

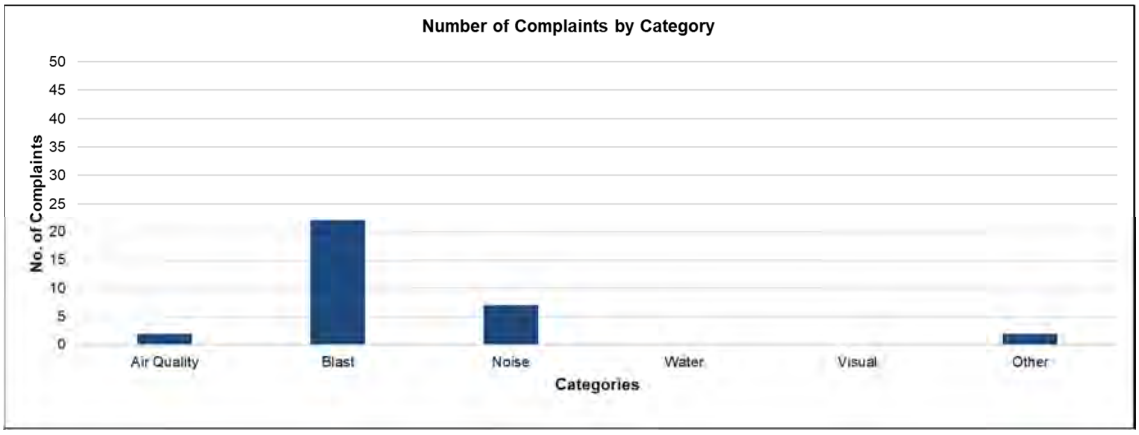



**Figure 22: Environmental Complaints Received 2022**

# 10 INDEPENDENT ENVIRONMENTAL AUDIT

*This section discusses the requirement for an Independent Environmental Audit (IEA) of the development the subject of SSD-5170 and Dams Safety NSW audit of Dams Safety Regulation 2019 and Mining Approvals 1-3.*

## 10.1 SSD-5170

In accordance with Schedule 5, Condition 9 of SSD-5170, BMC is required to commission an IEA of Bengalla within 1 year of the commencement of SSD-5170 (i.e. 2016) and every 3 years thereafter.

The most recent IEA was conducted in December 2019. Actions arising from this audit are being addressed and are detailed in **Appendix K**.

The next IEA was scheduled to be commissioned by 1 October 2022. BMC submitted auditor details to DPE on 28 September 2022, 14 October 2022, 16 January 2023 and 27 January 2023. The DPE approved the audit team on 31 January 2023. An audit team member has resigned from RPS, so BMC is seeking approval of a new audit team member.

The IEA is scheduled to be completed during second quarter 2023 and audit actions will be reported in the 2023 Annual Review.

## 10.2 DAMS SAFETY REGULATION 2019 AND MINING APPROVALS 1-3

Dams Safety Regulation 2019 commenced on 1 November 2019. As of 1 November 2021, any transitional arrangements and savings provisions have concluded, and all clauses of the regulation has commenced.

The purpose of the audit was to determine implantation and if applicable, identify high level compliance gaps with nominated elements of the Dam Safety Regulation 2019 (NSW). The audit reviewed the management practices in relation to Bengalla declared dams, particularly the Operation and Maintenance Plans, the Emergency Plans, and the Dam Safety Management System (together the Dams Safety NSW Plans).

The issue date of the Dams Safety NSW audit report was 9 March 2022. BMC reviewed the Dams Safety NSW Plans and adopted revised versions.

# 11 INCIDENTS AND NON-COMPLIANCES

*This section provides further information about the non-compliances identified in **Section 1** and describes the reportable incidents and exceedances that occurred at Bengalla during the Reporting Period.*

## 11.1 FURTHER INFORMATION ABOUT NON-COMPLIANCES

### 11.1.1 Elevated TSS Concentrations during Discharge Event 16 August 2022

- Summary

BMC recorded an elevated TSS reading (9,510 mg/L) at EPL 6538 monitoring point 26 during an authorised HRSTS water discharge event on 16 August 2022 (Discharge Event). The Discharge Event was notified to the DPE, EPA and DCCEEW.

- Details

The risk of actual or potential harm to the environment was investigated, and an expert report provided by BMC to the EPA, DPE and DCCEEW in September 2022 concluded that based on the assessment in the report the increase in sediment load at the Hunter River as a result of the discharge was negligible, well within allowable limits and is very unlikely to have resulted in any perceptible effect on the environment.

The EPA issued an Official Caution in respect of the Discharge Event on 10 March 2023.

- Actions taken to ensure compliance

BMC has reviewed the operation of the discharge dam and sampling procedures. BMC is also undertaking a program to desilt DW1.

### 11.1.2 Exceedance of Hourly Volume Discharge Limit 6-7 July 2022

- Summary

During the Reporting Period BMC notified the EPA of a potential breach of Conditions L1 and E1.3 of EPL 6538 regarding hourly volume discharge limits under the Hunter River Salinity Trading Scheme (HRSTS) on 6-7 July 2022.

- Details

At 23:41 on 6 July 2022, during the discharge that was occurring pursuant to Block 2022 – 189(2), BMC received notice that site discharge period Block 2022 – 189(3) had been determined although, as a consequence of the time of day, the determination went undetected by BMC's staff. Block 2022 – 189(3) applied to the same site discharge period as Block 2022 – 189(1) and Block 2022 – 189(2) but had the effect of decreasing the discharge rate. This resulted in changing the criteria that applied for the last 4 hours and 19 minutes of the relevant Block and as a consequence the discharge exceeded the requirement of Condition E1.3 of the EPL.

BMC did not expect any reduction in the amount of discharge that would be authorised due to the flow within the Hunter River over the relevant Block during that day. Any reduction in the

allowable discharge has the effect of putting BMC into technical non-compliance with Condition E1.3, as even when the notice is issued during the day there will always be a lag involved in calculating the revised parameters and physically implementing the changes required.

The matter was investigated, and an expert report provided to the EPA. The report analysed the salt mass discharged from Bengalla and the state of the Hunter River during the discharge that occurred between Water NSW issuing Block 189(3) under the HRSTS and BMC completing the discharge. In summary, the report concluded the exceedance of the allowable discharge limit was negligible and unlikely to have any significant environmental consequence.

BMC did not receive a response from the EPA to the report.

- Actions taken to ensure compliance

BMC has taken steps to monitor the river registers for the entirety of Block periods.

### 11.1.3 Long-term Security for Biodiversity Offsets

- Summary

BMC is taking steps to comply with Schedule 3 Condition 28 of SSD-5170 which requires BMC to make suitable arrangements to provide appropriate long term security for the Biodiversity Offset Areas through a Biobanking Agreement under the *Threatened Species Conservation Act 1995* (or an alternative mechanism agreed with BCD) to the satisfaction of the Secretary.

- Details

All Biodiversity Offset Areas identified in the relevant approvals are owned by the BJV and managed by BMC. All Biodiversity Offset Areas are managed in accordance with the BOMP.

By letter dated 6 October 2020, the Secretary agreed to an extension of time until 30 June 2022 to finalise the long-term security of the Biodiversity Offset Areas under Schedule 3 Condition 28 of SSD-5170. At this stage, the DPE has not granted a further extension in which to comply with the condition.

- Actions taken to ensure compliance

BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing the offsets. Following that correspondence, BMC is taking steps to progress Biodiversity Stewardship Agreements for the offset areas. In the meantime, the offset areas continued to be owned by the BJV and managed by BMC in accordance with the BOMP.

## 11.2 REPORTABLE INCIDENTS OR EXCEEDANCES

There were no "*incidents*" (as that term is defined in SSD-5170) during the Reporting Period.

**Table 30** provides details of matters or exceedances during the Reporting Period that were reported by BMC to regulatory authorities. Matters addressed at **Section 11.1** are not reproduced in **Table 30.**

**Table 30: Reportable Matters or Exceedances 2022**

| No | Date | Reported To | Nature | Details | Action Taken | Matter Status |
|---|---|---|---|---|---|---|
| 1. | 28 Jan 2022 | DPE | Air Quality | Potential exceedance of 24-hour air quality criteria at PM10-4 | Expert report (concluding BMC did not exceed criteria) supplied to DPE. BMC also supplied operations summary for relevant date to DPE. | No further action required. Completed and closed. |
| 2. | 15 Feb 2022 | DPE | Air Quality | Potential exceedance of 24-hour air quality criteria at PM10-4 | Expert report (concluding BMC did not exceed criteria) supplied to DPE. BMC also supplied operations summary for relevant date to DPE. | No further action required. Completed and closed. |
| 3. | 13 Sep 2022 | DPE | Air Quality | Potential exceedance of 24-hour air quality criteria at PM10-4 | Expert report (concluding BMC did not exceed criteria) supplied to DPE. BMC also supplied operations summary for relevant date to DPE. | No further action required. Completed and closed. |
| 4. | 30 Nov 2022 | DPE | Air Quality | Potential exceedance of 24-hour air quality criteria at PM10-4 | Expert report (concluding BMC did not exceed criteria) supplied to DPE. | No further action required. Completed and closed. |

| No | Date | Reported To | Nature | Details | Action Taken | Matter Status |
|---|---|---|---|---|---|---|
| | | | | | BMC also supplied operations summary for relevant date to DPE. | |

## 11.3 ACTIONS TO BE TAKEN TO PREVENT ENVIRONMENTAL INCIDENTS

BMC seeks to improve environmental and community performance through training of employees and contractors and implementation of the BMC environmental management system.

# 12 ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD

*This section summarises the operational and environmental management activities proposed to be undertaken during 2023.*

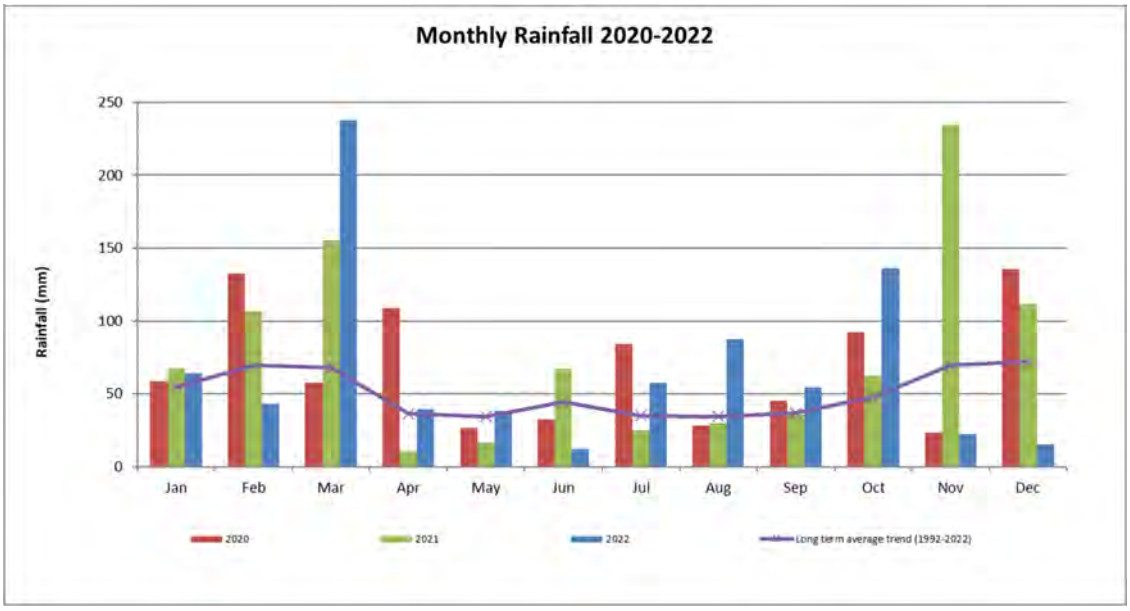
A summary of key environmental management activities proposed for 2023 is presented in **Table 31**. Progress against these activities will be reported in the 2023 Annual Review.

**Table 31: Environmental Management Activities Proposed for 2023**

| Area / Issue | Actions Proposed | Timeline for Implementation |
|---|---|---|
| Air quality | Implementation of updated Air Quality monitoring network. | December 2023 (subject to change due to delivery time of monitors and mains power supply to monitor site). |
| Regulatory | Continued assessment and preparation of SSD-5170 Modification Application 6. | To be confirmed. |
| Audit | Undertake Independent Environmental Audit. | To be progressed during 2023. |
| Management Plans | Undertake reviews of management plans in accordance with SSD-5170. | Following approval of Mod 5. |
| Tree Screening | Progress Denman Road tree screening (Schedule 3, Condition 40 and 41A of SSD-5170). | To be progressed during 2023. |
| Offsets | Progress long-term security of biodiversity offset areas (Schedule 3, Condition 28 of SSD-5170). | To be progressed during 2023. |
| Rehabilitation | Undertake new rehabilitation and installation of HDWV into existing rehabilitation according to the Rehabilitation Management Plan and Forward Program.<br>Commence Rehabilitation Strategy (Schedule 3, Condition 47 of SSD-5170). | To be progressed during 2023. |
| Noise | Upgrade Roxburgh real time noise monitor | Around May 2023. |

# Appendix A

## *Meteorological Monitoring Summary*




**Graph A1**
**Bengalla Monthly Rainfall 2020 to 2022**

**Table A1**
**Monthly Temperatures 2022**

| Month | Minimum Daily Temperature (°C) | Maximum Daily Temperature (°C) |
|---|---|---|
| January | 13.8 | 34.3 |
| February | 10.7 | 35.3 |
| March | 10.5 | 31.6 |
| April | 5.7 | 29.1 |
| May | 1.0 | 26.2 |
| June | -2.5 | 20.5 |
| July | -2.7 | 19.0 |
| August | -0.1 | 22.7 |
| September | 2.3 | 23.8 |
| October | 3.1 | 28.0 |
| November | 3.1 | 32.9 |
| December | 5.0 | 34.5 |

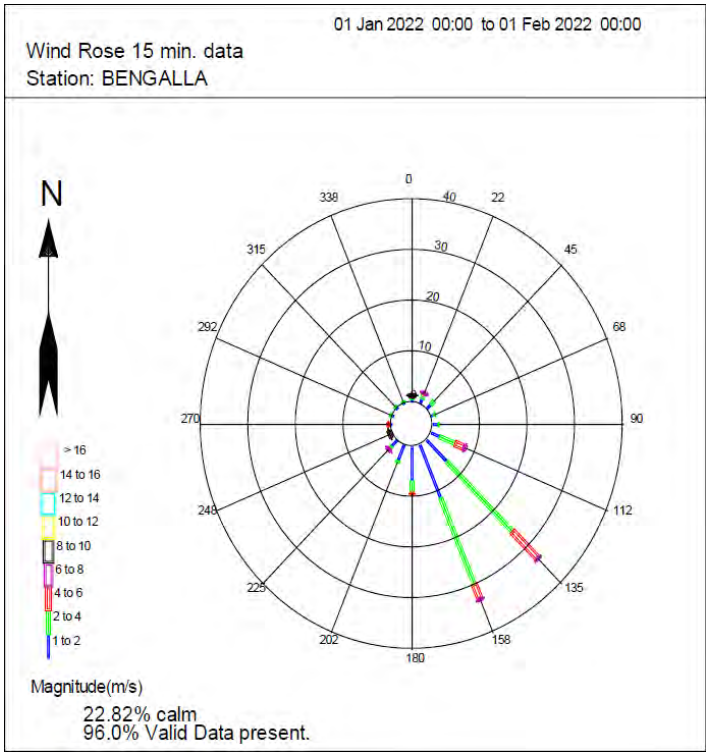



**Figure A1**
**Bengalla January 2022 Windrose**

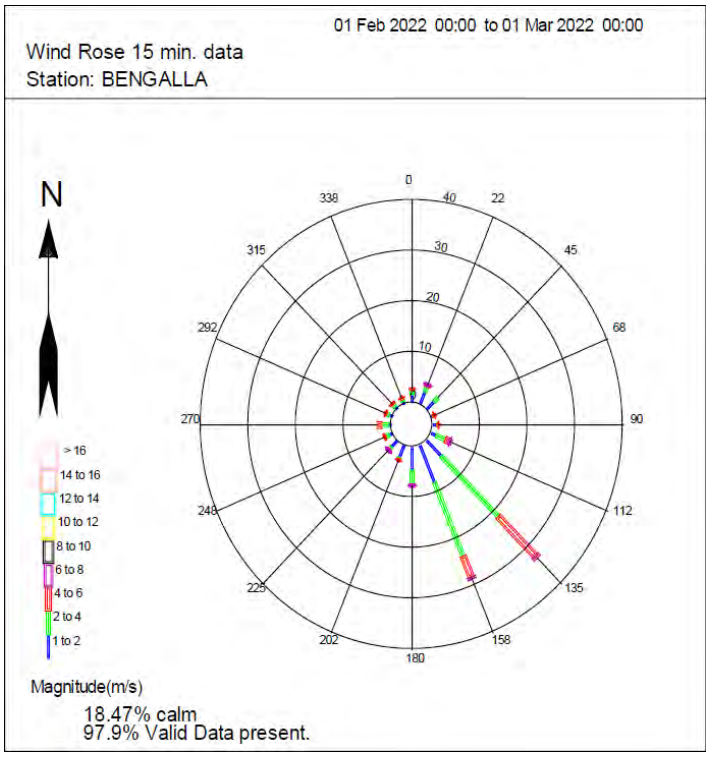



**Figure A2**
**Bengalla February 2022 Windrose**

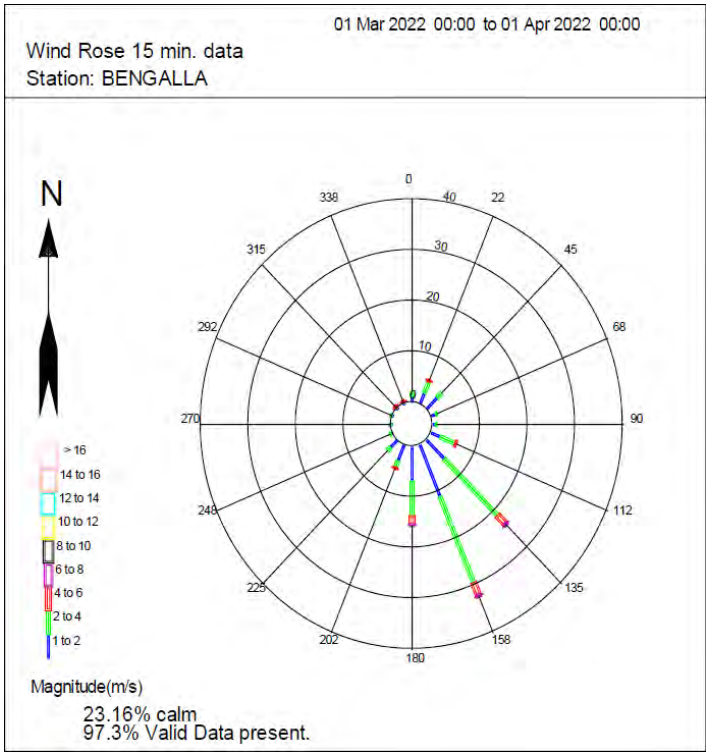



**Figure A3**
**Bengalla March 2022 Windrose**

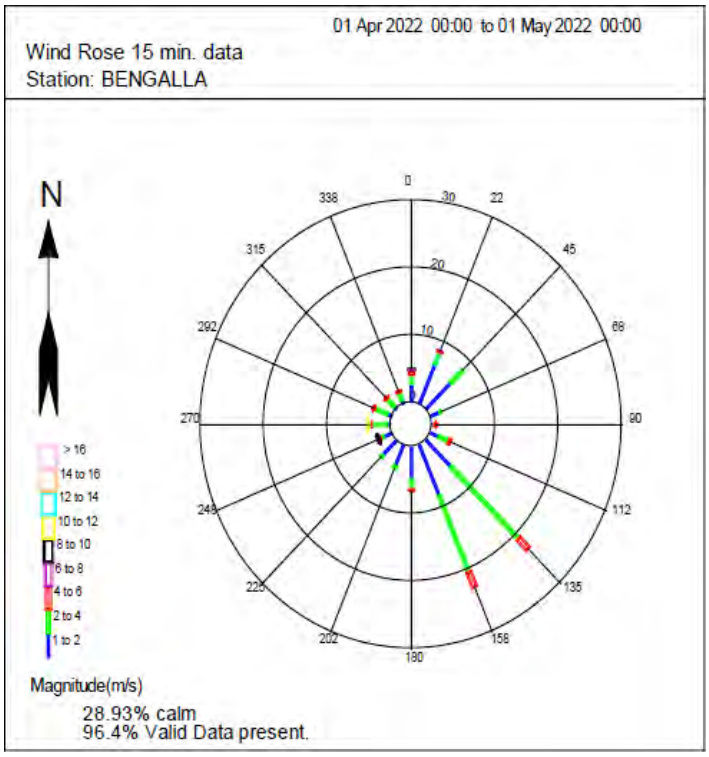



**Figure A4**
**Bengalla April 2022 Windrose**

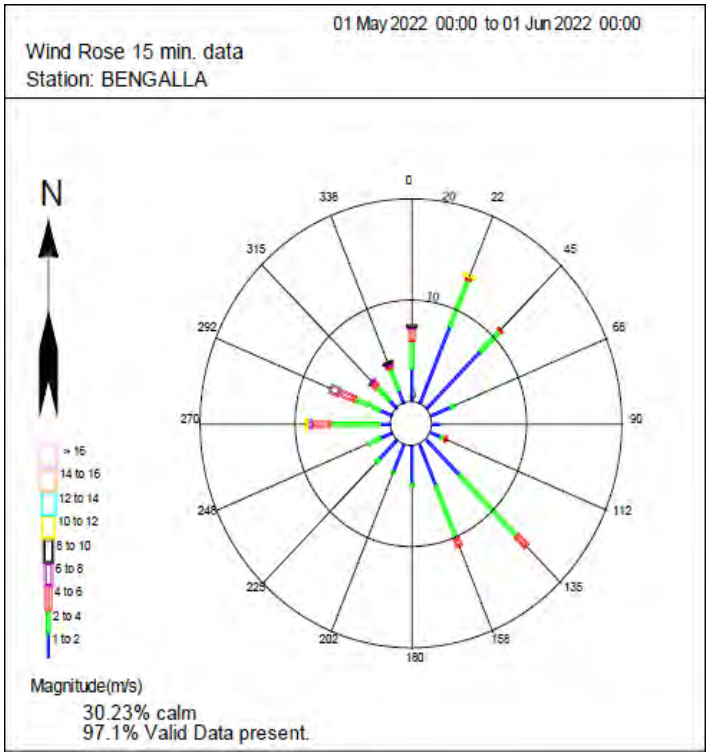



**Figure A5**
**Bengalla May 2022 Windrose**

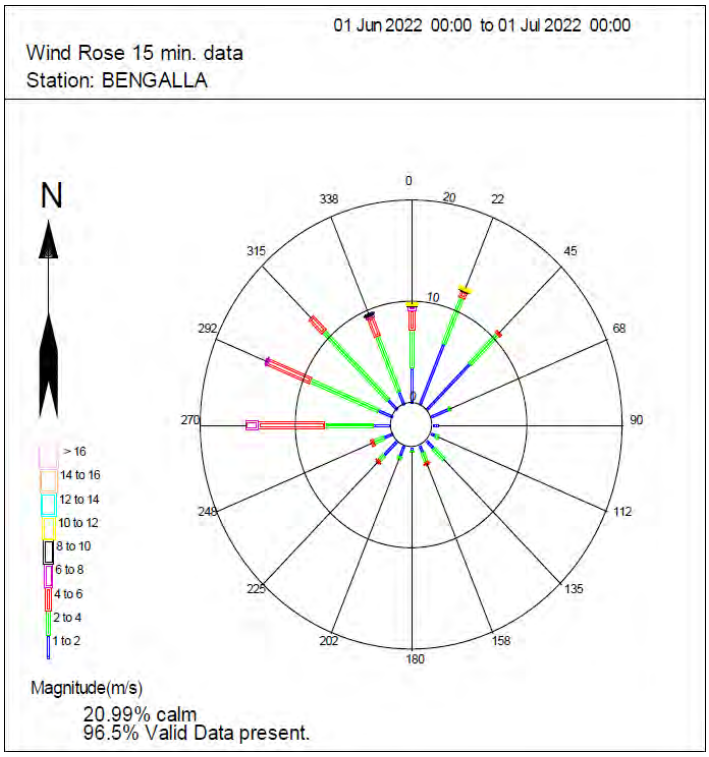



**Figure A6**
**Bengalla June 2022 Windrose**

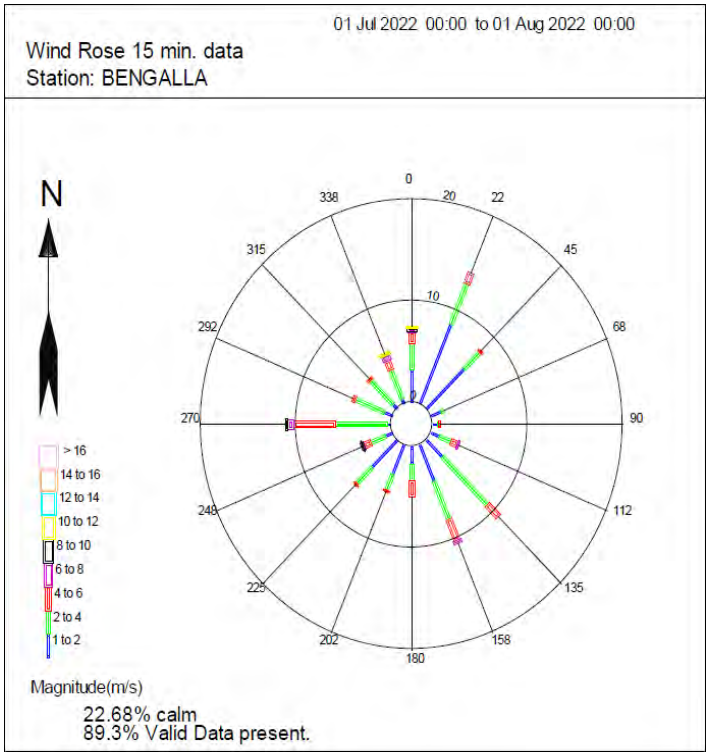



**Figure A7**
**Bengalla July 2022 Windrose**

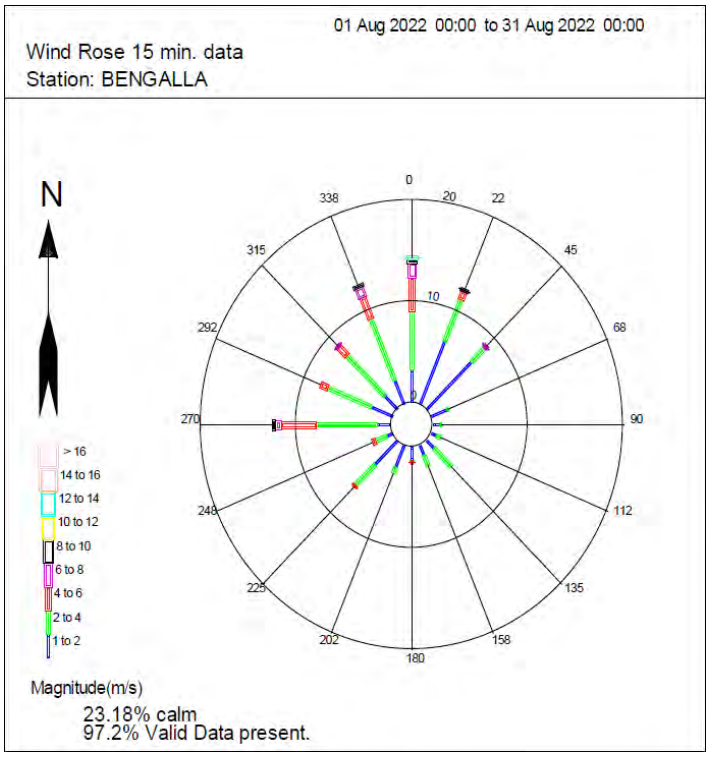



**Figure A8**
**Bengalla August 2022 Windrose**

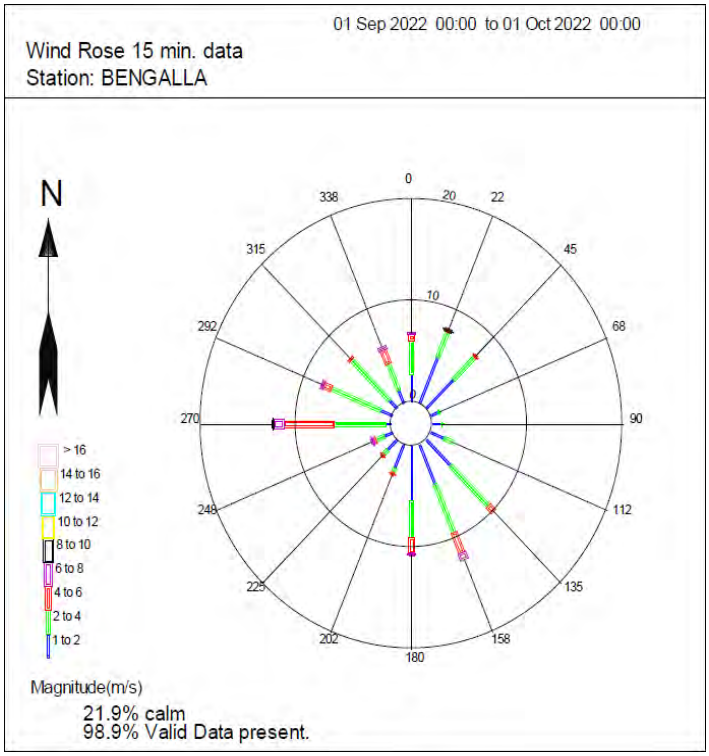



**Figure A9**
**Bengalla September 2022 Windrose**

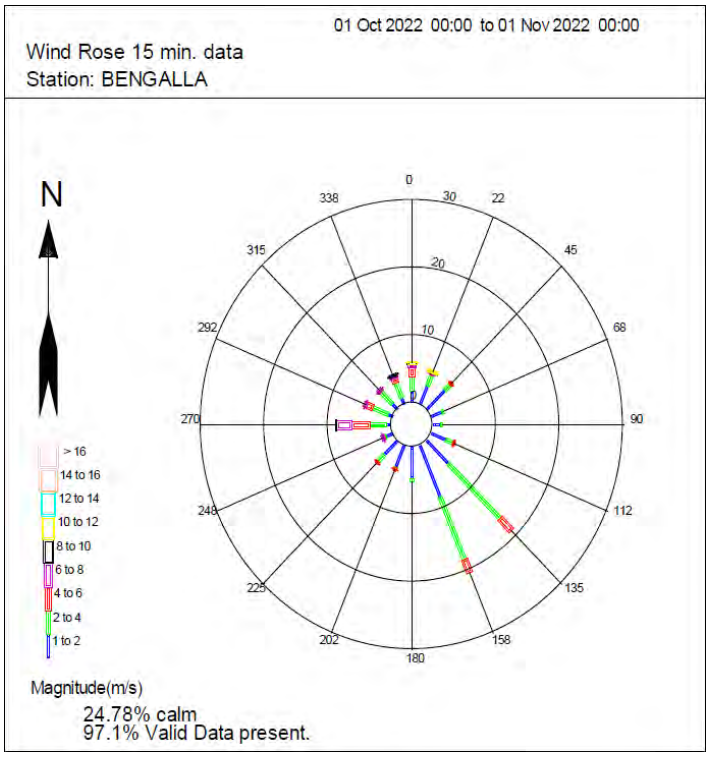



**Figure A10**
**Bengalla October 2022 Windrose**

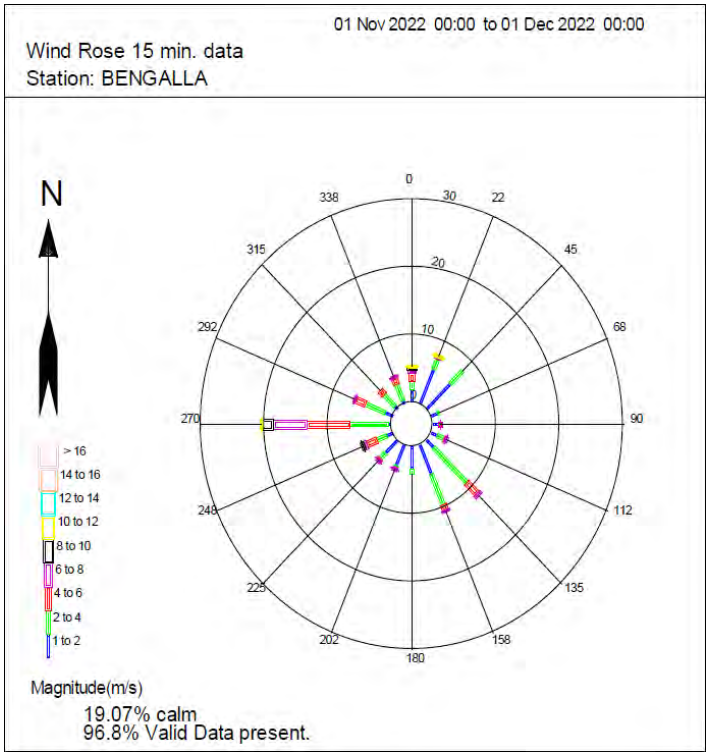



**Figure A11**
**Bengalla November 2022 Windrose**

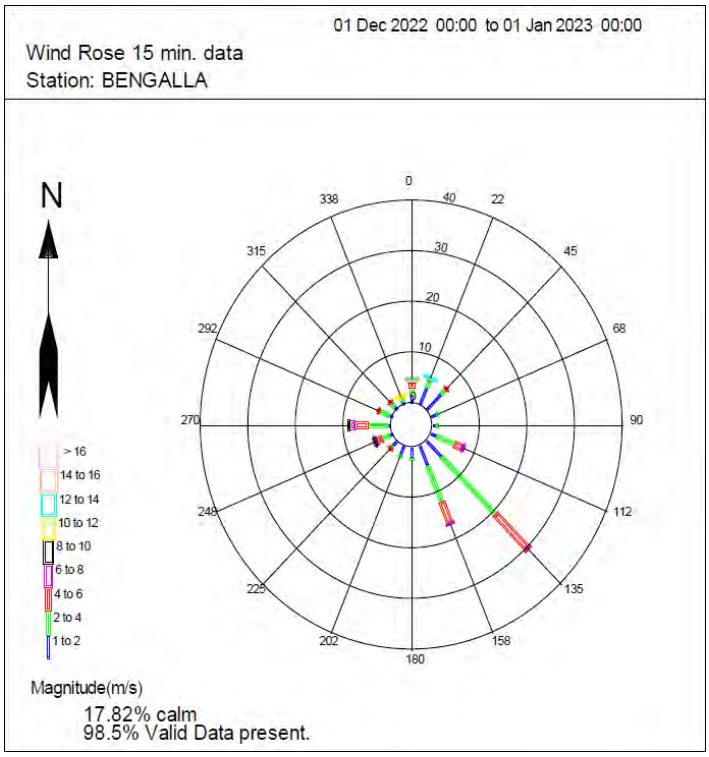



**Figure A12**
**Bengalla December 2022 Windrose**

***Notes:***
*Sourced from Benchmark Monitoring.*

# Appendix B

## *Noise Monitoring Summary*

## Table B1
## Summary of Compliance Attended Noise Monitoring Results 2022

| Site | Month | Met Conditions within Range? [3] | BMC only $LA_{eq}$ dB [1] | BMC Impact Assessment $LA_{eq}$ criterion [1, 4] | BMC only $LC_{eq}$ dB [2] | BMC Impact Assessment $LC_{eq}$ criterion [2, 4] | BMC only $LA_{1,1\ min}$ dB [5] | BMC $LA_{1,1\ min}$ criterion [4] | Exceedance dB |
|---|---|---|---|---|---|---|---|---|---|
| AN01 | Jan-22 | Yes | 31 | 35 | 53 | 60 | 37 | 45 | No |
| | Feb-22 | Yes | 26 | 35 | 48 | 60 | 32[6] | 45 | No |
| | Mar-22 | Yes | 33 | 35 | 55 | 60 | 41[6] | 45 | No |
| | Apr-22 | Yes | 27 | 35 | 52 | 60 | 30 | 45 | No |
| | May-22 | Yes | 35 | 35 | 56 | 60 | 46[6] | 45 | No (within 2 dBA) |
| | Jun-22 | No | 24 | 35 | 49 | 60 | 28 | 45 | No |
| | Jul-22 | No | 30 | 35 | 55 | 60 | 31 | 45 | No |
| | Aug-22 | Yes | 30 | 35 | 52 | 60 | 36 | 45 | No |
| | Sep-22 | No | 29 | 35 | 48 | 60 | 34 | 45 | No |
| | Oct-22 | No | IA | 35 | IA | 60 | IA | 45 | No |
| | Nov-22 | No | 27 | 35 | 50 | 60 | 35 | 45 | No |
| | Dec-22 | Yes | 31 | 35 | 50 | 60 | 36 | 45 | No |

| Site | Month | Met Conditions within Range? [3] | BMC only $LA_{eq}$ dB [1] | BMC Impact Assessment $LA_{eq}$ criterion [1, 4] | BMC only $LC_{eq}$ dB [2] | BMC Impact Assessment $LC_{eq}$ criterion [2, 4] | BMC only $LA_{1,1\ min}$ dB [5] | BMC $LA_{1,1\ min}$ criterion [4] | Exceedance dB |
|---|---|---|---|---|---|---|---|---|---|
| AN03 | Jan-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | Feb-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | Mar-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | Apr-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | May-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | Jun-22 | No | <30 | 40 | <58 | 60 | <35 | 45 | No |
| | Jul-22 | No | est 30 | 40 | est 52 | 60 | <35 | 45 | No |
| | Aug-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |
| | Sep-22 | No | IA | 40 | IA | 60 | IA | 45 | No |
| | Oct-22 | No | IA | 40 | IA | 60 | IA | 45 | No |
| | Nov-22 | No | 36 | 40 | 58 | 60 | 39 | 45 | No |
| | Dec-22 | Yes | IA | 40 | IA | 60 | IA | 45 | No |

| Site | Month | Met Conditions within Range? [3] | BMC only $LA_{eq}$ dB [1] | BMC Impact Assessment $LA_{eq}$ criterion [1, 4] | BMC only $LC_{eq}$ dB [2] | BMC Impact Assessment $LC_{eq}$ criterion [2, 4] | BMC only $LA_{1,1\ min}$ dB [5] | BMC $LA_{1,1\ min}$ criterion [4] | Exceedance dB |
|---|---|---|---|---|---|---|---|---|---|
| AN04 | Jan-22 | Yes | IA | 35 | IA | 60 | IA | 45 | No |
| | Feb-22 | Yes | IA | 35 | IA | 60 | IA | 45 | No |
| | Mar-22 | Yes | IA | 35 | IA | 60 | IA | 45 | No |
| | Apr-22 | Yes | IA | 35 | IA | 60 | IA | 45 | No |
| | May-22 | No | IA | 35 | IA | 60 | IA | 45 | No |
| | Jun-22 | Yes | 36[7] | 35 | 54 | 60 | 43[8] | 45 | No |
| | Jul-22 | No | 35 | 35 | 57 | 60 | 47[8, 9] | 45 | No |
| | Aug-22 | Yes | IA | 35 | IA | 60 | IA | 45 | No |
| | Sep-22 | No | est 32 | 35 | IA | 60 | IA | 45 | No |
| | Oct-22 | No | est 34 | 35 | approx. 54 | 60 | est 36 | 45 | No |
| | Nov-22 | No | est 28 | 35 | est 50 | 60 | est 32 | 45 | No |
| | Dec-22 | Yes | 28 | 35 | 50 | 60 | 31 | 45 | No |

*Source: Bridges Acoustics (2022)*

***Notes** (modified from Bridges Acoustics, 2022)*

*1. LAeq,15minute operational noise levels for BMC in the absence of all other noise sources;*

*2. LCeq,15minute operational noise levels for BMC in the absence of all other noise sources.*

*3. 'Yes' denotes meteorological conditions result in relevant criteria being applicable. 'No' denotes meteorological conditions are outside those specified in NSW Industrial Noise Policy;*

*4. From SSD-5170 (as modified) and EPL 6538. Monitoring locations AN02 and AN03 are closer to mining operations than the nearest private receiver. A correction factor has been applied based on noise modelling for the continuation of Bengalla Mine EIS (Hanson Bailey, 2013) as outlined in the approved NMP;*

*5. LA1,1minute operational noise levels for BMC in the absence of all other noise source;*

*6. The reported LA1,1min level includes a +5 dBA correction to periods of tonal noise*

*7. The estimated noise level of LAeq,15min is within 2 dBA of the criterion and is therefore considered compliant with the relevant conditions of SSD-5170.*

*8. The reported LA1,1min level includes a +5 dBA correction to periods of tonal noise.*

*9. The tonal-corrected noise level of LA1,1min is within 2 dBA above the criterion and occurred under invalid weather conditions and therefore compliant with relevant conditions of SSD-5170.*

*IA = inaudible*

# Appendix C

## *Blast Monitoring Summary*

## Table C1

## Blast Monitoring Summary – 2022

| BLAST DETAILS | | | | GROUND VIBRATION (mm/s) | | | OVERPRESSURE (dBL) | | |
|---|---|---|---|---|---|---|---|---|---|
| Event No. | Date | Time of Blast | Blast Code | Blake | Moore | School | Blake | Moore | School |
| 1 | 04/01/22 | 11:38:45 AM | S39-26-IB-VARL | 0.15 | 1.79 | 0.16 | 109.1 | 106.7 | 86.8 |
| 2 | 04/01/22 | 11:40:21 AM | S39-17-IB-PF2 | 0.03 | 0.27 | 0.02 | 102.6 | 103.6 | 99.4 |
| 3 | 07/01/22 | 4:19:32 PM | S38-20-PS-BYWN | 0.38 | 1.06 | 0.16 | 103.0 | 103.2 | 92.5 |
| 4 | 07/01/22 | 4:49:03 PM | S39-24-IB-VARL | 0.25 | 0.08 | 0.19 | 99.3 | 96.1 | 87.0 |
| 5 | 08/01/22 | 3:59:32 PM | S37-11-IB-WN | 0.03 | 0.17 | 0.01 | 88.9 | 94.2 | 91.8 |
| 6 | 11/01/22 | 2:54:33 PM | S38-22-IB-BR2C | 0.05 | 0.21 | 0.05 | 99.5 | 108.0 | 93.8 |
| 7 | 14/01/22 | 3:03:27 PM | S38-16-IB-BR1 | 0.03 | 0.36 | 0.03 | 88.1 | 91.2 | 86.3 |
| 8 | 15/01/22 | 1:00:06 PM | S39-29-CI-MAPF & S39-30-PS-PF2 | 0.05 | 0.31 | 0.04 | 86.5 | 97.3 | 88.6 |
| 9 | 18/01/22 | 3:27:20 PM | S39-22-IB-VARL | 0.23 | 2.00 | 0.07 | 97.6 | 98.9 | 94.2 |
| 10 | 24/01/22 | 11:31:27 AM | S38-11-IB-BR1 | 0.23 | 2.00 | 0.07 | 97.6 | 98.9 | 94.2 |
| 11 | 25/01/22 | 2:58:02 PM | S39-13-CI-MAPF | 0.11 | 1.09 | 0.04 | 90.0 | 100.1 | 87.7 |
| 12 | 28/01/22 | 12:22:37 PM | S39-20-IB-VARL | 0.28 | 1.52 | 0.13 | 86.0 | 99.5 | 87.8 |
| 13 | 01/02/22 | 12:46:55 PM | S41-00-IB-RL181 | 0.06 | 0.35 | 0.02 | 84.3 | 101.8 | 93.5 |
| 14 | 02/02/22 | 11:11:07 AM | S43-02-IB-RL180 | 0.30 | 3.09 | 0.09 | 94.3 | 105.3 | 92.3 |
| 15 | 02/02/22 | 2:57:14 PM | S38-18-IB-BR2A & S38-15-IB-BR1 | 0.10 | 0.87 | 0.06 | 98.6 | 101.1 | 89.4 |
| 16 | 04/02/22 | 3:00:51 PM | S39-10-IB-MA1 | 0.09 | 0.57 | 0.03 | 97.7 | **115.0** | 101.0 |
| 17 | 07/02/22 | 10:35:51 AM | S39-05-IB-MA1 | 0.19 | 2.40 | 0.05 | 100.1 | 106.1 | 96.9 |
| 18 | 09/02/22 | 4:39:18 PM | S38-19-IB-BR2C | 0.10 | 0.60 | 0.10 | 97.5 | 100.2 | 98.4 |
| 19 | 09/02/22 | 4:39:59 PM | S37-20-IB-WN | 0.03 | 0.06 | 0.01 | 88.9 | 96.2 | 84.3 |
| 20 | 10/02/22 | 4:30:11 PM | S38-19-IB-BR2A | 0.05 | 0.41 | 0.04 | 89.4 | 94.3 | 90.3 |
| 21 | 14/02/22 | 3:53:22 PM | S39-29-IB-PF2 | 0.14 | 0.63 | 0.10 | 87.0 | 99.6 | 87.6 |
| 22 | 16/02/22 | 12:07:25 PM | S37-03-IB-WN | 0.07 | 0.55 | 0.04 | 95.5 | 100.1 | 97.6 |
| 23 | 17/02/22 | 3:06:55 PM | S39-10-CI-MAPF | 0.19 | 1.28 | 0.06 | 94.2 | 98.2 | 91.6 |
| 24 | 19/02/22 | 4:12:40 PM | S39-14-IB-PF2 | 0.07 | 0.59 | 0.03 | 107.6 | 114.4 | 95.0 |
| 25 | 22/02/22 | 2:37:42 PM | S39-19-IB-VARL | 0.22 | 1.59 | 0.08 | 114.7 | 106.6 | 102.2 |
| 26 | 25/02/22 | 12:00:51 PM | S39-02-IB-MA1 | 0.19 | 1.35 | 0.05 | 95.8 | 109.0 | 94.7 |
| 27 | 26/02/22 | 3:28:34 PM | S38-12-PS-BYWN & S38-15-IB-BR2C | 0.25 | 2.25 | 0.16 | 99.1 | 104.6 | 91.8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 28 | 28/02/22 | 2:56:17 PM | S39-07-CI-MAPF | 0.14 | 0.80 | 0.04 | 107.4 | 101.0 | 93.5 |
| 29 | 01/03/22 | 12:05:54 PM | S39-03-IB-MA1 | 0.10 | 0.72 | 0.03 | 95.3 | 106.4 | 83.7 |
| 30 | 03/03/22 | 11:57:33 AM | S37-07-IB-WN | 0.07 | 0.54 | 0.03 | 102.1 | 105.1 | 96.9 |
| 31 | 07/03/22 | 12:20:00 PM | S38-04-IB-BR1 | 0.22 | 2.04 | 0.08 | 90.0 | 97.6 | 94.3 |
| 32 | 12/03/22 | 2:21:39 PM | S38-06-IB-BR1 | 0.20 | 1.00 | 0.06 | 102.5 | 105.8 | 98.2 |
| 33 | 15/03/22 | 3:04:28 PM | S39-27-IB-VA1 | 0.10 | 0.51 | 0.08 | 111.0 | 104.8 | 93.3 |
| 34 | 15/03/22 | 3:06:00 PM | S39-13-IB-VA1 | 0.48 | 3.26 | 0.09 | 100.9 | 107.1 | 88.3 |
| 35 | 18/03/22 | 11:01:05 AM | S39-02-PS-PF2 | 0.16 | 0.53 | 0.04 | 82.0 | 85.3 | 96.4 |
| 36 | 18/03/22 | 11:01:49 AM | S39-03-CI-MAPF | 0.12 | 0.56 | 0.03 | 87.4 | 99.4 | 88.2 |
| 37 | 21/03/22 | 11:06:54 AM | S38-02-IB-BR1 | 0.21 | 1.33 | 0.03 | 87.8 | 96.4 | 87.0 |
| 38 | 21/03/22 | 11:07:57 AM | S39-02-CI-MAPF | 0.12 | 0.63 | 0.04 | 91.0 | 99.4 | 86.6 |
| 39 | 22/03/22 | 11:56:42 AM | S39-10-IB-PF2 | 0.11 | 0.90 | 0.05 | 88.7 | 101.4 | 89.3 |
| 40 | 23/03/22 | 11:08:03 AM | S38-02-IB-BR1 | 0.19 | 0.86 | 0.12 | 92.4 | 97.7 | 94.0 |
| 41 | 25/03/22 | 2:32:43 PM | S38-09-IB-BR1 | 0.17 | 1.38 | 0.07 | 106.2 | 108.4 | 97.6 |
| 42 | 31/03/22 | 3:57:06 PM | S38-17-IB-BR2A | 0.02 | 0.15 | 0.01 | 101.6 | 95.3 | 85.9 |
| 43 | 31/03/22 | 3:57:57 PM | S39-22-IB-VA1 | 0.14 | 1.08 | 0.13 | 102.7 | 103.2 | 93.8 |
| 44 | 02/04/22 | 3:51:50 PM | S39-17-IB-VARL | 0.17 | 1.54 | 0.08 | 89.0 | 92.7 | 90.2 |
| 45 | 05/04/22 | 4:05:41 PM | S37-09-IB-WN | 0.07 | 0.30 | 0.03 | 94.6 | 92.8 | 90.9 |
| 46 | 05/04/22 | 4:06:49 PM | S38-08-IB-BR1 | 0.20 | 1.56 | 0.05 | 93.7 | 93.1 | 88.8 |
| 47 | 07/04/22 | 3:34:43 PM | S39-29-IB-VA1 | 0.07 | 0.35 | 0.08 | 85.8 | 107.8 | 85.9 |
| 48 | 07/04/22 | 3:36:36 PM | S39-15-IB-VA1 | 0.18 | 2.28 | 0.10 | 87.7 | 107.7 | 85.0 |
| 49 | 11/04/22 | 11:39:47 AM | S38-12-IB-BY1 | 0.16 | 1.52 | 1.09 | 97.9 | 101.9 | 100.1 |
| 50 | 12/04/22 | 3:31:27 PM | S40-24-IB-WW4 | 0.19 | 2.83 | 0.16 | 87.4 | 104.7 | 90.5 |
| 51 | 14/04/22 | 3:35:22 PM | S38-15-IB-BY1 | 0.15 | 1.13 | 0.08 | 89.5 | 107.6 | 90.4 |
| 52 | 19/04/22 | 3:04:36 PM | S38-03-PS-BYWN | 0.19 | 2.04 | 0.11 | 87.7 | 93.6 | 98.7 |
| 53 | 19/04/22 | 3:06:49 PM | S37-23-IB-BY1 | 0.10 | 0.66 | 0.11 | 88.1 | 94.9 | 91.6 |
| 54 | 19/04/22 | 3:07:45 PM | S39-16-IB-VARL | 0.13 | 1.86 | 0.07 | 85.2 | 90.6 | 92.2 |
| 55 | 21/04/22 | 1:39:23 PM | S38-17-IB-BY1 | 0.18 | 1.56 | 0.13 | 100.3 | 99.0 | 94.0 |
| 56 | 23/04/22 | 3:29:55 PM | S40-20-IB-WW4 | 0.09 | 1.72 | 0.05 | 94.8 | 103.7 | 91.2 |
| 57 | 26/04/22 | 3:40:42 PM | S40-26-IB-WW4 | 0.07 | 0.68 | 0.07 | 90.7 | 105.3 | 90.5 |
| 58 | 28/04/22 | 9:57:17 AM | S38-20-IB-BY1 | 0.10 | 0.85 | 0.09 | 93.6 | 97.7 | 95.5 |
| 59 | 29/04/22 | 4:02:43 PM | S38-07-PS-BYWN | 0.20 | 1.68 | 0.09 | 82.1 | 88.9 | 86.2 |
| 60 | 29/04/22 | 4:03:42 PM | S39-06-IB-PF2 | 0.22 | 1.35 | 0.06 | 93.9 | 99.0 | 89.1 |
| 61 | 30/04/22 | 2:28:36 PM | S38-22-RA-BY1 | 0.05 | 0.25 | 0.03 | 95.9 | 95.3 | 96.2 |
| 62 | 02/05/22 | 4:21:24 PM | S39-03-IB-PF2 | 0.23 | 2.12 | 0.07 | 95.3 | 106.2 | 93.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 63 | 05/05/22 | 2:56:50 PM | S40-18-IB-WW4 | 0.17 | 2.90 | 0.11 | 86.4 | 96.4 | 91.5 |
| 64 | 06/05/22 | 3:52:10 PM | S39-11-IB-VA1 | 0.20 | 2.30 | 0.08 | 92.4 | 97.7 | 94.4 |
| 65 | 11/05/22 | 3:55:41 PM | S39-17-IB-VA1 | 0.18 | 0.91 | 0.11 | 90.1 | 102.6 | 85.1 |
| 66 | 12/05/22 | 11:22:33 AM | S38-11-IB-BY1 | 0.26 | 1.61 | 0.07 | 90.9 | 100.0 | 87.0 |
| 67 | 16/05/22 | 3:54:55 PM | S40-16-IB-WW4 | 0.13 | 3.65 | 0.12 | 88.5 | 101.9 | 94.1 |
| 68 | 19/05/22 | 11:58:11 AM | S38-09-IB-BY1 | 0.24 | 2.82 | 0.08 | 93.9 | 98.0 | 88.1 |
| 69 | 21/05/22 | 2:57:24 PM | S38-06-IB-BY1 | 0.36 | 2.38 | 0.08 | 102.8 | 101.9 | 93.9 |
| 70 | 24/05/22 | 2:56:19 PM | S38-23-IB-BY1 | 0.17 | 0.95 | 0.12 | 105.3 | 98.2 | 86.2 |
| 71 | 27/05/22 | 3:00:22 AM | S38-03-IB-BY1 | 0.43 | 2.28 | 0.10 | 92.8 | 93.1 | 86.9 |
| 72 | 28/05/22 | 2:59:31 PM | S39-24-PS-BYWN | 0.20 | 1.42 | 0.19 | 89.8 | 88.9 | 95.3 |
| 73 | 30/05/22 | 12:06:37 PM | S39-02-IB-PF2 | 0.19 | 1.05 | 0.05 | 97.6 | 102.2 | 94.8 |
| 74 | 02/06/22 | 3:09:45 PM | S39-24-IB-BR2C | 0.03 | 0.15 | 0.02 | 85.4 | 95.8 | 90.3 |
| 75 | 03/06/22 | 2:58:01 PM | S40-22-CI-MAPF | 0.09 | 0.78 | 0.07 | 97.4 | 99.9 | 93.7 |
| 76 | 04/06/22 | 3:26:23 PM | S39-14-IB-VA1 | 0.05 | 0.41 | 0.03 | 101.3 | 113.0 | 101.1 |
| 77 | 07/06/22 | 2:28:07 PM | S39-07-IB-VA1 | 0.49 | 3.95 | 0.13 | 98.8 | 108.2 | 93.8 |
| 78 | 11/06/22 | 2:30:46 PM | S39-09-IB-VA1 | 0.40 | 3.16 | 0.13 | 102.2 | 101.1 | 97.2 |
| 79 | 15/06/22 | 4:05:51 PM | S39-03-IB-VA1 | 0.58 | 4.24 | 0.18 | 98.1 | 101.7 | 95.2 |
| 80 | 15/06/22 | 4:06:56 PM | S40-01-IB-WW2 | 0.18 | 1.17 | 0.04 | 96.8 | 102.4 | 96.7 |
| 81 | 18/06/22 | 10:56:49 AM | S39-05-IB-VA1 | 0.30 | 2.34 | 0.09 | 93.3 | 104.1 | 91.9 |
| 82 | 21/06/22 | 3:58:13 PM | S40-29-IB-WW2 & S40-26-CI-MAPF | 0.08 | 0.40 | 0.05 | 93.1 | 96.9 | 93.9 |
| 83 | 21/06/22 | 3:59:27 PM | S40-20-CI-MAPF | 0.05 | 0.44 | 0.04 | 90.7 | 88.0 | 92.4 |
| 84 | 23/06/22 | 2:29:09 PM | S38-18-IB-WN | 0.09 | 0.38 | 0.06 | 99.8 | 103.1 | 97.7 |
| 85 | 24/06/22 | 12:27:08 PM | S39-22-PS-BYWN | 0.21 | 1.01 | 0.16 | 106.7 | 102.2 | 100.3 |
| 86 | 25/06/22 | 3:22:56 PM | S39-17-PS-BYWN | 0.44 | 2.51 | 0.34 | 90.0 | 97.8 | 93.9 |
| 87 | 28/06/22 | 3:22:14 PM | S39-19-IB-BR2C | 0.04 | 0.23 | 0.03 | 92.5 | 101.0 | 82.7 |
| 88 | 30/06/22 | 12:00:39 PM | S39-17-IB-BR1 | 0.06 | 0.55 | 0.03 | 91.2 | 92.9 | 90.5 |
| 89 | 02/07/22 | 1:53:14 PM | S38-25-IB-WN | 0.11 | 0.55 | 0.09 | 94.9 | 104.4 | 98.7 |
| 90 | 11/07/22 | 3:09:31 PM | S39-02-IB-VA1 | 0.66 | 2.02 | 0.08 | 90.8 | 101.0 | 94.2 |
| 91 | 12/07/22 | 2:53:50 PM | S38-12-IB-WN | 0.08 | 0.26 | 0.02 | 91.9 | 101.7 | 97.9 |
| 92 | 15/07/22 | 4:02:33 PM | S38-21-IB-WN | 0.08 | 0.69 | 0.08 | 95.1 | 103.9 | 97.2 |
| 93 | 18/07/22 | 3:00:05 PM | S40-27-CI-MAPF | 0.04 | 0.31 | 0.03 | 96.8 | 107.6 | 100.4 |
| 94 | 21/07/22 | 3:25:01 PM | S40-29-IB-WW3 | 0.07 | 0.65 | 0.07 | 103.0 | 112.6 | 107.9 |
| 95 | 23/07/22 | 3:27:01 PM | S40-16-CI-MAPF | 0.11 | 0.95 | 0.08 | 95.4 | 107.4 | 88.5 |
| 96 | 25/07/22 | 3:30:23 PM | S38-14-IB-WN | 0.06 | 0.46 | 0.03 | 92.4 | 100.8 | 95.7 |
| 97 | 28/07/22 | 3:53:36 PM | S38-15-IB-WN | 0.06 | 0.44 | 0.03 | 95.3 | 100.5 | 93.6 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 98 | 30/07/22 | 4:08:32 PM | S38-08-IB-WN | 0.11 | 0.54 | 0.05 | 95.7 | 103.9 | 94.8 |
| 99 | 02/08/22 | 3:01:46 PM | S38-03-IB-WN | 0.09 | 0.46 | 0.03 | 98.5 | 104.3 | 98.3 |
| 100 | 04/08/22 | 12:24:30 PM | S38-06-IB-WN | 0.05 | 0.29 | 0.02 | 91.9 | 95.0 | 98.3 |
| 101 | 08/08/22 | 3:58:13 PM | S39-12-IB-BR1 | 0.26 | 2.65 | 0.08 | 93.9 | 99.7 | 89.5 |
| 102 | 11/08/22 | 3:56:38 PM | S39-09-IB-BR1 | 0.18 | 1.41 | 0.08 | 92.3 | 96.0 | 87.7 |
| 103 | 15/08/22 | 2:32:10 PM | S40-07-IB-WW3 | 0.07 | 0.72 | 0.03 | 100.4 | 103.8 | 99.0 |
| 104 | 17/08/22 | 3:58:46 PM | S39-06-IB-BR1 | 0.26 | 1.22 | 0.11 | 90.2 | 93.8 | 85.4 |
| 105 | 19/08/22 | 4:16:47 PM | S40-29-IB-WWRL | 0.09 | 0.75 | 0.06 | 98.3 | 102.2 | 98.5 |
| 106 | 23/08/22 | 3:28:55 PM | S40-11-IB-WW4 | 0.16 | 2.11 | 0.09 | 108.8 | 95.3 | 108.6 |
| 107 | 27/08/22 | 3:00:07 PM | S40-26-IB-PF2 | 0.16 | 1.84 | 0.12 | 92.1 | 103.3 | 89.5 |
| 108 | 30/08/22 | 12:03:42 PM | S39-03-IB-BR1 | 0.45 | 2.99 | 0.14 | 113.6 | 106.5 | 107.0 |
| 109 | 31/08/22 | 3:29:57 PM | S40-18-IB-PF2 | 0.06 | 0.67 | 0.05 | 102.0 | 101.9 | 87.2 |
| 110 | 02/09/22 | 3:06:36 PM | S40-03-IB-WW3 & S40-01-PS-MA2 | 0.17 | 1.14 | 0.06 | 98.4 | 108.3 | 97.7 |
| 111 | 07/09/22 | 11:29:11 AM | S39-18-IB-BR2A | 0.23 | 0.60 | 0.07 | 98.9 | 108.3 | 100.0 |
| 112 | 08/09/22 | 1:33:52 PM | S39-02-IB-BR1 | 0.29 | 1.32 | 0.06 | 97.7 | 100.6 | 88.4 |
| 113 | 08/09/22 | 1:35:05 PM | S40-01-IB-WW3 | 0.13 | 1.03 | 0.04 | 94.1 | 104.3 | 95.2 |
| 114 | 10/09/22 | 3:02:59 PM | S40-23-IB-PF2 | 0.10 | 1.25 | 0.07 | 110.6 | 111.6 | 99.5 |
| 115 | 12/09/22 | 2:56:51 PM | S39-11-PS-BYWN & S39-16-IB-BR2C | 0.31 | 2.29 | 0.14 | 97.9 | 104.0 | 94.8 |
| 116 | 15/09/22 | 3:54:49 PM | S40-29-IB-WW4 | 0.08 | 0.44 | 0.05 | 89.4 | 101.0 | 90.1 |
| 117 | 17/09/22 | 3:23:46 PM | S40-19-IB-VARL | 0.24 | 2.61 | 0.15 | 95.2 | 109.4 | 106.2 |
| 118 | 20/09/22 | 10:28:55 AM | S40-08-IB-WW4 | 0.09 | 1.44 | 0.05 | 93.4 | 101.6 | 89.2 |
| 119 | 26/09/22 | 10:36:39 AM | S39-11-IB-BY1 | 0.19 | 1.81 | 0.08 | 94.9 | 99.8 | 91.7 |
| 120 | 28/09/22 | 10:40:38 AM | S39-15-IB-BY1 | 0.19 | 1.56 | 0.09 | 106.5 | 102.9 | 100.0 |
| 121 | 30/09/22 | 2:40:24 PM | S39-17-IB-BY1 | 0.13 | 1.35 | 0.17 | **118.6** | 105.4 | 110.7 |
| 122 | 01/10/22 | 3:54:31 PM | S39-22-IB-BY1 | 0.11 | 0.72 | 0.07 | **116.3** | 108.4 | 88.6 |
| 123 | 04/10/22 | 10:57:22 AM | S39-19-IB-BY1 & S39-22-RA-BY1 | 0.10 | 0.70 | 0.08 | 94.9 | 99.7 | 94.5 |
| 124 | 08/10/22 | 4:25:46 PM | S40-29-IB-VARL | 0.40 | 1.91 | 0.26 | 91.4 | 96.3 | 90.0 |
| 125 | 08/10/22 | 4:25:06 PM | S39-23-IB-BY1 | 0.18 | 0.93 | 0.14 | 81.8 | 93.1 | 83.4 |
| 126 | 12/10/22 | 3:52:18 PM | S40-22-IB-VARL | 0.17 | 1.92 | 0.12 | 103.9 | 113.1 | 90.1 |
| 127 | 15/10/22 | 12:34:44 PM | S40-04-IB-WW4 | 0.12 | 0.81 | 0.05 | 102.3 | 111.3 | 91.6 |
| 128 | 18/10/22 | 1:22:43 PM | S39-03-PS-BYWN | 0.15 | 0.95 | 0.05 | 95.5 | 96.7 | 101.9 |
| 129 | 18/10/22 | 1:24:34 PM | S41-01-IB-WW1 | 0.18 | 3.45 | 0.06 | 103.8 | 106.6 | 87.8 |
| 130 | 20/10/22 | 1:54:06 PM | S39-07-PS-BYWN | 0.27 | 0.75 | 0.05 | 90.0 | 90.7 | 84.5 |
| 131 | 21/10/22 | 3:57:10 PM | S40-11-CI-MAPF | 0.13 | 0.98 | 0.05 | 87.5 | 94.9 | 86.7 |
| 132 | 27/10/22 | 1:22:25 PM | S40-24-IB-VARL | 0.20 | 1.51 | 0.16 | 90.7 | 94.8 | 97.6 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 133 | 28/10/22 | 12:08:05 PM | S40-02-IB-WW2 | 0.16 | 0.88 | 0.03 | 110.0 | 109.2 | 102.6 |
| 134 | 28/10/22 | 4:04:52 PM | S40-29-CI-MAPF | 0.06 | 0.34 | 0.04 | 104.4 | **115.7** | 105.6 |
| 135 | 31/10/22 | 4:21:59 PM | S41-18-IB-WW4 | 0.12 | 0.44 | 0.12 | 111.2 | 109.8 | 97.1 |
| 136 | 04/11/22 | 3:55:23 PM | S41-16-IB-WW4 | 0.19 | 2.80 | 0.12 | 97.6 | 108.0 | 86.3 |
| 137 | 08/11/22 | 11:23:59 AM | S39-08-IB-BY1 | 0.28 | 2.31 | 0.11 | 91.8 | 98.2 | 86.3 |
| 138 | 09/11/22 | 2:56:30 PM | S41-26-IB-WW3 | 0.05 | 0.37 | 0.04 | 94.8 | 103.9 | 95.5 |
| 139 | 11/11/22 | 12:24:51 PM | S40-09-IB-MA1 | 0.05 | 0.72 | 0.03 | 98.9 | 104.3 | 93.6 |
| 140 | 14/11/22 | 10:54:18 AM | S41-20-IB-WW4 | 0.12 | 1.54 | 0.10 | 110.6 | 114.6 | 94.4 |
| 141 | 16/11/22 | 10:58:45 AM | S41-02-IB-RL181-DAM | 0.17 | 1.55 | 0.06 | 104.5 | 107.5 | 107.6 |
| 142 | 17/11/22 | 12:02:20 PM | S40-05-IB-MA1 | 0.19 | 1.62 | 0.07 | 94.1 | 100.9 | 93.1 |
| 143 | 19/11/22 | 4:10:53 PM | S41-23-IB-WW4 | 0.12 | 2.00 | 0.11 | 102.8 | 95.6 | 99.2 |
| 144 | 22/11/22 | 3:30:22 PM | S41-27-IB-WW3 | 0.10 | 1.40 | 0.09 | 107.2 | 110.0 | 104.3 |
| 145 | 23/11/22 | 3:59:53 PM | S41-21-IB-PF2 | 0.07 | 0.76 | 0.06 | 108.6 | 101.0 | 100.3 |
| 146 | 25/11/22 | 3:28:54 PM | S40-09-CI-MAPF | 0.05 | 0.30 | 0.02 | 101.9 | 98.6 | 97.0 |
| 147 | 25/11/22 | 3:30:53 PM | S40-16-IB-PF2 | 0.12 | 2.00 | 0.11 | 102.8 | 95.6 | 99.2 |
| 148 | 29/11/22 | 11:06:48 AM | S40-26-IB-VARL | 0.28 | 1.77 | 0.26 | 88.9 | 98.1 | 94.0 |
| 149 | 01/12/22 | 10:56:46 AM | S40-01-IB-WW4 | 0.14 | 0.49 | 0.03 | 99.9 | 108.0 | 95.9 |
| 150 | 03/12/22 | 3:02:32 PM | S39-05-IB-BY1 | 0.41 | 2.32 | 0.11 | 94.2 | 102.4 | 85.1 |
| 151 | 05/12/22 | 10:52:57 AM | S40-07-CI-MAPF | 0.10 | 0.66 | 0.03 | 95.8 | 104.1 | 91.7 |
| 152 | 06/12/22 | 10:56:15 AM | S41-13-IB-WW4 | 0.19 | 2.73 | 0.07 | 93.5 | 102.7 | 89.7 |
| 153 | 08/12/22 | 2:58:34 PM | S39-03-IB-BY1 | 0.38 | 2.55 | 0.09 | 105.6 | 103.8 | 98.2 |
| 154 | 10/12/22 | 11:38:45 AM | S41-10-IB-WW4 | 0.15 | 1.25 | 0.08 | 96.1 | 109.3 | 83.4 |
| 155 | 12/12/22 | 10:29:33 AM | S40-17-IB-VARL | 0.85 | 3.09 | 0.28 | 108.3 | 100.3 | 106.5 |
| 156 | 12/12/22 | 10:30:49 AM | S40-03-IB-MA1 | 0.13 | 1.06 | 0.05 | **116.4** | 109.2 | 105.7 |
| 157 | 14/12/22 | 10:28:25 AM | S41-08-IB-WW3 | 0.08 | 0.76 | 0.03 | 96.2 | 112.9 | 105.8 |
| 158 | 16/12/22 | 12:28:32 PM | S41-26-IB-WW4 | 0.11 | 3.29 | 0.10 | 109.0 | 106.5 | 86.9 |
| 159 | 19/12/22 | 11:34:12 AM | S41-27-IB-WW4 | 0.19 | 2.57 | 0.19 | 103.4 | 104.9 | 86.0 |
| 160 | 21/12/22 | 11:14:59 AM | S39-21-IB-WN | 0.52 | 0.38 | 0.13 | 103.0 | 96.0 | 101.5 |
| 161 | 24/12/22 | 11:25:27 AM | S41-19-CI-MAPF | 0.09 | 1.12 | 0.08 | 84.3 | 101.9 | 102.7 |
| 162 | 30/12/22 | 10:00:25 AM | S40-01-IB-MA1 | 0.26 | 1.69 | 0.07 | 92.6 | 104.6 | 89.4 |
| 163 | 30/12/22 | 10:02:02 AM | S41-03-IB-RL181 | 0.18 | 2.50 | 0.04 | 106.4 | 107.9 | 89.8 |
| 164 | 31/12/22 | 3:26:00 PM | S40-30-IB-PF2 | 0.04 | 0.18 | 0.03 | 105.1 | 106.5 | 83.1 |
| 165 | 31/12/22 | 3:27:00 PM | S40-13-IB-PF2 | 0.04 | 0.32 | 0.02 | 98.2 | 108.1 | 94.9 |

# Appendix D

## *Air Quality Monitoring Summary*

## Table D1
## Particulate Matter <10µm ($PM_{10}$) Summary

| Run Date | $PM_{10}$-1 | | $PM_{10}$-2 | | $PM_{10}$-3 | | $PM_{10}$-4 | | 24-hour Assessment Criteria (µg/m$^3$) | Annual Assessment Criteria (µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | | |
| 04/01/2022 | 25.0 | 20.3 | 22.7 | 17.1 | 31.4 | 15.9 | 49.0 | 24.6 | *50* | *25* |
| 10/01/2022 | 23.8 | 20.5 | 25.8 | 17.4 | 22.5 | 15.9 | 30.4 | 24.8 | *50* | *25* |
| 16/01/2022 | 27.1 | 20.3 | 25.6 | 17.4 | 30.8 | 15.9 | 35.3 | 24.8 | *50* | *25* |
| 22/01/2022 | 15.6 | 20.1 | 17.2 | 17.2 | 23.5 | 15.7 | 33.1 | 24.3 | *50* | *25* |
| 28/01/2022 | 25.6 | 19.8 | 23.0 | 17.4 | 36.6 | 16.2 | 52.6 | 23.6 | *50* | *25* |
| 03/02/2022 | 18.0 | 19.9 | 19.1 | 17.5 | 14.3 | 16.1 | 30.3 | 24.1 | *50* | *25* |
| 09/02/2022 | 20.1 | 19.8 | 21.7 | 17.5 | 22.3 | 16.1 | 23.2 | 24.4 | *50* | *25* |
| 15/02/2022 | 25.1 | 20.0 | 29.6 | 17.6 | 40.5 | 16.4 | 55.0 | 24.7 | *50* | *25* |
| 21/02/2022 | 34.5 | 20.4 | 25.5 | 17.9 | 12.8 | 16.3 | 14.9 | 25.2 | *50* | *25* |
| 27/02/2022 | 20.0 | 20.5 | 16.8 | 17.8 | 19.3 | 16.4 | 29.3 | 25.8 | *50* | *25* |
| 05/03/2022 | 15.8 | 20.4 | 14.5 | 17.8 | 22.8 | 16.4 | 29.0 | 24.0 | *50* | *25* |
| 11/03/2022 | 18.9 | 20.3 | 21.3 | 17.7 | 22.3 | 16.2 | 35.4 | 24.0 | *50* | *25* |
| 17/03/2022 | 21.2 | 20.5 | 19.2 | 17.7 | 25.5 | 16.2 | 37.5 | 24.1 | *50* | *25* |
| 23/03/2022 | 33.8 | 20.9 | 27.3 | 18.1 | 28.6 | 16.4 | 28.5 | 24.4 | *50* | *25* |
| 29/03/2022 | 9.5 | 20.9 | 9.3 | 18.0 | 7.3 | 16.4 | 8.0 | 24.2 | *50* | *25* |
| 04/04/2022 | 19.5 | 21.0 | 21.2 | 18.2 | 15.1 | 16.3 | 13.2 | 23.9 | *50* | *25* |
| 10/04/2022 | 21.2 | 20.9 | 17.0 | 18.1 | 14.6 | 16.3 | 33.9 | 24.2 | *50* | *25* |
| 16/04/2022 | 15.8 | 20.2 | 14.3 | 17.6 | 20.7 | 16.3 | 28.1 | 24.1 | *50* | *25* |
| 22/04/2022 | 13.1 | 20.1 | 11.1 | 17.4 | 6.2 | 16.2 | 13.8 | 24.1 | *50* | *25* |
| 28/04/2022 | 11.4 | 20.0 | 12.2 | 17.3 | 7.4 | 15.8 | 11.1 | 23.3 | *50* | *25* |
| 04/05/2022 | 13.8 | 20.0 | 17.5 | 17.3 | 18.2 | 15.9 | 23.5 | 23.3 | *50* | *25* |
| 10/05/2022 | 17.9 | 20.1 | 15.1 | 17.3 | 27.1 | 16.2 | 18.4 | 23.2 | *50* | *25* |
| 16/05/2022 | 13.4 | 19.8 | 10.9 | 17.2 | 6.2 | 16.2 | 5.5 | 23.1 | *50* | *25* |

| Run Date | $PM_{10}$-1 | | $PM_{10}$-2 | | $PM_{10}$-3 | | $PM_{10}$-4 | | 24-hour Assessment Criteria ($\mu g/m^3$) | Annual Assessment Criteria ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | | |
| 22/05/2022 | 10.5 | 19.8 | 5.1 | 17.0 | 5.6 | 15.9 | 13.6 | 23.1 | *50* | *25* |
| 28/05/2022 | 9.4 | 19.6 | 10.4 | 16.9 | 4.3 | 15.9 | 3.4 | 23.1 | *50* | *25* |
| 03/06/2022 | 7.8 | 19.4 | 11.2 | 16.8 | 2.1 | 15.7 | 4.6 | 22.8 | *50* | *25* |
| 09/06/2022 | 10.1 | 19.3 | 7.2 | 16.7 | 1.7 | 15.6 | 2.2 | 22.6 | *50* | *25* |
| 15/06/2022 | 17.7 | 19.5 | 18.7 | 16.8 | 3.9 | 15.6 | 7.2 | 22.7 | *50* | *25* |
| 21/06/2022 | 14.1 | 19.6 | 16.7 | 17.0 | 1.4 | 15.5 | 7.6 | 22.7 | *50* | *25* |
| 27/06/2022 | 14.4 | 19.7 | 14.7 | 17.1 | 7.2 | 15.6 | 18.8 | 22.9 | *50* | *25* |
| 03/07/2022 | 4.2 | 19.6 | 5.1 | 17.0 | 3.2 | 15.6 | 1.8 | 22.9 | *50* | *25* |
| 09/07/2022 | 5.6 | 19.4 | 9.3 | 16.7 | 2.9 | 15.4 | 2.7 | 22.2 | *50* | *25* |
| 15/07/2022 | 6.0 | 19.1 | 8.6 | 16.7 | 5.2 | 15.4 | 12.7 | 22.2 | *50* | *25* |
| 21/07/2022 | 8.2 | 19.0 | 8.5 | 16.7 | 16.2 | 15.6 | 14.4 | 22.3 | *50* | *25* |
| 27/07/2022 | 14.1 | 19.0 | 11.7 | 16.7 | 18.5 | 15.9 | 4.0 | 22.3 | *50* | *25* |
| 02/08/2022 | 4.1 | 18.6 | 8.8 | 16.5 | 4.0 | 15.8 | 10.0 | 22.4 | *50* | *25* |
| 08/08/2022 | 8.0 | 18.5 | 10.0 | 16.5 | 5.1 | 15.8 | 17.9 | 22.6 | *50* | *25* |
| 14/08/2022 | 3.1 | 18.3 | 1.5 | 16.2 | 0.8 | 15.6 | <0.1 | 21.5 | *50* | *25* |
| 20/08/2022 | 6.7 | 17.9 | 10.3 | 15.8 | 18.3 | 15.6 | 4.1 | 20.8 | *50* | *25* |
| 26/08/2022 | 12.9 | 18.0 | 10.7 | 15.9 | 12.1 | 15.7 | 28.1 | 21.2 | *50* | *25* |
| 01/09/2022 | 22.3 | 18.0 | 16.0 | 15.9 | 29.5 | 16.0 | 28.0 | 21.0 | *50* | *25* |
| 07/09/2022 | 13.6 | 18.0 | 14.1 | 15.9 | 20.2 | 16.1 | 35.0 | 21.4 | *50* | *25* |
| 13/09/2022 | 12.7 | 17.4 | 11.3 | 15.7 | 9.8 | 16.0 | 56.1 | 22.1 | *50* | *25* |
| 19/09/2022 | 19.2 | 17.2 | 15.6 | 15.7 | 3.6 | 15.7 | 3.6 | 21.8 | *50* | *25* |
| 25/09/2022 | 8.5 | 16.8 | 3.1 | 15.5 | 4.4 | 15.6 | 6.6 | 21.7 | *50* | *25* |
| 01/10/2022 | 16.4 | 16.8 | 15.7 | 15.6 | 16.0 | 15.8 | 31.6 | 22.1 | *50* | *25* |
| 07/10/2022 | 7.1 | 16.2 | 6.7 | 15.4 | 6.2 | 15.6 | 6.7 | 22.0 | *50* | *25* |
| 13/10/2022 | 18.8 | 16.3 | 17.1 | 15.5 | 21.0 | 15.9 | 36.5 | 22.4 | *50* | *25* |
| 19/10/2022 | 12.2 | 16.2 | 9.2 | 15.4 | 13.4 | 15.8 | 10.6 | 22.0 | *50* | *25* |

| Run Date | $PM_{10}$-1 | | $PM_{10}$-2 | | $PM_{10}$-3 | | $PM_{10}$-4 | | 24-hour Assessment Criteria ($\mu g/m^3$) | Annual Assessment Criteria ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | Run Date Reading ($\mu g/m^3$) | Annual Rolling Average ($\mu g/m^3$) | | |
| 25/10/2022 | 14.3 | 16.1 | 10.0 | 15.3 | 7.9 | 15.7 | 7.4 | 21.8 | *50* | *25* |
| 31/10/2022 | 27.1 | 15.9 | 17.3 | 15.1 | 15.6 | 15.4 | 23.0 | 21.4 | *50* | *25* |
| 06/11/2022 | 18.0 | 16.0 | 13.9 | 15.1 | 22.2 | 15.6 | 36.9 | 21.7 | *50* | *25* |
| 12/11/2022 | 13.3 | 16.0 | 14.3 | 15.2 | 7.6 | 15.5 | 22.6 | 21.9 | *50* | *25* |
| 18/11/2022 | 24.8 | 16.0 | 21.4 | 15.2 | 27.4 | 15.5 | 46.9 | 22.1 | *50* | *25* |
| 24/11/2022 | 22.8 | 16.2 | 21.2 | 15.3 | 19.3 | 15.6 | 29.6 | 22.2 | *50* | *25* |
| 30/11/2022 | 26.1 | 16.2 | 20.3 | 15.3 | 33.7 | 15.8 | 58.5 | 22.7 | *50* | *25* |
| 06/12/2022 | 38.0 | 16.5 | 27.8 | 15.4 | 35.8 | 15.9 | 31.1 | 22.5 | *50* | *25* |
| 12/12/2022 | 32.4 | 16.8 | 24.2 | 15.6 | 13.6 | 16.0 | 21.1[1] | 22.6[1] | *50* | *25* |
| 18/12/2022 | 17.6 | 16.7 | | | 20.7 | 15.8 | 29.3 | 22.5 | *50* | *25* |
| 24/12/2022 | 17.0 | 16.6 | | | 20.2 | 15.7 | 14.8 | 22.2 | *50* | *25* |
| 30/12/2022 | 9.1 | 16.5 | | | 36.7 | 16.0 | 51.0 | 22.6 | *50* | *25* |

*Source: AECOM (2022)*
*AQMP approved 14/12/2022, $PM_{10}$-2 decommissioned.*
*1. AQMP approved 14/12/2022, $PM_{10}$-4 changed status from compliance monitor to real-time monitor.*

## Table D2
## Total Suspended Particulates (TSP) Summary

| Run Date | HV1 | | HV2 | | HV3 | | HV4 | | HV6 | | Annual Assessment Criteria (<90 µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m3) | Annual Rolling Average (µg/m3) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | |
| 04/01/2022 | 62.4 | 64.5 | 65.6 | 55.9 | 54.8 | 42.2 | 51.1 | 45.5 | 146.0 | 77.0 | 90 |
| 10/01/2022 | 74.1 | 65.3 | 53.2 | 56.3 | 49.0 | 42.7 | 46.8 | 44.7 | 98.6 | 77.6 | 90 |
| 16/01/2022 | 59.8 | 64.1 | 56.3 | 55.3 | 44.8 | 42.2 | 18.2 | 43.8 | 93.6 | 77.1 | 90 |
| 22/01/2022 | 42.1 | 63.1 | 41.2 | 54.7 | 28.3 | 41.6 | 31.6 | 43.8 | 101.0 | 75.0 | 90 |
| 28/01/2022 | 60.3 | 63.4 | 72.4 | 54.4 | 43.4 | 41.9 | 62.7 | 44.2 | 209.0 | 72.4 | 90 |
| 03/02/2022 | 43.2 | 63.4 | 44.7 | 54.5 | 37.7 | 42.0 | 42.6 | 44.1 | 114.0 | 73.0 | 90 |
| 09/02/2022 | 64.5 | 63.8 | 65.1 | 54.7 | 38.0 | 42.1 | 56.0 | 44.4 | 108.0 | 73.2 | 90 |
| 15/02/2022 | 58.3 | 64.0 | 63.8 | 55.2 | 46.1 | 42.3 | 63.5 | 44.8 | 199.0 | 74.7 | 90 |
| 21/02/2022 | 103.0 | 65.3 | 110.0 | 56.5 | 56.7 | 42.9 | 53.8 | 44.8 | 66.2 | 74.2 | 90 |
| 27/02/2022 | 36.9 | 64.5 | 38.8 | 56.1 | 24.2 | 42.6 | 44.2 | 44.6 | 120.0 | 75.1 | 90 |
| 05/03/2022 | 30.2 | 63.9 | 30.6 | 55.6 | 23.1 | 42.4 | 24.0 | 44.1 | 94.4 | 75.1 | 90 |
| 11/03/2022 | 31.4 | 63.4 | 36.3 | 55.2 | 29.2 | 41.9 | 40.9 | 44.2 | 105.0 | 75.1 | 90 |
| 17/03/2022 | 46.8 | 63.6 | 50.5 | 55.4 | 37.3 | 42.0 | 42.4 | 44.8 | 131.0 | 75.9 | 90 |
| 23/03/2022 | 101.0 | 65.1 | 89.2 | 56.7 | 58.2 | 42.1 | 68.0 | 45.4 | 91.3 | 77.2 | 90 |
| 29/03/2022 | 12.8 | 64.1 | 17.3 | 56.1 | 14.3 | 41.8 | 13.8 | 45.1 | 23.6 | 76.6 | 90 |
| 04/04/2022 | 106.0 | 65.0 | 66.4 | 56.5 | 41.5 | 41.9 | 50.3 | 44.9 | 32.6 | 75.1 | 90 |
| 10/04/2022 | 47.8 | 64.1 | 49.4 | 55.7 | 28.3 | 41.7 | 40.3 | 43.3 | 149.0 | 76.8 | 90 |
| 16/04/2022 | 36.9 | 64.4 | 40.8 | 53.8 | 17.0 | 37.6 | 37.8 | 43.0 | 107.0 | 77.4 | 90 |
| 22/04/2022 | 30.6 | 63.8 | 30.1 | 53.4 | 17.1 | 37.3 | 26.0 | 42.8 | 78.4 | 78.0 | 90 |
| 28/04/2022 | 25.0 | 63.5 | 22.1 | 52.9 | 20.1 | 36.9 | 21.2 | 42.3 | 31.2 | 76.2 | 90 |
| 04/05/2022 | 48.4 | 62.7 | 38.9 | 52.6 | 26.8 | 36.7 | 41.4 | 42.4 | 63.2 | 75.9 | 90 |
| 10/05/2022 | 48.4 | 62.4 | 42.4 | 52.6 | 31.0 | 36.7 | 39.6 | 41.8 | 75.0 | 76.1 | 90 |
| 16/05/2022 | 37.7 | 62.3 | 45.6 | 51.8 | 0.0 | 36.2 | 35.7 | 41.7 | 16.9 | 76.0 | 90 |

| Run Date | HV1 | | HV2 | | HV3 | | HV4 | | HV6 | | Annual Assessment Criteria (<90 µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m3) | Annual Rolling Average (µg/m3) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | |
| 22/05/2022 | 32.6 | 62.1 | 24.9 | 51.6 | 19.4 | 36.0 | 24.0 | 41.0 | 63.6 | 76.1 | 90 |
| 28/05/2022 | 32.9 | 61.2 | 25.0 | 50.8 | 2.5 | 35.3 | 21.4 | 40.6 | 28.0 | 76.3 | 90 |
| 03/06/2022 | 41.9 | 60.6 | 30.4 | 50.1 | 23.7 | 35.1 | 26.1 | 40.5 | 14.6 | 75.1 | 90 |
| 09/06/2022 | 63.0 | 60.3 | 35.8 | 50.0 | 29.0 | 35.0 | 31.5 | 40.7 | 7.3 | 74.7 | 90 |
| 15/06/2022 | 71.4 | 60.4 | 51.7 | 50.3 | 34.2 | 35.3 | 47.5 | 41.1 | 24.1 | 74.9 | 90 |
| 21/06/2022 | 66.0 | 60.7 | 50.9 | 50.7 | 33.1 | 35.5 | 44.3 | 41.3 | 29.4 | 75.0 | 90 |
| 27/06/2022 | 59.1 | 60.6 | 47.3 | 50.8 | 35.9 | 35.5 | 42.5 | 41.6 | 75.5 | 75.9 | 90 |
| 03/07/2022 | 15.7 | 60.1 | 11.7 | 50.6 | 10.6 | 35.3 | 11.8 | 41.0 | 12.9 | 75.8 | 90 |
| 09/07/2022 | 12.4 | 59.7 | 16.7 | 50.3 | 6.7 | 35.0 | 16.0 | 40.7 | 8.5 | 73.7 | 90 |
| 15/07/2022 | 32.8 | 58.6 | 21.9 | 49.3 | 15.4 | 34.8 | 19.3 | 40.5 | 29.0 | 73.3 | 90 |
| 21/07/2022 | 23.1 | 58.0 | 24.2 | 49.1 | 21.7 | 34.7 | 24.5 | 40.2 | 62.7 | 74.0 | 90 |
| 27/07/2022 | 61.8 | 57.9 | 51.1 | 49.0 | 33.8 | 34.7 | 43.7 | 40.0 | 14.3 | 73.9 | 90 |
| 02/08/2022 | 21.7 | 56.4 | 20.1 | 48.2 | 13.1 | 33.9 | 16.2 | 39.6 | 32.1 | 74.1 | 90 |
| 08/08/2022 | 26.0 | 55.1 | 24.2 | 48.0 | 19.5 | 33.6 | 23.1 | 39.1 | 52.0 | 74.7 | 90 |
| 14/08/2022 | 20.0 | 54.2 | 17.6 | 47.4 | 6.2 | 33.1 | 6.2 | 38.1 | 3.0 | 71.8 | 90 |
| 20/08/2022 | 47.6 | 53.4 | 25.1 | 46.6 | 41.5 | 32.9 | 24.0 | 38.1 | 9.4 | 70.1 | 90 |
| 26/08/2022 | 35.6 | 53.4 | 30.0 | 46.6 | 21.2 | 32.8 | 27.6 | 37.9 | 114.0 | 71.7 | 90 |
| 01/09/2022 | 37.9 | 53.0 | 48.7 | 46.3 | 28.8 | 32.8 | 32.4 | 37.8 | 96.0 | 70.4 | 90 |
| 07/09/2022 | 23.6 | 52.6 | 110.0 | 47.6 | 24.0 | 32.7 | 29.4 | 37.0 | 136.0 | 72.0 | 90 |
| 13/09/2022 | 48.9 | 51.0 | 52.4 | 46.4 | 35.5 | 31.9 | 38.2 | 36.8 | 166.0 | 74.0 | 90 |
| 19/09/2022 | 97.1 | 51.4 | 86.1 | 46.5 | 52.9 | 32.1 | 66.5 | 37.0 | 21.2 | 73.4 | 90 |
| 25/09/2022 | 41.0 | 49.2 | 56.8 | 46.0 | 24.1 | 31.6 | 34.1 | 37.1 | 27.2 | 73.1 | 90 |
| 01/10/2022 | 40.5 | 48.7 | 35.6 | 45.6 | 38.4 | 31.7 | 34.1 | 36.8 | 139.0 | 74.8 | 90 |
| 07/10/2022 | 29.8 | 47.1 | 15.6 | 44.6 | 21.8 | 31.4 | 19.0 | 36.8 | 26.6 | 74.7 | 90 |
| 13/10/2022 | 39.0 | 47.3 | 47.9 | 45.0 | 41.3 | 31.8 | 41.4 | 36.7 | 163.0 | 77.0 | 90 |
| 19/10/2022 | 31.7 | 46.6 | 33.1 | 44.7 | 53.7 | 32.0 | 25.4 | 36.4 | 50.3 | 76.2 | 90 |

| Run Date | HV1 | | HV2 | | HV3 | | HV4 | | HV6 | | Annual Assessment Criteria (<90 µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m3) | Annual Rolling Average (µg/m3) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | Run Date Reading (µg/m$^3$) | Annual Rolling Average (µg/m$^3$) | |
| 25/10/2022 | 62.8 | 46.8 | 38.0 | 44.5 | 35.8 | 32.0 | 25.1 | 35.5 | 26.7 | 75.5 | 90 |
| 31/10/2022 | 107.0 | 46.9 | 81.6 | 44.3 | 63.3 | 31.9 | 55.6 | 35.9 | 108.0 | 75.1 | 90 |
| 06/11/2022 | 34.1 | 46.8 | 46.6 | 44.5 | 34.2 | 32.0 | 33.4 | 36.1 | 149.0 | 76.5 | 90 |
| 12/11/2022 | 38.6 | 46.9 | 53.0 | 44.9 | 43.2 | 32.3 | 38.8 | 36.0 | 93.0 | 77.6 | 90 |
| 18/11/2022 | 65.6 | 46.9 | 54.6 | 45.0 | 43.4 | 32.4 | 53.4 | 36.4 | 168.0 | 78.6 | 90 |
| 24/11/2022 | 75.4 | 47.7 | 80.0 | 45.9 | 85.2 | 33.3 | 70.7 | 36.9 | 102.0 | 79.4 | 90 |
| 30/11/2022 | 42.3 | 47.7 | 65.9 | 46.3 | 47.3 | 33.5 | 50.6 | 37.0 | 184.0 | 81.0 | 90 |
| 06/12/2022 | 127.0 | 49.1 | 96.0 | 47.1 | 81.8 | 34.1 | 81.7 | 37.8 | 89.7 | 80.5 | 90 |
| 12/12/2022 | 111.0 | 50.4 | 81.5 | 47.9 | 79.1 | 34.9 | 64.7 | 37.8 | 56.8[1] | 80.4[1] | 90 |
| 18/12/2022 | | | 52.9 | 47.6 | 31.3 | 34.5 | | | 124.0 | 80.8 | 90 |
| 24/12/2022 | | | 40.1 | 47.3 | 28.1 | 34.2 | | | 59.4 | 80.2 | 90 |
| 30/12/2022 | | | 86.6 | 48.2 | 44.0 | 34.5 | | | 168.0 | 81.8 | 90 |

*Source: AECOM (2022)*
*AQMP approved 14/12/2022, HV1 and HV4 decommissioned.*
*1. AQMP approved 14/12/2022, HV6 changed status from compliance monitor to real-time monitor.*

## Table D3
## Total Deposited Dust Summary

| Total Deposited Dust (g/m2/month) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Month** | **D01** | **D02** | **D04A** | **D05** | **D06** | **D07A** | **D08** | **D09** | **D10** | **D20** | **D23B** | **D25** | **D26** | **DA** |
| January | 0.9 | 0.7 | 1.0 | 2.8 | 1.9 | 1.2 | 3.5 | 2.3 | 1.3 | 4.7 | 1.3 | 2.2 | 1.0 | 3.7 |
| February | 2.7 | 1.0 | 2.9 | 1.2 | 0.7 | 1.0 | 1.2 | 5.4 | 1.3 | 4.7 | 1.6 | 1.0 | 2.5 | 4.0 |
| March | 1.2 | 0.9 | 1.5 | 1.2 | 1.2 | 1.2 | 1.9 | 1.7 | 1.4 | 3.0 | 0.9 | 3.6 | 2.1 | 4.0 |
| April | 1.3 | 1.1 | 0.8 | 1.4 | 1.8 | 2.4 | 1.7 | 1.9 | 0.5 | 4.6 | 2.4 | 4.6 | 2.7 | 3.5 |
| May | 1.0 | 1.2 | 2.4 | 2.1 | 1.2 | 1.2 | 1.5 | 1.5 | 1.2 | 3.2 | 3.2 | 1.8 | 0.4 | 2.0 |
| June | 0.6 | 0.6 | 0.8 | 1.1 | 0.8 | 0.5 | 0.7 | 1.3 | 2.1 | 1.9 | 3.2 | 0.7 | 1.0 | 1.0 |
| July | 0.8 | 0.7 | 1.0 | 1.6 | 1.0 | 0.8 | 0.8 | 2.3 | 1.3 | 1.8 | 1.2 | 1.1 | 0.9 | 1.1 |
| August | 0.4 | 0.5 | 1.0 | 1.8 | 0.8 | 0.7 | 0.5 | 1.6 | 0.8 | 1.8 | 0.5 | 0.8 | 0.7 | 0.9 |
| September | 0.5 | 0.8 | 1.6 | 2.2 | 1.4 | 1.0 | 0.9 | 2.2 | 1.4 | 3.1 | 1.2 | 2.4 | 1.4 | 2.2 |
| October | 0.8 | 1.5 | 1.4 | 1.5 | 1.0 | 1.8 | 1.1 | 2.0 | 1.5 | 3.2 | 1.3 | 2.0 | 1.8 | 2.2 |
| November | 0.8 | 1.2 | 1.7 | 2.6 | 1.6 | 1.0 | 1.4 | 2.4 | 1.7 | 5.5 | 1.4 | 2.7 | 2.0 | 3.6 |
| December | 1.2 | 2.8 | 1.4 | 2.8 | 3.3 | 1.5 | 1.5 | 3.6 | 5.1 | 4.2 | 1.4 | 2.5 | 2.0 | 3.4 |
| **Annual Average** | **1.0** | **1.1** | **1.5** | **1.9** | **1.4** | **1.2** | **1.4** | **2.4** | **1.6** | **3.5** | **1.6** | **2.1** | **1.5** | **2.6** |
| **Criteria ($g/m^2$/month)** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** |

*c = contaminated sample*

## Table D4
## Increase in Deposited Dust

| Increase in Deposited Dust (g/m2/month) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Month** | **D01** | **D02** | **D04A** | **D05** | **D06** | **D07A** | **D08** | **D09** | **D10** | **D20** | **D23B** | **D25** | **D26** | **DA** |
| January | -0.3 | -1.2 | -0.7 | 0.0 | 0.7 | -1.0 | 0.0 | 0.0 | -0.1 | -1.1 | -0.3 | -0.7 | -1.4 | -1.8 |
| February | 0.0 | -0.7 | -0.3 | 0.3 | 0.9 | -0.6 | 0.0 | 0.3 | 0.2 | -0.7 | 0.1 | -0.9 | -1.0 | -1.3 |
| March | 0.1 | -0.7 | -0.4 | 0.2 | 1.0 | -0.1 | 0.0 | 0.4 | 0.2 | -1.1 | 0.1 | -0.7 | -0.5 | -1.4 |
| April | 0.1 | -0.6 | -0.3 | 0.4 | 0.8 | 0.1 | 0.2 | 0.3 | 0.0 | -0.7 | 0.1 | -0.3 | -0.3 | -1.2 |
| May | 0.1 | -0.6 | -0.2 | 0.4 | 0.9 | 0.1 | 0.3 | 0.1 | -0.3 | -0.7 | 0.1 | -0.4 | -0.6 | -1.3 |
| June | 0.1 | -0.6 | -0.4 | 0.3 | 0.9 | 0.0 | 0.2 | -0.1 | -0.5 | -0.7 | 0.1 | -0.5 | -0.6 | -1.2 |
| July | 0.1 | -0.5 | -0.5 | -0.3 | 1.0 | -0.1 | 0.1 | -0.3 | -0.5 | -0.6 | 0.2 | -0.1 | -0.4 | -0.6 |
| August | 0.1 | -0.6 | -0.6 | -0.3 | 0.8 | -0.1 | 0.1 | -0.5 | -0.7 | -0.4 | 0.0 | -0.4 | -0.3 | -0.3 |
| September | 0.0 | -0.6 | -0.7 | -0.3 | 0.2 | -0.2 | 0.0 | -0.8 | -1.3 | -0.5 | 0.0 | -0.3 | -0.2 | -0.2 |
| October | 0.0 | -0.6 | -0.8 | -0.4 | 0.2 | -0.1 | -0.2 | -1.0 | -1.6 | -0.4 | 0.1 | -0.2 | 0.0 | 0.1 |
| November | 0.0 | -0.5 | -0.9 | -0.3 | -0.1 | -0.1 | -0.2 | -0.9 | -1.6 | -0.2 | 0.0 | -0.4 | 0.1 | 0.5 |
| December | 0.1 | -0.1 | -0.6 | -0.2 | -1.4 | -0.1 | -0.1 | -0.5 | -1.2 | 0.5 | 0.1 | -0.1 | 0.1 | 0.8 |
| **Annual Increase** | **0** | **-0.6** | **-0.5** | **0** | **0.5** | **-0.2** | **0** | **-0.3** | **-0.6** | **-0.6** | **0.1** | **-0.4** | **-0.4** | **-0.7** |
| **Criteria ($g/m^2$/month)** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** | **2** |

## Table D5
## Particulate Matter <2.5µm ($PM_{2.5}$) Summary

| *$PM_{2.5}$ ($\mu g/m^3$)* | | |
|---|---|---|
| **Monitor** | **Annual Assessment Criteria** | **Result** |
| DPIE Upper hunter Air Quality Monitoring Network "Muswellbrook" Monitor | 8.0 | 6.2 |

*Note: BMC currently relies upon the Upper Hunter Air Quality Monitoring Network managed by the DPIE to record and monitor particulate matter less than 2.5 microns ($PM_{2.5}$) levels. The monitor adopted by BMC is the Muswellbrook monitor located approximately 5 km to the east of Bengalla.*

## Table D6
## Continuous $PM_{10}$ Monitoring (EPA22 and EPA24) 24 Hour Average Summary

| *Date* | EPA-22 PM10 Avg (ug/m3) | EPA-24 PM10 Avg (ug/m3) |
|---|---|---|
| 1/01/2022 | 5.8 | 7.5 |
| 2/01/2022 | 6.3 | 12.0 |
| 3/01/2022 | 6.0 | 7.6 |
| 4/01/2022 | 7.7 | 8.7 |
| 5/01/2022 | 5.0 | 6.0 |
| 6/01/2022 | 5.4 | 6.3 |
| 7/01/2022 | 4.4 | 5.5 |
| 8/01/2022 | 3.7 | 3.1 |
| 9/01/2022 | 14.2 | 14.1 |
| 10/01/2022 | 20.8 | 19.1 |
| 11/01/2022 | 17.0 | 15.4 |
| 12/01/2022 | 12.7 | 14.0 |
| 13/01/2022 | 7.5 | 7.7 |
| 14/01/2022 | 14.6 | 15.7 |
| 15/01/2022 | 10.0 | 5.8 |
| 16/01/2022 | 16.9 | 14.5 |
| 17/01/2022 | 31.6 | 26.5 |
| 18/01/2022 | 21.1 | 18.1 |
| 19/01/2022 | 5.6 | 6.2 |
| 20/01/2022 | 7.3 | 8.2 |
| 21/01/2022 | 7.6 | 8.5 |
| 22/01/2022 | 6.5 | 6.8 |
| 23/01/2022 | 5.6 | 7.9 |
| 24/01/2022 | 5.8 | 7.6 |
| 25/01/2022 | 9.7 | 10.4 |
| 26/01/2022 | 9.0 | 10.0 |
| 27/01/2022 | 5.5 | 7.1 |
| 28/01/2022 | 5.9 | 9.1 |
| 29/01/2022 | 7.8 | 9.7 |
| 30/01/2022 | 9.7 | 9.3 |
| 31/01/2022 | 13.2 | 13.9 |
| 1/02/2022 | 15.8 | 11.0 |
| 2/02/2022 | 5.3 | 3.8 |
| 3/02/2022 | 4.8 | 5.8 |
| 4/02/2022 | 4.8 | 5.9 |
| 5/02/2022 | 3.5 | 4.6 |
| 6/02/2022 | 4.5 | 5.1 |
| 7/02/2022 | 4.6 | 5.9 |
| 8/02/2022 | 5.3 | 6.6 |
| 9/02/2022 | 11.9 | 8.6 |
| 10/02/2022 | 8.8 | 8.0 |
| 11/02/2022 | 9.0 | 9.1 |
| 12/02/2022 | 6.6 | 8.0 |
| 13/02/2022 | 5.9 | 9.2 |
| 14/02/2022 | 7.0 | 10.6 |
| 15/02/2022 | 7.7 | 10.0 |
| 16/02/2022 | 9.7 | 12.7 |
| 17/02/2022 | 9.6 | 8.3 |
| 18/02/2022 | 10.9 | 7.9 |
| 19/02/2022 | 9.8 | 11.0 |
| 20/02/2022 | 9.1 | 11.0 |
| 21/02/2022 | 9.9 | 4.8 |
| 22/02/2022 | 9.2 | 12.1 |
| 23/02/2022 | 5.6 | 7.8 |
| 24/02/2022 | 3.1 | 4.7 |
| 25/02/2022 | 6.4 | 8.2 |
| 26/02/2022 | 5.7 | 7.9 |
| 27/02/2022 | 7.0 | 9.4 |
| 28/02/2022 | 3.7 | 6.3 |
| 1/03/2022 | 2.7 | 5.0 |
| 2/03/2022 | 3.4 | 5.6 |
| 3/03/2022 | 2.4 | 2.9 |
| 4/03/2022 | 2.5 | 3.0 |
| 5/03/2022 | 10.7 | 14.0 |
| 6/03/2022 | 4.1 | 3.9 |
| 7/03/2022 | 4.6 | 5.0 |
| 8/03/2022 | 2.3 | 1.6 |
| 9/03/2022 | 1.6 | 1.7 |
| 10/03/2022 | 4.7 | 6.7 |
| 11/03/2022 | 6.2 | 11.7 |
| 12/03/2022 | 4.4 | 8.1 |
| 13/03/2022 | 4.6 | 9.3 |
| 14/03/2022 | 7.4 | 9.1 |
| 15/03/2022 | 4.5 | 7.9 |
| 16/03/2022 | 5.6 | 10.8 |
| 17/03/2022 | 11.4 | 13.6 |
| 18/03/2022 | 10.4 | 13.0 |
| 19/03/2022 | 7.1 | 12.1 |
| 20/03/2022 | 8.0 | 12.4 |
| 21/03/2022 | 7.7 | 10.8 |
| 22/03/2022 | 16.3 | 16.3 |
| 23/03/2022 | 15.0 | 14.4 |
| 24/03/2022 | 3.3 | 5.4 |
| 25/03/2022 | 5.8 | 9.3 |
| 26/03/2022 | 2.7 | 5.2 |
| 27/03/2022 | 3.4 | 6.3 |
| 28/03/2022 | 9.6 | 15.2 |

| | | |
|---|---|---|
| 29/03/2022 | 4.9 | 7.2 |
| 30/03/2022 | 5.2 | 6.4 |
| 31/03/2022 | 5.4 | 5.9 |
| 1/04/2022 | 2.9 | 4.5 |
| 2/04/2022 | 4.3 | 6.4 |
| 3/04/2022 | 6.0 | 3.2 |
| 4/04/2022 | 7.6 | 5.3 |
| 5/04/2022 | 11.1 | 19.8 |
| 6/04/2022 | 18.6 | 23.2 |
| 7/04/2022 | 5.6 | 8.7 |
| 8/04/2022 | 2.9 | 5.1 |
| 9/04/2022 | 3.1 | 5.9 |
| 10/04/2022 | 5.6 | 9.9 |
| 11/04/2022 | 6.8 | 7.9 |
| 12/04/2022 | 7.9 | 14.7 |
| 13/04/2022 | 4.6 | 8.0 |
| 14/04/2022 | 4.0 | 8.6 |
| 15/04/2022 | 7.2 | 11.1 |
| 16/04/2022 | 4.9 | 8.3 |
| 17/04/2022 | 6.4 | 10.0 |
| 18/04/2022 | 9.5 | 11.0 |
| 19/04/2022 | 5.8 | 8.2 |
| 20/04/2022 | 2.5 | 1.2 |
| 21/04/2022 | 4.9 | 7.4 |
| 22/04/2022 | 3.2 | 5.8 |
| 23/04/2022 | 3.6 | 8.0 |
| 24/04/2022 | 4.2 | 9.7 |
| 25/04/2022 | 5.3 | 10.8 |
| 26/04/2022 | 3.5 | 7.0 |
| 27/04/2022 | 7.1 | 10.7 |
| 28/04/2022 | 19.6 | 21.5 |
| 29/04/2022 | 11.3 | 9.6 |
| 30/04/2022 | 7.3 | 4.9 |
| 1/05/2022 | 7.7 | 9.9 |
| 2/05/2022 | 11.9 | 13.2 |
| 3/05/2022 | 10.6 | 14.2 |
| 4/05/2022 | 8.2 | 10.3 |
| 5/05/2022 | 6.9 | 3.5 |
| 6/05/2022 | 6.1 | 2.4 |
| 7/05/2022 | 5.6 | 5.0 |
| 8/05/2022 | 6.5 | 9.5 |
| 9/05/2022 | 9.6 | 20.0 |
| 10/05/2022 | 6.4 | 9.5 |
| 11/05/2022 | 2.7 | 5.6 |
| 12/05/2022 | 6.2 | 9.6 |
| 13/05/2022 | 8.1 | 12.2 |
| 14/05/2022 | 13.8 | 11.3 |
| 15/05/2022 | 9.2 | 4.9 |
| 16/05/2022 | 10.4 | 2.4 |
| 17/05/2022 | 7.0 | 5.9 |
| 18/05/2022 | 4.2 | 1.8 |
| 19/05/2022 | 6.1 | 6.9 |
| 20/05/2022 | 6.3 | 12.9 |
| 21/05/2022 | 5.5 | 11.3 |
| 22/05/2022 | 4.5 | 7.6 |
| 23/05/2022 | 3.4 | 7.8 |
| 24/05/2022 | 4.4 | 9.6 |
| 25/05/2022 | 12.5 | 16.7 |
| 26/05/2022 | 17.8 | 22.8 |
| 27/05/2022 | 12.3 | 14.5 |
| 28/05/2022 | 12.9 | 6.7 |
| 29/05/2022 | 5.8 | 1.7 |
| 30/05/2022 | 4.6 | 3.4 |
| 31/05/2022 | 1.8 | 1.1 |
| 1/06/2022 | 3.8 | 2.0 |
| 2/06/2022 | 4.3 | 3.1 |
| 3/06/2022 | 6.4 | 4.1 |
| 4/06/2022 | 2.1 | 0.8 |
| 5/06/2022 | 4.0 | 0.5 |
| 6/06/2022 | 1.9 | 0.7 |
| 7/06/2022 | 4.7 | 2.0 |
| 8/06/2022 | 4.0 | 1.1 |
| 9/06/2022 | 3.4 | 0.9 |
| 10/06/2022 | 2.6 | 0.5 |
| 11/06/2022 | 3.1 | 0.9 |
| 12/06/2022 | 4.6 | 3.3 |
| 13/06/2022 | 7.1 | 5.9 |
| 14/06/2022 | 12.6 | 15.9 |
| 15/06/2022 | 11.1 | 3.3 |
| 16/06/2022 | 9.2 | 7.8 |
| 17/06/2022 | 6.2 | 1.2 |
| 18/06/2022 | 7.5 | 10.6 |
| 19/06/2022 | 8.2 | 9.1 |
| 20/06/2022 | 13.5 | 15.8 |
| 21/06/2022 | 12.3 | 6.2 |
| 22/06/2022 | 8.9 | 2.9 |
| 23/06/2022 | 7.1 | 2.0 |
| 24/06/2022 | 5.2 | 1.4 |
| 25/06/2022 | 7.7 | 1.9 |
| 26/06/2022 | 9.7 | 3.6 |
| 27/06/2022 | 5.5 | 3.5 |
| 28/06/2022 | 8.1 | 7.5 |
| 29/06/2022 | 13.3 | 12.7 |
| 30/06/2022 | 9.2 | 9.4 |

| | | |
|---|---|---|
| 1/07/2022 | 9.2 | 14.2 |
| 2/07/2022 | 13.5 | 14.4 |
| 3/07/2022 | 7.1 | 3.7 |
| 4/07/2022 | 4.1 | 1.2 |
| 5/07/2022 | - | 2.7 |
| 6/07/2022 | 0.2 | 0.2 |
| 7/07/2022 | 2.0 | 0.8 |
| 8/07/2022 | 3.5 | 2.7 |
| 9/07/2022 | 5.6 | 2.4 |
| 10/07/2022 | 6.2 | 6.4 |
| 11/07/2022 | 8.2 | 8.7 |
| 12/07/2022 | 6.6 | 9.0 |
| 13/07/2022 | 2.4 | 1.7 |
| 14/07/2022 | 3.9 | 3.5 |
| 15/07/2022 | 8.7 | 9.5 |
| 16/07/2022 | 6.1 | 4.5 |
| 17/07/2022 | 4.8 | 2.2 |
| 18/07/2022 | 4.2 | 1.2 |
| 19/07/2022 | 4.8 | 12.8 |
| 20/07/2022 | 4.1 | 8.6 |
| 21/07/2022 | 3.3 | 5.4 |
| 22/07/2022 | 3.0 | 6.0 |
| 23/07/2022 | 5.6 | 10.1 |
| 24/07/2022 | 14.0 | 21.9 |
| 25/07/2022 | 13.5 | 8.8 |
| 26/07/2022 | 8.4 | 4.2 |
| 27/07/2022 | 4.0 | 2.5 |
| 28/07/2022 | 3.7 | 1.2 |
| 29/07/2022 | 5.2 | 3.4 |
| 30/07/2022 | 8.3 | 13.8 |
| 31/07/2022 | 14.5 | 17.3 |
| 1/08/2022 | 9.1 | 2.3 |
| 2/08/2022 | 7.8 | 6.3 |
| 3/08/2022 | 8.8 | 9.4 |
| 4/08/2022 | 11.6 | 7.0 |
| 5/08/2022 | 5.4 | 2.9 |
| 6/08/2022 | 5.8 | 1.2 |
| 7/08/2022 | 6.4 | 1.0 |
| 8/08/2022 | 6.2 | 9.8 |
| 9/08/2022 | 5.9 | 8.2 |
| 10/08/2022 | 8.5 | 5.6 |
| 11/08/2022 | 15.0 | 16.4 |
| 12/08/2022 | 19.5 | 8.9 |
| 13/08/2022 | 2.5 | 1.3 |
| 14/08/2022 | 3.2 | 0.2 |
| 15/08/2022 | 2.8 | 0.7 |
| 16/08/2022 | 5.8 | 1.4 |
| 17/08/2022 | 7.0 | 1.9 |
| 18/08/2022 | 4.6 | 1.9 |
| 19/08/2022 | 4.2 | 1.1 |
| 20/08/2022 | 4.2 | 1.9 |
| 21/08/2022 | 11.6 | 8.2 |
| 22/08/2022 | 15.5 | 9.9 |
| 23/08/2022 | 10.0 | 7.4 |
| 24/08/2022 | 3.4 | 1.2 |
| 25/08/2022 | 2.8 | 2.1 |
| 26/08/2022 | 4.8 | 9.3 |
| 27/08/2022 | 7.7 | 10.4 |
| 28/08/2022 | 19.3 | 19.7 |
| 29/08/2022 | 23.1 | 17.6 |
| 30/08/2022 | 15.0 | 10.7 |
| 31/08/2022 | 6.3 | 6.4 |
| 1/09/2022 | 24.7 | 19.6 |
| 2/09/2022 | 10.2 | 7.8 |
| 3/09/2022 | 3.1 | 3.1 |
| 4/09/2022 | 3.4 | 2.9 |
| 5/09/2022 | 4.6 | 4.1 |
| 6/09/2022 | 5.4 | 8.9 |
| 7/09/2022 | 12.2 | 13.2 |
| 8/09/2022 | 9.9 | 10.9 |
| 9/09/2022 | 7.8 | 4.8 |
| 10/09/2022 | 2.8 | 0.6 |
| 11/09/2022 | 6.3 | 2.7 |
| 12/09/2022 | 5.2 | 2.4 |
| 13/09/2022 | 4.3 | 13.5 |
| 14/09/2022 | 6.9 | 9.1 |
| 15/09/2022 | 12.2 | 13.8 |
| 16/09/2022 | 5.4 | 1.9 |
| 17/09/2022 | 5.9 | 2.6 |
| 18/09/2022 | 4.9 | 1.6 |
| 19/09/2022 | 6.7 | 2.5 |
| 20/09/2022 | 5.9 | 14.5 |
| 21/09/2022 | 9.3 | 11.5 |
| 22/09/2022 | 4.8 | 6.7 |
| 23/09/2022 | 5.9 | 8.4 |
| 24/09/2022 | 8.2 | 7.0 |
| 25/09/2022 | 7.0 | 5.3 |
| 26/09/2022 | 7.5 | 8.3 |
| 27/09/2022 | 8.0 | 9.7 |
| 28/09/2022 | 5.2 | 2.6 |
| 29/09/2022 | 2.4 | 1.2 |
| 30/09/2022 | 3.7 | 4.8 |
| 1/10/2022 | 5.7 | 9.8 |
| 2/10/2022 | 6.5 | 9.5 |

| | | |
|---|---|---|
| 3/10/2022 | 10.1 | 10.3 |
| 4/10/2022 | 9.2 | 12.1 |
| 5/10/2022 | 4.8 | 8.0 |
| 6/10/2022 | 6.4 | 9.8 |
| 7/10/2022 | 12.8 | 12.7 |
| 8/10/2022 | 12.1 | 6.6 |
| 9/10/2022 | 2.1 | 1.6 |
| 10/10/2022 | 5.8 | 7.1 |
| 11/10/2022 | 4.4 | 7.7 |
| 12/10/2022 | 5.1 | 7.7 |
| 13/10/2022 | 4.7 | 8.1 |
| 14/10/2022 | 6.2 | 2.8 |
| 15/10/2022 | 4.5 | 3.9 |
| 16/10/2022 | 6.5 | 13.6 |
| 17/10/2022 | 6.6 | 7.7 |
| 18/10/2022 | 9.1 | 10.3 |
| 19/10/2022 | 9.5 | 9.5 |
| 20/10/2022 | 10.2 | 13.2 |
| 21/10/2022 | 6.9 | 8.5 |
| 22/10/2022 | 6.4 | 4.4 |
| 23/10/2022 | 5.4 | 6.1 |
| 24/10/2022 | 6.7 | 8.9 |
| 25/10/2022 | 15.4 | 9.1 |
| 26/10/2022 | 6.6 | 1.6 |
| 27/10/2022 | 7.3 | 1.7 |
| 28/10/2022 | 8.2 | 2.9 |
| 29/10/2022 | 5.5 | 1.5 |
| 30/10/2022 | 5.3 | 4.7 |
| 31/10/2022 | 5.6 | 7.6 |
| 1/11/2022 | 2.1 | 0.9 |
| 2/11/2022 | 3.1 | 0.9 |
| 3/11/2022 | 2.3 | 2.5 |
| 4/11/2022 | 4.7 | 8.2 |
| 5/11/2022 | 5.4 | 0.2 |
| 6/11/2022 | 7.0 | 0.1 |
| 7/11/2022 | 7.9 | 0.1 |
| 8/11/2022 | 5.1 | 0.1 |
| 9/11/2022 | 3.9 | 0.1 |
| 10/11/2022 | 4.3 | 0.1 |
| 11/11/2022 | 8.0 | 0.1 |
| 12/11/2022 | 9.3 | 0.1 |
| 13/11/2022 | 17.5 | 0.1 |
| 14/11/2022 | 5.2 | 1.6 |
| 15/11/2022 | 4.2 | 0.3 |
| 16/11/2022 | 3.0 | 0.2 |
| 17/11/2022 | 2.8 | 0.1 |
| 18/11/2022 | 4.1 | 0.1 |
| 19/11/2022 | 5.3 | 0.3 |
| 20/11/2022 | 6.5 | 1.8 |
| 21/11/2022 | 4.5 | 0.4 |
| 22/11/2022 | 4.9 | 0.1 |
| 23/11/2022 | 5.0 | 0.2 |
| 24/11/2022 | 3.6 | 0.1 |
| 25/11/2022 | 9.2 | 0.1 |
| 26/11/2022 | 12.7 | 0.1 |
| 27/11/2022 | 9.5 | 0.8 |
| 28/11/2022 | 12.7 | 0.2 |
| 29/11/2022 | 10.0 | 4.8 |
| 30/11/2022 | 7.9 | 10.4 |
| 1/12/2022 | 6.8 | 9.4 |
| 2/12/2022 | 6.0 | 8.6 |
| 3/12/2022 | 5.9 | 8.3 |
| 4/12/2022 | 3.8 | 7.4 |
| 5/12/2022 | 8.6 | 6.5 |
| 6/12/2022 | 10.5 | 9.4 |
| 7/12/2022 | 7.3 | 5.8 |
| 8/12/2022 | 5.0 | 4.0 |
| 9/12/2022 | 6.4 | 8.5 |
| 10/12/2022 | 5.3 | 7.1 |
| 11/12/2022 | 8.6 | 9.1 |
| 12/12/2022 | 9.1 | 5.3 |
| 13/12/2022 | 5.6 | 2.6 |
| 14/12/2022 | 3.3 | 2.4 |
| 15/12/2022 | 2.8 | 2.5 |
| 16/12/2022 | 4.2 | 6.2 |
| 17/12/2022 | 4.6 | 7.5 |
| 18/12/2022 | 2.4 | 4.3 |
| 19/12/2022 | 6.8 | 9.9 |
| 20/12/2022 | 6.2 | 9.6 |
| 21/12/2022 | 5.1 | 7.9 |
| 22/12/2022 | 6.0 | 9.1 |
| 23/12/2022 | 12.2 | 10.4 |
| 24/12/2022 | 10.4 | 8.7 |
| 25/12/2022 | 14.1 | 11.2 |
| 26/12/2022 | 10.0 | 10.7 |
| 27/12/2022 | 8.9 | 14.2 |
| 28/12/2022 | 16.2 | 17.5 |
| 29/12/2022 | 17.3 | 20.2 |
| 30/12/2022 | 9.8 | 12.3 |
| 31/12/2022 | 7.7 | 9.9 |

*Source: AECOM (2022)*
*EPA23 was removed due to blasting and mining operations on 27 October 2021. BMC advised NSW EPA that EPA-23 will be removed from EPL6538 at the next Variation Application*

# Appendix E

## *Annual Compliance Report for EPBC Approval 2012/6378*

# BENGALLA MINING COMPANY

## Bengalla Mine (EPBC APPROVAL 2012/6378)

# 2022 ANNUAL COMPLIANCE REPORT

Prepared by:
BENGALLA MINING COMPANY PTY LIMITED
Locked Bag 5
MUSWELLBROOK NSW 2333
March 2022

## TABLE OF CONTENTS



## LIST OF TABLES



## LIST OF FIGURES

# BENGALLA MINE

# ANNUAL COMPLIANCE REPORT FOR EPBC APPROVAL 2012/6378

## 1 INTRODUCTION

### 1.1 Background

Bengalla Mining Company Pty Limited (BMC) operates the Bengalla Mine (Bengalla) on behalf of the Bengalla Joint Venture (comprising New Hope Bengalla Pty Ltd as to 8/10 share and Taipower Bengalla Pty Limited as to 2/10 share). Bengalla is located 130 km north-west of Newcastle and 4 km west of the township of Muswellbrook.

Bengalla commenced operations in 1998 and is approved to extract up to 15 Million tonnes per annum of run of mine coal until 2039.

On 3 March 2015, State Significant Development Consent (SSD-5170) for the Bengalla Continuation of Mining Project was granted by the Secretary of the NSW Department of Planning and Environment (DPE) under the *Environmental Planning and Assessment Act 1979* NSW. SSD-5170 has since been modified on various occasions.

On 27 May 2015, BMC was granted *Environment Protection and Biodiversity Conservation Act 1999* Cth (EPBC Act) Approval 2012/6378 (the EPBC Approval).

Both the EPBC Approval and SSD-5170 (as originally granted) are supported by (relevantly) the '*Continuation of Bengalla Mine Environmental Impact Statement*' (Hansen Bailey, 2013) (EIS) and *Continuation of Bengalla Mine Response to Submissions* (Hansen Bailey, 2014) (RTS).

The Biodiversity Offset Management Plan (BOMP) has been developed to meet relevant requirements under the EPBC Approval and SSD-5170. The current version of the BOMP was approved by what was then the Commonwealth Department of Environment and Energy (DoEE)[1] on 8 March 2017 and by DPE on 18 August 2017.

The Biodiversity Management Plan (BDMP) has also been developed to meet relevant requirements under the EPBC Approval and SSD-5170. The current version of the BDMP was approved by DPE on 18 August 2017 and by DoEE on 20 September 2017. The BDMP incorporates the Vegetation Clearance Protocol and Landscape Management Plan (VCPLMP) referred to in the EPBC Approval.

### 1.2 Purpose and Scope

This report has been prepared in accordance with Condition 12 of the EPBC Approval which states:

> *"By the end of March each year, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BOMP and VCLMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published.*
>
> *Note: The Annual Review required under NSW Approval condition 4 (of Schedule 5) may be used to satisfy this condition if it meets the above content and submission requirements)."*

This report applies to the period 1 January 2022 to 31 December 2022 (Reporting Period).

[1] Now the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

This report is published as a stand-alone report and will also form an Appendix to the 2022 Annual Review for Bengalla required under SSD-5170 Schedule 5 Condition 4.

## 1.3 Clearing Activities in 2022

**Table** 1 is a reproduction of Figure 6 from the BDMP. It provides details of the staged clearing approach undertaken at Bengalla.

**Table 1**
**Staged Clearing Approach**

| Stage | Actions |
|---|---|
| Pre-Clearing Survey | • Performed within one month of clearing<br>• All fauna, flora and *Cymbidium canaliculatum* recorded<br>• Vegetation health assessed and documented<br>• Habitat features marked and flagged<br>• Fauna captured and relocated |
| Clearing – Stage 1 | • Removal of all vegetation other than habitat trees<br>• Habitat features left standing overnight |
| Clearing – Stage 2 | • A final pre-clearing inspection will be conducted to identify and capture any fauna<br>• Habitat trees lightly shaken by machinery prior to felling<br>• Appropriate machinery used to fell the tree<br>• Any *Cymbidium canaliculatum* (Tiger Orchid) translocated<br>• Remaining fauna captured and relocated<br>• Felled habitat trees left overnight and then appropriate sections are removed and relocated to a storage location, rehabilitation areas or disposed |

The Bengalla Mine Annual Clearing Report for 2022 (Clearing Report) is presented in **Appendix C** and contains details about the procedures and results for all pre-clearing and clearing activities completed at Bengalla during the Reporting Period.

Clearing works in 2022 were undertaken in relation to, but not limited to the following:

- General pit progression and relocation of infrastructure,
- Construction of new infrastructure, and
- Maintenance works.

The Clearing Report summarises the 2022 pre-clearance and clearance surveys, which included:

- Identification of 232 hollow-bearing / habitat trees, of which 207 were felled;
- 100 animals were relocated or captured during pre-clearance and clearance surveys;
- Observation of 21 animals that evaded capture during clearing;
- Nine animals were killed as a result of tree felling;
- Six animals required euthanasia due to injuries obtained when clearing;

- 15 animals required assistance from wildlife rehabilitation agencies; and
- One *Cymbidium canaliculatum* (listed as endangered under the EPBC Act) was identified during Stage 1 pre-clearance surveys in 2022. This individual was successfully translocated to a donor tree prior to Stage 2 tree clearing activities in December 2022.

**Figure 1** is a reproduction of Figure 3 from the approved BOMP and has been updated to illustrate areas cleared during the Reporting Period, including Critically Endangered Ecological Communities (CEEC) listed under the EPBC Act.

CEEC identified in environmental assessments completed for the EIS and RTS included the following four communities identified as conforming to Upper Hunter White Box-Ironbark Grassy Woodland (Box Gum Woodland):

- Grey Box/White Box Intergrade Grassy Woodland;
- Upper Hunter White Box -Ironbark Grassy Woodland;
- Central Hunter Ironbark – Spotted Gum Forest; and
- Derived Native Grassland.

## 1.4 Weed and Pest Management in 2022

Information about the weed and pest management programs implemented at Bengalla and the offset areas during the Reporting Period is presented in **Appendix D**.

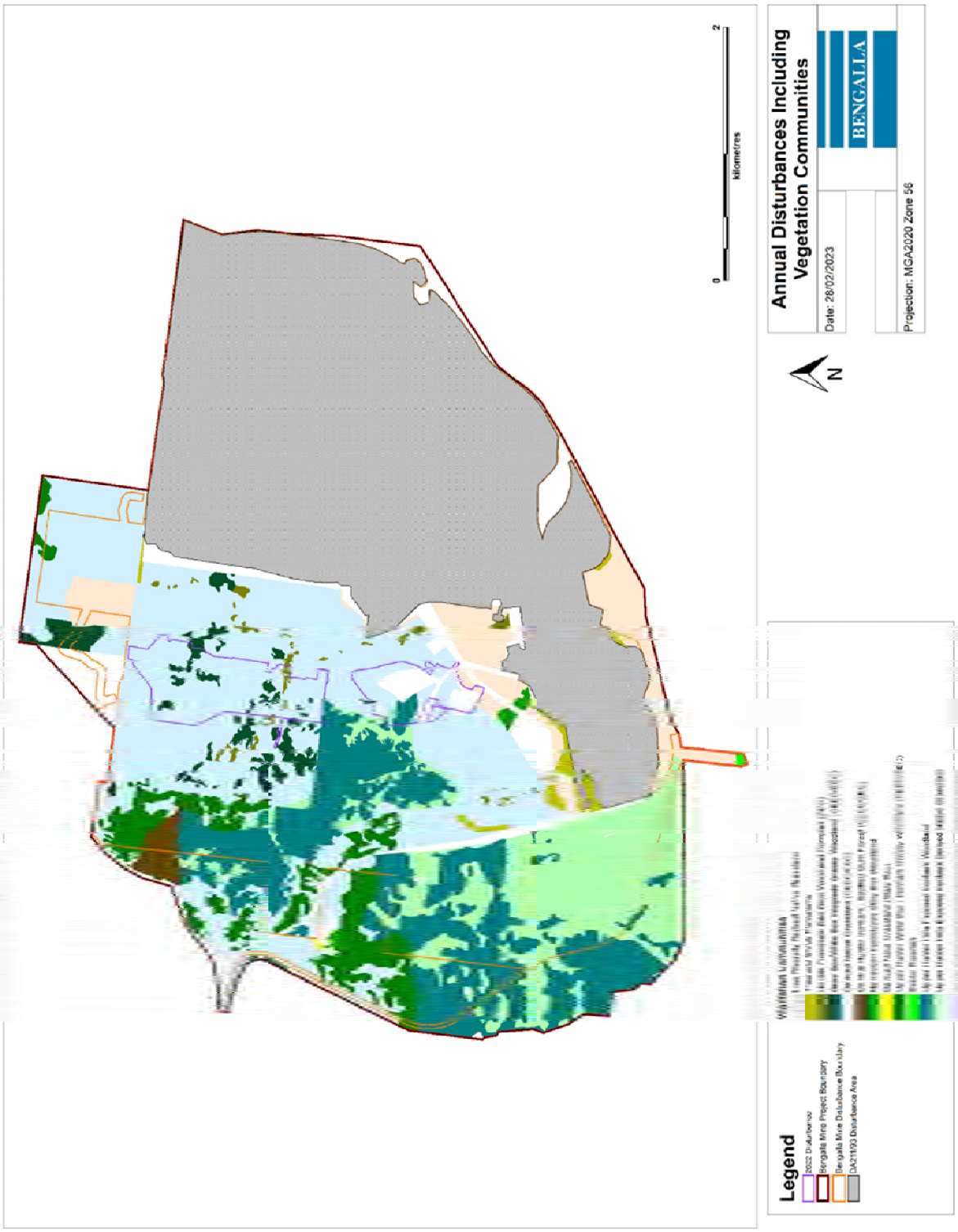



**Figure 1 - Vegetation Communities**

## 1.5 Compliance Report

The commitments made in the approved BDMP and BOMP, along with the compliance status of each for the Reporting Period, are presented in **Appendix A** and **Appendix B** respectively with comments provided against each where required.

**Table 2** lists the conditions of the EPBC Approval and indicates the compliance status of each for the Reporting Period as 'compliant', 'not compliant' or 'not triggered'. Comments are provided against each condition, where required.

**Table 2**
**BMC Compliance Status against Conditions of EPBC Approval for 2022**

| Ref | Condition | Status | Comment |
|---|---|---|---|
| 1 | The approval holder must not clear more than 535 hectares of *White Box-Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland* ecological community (Box Gum Woodland) and must limit clearing to within the project disturbance boundary defined at Schedule 1. | Compliant | In 2022 clearing was undertaken within the Project Disturbance Boundary shown on the plan at Schedule 1 of the EPBC Approval. BMC has not cleared more than 535 hectares of Box Gum Woodland (see **Figure 1**). |
| 2 | To mitigate impacts of the action on Box Gum Woodland, the Grey Headed Flying Fox, Large-eared Pied Bat, South-eastern Long-eared Bat, Regent Honeyeater, Swift Parrot and Spotted-tail Quoll, the approval holder must prepare and submit, prior to the proposed date of commencement of the action, a mine site Vegetation Clearance Protocol and Landscape Management Plan (VCPLMP) for the Minister's written approval. The VCPLMP must:<br>a. Delineate areas to be cleared, describe pre-clearance survey methods, specify actions to minimise fauna impacts and detail vegetation clearance procedures<br>b. Require collection and stockpiling of habitat features important to threatened fauna species for reinstatement in rehabilitation areas<br>c. Require use of native, locally sourced seed for propagation for rehabilitation activities<br>d. Include measures to avoid, suppress and control the spread of plant pathogens (such as *Phytophthora cinnamomi*)<br>e. Specify a two stage clearing protocol where non-habitat trees are cleared 24 hours prior to any habitat trees being cleared, to encourage fauna to move out of an area.<br>The approval holder must not commence the action until the VCPLMP is approved by the | Compliant | A BDMP was developed to meet this requirement and is implemented at Bengalla. **Appendix A** sets out the commitments from the BDMP and the compliance status of each for the Reporting Period.<br>The original BDMP was approved by each of (then) DPE and DoEE on 14 August 2015. BMC commenced implementation of the BDMP from that date (before operations commenced under SSD-5170).<br>The current (revised) version of the BDMP was approved by DPE on 18 August 2017 and DoEE on 20 September 2017.<br>The BDMP addresses each of the requirements in Condition 2(a)-(e) of the EPBC Approval (refer to Table 1 of the BDMP). |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | Minister. The approved VCPLMP must be implemented.<br><br>Note: The Biodiversity Management Plan required under NSW Approval condition 29 may be used to satisfy this condition if it meets the above content and submission requirements. | | |
| 3 | To compensate for the loss of 535 hectares of Box Gum Woodland ecological community and 272 hectares of habitat for the Grey Headed Flying Fox, Large-eared Pied Bat, South-eastern Long-eared Bat, Regent Honeyeater, Swift Parrot and the Spotted-tail Quoll, the approval holder must prepare and submit, by 3 September 2015, a Biodiversity Offset Management Plan (BOMP) for the Minister's written approval.<br><br>The BOMP must:<br><br>a. Identify those lands described as the Offset Areas at Schedule 2 (Figures 1- 6) of this notice. This must include offset attributes, shape files, textual descriptions and maps to clearly define the location and boundaries of the offset area(s)<br><br>b. Provide a survey and description of the current condition (prior to any management activities) of the offset areas identified in Condition 3a<br><br>c. Detail management actions and regeneration and revegetation strategies to be undertaken on the offset areas to improve the ecological quality of these areas, including:<br><br>(i) a description and timeframe of measures that would be implemented to improve the condition of Box Gum Woodland and habitat for the Grey Headed Flying Fox, Large-eared Pied Bat, South-eastern Long-eared Bat, Regent Honeyeater, Swift Parrot and the Spotted-tail Quoll on the offsets sites;<br><br>(ii) performance and completion criteria for evaluating the management of the offset areas, and criteria for triggering remedial action;<br><br>(iii) a program to monitor and report on the effectiveness of these measures, and progress | Compliant | A BOMP was developed to meet this requirement and is implemented at Bengalla. **Appendix B** sets out the commitments from the BOMP and the compliance status of each for the Reporting Period.<br><br>The draft BOMP was submitted to then DoEE and DPE on 2 September 2015. Following an extensive consultation process (see Appendix A of the BOMP), the BOMP was approved by DoEE on 8 March 2017 and by DPE on 18 August 2017.<br><br>The BOMP addresses each of the requirements in Condition 3(a)-(c) of the EPBC Approval (refer to Table 1 of the BOMP).<br><br>The approved BOMP was published on Bengalla's website within 1 month after being approved and continues to be available on the website.<br><br>As noted in last year's report, BMC has taken preliminary steps towards separating the BOMP into three separate BOMPs (one for each offset property). At this stage, this process is on hold as BMC proposes to enter into a Biodiversity Stewardship Agreement for each of the three offset properties (refer to Condition 4 below). The currently approved BOMP continues to be implemented in the interim. |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | against the performance and completion criteria;<br>(iv) a description of potential risks to the successful implementation of the plan, a description of the measures that will be implemented to mitigate against these risks and a description of the contingency measures that will be implemented if defined triggers arise; and<br>(v) details of who would be responsible for monitoring, reviewing, and implementing the plan.<br>The approved BOMP must be implemented. The approved BOMP must be published on the approval holder's internet web site within 1 month of being approved. The most recently approved version of the BOMP must be published on the approval holder's internet web site for a period of 5 years after it is approved.<br>Note: The Biodiversity Management Plan required under NSW Approval condition 29 may be used to satisfy this condition if it meets the above content and submission requirements. | | |
| 4 | The approval holder must secure the lands identified as the *Offset Areas* at Schedule 2 (Figures 1- 6) of this notice as a biodiversity offset, in accordance with NSW Approval condition 28. | DCCEEW concluded not compliant with Condition 4 – no further action taken | All Biodiversity Offset Areas identified in Schedule 2 (Figures 1-6) of the EPBC Approval are owned by the Bengalla Joint Venturers (BJV) and managed by BMC. All Biodiversity Offset Areas are managed in accordance with the BOMP.<br>By letter dated 6 October 2020, the Secretary agreed to an extension of time until 30 June 2022 to finalise the long-term security of the Biodiversity Offset Areas under Schedule 3 Condition 28 of SSD-5170 (Condition 28). At this stage, the DPE has not granted a further extension in which to comply with Condition 28.<br>BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing the offsets. Following that correspondence, BMC is taking steps to progress Biodiversity Stewardship Agreements for the offset areas. In the meantime, the offset areas continued to be owned by the BJV and managed by BMC in accordance with the BOMP.<br>BMC notified the non-compliance with Condition 28 to DCCEEW on 7 September 2022. By letter dated 12 October 2022, DCCEEW advised that it |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | | | had reviewed the matter and "*concluded that the issuing of an infringement notice would not be an appropriate course of action in this case. Consequently, no further action will be taken regarding this matter*". |
| 5 | In order to protect listed threatened species and listed threatened ecological communities, the approval holder must undertake rehabilitation activities in accordance with NSW approval conditions 44, 45 and 46. | Compliant | **Condition 44**<br>• Requirement<br>Schedule 3 Condition 44 of SSD-5170 (Condition 44) requires BMC to rehabilitate the site to the satisfaction of what is now the Resources Regulator.[2] The rehabilitation must comply with the objectives in Table 15 of SSD-5170 and be consistent with the conceptual final landform shown in Append_ix 9 of SSD-5170.<br>• Status<br>Rehabilitation at Bengalla is ongoing. It is undertaken in accordance with SSD-5170 (as modified) and the current Forward Program and Rehabilitation Management Plan (which replaced the former Mining Operations Plan from 1 July 2022).<br>The current Forward Program covers a period from 27 June 2022 to 26 June 2025. The proposed rehabilitation activities for Year 1 (July 2022 to July 2023) include development of approx. 47.7 ha of retrofitted High Density Woody Vegetation (HDWV) on the eastern face of the Overburden Emplacement Area (OEA) and reshaping of approximately 20 ha of land of overburden for rehabilitation to Class IV pasture 8.7 ha and HDWV 11.3 ha on the landform of the OEA.<br>During the Reporting Period, no areas of new rehabilitation were undertaken.<br>BMC installed 20,000 HDWV tubestock into previously rehabilitated land according to the current Forward Plan.<br>Further detail about the rehabilitation carried out at Bengalla during the Reporting Period will be available in Section 8 of the Annual Review for 2022.<br>**Condition 45**<br>• Requirement<br>Schedule 3 Condition 45 of SSD-5170 requires BMC to carry out progressive rehabilitation. Interim stabilisation measures are to be used where reasonable and feasible to control dust |

[2] This requirement was modified slightly as a result of Mod 5 to SSD-5170 (approved on 24 February 2023, after the end of the Reporting Period). The first part of Schedule 3 Condition 44 of SSD-5170 now requires BMC to "*rehabilitate the site in accordance with the provisions under the Mining Act 1992*".

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | | | emissions in disturbed areas that are not active but not ready for final rehabilitation.<br>• Status<br>Rehabilitation is carried out progressively at Bengalla, as soon as reasonably practicable following disturbance. Interim stabilisation measures are used where required.<br>**Condition 46**<br>• Requirement<br>During the Reporting Period, Schedule 3 Condition 46 of SSD-5170 (Condition 46) required BMC to prepare a Rehabilitation Management Plan to the satisfaction of what is now the Resources Regulator. The plan was to be prepared in accordance with and incorporate the elements specified in Condition 46. BMC was required to implement the plan as approved by the Resources Regulator.[3]<br>• Status<br>BMC was required to develop and implement a new Rehabilitation Management Plan and Forward Program (among other actions) from 1 July 2022 due to reforms to the Mining Act 1992.<br>These new documents effectively replaced the previous approved Mining Operations Plan (which was implemented during the first half of the Reporting Period) and function as the Rehabilitation Management Plan for the purposes of Schedule 3 Condition 46 of SSD-5170. The new Rehabilitation Management Plan and Forward Program were implemented at Bengalla as part of mining operations during the second half of the Reporting Period. |
| 6 | The approval holder must undertake management and monitoring of water resources in accordance with NSW approval conditions 23 to 25. | EPA concluded not compliant with EPL conditions relating to TSS concentration limits in respect of discharge event on 16 August 2022 | **Condition 23**<br>• Requirement<br>Schedule 3 Condition 23 of SSD-5170 (Condition 23) requires BMC to comply with section 120 of the *Protection of the Environment Operations Act 1990* NSW (POEO Act) and the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* NSW (unless an EPL or the EPA authorises otherwise).<br>• Status<br>During the Reporting Period BMC notified DCCEEW, DPE and the NSW Environment Protection Authority (EPA) of a potential non- |

[3] Schedule 3 Condition 46 of SSD-5170 was modified on 24 February 2023, after the end of the Reporting Period. It now requires BMC to "*prepare a Rehabilitation Management Plan for the development in accordance with the provisions under the Mining Act 1992 and carry out the development in accordance with this plan*."

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | | – caution issued | compliance relating to Condition 23. This involved an elevated Total Suspended Solids (TSS) concentration recorded for a discharge event on 16 August 2022.<br><br>The matter was investigated and a report provided to DCCEEW, DPE and EPA. The DPE and EPA subsequently issued further correspondence to BMC, to which BMC responded as requested.<br><br>By letter dated 10 March 2023, the EPA advised BMC that it *"has reasonable grounds to believe that* [BMC] *committed an offence under section 64(1) of the* [POEO Act] *by the alleged non-compliance with EPL condition L2.1, by exceeding the concentration limits specified in condition L2.4, which occurred on 16 August 2022 … the EPA has given consideration to this matter and in these circumstances … considers it appropriate to issue* [BMC] *with this Official Caution for the alleged offence*".<br><br>During the Reporting Period, BMC discharged a total of 1,904 ML of saline water to the Hunter River under the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* NSW.<br><br>**Condition 24**<br><br>• Requirement<br><br>Schedule 3 Condition 24 of SSD-5170 requires BMC to ensure that mining operations comply with the performance measures in Table 12 of SSD-5170 to the satisfaction of the Secretary.<br><br>• Status<br><br>Water management at Bengalla during the Reporting Period was undertaken in accordance with the performance measures in Table 12 of SSD-5170. The approved Water Management Plan (WMP) also addresses the performance measures (see Table 1 of the WMP).<br><br>Further detail about the site water balance and results of surface water monitoring and groundwater monitoring during the Reporting Period will be available in the Annual Review for 2022.<br><br>**Condition 25**<br><br>• Requirement<br><br>Schedule 3 Condition 25 of SSD-5170 requires BMC to prepare a Water Management Plan to the satisfaction of the Secretary. The plan must be prepared in accordance with and incorporate the elements specified in Condition 25. BMC must implement the plan as approved by the Secretary. |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | | | • Status<br>The WMP was developed to meet this requirement and is implemented at Bengalla.<br>The current WMP was approved by the Secretary on 1 February 2019. The WMP was prepared in consultation with the relevant authorities and addresses each of the requirements of Schedule 3 Condition 25 of SSD-5170 (see Table 2 of the WMP). |
| 7 | In order to protect water resources, the approval holder must undertake rehabilitation activities in accordance with NSW approval conditions 44 and 46. | Compliant | Refer to comments at Conditions 5 and 6 above. |
| 8 | Upon request, the approval holder shall supply the groundwater monitoring data for the Bengalla Mine to the Department, NSW Government agencies, operators of the Mt Arthur and/or Mount Pleasant mines or other adjacent mine operators. A protocol for the supply of the data must be included in the approval holder's Water Management Plan. | Not Triggered | No request was made during the Reporting Period.<br>In accordance with Schedule 5 Condition 11 of SSD-5170 and BMC's approved Water Management Plan, groundwater monitoring results are published as part of the Annual Review on Bengalla's website each year. |
| 9 | The approval holder must make available to the Minister on request, all plans or programs and any review of plans or programs required under the Project Approval issued for the project under the Environmental Planning and Assessment Act, 1979 (NSW), including the Biodiversity Management Plan, the Rehabilitation Management Plan and the Water Management Plan, which must include a Site Water Balance, Surface Water Management Plan and Groundwater Management Plan. | Not Triggered | No request was made during the Reporting Period.<br>Approved Bengalla management plans are available on Bengalla's website.<br>BMC's approved Water Management Plan includes a Site Water Balance, Surface Water Management Plan and Groundwater Management Plan. |
| 10 | Within 30 days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement. | Compliant | By email dated 30 October 2015, BMC advised the then DoEE that the action the subject of the EPBC Approval commenced on 1 October 2015. |
| 11 | The approval holder must maintain accurate records substantiating all activities associated with or relevant to these conditions of approval, including measures taken to implement the BOMP and VCPLMP, and make them available upon request to the Department.<br>Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media. | Not Triggered | BMC maintains accurate records substantiating all activities associated with or relevant to the EPBC Approval conditions, including measures to implement the BOMP and the BDMP (which incorporates the VCPLMP).<br>No request was made during the Reporting Period to make any records available to DCCEEW.<br>**Appendix A** describes the commitments made in the approved BDMP and how each has been addressed in the Reporting Period.<br>**Appendix B** describes the commitments made in the approved BOMP and how each has been addressed in the Reporting Period. |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | | | **Appendix C** describes pre-clearing and clearing activities implemented in accordance with the BDMP during the Reporting Period. |
| 12 | By the end of March each year, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BOMP and VCPLMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published.<br><br>Note: The Annual Review required under NSW Approval condition 4 (of Schedule 5) may be used to satisfy this condition if it meets the above content and submission requirements. | Compliant | This report addresses compliance with each of the conditions of the EPBC Approval for the Reporting Period.<br><br>**Appendix A** describes the commitments made in the approved BDMP and how each has been addressed in the Reporting Period.<br><br>**Appendix B** describes the commitments made in the approved BOMP and how each has been addressed in the Reporting Period.<br><br>**Appendix C** describes pre-clearing and clearing activities implemented in accordance with the BDMP during the Reporting Period.<br><br>This report will be uploaded to Bengalla's website by the end of March 2023 and documentary evidence of publication will be provided to DCCEEW at the same time. |
| 13 | Non-compliance with any of the conditions of this approval must be reported to the Department within 2 business days of the approval holder becoming aware of the non-compliance. | Non-compliances with Conditions 4 and 6 reported to DCCEEW during the Reporting Period | On 23 August 2022 (following receipt of water monitoring results on 19 August 2022 with those results not being viewed by BMC staff until 22 August 2022 due to a Mine Infrastructure Area evacuation due to blasting that occurred nearby on 19 August 2022), BMC notified DCCEEW of a potential non-compliance relating to Schedule 3 Condition 23 of SSD-5170 in respect of a discharge event that occurred on 16 August 2022 (see further comments above).<br><br>On 7 September 2022, BMC notified DCCEEW of a non-compliance relating to Schedule 3 Condition 28 of SSD-5170 which requires provision of appropriate long-term security for the offset areas (see further comments above). This followed correspondence from DPE on 17 August 2022 advising that an extension of time to comply with Condition 28 would not be granted. As described above, BMC corresponded with the relevant NSW government departments during 2022 to determine the appropriate long-term mechanism for securing the offsets and Biodiversity Stewardship Agreements are being progressed. |
| 14 | Upon the direction of the Minister, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the | Not Triggered | No direction was made during the Reporting Period. |

| Ref | Condition | Status | Comment |
|---|---|---|---|
| | Minister and the audit report must address the criteria to the satisfaction of the Minister. | | |
| 15 | If the approval holder wishes to carry out any activity other than in accordance with a Plan as specified in the conditions, the approval holder must submit to the Department for the Minister's written approval a revised version of that Plan. The approval holder must not commence the varied activity until the Minister has approved the varied Plan in writing. The Minister will not approve a varied Plan unless the revised Plan would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised Plan, that Plan must be implemented in place of the Plan originally approved. | Not Triggered | No relevant activities other than those described in the BDMP or BOMP were required during the Reporting Period. |
| 16 | If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities to do so, the Minister may request that the approval holder make specified revisions to a Plan specified in the conditions and submit the revised Plan for the Minister's written approval. The approval holder must comply with any such request. The revised approved Plan must be implemented. Unless the Minister has approved the revised Plan then the approval holder must continue to implement the Plan originally approved, as specified in the conditions. | Not Triggered | No request was made during the Reporting Period. |
| 17 | If, at any time after 5 years from the date of this approval, the approval holder has not commenced the action, then the approval holder must not commence the action without the written agreement of the Minister. | Not Triggered | By email dated 30 October 2015, BMC advised the then DoEE that the action the subject of the EPBC Approval commenced on 1 October 2015. |

## 1.6 Conclusion

During the Reporting Period, there were two non-compliances with EPBC Approval conditions reported to DCCEEW. These related to Condition 6 (discharge event on 16 August 2022 in respect of which the EPA has issued a caution) and Condition 4 (provision of long-term security for offset properties in respect of which DCCEEW has advised that no further action will be taken).

BMC will continue to review and document all relevant activities at Bengalla during the 2023 reporting period to assist in maintaining compliance with the EPBC Approval conditions.

**Appendix A** and **Appendix B** provide comments about the implementation of the BDMP and BOMP commitments respectively during the Reporting Period. In summary, BMC has generally complied with the BDMP and BOMP commitments for the Reporting Period.

# Appendix A Biodiversity Management Plan Commitments

| BDMP Section | Control / Action | Timing / Trigger | Responsibility | Monitoring | Reporting | Status | Comment |
|---|---|---|---|---|---|---|---|
| 4.1 | Marking Limits of Clearing | Prior to clearing | Environment Superintendent / Mining Manager / Surveyors | Inspection to be undertaken throughout duration of clearing. | Documented in Ground Disturbance Permit (GDP) form and signed off. | Compliant | GDP boundaries are demarcated prior to clearing, where required. Refer section 2.2 of **Appendix C.** |
| 4.2 | Identification of suitable fauna relocation sites | Prior to clearing | Environment Superintendent / Mining Manager | N/A | Documented in GDP form and/or pre-clearing report. | Compliant | Refer Section 2.2.6 of **Appendix C**. |
| 4.2 | Pre-clearing surveys | Within one month prior to clearing | Suitably qualified person | Monitoring of fauna and flora (including Tiger Orchid, pest and weed species), habitat features and plant pathogens. | Documented and signed off in the pre-clearing report. Results to be reported in Annual Review. OEH notified if new threatened species identified. | Compliant | Refer Section 3.1 of **Appendix C**. |
| 4.2 | Clearing Surveys | Within one month of the pre-clearing survey | Suitably qualified person | Monitoring of fauna and flora (including Tiger Orchid, pest and weed species), habitat features and plant pathogens. | Documented and signed off in the clearing report. Results to be reported in Annual Review. OEH notified if new threatened species identified. | Compliant | Refer Section 3.2 of **Appendix C**. |
| 4.3 | Pre-clearing weed management | Prior to clearing and during clearing | Suitably qualified person and Environment Superintendent | Inspection to be undertaken prior to clearing. | Documented and signed off in the GDP. Results to be reported in Annual Review. | Compliant | Refer Section 3.1.7 of **Appendix C**. |

| BDMP Section | Control / Action | Timing / Trigger | Responsibility | Monitoring | Reporting | Status | Comment |
|---|---|---|---|---|---|---|---|
| 4.2.3 | Relocation of habitat features to rehabilitation areas, adjacent vegetation or storage location. | During and/or after clearing | Environment Superintendent | N/A | Documented and signed off in the GDP. Results to be reported in Annual Review. | Compliant | Refer Section 3.1.8 and Section 3.2 of **Appendix C**. |
| 4.1 | Inductions and Staff Education | Ongoing as part of the existing induction process or as part of toolbox talks prior to commencement of ground disturbance works. | Environment Superintendent | N/A | As per Induction procedure | Compliant | Inductions provided to BMC staff and contractors include a component on biodiversity management. |
| 4.2 | Vehicle Driving Policy and Signage | Ongoing or when wildlife crossing areas are identified | Mining Manager / Environment Superintendent | N/A | N/A | Compliant | No wildlife crossing areas were identified by the suitably qualified expert (WSP) during 2022. Site access tracks and controls are included in site procedures. |
| 4.2.5 | Seed collection | Targeted throughout year and opportunistically before and immediately after clearing | Environment Superintendent | Observations to be made throughout year to check flowering / seeding development of key species. Ensure correct licences are held by any contractors. | To be documented and reported in Annual Review. | Compliant | Refer Section 3.1.6 of **Appendix C**. |
| 4.3 | Weed control | Ongoing over life of mine | Environment Superintendent | Routine field observations in Weed Control Zones, including rehabilitation areas. | Results to be reported in Annual Review. | Compliant | Refer **Appendix D.** |
| 4.4 | Feral animal control | Ongoing over life of mine | Environment Superintendent | Routine field observations undertaken including rehabilitation areas. | Results to be reported in Annual Review. | Compliant | Refer **Appendix D.** |
| 5.0 | Ecological Monitoring | Ongoing over life of mine | Ecologist | N/A | Results to be reported in | Compliant | The purpose of the ecological monitoring program is primarily to |

| BDMP Section | Control / Action | Timing / Trigger | Responsibility | Monitoring | Reporting | Status | Comment |
|---|---|---|---|---|---|---|---|
| | and Inspections | | | | Annual Review. | | monitor the risks posed by plant pathogens, exotic weeds and feral animals in biodiversity offsets, residual vegetation and rehabilitation areas and to indicate where management actions are required.<br><br>For weed and feral animal monitoring programs for Bengalla and the biodiversity offset areas refer to **Appendix D.**<br><br>Rehabilitation monitoring was completed during November 2022. Details of results will be presented in Section 8 of the 2022 Annual Review.<br><br>As stated at section 5.4 of the BDMP, no immediate management actions are required for the management of plant pathogens at Bengalla. However, signs of pathogens outbreaks (e.g. in pre-clearing surveys) may require measures to be taken in the future. |

# Appendix B Biodiversity Offset Management Plan Commitments

| BOMP Section | Commitment | Status | Comment |
|---|---|---|---|
| **Notification** | | | |
| 2.3 | Following approval, all actions detailed within this BOMP will be implemented. Within one month of receiving approval, this BOMP will be made available to the public on the BMC website. | Compliant | The BOMP is implemented as part of BMC's operations.<br>The BOMP (with regulatory approval letters) (August 2017) is publicly available on Bengalla's website. |
| **Fencing, Gates and Signage** | | | |
| 8.1 | Boundary fencing will remain around all BOS Areas and will be inspected annually to identify area that may require maintenance. | Compliant | An annual inspection of certain boundary fencing for all biodiversity offset areas (BOS Areas) was undertaken in 2022.<br>Fencing maintenance work and the replacement of two gates were undertaken at Kenalea during 2022. |
| 8.1 | Internal fencing within Kenalea properties and Black Mountain will be maintained (where appropriate) to allow for the management of controlled grazing in these properties. | Compliant | No internal fence repairs were required in 2022 at Kenalea or Black Mountain. |
| 8.1 | Stock proof fencing will be utilised where existing fences are absent to protect sensitive areas. | Not Triggered | Not required during the Reporting Period. |
| 8.1 | Current gates for access to BOS Areas will be retained and kept locked. | Compliant | Gates to BOS Areas remained secured and locked during 2022. Two gates were replaced at Kenalea. |
| 8.1 | BMC will install signage at the entrances to the BOS Areas to inform the public of restricted access to properties. | Compliant | Restricted access signage at the entrances to the BOS Areas has been installed prior to 2022. |
| **Controlled Activities** | | | |
| 8.2 | All contractors, stakeholders and visitors to the BOS Areas will be inducted. The induction will include information on activities prohibited in BOS Areas unless explicitly undertaken for the purposes of ongoing management. | Compliant | BMC has established internal polices which require all staff/contractors, stakeholders and visitors working at Bengalla (or BOS Areas) to be inducted prior to undertaking specified work.<br>The BOS Areas induction identifies relevant compliance obligations including under applicable management plans. |

| BOMP Section | Commitment | Status | Comment |
|---|---|---|---|
| **Control Grazing** | | | |
| 8.3 | Control grazing will only be permitted in Zone 1 and Zone 2 management areas. | Not Triggered | No control grazing was undertaken during 2022. |
| 8.3 | Best practice for control grazing will be implemented wherever control grazing is employed, including:<br>• Providing adequate rest periods and adjusting rest periods to suit the recovery needs and growth rates of the desirable plants;<br>• Targeting defined areas with high fuel loads or weed infestations;<br>• Cattle stocking numbers kept below 4 dray sheep equivalent;<br>• Pre and post grazing monitoring;<br>• Periods of grazing must be kept as short as practicable; and<br>• Control grazing will not be conducted during declared drought periods. | Not Triggered | No control grazing was undertaken during 2022. |
| 8.3 | Control grazing will be monitored against Trigger and Performance Criteria. | Not Triggered | No control grazing was undertaken during 2022. |
| 7.1 | Should monitoring results indicate that regeneration is not occurring naturally after Year 5, assisted revegetation will take place in areas that require this management action. | Not Triggered | An assisted regeneration program will be developed and implemented to mid and over storey covers in identified areas as required. |
| 8.3 | Stock will be excluded from riparian areas and will access water primarily from farm dams or water troughs. | Not Triggered | No cattle grazing was undertaken during 2022. |
| 8.3 | Monitoring will be undertaken pre and post grazing with the use of photo reference points. Areas subject to control grazing will be monitored as part of annual monitoring program. | Not Triggered | No cattle grazing was undertaken during 2022 |
| **Bushfire management** | | | |
| 8.4 | BMC will take practicable steps to prevent the occurrence of bushfires on the land and minimise the spread of bushfire. | Compliant | Fire trail maintenance was completed on Kenalea and Black Mountain in 2022. An assessment of fuel loads and fuel characteristics was completed on each offset area. Subsequent to this assessment, bushfire hazard reduction burns are planned for 2023 for each offset. |

| BOMP Section | Commitment | Status | Comment |
|---|---|---|---|
| 8.4 | BMC will provide maps (including water fill points) and contact details of the properties to the RFS. | Compliant | Maps, keys and relevant contact information have previously been provided to local RFS captains. Locations of water fill points were provided to the RFS in 2018 following the ground truthing of these locations. |
| **Weed Control** | | | |
| 8.5 | Weed management actions will target Weeds of National Significance and Noxious Weeds across BOS Areas. | Compliant | Enright Land Management undertook a weed monitoring and control program in BOS Areas (excluding Merriwa River) due to access constraints) during the Reporting Period. Records of the location of weed control are detailed in **Appendix D**. |
| 8.5 | Weed control will focus on species that exclude or have the potential to exclude native species, disrupt the recruitment of native species or impede ecological progress. | Compliant | A summary of the weed monitoring and control program undertaken during the Reporting Period is provided in **Appendix D**. |
| 8.5 | Weed management will be undertaken in accordance with the management principles listed in Section 8.5 of the BOMP. | Compliant | Weed management practices were undertaken during the Reporting Period in accordance with Section 8.5 of the BOMP. |
| 8.5 | The results and outcomes of weed management will be documented and analysed for each year in the Annual Review. This will include documentation of areas subject to weeding, techniques used, target species controlled, new species identified, chemicals used and revised approaches to weed control in light of learnings during the previous reporting period. | Compliant | A summary of the weed monitoring and control program for the Reporting Period is provided in **Appendix D**. |
| 8.5 | Weed infestation maps will be updated annually and annotated as required with information about previously implemented weed controls. | Compliant | A weed monitoring and control program was undertaken during the Reporting Period. The location of weeds identified during the program was recorded for GIS input and is presented in **Appendix D**. |
| **Feral Animal Control** | | | |
| 8.6 | BMC will conduct an annual feral animal control program in conjunction with current Local Land Services programs. | Compliant | A feral animal control program was undertaken in 2022. This was undertaken in line with neighbouring properties and the Local Land Services baiting program and is described in **Appendix D**. |
| 8.6 | Should any native fauna deaths be recorded during 1080 baiting and if sufficient carcass is available the animal will be sent to a veterinarian to provide a cause of death should there be any evidence of poisoning. | Not triggered | No native fauna deaths were reported during the 2022 feral animal control program. |

| BOMP Section | Commitment | Status | Comment |
|---|---|---|---|
| 8.6 | The results and outcomes of feral animal management will be documented for each year in the Annual Review. This will include documentation of the techniques used for each feral species, the quantity of bait material purchased and deployed, the areas subject to control, estimate of the numbers of animals culled, new species identified (if any) and any other chemicals used. | Compliant | A summary of the 2022 feral animal control program is provided in **Appendix D**. |
| 8.6 | All personnel involved in feral animal management must hold relevant and valid licences/permits, including any relevant chemical licences for pesticide use or a firearms licence for shooting. | Compliant | Staff and/or contractors involved in feral animal management held all relevant licences and accreditations to undertake the feral animal control works in 2022. |
| **Maintenance Track Improvement and Additional Infrastructure** | | | |
| 8.7 | Maintenance of existing tracks and installation of additional infrastructure may be required to provide safe access to BOS Areas. Maintenance or construction works may result in minor/localised disturbance. BMC will ensure compliance with all legal and environmental protection measures prior to any significant disturbance. | Compliant | All existing access tracks in Kenalea and Black Mountain were assessed and regraded where required in 2022. Merriwa River was not completed due to access being compromised by continued wet conditions. |
| 8.7 | BMC will record and store all relevant GIS information related to the improvement or installation of additional infrastructure. | Compliant | BMC has recorded and stored GIS information for all improvements and installation of additional infrastructure on the BMC GIS database. |
| 8.7 | BMC will undertake routine inspections and maintenance of BOS infrastructure (e.g. tracks, fence lines, gates) | Compliant | Inspections and maintenance of tracks was undertaken in 2022. Certain fence lines and gates were also inspected. Fencing maintenance work and the replacement of two gates were undertaken at Kenalea during 2022. |
| **Contingency Measures** | | | |
| 8.8 | Contingency measures will be utilised should monitoring indicate that performance measures or contingency measures are not being met. | Not Triggered | No contingency measures were required during the Reporting Period. |

# Appendix C Annual Clearing Report 2022

Bengalla Mining Company Pty Ltd

February 2023

# Bengalla Coal Mine

## 2022 Annual Clearing Report

Question today
*Imagine tomorrow*
Create for the future

# Bengalla Coal Mine
# 2022 Annual Clearing Report

Bengalla Mining Company Pty Ltd

WSP
Level 3, 51-55 Bolton St
Newcastle NSW 2300
PO Box 1162
Newcastle NSW 2300

Tel: +61 2 4929 8300
Fax: +61 2 4929 8382
wsp.com

| Rev | Date | Details |
|---|---|---|
| A | 31/01/2023 | Draft |
| B | 06/02/2023 | Draft – address client comments |
| C | 21/02/2023 | Final |

| | Name | Date | Signature |
|---|---|---|---|
| Prepared by: | Gavin Shelley | 31/01/2023 | |
| Reviewed by: | Nathan Cooper | 06/02/2023 | |
| Approved by: | Nathan Cooper | 06/02/2023 | |

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

# Table of contents



## List of tables

## List of figures



## List of photographs

## List of appendices

# Abbreviations

| | |
|---|---|
| BMC | Bengalla Mining Company Pty Ltd |
| Bengalla | Bengalla Mine |
| BMP | Biodiversity Management Plan |
| EEC | Endangered Ecological Community |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* |
| GDP | Ground Disturbance Permit |
| BC Act | *Biodiversity Conservation Act 2016* |

# Executive summary

The Bengalla Mine (Bengalla) Biodiversity Management Plan (BMP) (Bengalla Mining Company Pty Ltd, 2017) provides a framework for biodiversity management, reporting and auditing of ecological issues across Bengalla. As part of the Ground Disturbance Permit (GDP) process, the BMP requires that ecological pre-clearing and clearing surveys be carried out by a suitably qualified person to minimise harm to native flora and fauna.

This report summarises the pre-clearing and clearing surveys completed at Bengalla between January and December of 2022 (reporting period). These works were in relation to:

- general pit progression and relocation of infrastructure
- construction of new infrastructure
- maintenance work.

During the reporting period, pre-clearing and clearing surveys were undertaken by appropriately qualified WSP ecologists in accordance with the BMP.

During pre-clearing surveys, habitat features such as hollow trees were recorded, marked with the letter "H" (for habitat), and flagged with fluorescent tape. A total of 232 hollow-bearing/habitat trees were identified within the GDP area, 207 of which were felled in 2022. Salvaged habitat items were stockpiled, with the intention to relocate them to rehabilitation areas as areas become available.

One large *Cymbidium canaliculatum* was identified during Stage 1 pre-clearing surveys in 2022. This individual was successfully translocated to a donor tree prior to Stage 2 tree clearing activities in December 2022.

Immediately prior to the habitat trees being felled, the ecologist generally conducted a final pre-clearance survey and recorded the results as part of the clearance documentation. Following the felling of the tree, the ecologist investigated hollows for the presence of animals. During the 2022 clearing activities, 100 animals were relocated, 21 were observed but evaded capture, nine animals died during clearing and six animals required immediate euthanasia due to injuries obtained. Fifteen advanced nestling birds were also captured and passed on to appropriate wildlife rehabilitation agencies.

Clearing activities undertaken throughout 2023 will continue to follow the methodology outlined within the BMP.

# 1 Project background

## 1.1 Existing operation

The Bengalla Mining Company (BMC) operates Bengalla Mine (Bengalla), an open cut coal mine located approximately four kilometres (km) west of Muswellbrook in the Upper Hunter Valley, NSW.

Activities associated with clearing operations during the reporting period relate to the construction of new infrastructure, the relocation and maintenance of infrastructure and service roads, in addition to an extension of the open cut mining pit towards the west.

## 1.2 Aims and objectives

The aims of this annual clearing report are to detail the procedures and results for all pre-clearing and clearing operations completed at Bengalla in 2022, inclusive of:

- ecology pre-clearing surveys
- Stage 1 and Stage 2 clearing operations
- fauna handling and relocation
- habitat salvage and procedures.

# 2 Methods

## 2.1 Personnel

The contributors to the delivery of clearing operations and reporting, their qualifications and roles are listed in Table 2.1.

Table 2.1 Contributors and their role

| Name | Qualification | Role |
|---|---|---|
| Gavin Shelley | B.Env Sc. Mgmt | Ecologist – pre-clearing surveys, spotter catcher and reporting |
| Sebastian Miller | B.Sc. | Ecologist – pre-clearing surveys, spotter catcher and reporting |
| Allan Richardson | B Env Sc (Hons) | Associate Ecologist – pre-clearing surveys, spotter catcher and reporting |
| Nathan Cooper | B.Env.Sc.<br>Grad Dip Ornithology | Principal Ecologist – pre-clearing surveys, spotter catcher and technical review, project manager |

All work was carried out under the appropriate licenses, including a scientific licence as required under Part 2 of the NSW *Biodiversity Conservation Act 2016* (BC Act) (License Number: SL100630), and an Animal Research Authority issued by the Department of Primary Industries (Agriculture).

## 2.2 Pre-clearing survey procedure

The ecology pre-clearance surveys were conducted throughout 2022 and were completed in accordance with Section 4.2.1 of the BMP, which outlines management actions for vegetation pre-clearance procedures. The aims and objectives of the ecology pre-clearing survey include:

- detecting the presence/absence of threatened species and their habitat, including Cymbidium canaliculatum (Tiger Orchid)
- recording the presence of any fauna or flora species
- identification and demarcation of habitat trees, large logs, and boulders
- identification and demarcation of salvageable material including hollow bearing trees, debris, and boulders
- searching for evidence of plant pathogen Phytophthora cinnamomi
- identification of appropriate fauna relocation sites for captured fauna species
- identification of plants suitable for seed collection
- identification of weed and pest species infestations.

Clearing boundaries were initially marked by a surveyor with survey pegs, generally incorporating spacing commensurate with visible line of sight. A hard copy map of the GDP area was also used as a reference when in the field.

It should be noted that throughout the year some GDP areas were assessed more than once due to only part of the GDP area being disturbed or an extended time frame between the initial pre-clearance inspection and commencement of works (Section 3.1).

### 2.2.1 Fauna habitat identification

Each clearing area was traversed by a field ecologist to identify important fauna habitat values, including:

- habitat trees – identified as any substantial non hollow-bearing tree that either provided significant canopy cover and thus significant potential foraging resources, or was observed to contain nesting material
- hollow-bearing trees – which include any tree that was observed to contain a visible hollow or fissure that may support microhabitat values for native fauna.

All identified habitat, hollow-bearing or significant trees were marked with "H" (habitat tree) in high visibility paint as well as pink flagging tape to ensure dark trees, such as *Eucalyptus crebra* (Narrow-leaved Ironbark), were clearly marked prior to the commencement of clearing activities. The number of habitat, hollow-bearing or significant trees were recorded on field proformas.

### 2.2.2 Species inventory

All flora and fauna species identified during the ecology pre-clearance surveys and clearing surveys were recorded and are presented in Appendix A and Appendix B.

### 2.2.3 Surveys for Cymbidium canaliculatum

Trees within the clearing area were visually examined for the presence of *Cymbidium canaliculatum*, which is listed as an Endangered Population in the Hunter Catchment under the NSW BC Act.

### 2.2.4 Salvageable habitat material

In accordance with the BMP, selected salvageable hollow logs and rocks were identified for later reuse in rehabilitation areas. Since materials vary in abundance and quality throughout Bengalla, ecologists are guided by the selection criteria for salvageable materials (as outlined in Table 5 of the BMP) when identifying logs and rocks for re-use.

### 2.2.5 Surveys for Phytophthora cinnamomi

Vegetation health assessments were undertaken to detect the presence of the plant pathogen *Phytophthora cinnamomi*. This involved assessing vegetation for any visible signs of disease.

### 2.2.6 Fauna relocation sites

Sites suitable for the relocation of displaced native fauna were assessed prior to the commencement of the ecology pre-clearance survey. Relocation sites were assessed for habitat attributes which represent similar or commensurate habitat attributes as those within the clearing areas. All relocation sites are located outside of the clearing area and consist of the same vegetation community. Fauna relocation sites are illustrated on Figure 3.1.

### 2.2.7 Collection of seeds for rehabilitation purposes

In accordance with the BMP, native trees and shrubs suitable for the harvesting and propagation of native seed for use in rehabilitation activities are required to be identified. Any areas of particularly high seed yield were marked on maps for future reference. During pre-clearing surveys throughout 2022, there was a lack of seed availability and as such, no seed was collected for use in rehabilitation areas.

### 2.2.8 Identification of weed and pest species infestations

Significant infestations of Weeds of National Significance (WONS) and noxious weeds identified during the field surveys were recorded and notified to BMC Environmental Department.

## 2.3 Clearing procedure

In accordance with Section 4.2.2 of the BMP, clearing activities in 2022 were undertaken as a two-stage process as follows:

- **Stage 1 clearing** – removal of understory vegetation other than marked/flagged habitat features. Habitat trees, marked with an 'H', were left to stand overnight to enable any resident fauna to self-relocate into adjacent habitat.
- **Stage 2 clearing** – commenced no less than 24 hours following the completion of Stage 1 clearing. Felled habitat trees were left undisturbed over night to allow any undetected fauna further opportunity to relocate.

### *2.3.1 Fauna handling and relocation*

The following information is recorded in relation to fauna species observed during the clearing activities:

- details of animals sighted, captured, relocated, injured, or killed as a result of vegetation clearing activities
- the relocation of fauna within designated relocation areas
- tree species used for breeding or roosting by fauna
- micro-habitat features of where the species was found on the tree.

Uninjured adult fauna will be relocated into suitable habitat within designated relocation sites. Juvenile and injured fauna will be passed on to the Muswellbrook Satur Vets, local Wildlife Aid carers or euthanised in accordance with the Animal Research Authority Code of Practice (National Health and Medical Research Council, 2013).

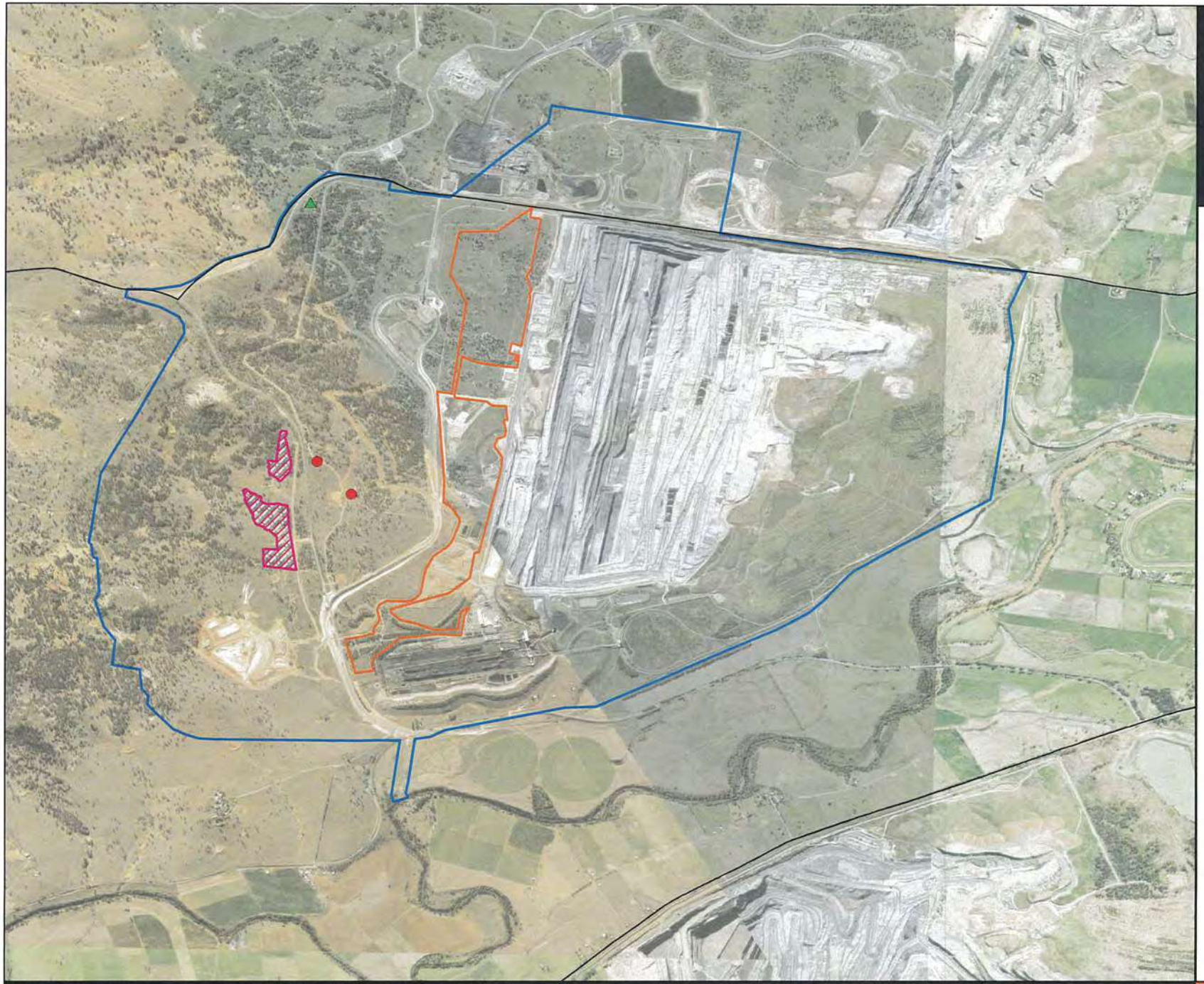
# 3 Results

## 3.1 Stage 1 pre-clearance surveys

Pre-clearing surveys completed by or on behalf of BMC in 2022 are summarised in Table 3.1 and illustrated in Figure 3.1. It should be noted that throughout 2022, the GDP area was assessed on more than one occasion due to only part of the GDP area being disturbed, or an extended time frame between the initial pre-clearance inspection and commencement of works.

Table 3.1 Pre-clearing surveys completed in 2022

| Ground disturbance permit area (GDP) | Date pre-clearance undertaken | Vegetation community |
|---|---|---|
| GDP 2201 | 11/01/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 16/02/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 8/06/2022 | Derived native and exotic grassland with planted 10 year old *Eucalyptus crebra* and *Eucalyptus moluccana* canopy. |
| GDP 2201 | 8/06/2022 | Central Hunter *Eucalyptus crebra* and *Eucalyptus moluccana* grassy woodland |
| GDP 2201 | 15/07/2022 | Derived native and exotic grassland with planted 10 year old *Eucalyptus crebra* and *Eucalyptus moluccana* canopy. |
| GDP 2201 | 15/07/2022 | Derived native and exotic grassland with patches of *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 29/07/2022 & 3/08/2022 | Derived native and exotic grassland with patches of *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 9/08/2022 | Derived native and exotic grassland with patches of *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest |
| GDP 2201 | 16/11/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 28/11/2022 & 29/11/2022 | Derived native and exotic grassland with patches of *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest |
| GDP 2201 | 16/12/2022 | Derived native and exotic grassland with planted 10-year-old *Eucalyptus crebra* and *Eucalyptus moluccana* canopy. |



wsp

Figure 3.1
Ground disturbance permit areas subject to clearing activities in 2022

**Legend**

- Cymbidium Translocation Site
- Relocation Points
- Road
- Fauna Relocation Site
- Project Development Boundary
- GDP2201


Coordinate system: GDA2020

Scale ratio correct when printed at A3

1:30,000 Date: 21/02/2023

GDA 2020

Data sources: DELWP, Geoscience Australia, Metromap





C:\Users\AUCM507517\WSP GIS\AU-WKG - Geospatial - AIS - Projects\PS135587_Bengalla_Mining_Company\Mxd\PS135587_GDP2022_rhv3.mxd | Author: C.MARTEL | QA: I.AUGEY

### 3.1.1 Vegetation community structure

The following vegetation communities were identified in the areas pre-cleared in 2022:

- derived native and exotic grassland
- derived native and exotic grassland with isolated pockets of *Eucalyptus crebra*
- derived native and exotic grassland with *Eucalyptus crebra, Eucalyptus moluccana*, and *Allocasuarina luehmannii* open forest
- derived native and exotic grassland with planted *Eucalyptus crebra* and *Eucalyptus moluccana*
- miscellaneous exotic and native planted vegetation.

### 3.1.2 Habitat, hollow-bearing and significant trees

A total of 232 hollow-bearing/habitat trees were identified within the GDP area subject to pre-clearing surveys in 2022.

### 3.1.3 Species inventory

#### 3.1.3.1 Flora

A total of 43 flora species were recorded during pre-clearing surveys completed in 2022. Of these, 23 were introduced species (Appendix A).

#### 3.1.3.2 Fauna

A total of 46 fauna species were recorded during pre-clearing surveys completed in 2022. Of these, four were introduced species (Appendix B).

### 3.1.4 Cymbidium canaliculatum surveys

One *Cymbidium canaliculatum* was identified during pre-clearing surveys in 2022, in association with Strip 41 (Latitude: -32.259929 Longitude: 150.815367) (Photo 3.1 and Photo 3.2). The orchid was observed growing in a large *Eucalyptus crebra,* approximately 11 m above the ground. The orchid was positioned with a north east aspect, occurring under the host trees canopy, and was observed in shade late in the morning. The orchid would be subject to morning sun but shaded from the afternoon sun.

In accordance with the BMP, Stage 2 clearing of the orchid's host tree was undertaken following the implementation of a translocation procedure, which was derived based on:

- site inspections and liaison between BMC staff, qualified arborists, bucket truck operators, crane operators, qualified ecologists
- determining suitable translocation site(s) and donor tree(s)
- safety and risk assessment documentation.

The *Cymbidium canaliculatum* translocation is detailed in Section 3.2.4.

Photo 3.1 *Cymbidium canaliculatum* requiring translocation in 2022

Photo 3.2 *Cymbidium canaliculatum* requiring translocation in 2022

### 3.1.5 *Phytophthora cinnamomi surveys*

No evidence of disease or plant dieback was identified within the GDP area subject to pre-clearing surveys in 2022.

### 3.1.6 *Collection of seeds for rehabilitation purposes*

During pre-clearing surveys throughout 2022, no seed was identified within survey areas deemed suitable to be collected for use in rehabilitation. Some species were identified to have seed including *Acacia salicinia, Acacia parvipinnula, Eucalyptus crebra and Eucalyptus moluccana*; however, survey times were conducted when these species were mainly flowering, or seeds were too immature to be considered suitable for propagation purposes. Overall, due to clearing times and large areas of derived native and exotic grasslands limiting the number of canopy species, no suitable native flora seeding opportunities were present and no seed collection was conducted.

### 3.1.7 *Weed species*

Table 3.2 Noxious weeds recorded during pre-clearance surveys

| Species | Class | Legal requirements |
|---|---|---|
| *Lycium ferocissimum* (African Boxthorn) | 3 | This plant must be continually suppressed and destroyed, and the plant must not be sold propagated or knowingly distributed. |
| *Opuntia stricta* (Prickly Pear) | 4 | The growth of the plant must be managed that reduces its numbers, spread and incidence and continuously inhibits its reproduction and the plant must not be sold propagated or knowingly distributed. |
| *Senecio madagascariensis* (Fireweed) | 4 | The growth of the plant must be managed that reduces its numbers, spread and incidence and continuously inhibits its reproduction and the plant must not be sold propagated or knowingly distributed. |

### 3.1.8 *Salvageable material*

A total of 308 lineal metres of hollow ground timber was identified during Stage 1 pre-clearance surveys in 2022, examples of which are provided in Photo 3.3 and Photo 3.4.

Photo 3.3 An example of salvageable material identified during Stage 1 pre-clearing surveys in 2022

Photo 3.4 An example of salvageable material identified during Stage 1 pre-clearing surveys in 2022

## 3.2 Stage 2 tree clearing

The GDP area cleared in part in 2022 is summarised in Table 3.3 and illustrated on Figure 3.1. The removal of understory vegetation surrounding habitat trees was undertaken a minimum of 24 hours prior to habitat tree removal. Stage 2 clearing of habitat trees was undertaken over eight discrete periods in 2022, with a total of 207 habitat trees felled.

Table 3.3 Stage 2 clearing completed in 2022

| Ground disturbance permit area | Stage 2 clearing completed (date) | Vegetation community |
|---|---|---|
| GDP 2201 | 12/01/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 17/02/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 27/06/2022 | Central Hunter *Eucalyptus crebra* and *Eucalyptus moluccana* grassy woodland. |
| GDP 2201 | 27/06/2022 | Central Hunter *Eucalyptus crebra* and *Eucalyptus moluccana* grassy woodland. |
| GDP 2201 | 19/07/2022 | Derived native and exotic grassland with planted 10 year old *Eucalyptus crebra* and *Eucalyptus moluccana* canopy. |
| GDP 2201 | 9/08/2022 | Low diversity native grassland/exotic understorey, canopy trees *Allocasuarina leuhmanii* dead from historical inundation from dam. |
| GDP2201 | 12/12/2022 | Derived native grassland in between *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |
| GDP 2201 | 13-16/12/2022 | Derived native and exotic grassland with patches of *Eucalyptus crebra, Eucalyptus moluccana* and *Allocasuarina luehmannii* shrub open forest. |

Prior to the habitat trees being felled, the trees were visually inspected to identify signs of fauna utilisation. Habitat trees were gently shaken prior to felling to encourage any resident fauna to vacate any fissure and/ or hollow. Habitat trees were then felled sequentially when directed by the supervising ecologist.

Immediately following the felling of each habitat tree, the supervising ecologist inspected the trees for remaining fauna. Tree hollows were inspected using a hand-held torch. Felled habitat trees were left undisturbed over night to allow any undetected fauna further opportunity to relocate. The habitat trees were then stockpiled for mulching or utilisation in rehabilitation areas.

Photo 3.5 Stage 2 – clearing – GDP 2201

Photo 3.6 Stage 2 – clearing – post felling

### 3.2.1 *Fauna recorded and relocated*

A total of 46 species of animal were observed whilst on site at Bengalla during Stage 1 and Stage 2 clearing activities (Appendix B). No animals were captured or relocated during Stage 1 pre-clearing inspections completed in 2022. Of the 46 species observed on site, a minimum of 151 individual animals were recorded using habitat trees impacted within the GDP area subject to Stage 2 tree clearing activities (Table 3.4, Table 3.5). This comprised of seven species of bird, five mammals, four reptiles and two species of frog. Animals handled for purpose of relocation or euthanasia were handled in accordance with the Animal Research Authority Code of Practice (National Health and Medical Research Council, 2013). During the 2022 Stage 2 tree clearing operations:

- 100 animals were successfully relocated
- 21 animals were displaced but evaded capture
- nine animals were killed as a result of tree felling
- six animals were euthanised following tree felling
- 15 animals required assistance from wildlife rehabilitation agencies.

Table 3.4 Species of animal recorded during Stage 2 tree clearing operations in 2022

| Common name | Scientific name | Notes | Number of individuals |
|---|---|---|---|
| **Animals relocated during Stage 2 tree clearing operations** | | | |
| Robust Velvet Gecko | *Nebulifera robusta* | – | 17 |
| Tree Skink | *Egernia striolata* | – | 26 |
| Common Brushtail Possum | *Trichosurus vulpecula* | – | 1 |
| South-eastern Free-tailed Bat | *Ozimops planiceps* | – | 3 |
| Eastern Broad-nosed Bat | *Scotorepens orion* | – | 1 |
| Ride's Free-tailed Bat | *Ozimops ridei* | – | 4 |
| Free-tailed Bat | *Ozimops* spp. | Roost limb relocated | 8 (minimum) |
| Unidentified microbat | – | Roost limb relocated | 6 (minimum) |
| Gould's Wattled Bat | *Chalinolbus gouldii* | – | 27 |
| Striated Pardalote | *Pardalotus striatus* | – | 1 |
| Eastern Rosella | *Platycerus eximius* | – | 3 |
| Green Tree Frog | *Litoria caerulea* | – | 2 |
| Peron's Tree Frog | *Litoria peroni* | – | 1 |
| | | **Total** | **100** |
| **Animals displaced but evaded capture** | | | |
| Elegant Snake-eyed Skink | *Cryptoblepharus pulcher* | – | 3 |
| Tree Skink | *Egernia striolata* | – | 3 |
| Robust Velvet Gecko | *Nebulifera robusta* | – | 1 |
| Gould's Wattled Bat | *Chalinolbus gouldii* | Self-relocated | 8 |
| Unidentified microbat | – | Roost limb. Hollow entrance observed but bats were not accessible. Trunk could not be sectioned and relocated, and individuals remained in hollow to self-relocate at nightfall. | 1 (minimum) |
| Common Myna | *Acridotheres tristis* | Self-relocated | 4 |
| Striated Pardalote | *Pardalotus striatus* | Hollow limb with fledgling relocated immediately adjacent nest tree where parents were calling from. Individual self-relocated within one hour. | 1 |
| | | **Total** | **21** |

| Common name | Scientific name | Notes | Number of individuals |
|---|---|---|---|
| **Animal killed during Stage 2 tree clearing operations** | | | |
| Tree Skink | *Egernia striolata* | – | 4 |
| Common Myna | *Acridotheres tristis* | 3 x recent hatchlings | 3 |
| Gould's Wattled Bat | *Chalinolbus gouldii* | – | 1 |
| Eastern Broad-nosed Bat | *Scotorepens orion* | – | 1 |
| | | **Total** | **9** |
| **Animals euthanised following Stage 2 tree clearing operations** | | | |
| Robust Velvet Gecko | *Nebulifera robusta* | – | 1 |
| Lace monitor | *Varanus varius* | – | 1 |
| Common Myna | *Acridotheres tristis* | 1 x advanced nestling | 1 |
| Common Starling | *Sturnus vulgaris* | 1 x advanced nestling | 1 |
| Eastern Rosella | *Platycerus eximius* | 3 x eggs, 2 x recent hatchlings | 2 |
| | | **Total** | **6** |
| **Animals requiring assistance from wildlife rehabilitation agencies** | | | |
| Eastern Rosella | *Platycerus eximius* | Delivered to Muswellbrook Satur Vets for collection by wildlife rehabilitation agencies | 7 |
| Galah | *Eolophus roseicapilla* | | 1 |
| Striated Pardalote | *Pardalotus striatus* | | 3 |
| Black-faced Cuckoo-shrike | *Coaracina novaehollandiae* | | 2 |
| Noisy Miner | *Manorina melanocephala* | | 2 |
| | | **Total** | **15** |

Table 3.5 Fauna guilds recorded during Stage 2 clearing operations in 2022

| Guild | Number of individuals recorded | | | | |
|---|---|---|---|---|---|
| | Relocated | Observed | Injured | Dead/ Euthanised | Taken to Wildlife carer |
| Reptiles | 43 | 7 | 0 | 6 | 0 |
| Microchiropteran bats/mammals | 50 | 9 | 0 | 2 | 0 |
| Amphibians | 3 | 0 | 0 | 0 | 0 |
| Birds | 4 | 5 | 0 | 7 | 15 |
| **Total** | **100** | **21** | **0** | **15** | **15** |

Whilst reptiles, frogs and microbats were released at designated relocation areas, a Noisy Friarbird nest was observed in an *Allocasuarina luehmanii* (Buloke) during clearing works completed in mid-December 2022, with adults attending and sitting on the nest (Photo 3.7). A strip of trees associated with the nest tree was left for the purpose of allowing the adults to raise and fledge their young (Photo 3.8). It was envisaged that nest might be vacated in a 5–6-week window, after which the nest would be inspected by an ecologist to gauge activity and guide clearing of the remaining trees in accordance with the BMP.


Photo 3.7 Active Noisy Friarbird nest, December 2022

Photo 3.8 Vegetation strip reserved to assist Noisy Friarbird breeding attempt, December 2022

### 3.2.2 *Salvage of habitat resources*

Stage 1 clearing operations identified approximately 308 lineal metres of new salvageable material potentially suitable for reuse in rehabilitation works in 2022. An additional 90 lineal metres of suitable salvageable material was identified from hollow-bearing trees felled during Stage 2 tree clearing activities (Photo 3.9 and Photo 3.10). Salvaged habitat items were to be stockpiled with the intention to relocate within rehabilitation areas as work progresses.


Photo 3.9 An example of salvageable material identified during Stage 2 tree clearing


Photo 3.10 An example of salvageable material identified during Stage 2 tree clearing

### 3.2.3 Stage 2 clearing works completed outside approved clearing time

In accordance with Bengalla's BMP, clearing of woodland areas will be avoided during May to November, in order to avoid impacting hibernating bats and important growth and flowering periods for *Cymbidium canaliculatum* (Bengalla Mining Company Pty Ltd, 2017). If clearing is to occur during this period, an assessment by a suitably qualified ecologist justifying clearing activities must be recorded.

*Electrical easement widening (June 2022)*

A Stage 1 pre-clearing survey was completed 15 June 2022 (and again on 15 July 2022) to assess the potential for impacts upon ecological values during proposed works requiring the removal of native vegetation for small widening to an electrical easement immediately north of the main mine access road. This area was confirmed as representing habitat of a planted nature, the plantings being restricted to native trees forming the canopy layer of the proposed clearing area. The area also contained two existing trees, two mature *Allocasuarina luehmannii*, one of which was deceased. One planted native tree was deceased but remained standing and was still holding decorticating bark (Photo 3.11 and Photo 3.12). The area did not contain any individuals of threatened flora species or habitat for such species.

In total, there were three trees which contained habitat features that may be used by microchiropteran bats. However, the three trees retained habitat features that were predominantly open in nature and while they may be used as bivouacs for bats hunting in the area during warmer months, the open nature of the habitat features, being limited to open fissures on two trees and decorticating bark on the third tree, are considered unlikely to offer sufficient protection for microchiropteran bats as to represent long-term hibernation sites for such species, due to the exposed nature of these features. Therefore, clearing of this area in the May to September period was considered unlikely to impact upon hibernating bats.

While some minor habitat existed within this area, there was not sufficient resources to justify waiting until summer to clear the vegetation. Appropriate ecologist supervision still occurred to ensure that any arising ecological matters were appropriately addressed and handled to ensure protection of important biodiversity. The three habitat trees were felled successfully on 19 July 2022, with no animals injured or requiring veterinary assistance. One Green Tree Frog (*Litoria caerulea*) was captured and relocated during these works.

Photo 3.11 Stage 1 pre-clearing survey of the proposed electricity easement widening showing two of the three habitat trees

Photo 3.12 Stage 2 tree clearing operations associated with the electricity easement

*Clay stockpile*

A proposed clay stockpile was also inspected on 15 June 2022. The area encompassed some 318 trees sparsely distributed as single trees and clumps, being a mixture of regrowth eucalyptus species, predominantly *Eucalyptus crebra* and *Eucalyptus moluccana* (Grey Box) and scattered mature *Brachychiton populneus* (Kurrajong). There were no trees within this area of a sufficient age class to develop hollows, and therefore, was not considered to provide potential hibernation habitat for microchiropteran bats. There were three pile of logs within the area from previous clearing operations, each of which had logs containing hollows. However, the proximity of the logs to the ground and their lack of sufficient depth, precludes their potential to represent safe and insulated suitable roosting locations for long term hibernation through the coldest periods of the year. Therefore, clearing of this area through the May to September period was not considered likely to impact threatened microchiropteran bats.

*Isolated trees*

On the 27 June 2022, one isolated *Brachychiton populneus* positioned on the edge of a mine high wall and a separate *Allocasuarina luehmannii* stump surrounded by mine infrastructure were inspected to determine their potential suitability for felling during the May to November avoidance period. The *Brachychiton populneus* contained one medium-sized trunk hollow approximately 3 m above the ground. The *Allocasuarina luehmannii* stump was approximately 3.5 m high with broken branches, fissures and some decorticating bark. Both trees were considered to contain minimal microchiropteran bat habitat, were positioned near active mine operations and were isolated from other trees or stands of native vegetation (Photo 3.13 and Photo 3.14). Both trees were felled without incidence on 27 June 2022 with no animals observed.

Photo 3.13 Isolated *Brachychiton populneus* felled in June 2022

Photo 3.14 Isolated *Allocasuarina luehmannii* stump felled in June 2022

*Mine pit advancement (July – August 2022)*

A Stage 1 pre-clearing survey was completed 15 July 2022 to assess the potential for impacts upon ecological values associated with a proposed mine advancement that required the removal of native vegetation and fauna habitat. The proposed mine advancement to the west of active mine operations incorporated Strip 41 and Strip 43. Due to the presence of many hollow-bearing trees (including stags with knot holes, fissures and some larger hollows), mine advancement plans were revised.

The revised mine plan reduced the area of impact, and thus, the number of hollow-bearing trees potentially affected. However, hollow-bearing trees were observed to contain features that could offer shelter for native fauna, particularly small mammals, reptiles and amphibians. Habitat features recorded ranged from small to medium sized fissures within the trunks of trees, small to large-sized hollows (including knot holes) and decorticating bark, which had lifted sufficiently to provide spaces for fauna to shelter. Examples of habitat features are provided in Photo 3.15 and Photo 3.16.

Due to the presence of potentially suitable microhabitats, follow-up inspections and additional methodologies were employed to ascertain whether habitat features were in use by over-wintering fauna; particularly microchiropteran bats. For this scenario, a bucket truck was used to visually inspect potential habitat features (fissures, knot holes, hollows, broken branches) at elevation with a hand-held light source and a Signet 9 mm Inspection Camera (QC-8710) with a 2 m gooseneck extension. Additional targeted inspections were completed on 29 July 2022 and 3 August 2022. A total of 16 dead trees associated with an historic mine discharge dam were inspected over the two separate targeted inspection dates and comprised of *Allocasuarina luehmannii* and *Eucalyptus crebra* trees (Photo 3.19).

Photo 3.15 An example of a hollow-bearing tree with small knot holes & fissures


Photo 3.16 A dead *Eucalyptus crebra* that contained hollows of varying size-classes

Photo 3.17 Inspection of microhabitat features from a bucket truck

Photo 3.18 Inspection of a large Ironbark hollow at elevation from a bucket truck


Photo 3.19 Location of dead trees felled in August 2022

In total, 12 of 16 trees were safely inspected from the bucket (Photo 3.17 and Photo 3.18) with no microchiropteran bats or any sign of animal activity or habitation observed, inclusive of H6 and H16 – H26. The inspection of trees at height confirmed that most potential microchiropteran bat roost habitat observed from the ground was minimal in nature and unlikely to provide suitable thermal characteristics or protection during torpor. Four trees (H12 – H15) were not inspected at height during the targeted inspection program. Soft ground conditions in their immediacy dictated that working at height from a bucket truck could not be undertaken safely.

Due to the minimal nature of observed microhabitat features, the trees proximity to active mine operations and distance from patches of native vegetation, it was considered that the trees could be safely felled during the microchiropteran bat avoidance period with appropriate ecological supervision to ensure that any arising ecological matters were appropriately addressed and handled to ensure protection of important biodiversity.

The 16 dead trees were felled on 9 August 2022 without injury to any fauna. A total of nine individual animals (one *Litoria caerulea* (Green Tree Frog), seven *Egernia striolata* (Tree Skink) and one *Chalinolobus gouldii* (Gould's Wattled Bat) were successfully relocated west of Bengalla Road.

### 3.2.4 *Cymbidium canaliculatum translocation*

The *Cymbidium canaliculatum* was translocated on 12 December 2022. The orchid was sectioned from the *Eucalyptus crebra* host tree by an experienced arborist from a bucket truck (Photo 3.20). The limb containing the orchid was secured by a crane prior to the arborist sectioning the limb approximately 1.5 m above the orchid and approximately 1 m below, back to the tree trunk (Photo 3.21).

Photo 3.20 Limb containing *Cymbidium canaliculatum* being sectioned from *Eucalyptus crebra* host tree

Photo 3.21 *Cymbidium canaliculatum* being lowered from host tree

The sectioned limb was positioned and secured on a flatbed truck and transported to the proposed translocation site (Photo 3.22). The sectioned limb containing the orchid was positioned on the ground and leant against the donor *Eucalyptus crebra* and secured using metal strips (Photo 3.23).


Photo 3.22 *Eucalyptus crebra* donor tree


Photo 3.23 Translocated *Cymbidium canaliculatum*

# 4 Conclusions

This report documents the pre-clearing and clearing activities completed at Bengalla Mine in 2022. Pre-clearing and clearing surveys were undertaken by appropriately qualified WSP ecologists to allow for the safe removal and relocation of native flora and fauna, where practicable.

A total of 232 hollow-bearing/ habitat trees were identified within GDP areas, 207 of which were felled in 2022. In total, approximately 398 lineal metres of salvageable material potentially suitable for reuse in rehabilitation programs was identified, with the intention to relocate within rehabilitation areas as work progresses.

During Stage 2 clearing operations, 100 animals required relocation, nine were killed and six were euthanised. Fifteen advanced nestling birds were also captured and passed on to appropriate wildlife rehabilitation agencies. In addition, 21 animals were observed using habitat trees but evaded capture once the tree was felled, and one microchiropteran bat roost was observed, but the trunk could not be sectioned and relocated. Uncaptured microchiropteran bats remaining in the roost were left to self-relocate at nightfall.

One large *Cymbidium canaliculatum* was identified during Stage 1 pre-clearing surveys in 2022. This individual was successfully translocated to a donor tree prior to Stage 2 tree clearing activities in December 2022.

Several clearing events occurred during the May to November avoidance period in 2022. Due to the minimal nature of observed microhabitat features, or the targeted inspection of microhabitats at elevation from a bucket truck, it was considered that the trees could be safely felled with appropriate ecological supervision to ensure that any arising ecological matters were appropriately addressed and handled to ensure protection of important biodiversity. All trees were felled successfully, with no animals injured or requiring veterinary assistance. Several animals were captured and relocated during these works.

Clearing activities undertaken in 2023 will continue to follow the methodology outlined within the BMP.