CENTENNIAL MANDALONG PTY LTD
Mandalong Mine
2024 ANNUAL REVIEW

March 2025

Annual Review Title Block

Name of Operation	Mandalong Mine
Name of Operator	Centennial Mandalong Pty Ltd
Development Consent/ Project Approval #	SSD-5144, SSD-5145, DA 35-2-2004.
Name of holder of Development Consent/ Project Approval	SSD-5144 & DA 35-2-2004 - Centennial Mandalong Pty Ltd SSD-5145 – Centennial Northern Coal Services Pty Limited
Mining Lease #	CCL 762 CCL 746 Sub-Lease Mining Purposes Lease 191 Mining Lease 1443 Mining Lease 1543 Mining Lease 1553 Mining Lease 1722 Mining Lease 1744 Mining Lease 1793 Mining Lease 1852
Name of Holder of Mining Lease	Centennial Mandalong Pty Ltd
Water License #	WAL39767
Name of Holder of Water License	Centennial Mandalong Pty Ltd
Annual Review Start Date	1 January 2024
Annual Review End Date	31 December 2024

I, Craig Shales certify that this audit report is a true and accurate record of the compliance status of Centennial Mandalong for the period 1 January to 31 December 2024 and that I am authorised to make this statement on behalf of Centennial Mandalong Pty Ltd.

Note:

a) *The Annual Review is an 'environmental audit' for the purposes of s122B(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	CRAIG SHALES.
Title of Authorised Reporting Officer	Mine Manager
Signature of Authorised Reporting Officer	
Date	27/3/25.

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Appendices

Appendix No.	Appendix Name
1	Independent Environmental Audit Action Plan

1 STATEMENT OF COMPLIANCE

The compliance status of the Mandalong Mine for the year 2024 is presented in **Table 1-1**. During the reporting period there were no non-compliances. **Table 1-2** presents a summary of the non-compliances.

Table 1-1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
SSD-5144 (MOD10)	Yes
SSD-5144 Mandalong Southern Extension Project Statement of Commitments	Yes
SSD-5144 MOD 1 Statement of Commitments	Yes
SSD-5144 MOD 6 Statement of Commitments	Yes
SSD-5144 MOD 7 Statement of Commitments	Yes
SSD-5145 (MOD 1)	Yes
DA35-2-2004 (MOD 1)	Yes
EPL 365	Yes
Mining Lease 1443	Yes
Mining Lease 1543	Yes
Mining Lease 1553	Yes
Mining Lease 1722	Yes
Mining Lease 1744	Yes
Mining Lease 1793	Yes
Mining Lease 1852	Yes
Mining Purposes Lease 191	Yes
Consolidated Coal Lease 762	Yes
Consolidated Coal Lease 764	Yes
WAL39767	Yes
EPBC Approval 2013/6906	Yes

Table 1-2: 2024 Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Where Addressed in Annual Review
N/A	-	-	-	-	-

Note: Compliance Status Key for Table 1-2

Risk Level	Colour Code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with: • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur
Low	Non-Compliant	Non-compliance with: • Potential for moderate environmental consequences, but is unlikely to occur; or • Potential for low environmental consequences, but is likely to occur
Administrative	Non-Compliant	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)

2 INTRODUCTION

Mandalong Mine is owned and operated by Centennial Mandalong Pty Ltd (Centennial Mandalong), a subsidiary of Centennial Coal Company Limited ('Centennial').

Mandalong Mine is a modern underground longwall operation located on the western side of Lake Macquarie near Morisset and west of the M1 Motorway. The Mine is situated approximately 130 km north of Sydney and 50 km from the Port of Newcastle, supplying up to 6.5 million tonnes of coal to the domestic power and export markets **(Figure 2-1)**.

The Mandalong Mine comprises the underground workings and surface infrastructure of:

- The Mandalong Mine Access Site (MMAS), underground workings including longwall panels, development units and surface infrastructure located near Morisset;
- The Cooranbong Entry Site (CES), consisting of the Cooranbong Colliery underground workings and surface infrastructure located near Dora Creek;
- The Mandalong South Surface Site (MSSS) located off Mandalong Road; and
- The Delta Entry Site (DES), which encompasses an entry and coal delivery system, located near Wyee at the Vales Point Rail Unloader Facility.

Within this Annual Review Mandalong Mine refers collectively to MMAS, CES, MSSS and DES.

An Environmental Impact Statement (EIS) was submitted in 1997 and a Commission of Inquiry held in 1998. The Mine was granted development consent DA 97/800, in October 1998. After obtaining development consent, Centennial constructed the Mandalong Mine site and decline tunnel to access the Mandalong mining area. Longwall mining operations at Mandalong commenced in January 2005. The Mine has approval to extract up to 6.5 million tonnes per annum of coal from the West Wallarah Seam and Wallarah-Great Northern Seam using the longwall mining method.

Development consent DA 35/2/2004 granted in July 2004 by the then NSW Department of Planning & Infrastructure approved the construction and operation of the coal handling and clearance system at the Delta Entry Site. Construction of the Delta Coal Clearance System was completed in 2006. The Cooranbong Entry Site and the Delta Entry Site contain coal handling infrastructure, enabling the Mandalong Mine to process and convey as permitted by their respective development consents up to 10 million tonnes of coal per annum. These sites are maintained under current mine leases as detailed in **Table 3-1**.

Development consent SSD-5144 was granted by the Planning & Assessment Commission (PAC) on 12 October 2015. As per Condition 13 of Schedule 2 of SSD-5144 and agreed with the Secretary of the Department of Planning & Environment (DPE), on 16 September 2016 in accordance with Section 104A of the Environmental Planning and Assessment Act 1979 (EP&A Act), Centennial Mandalong shall surrender DA97/800 by 30 September 2022.

A Notice of Consent Surrender was submitted by Centennial Mandalong to the DPE (via the major project portal) on 10 August 2022. The Department notified Centennial Mandalong on 29 August 2023 that DA97/800 had been voluntarily surrendered pursuant to section 4.63 of the *Environmental Planning and Assessment Act 1979* and section 68 of the *Environmental Planning and Assessment Regulation 2021*.

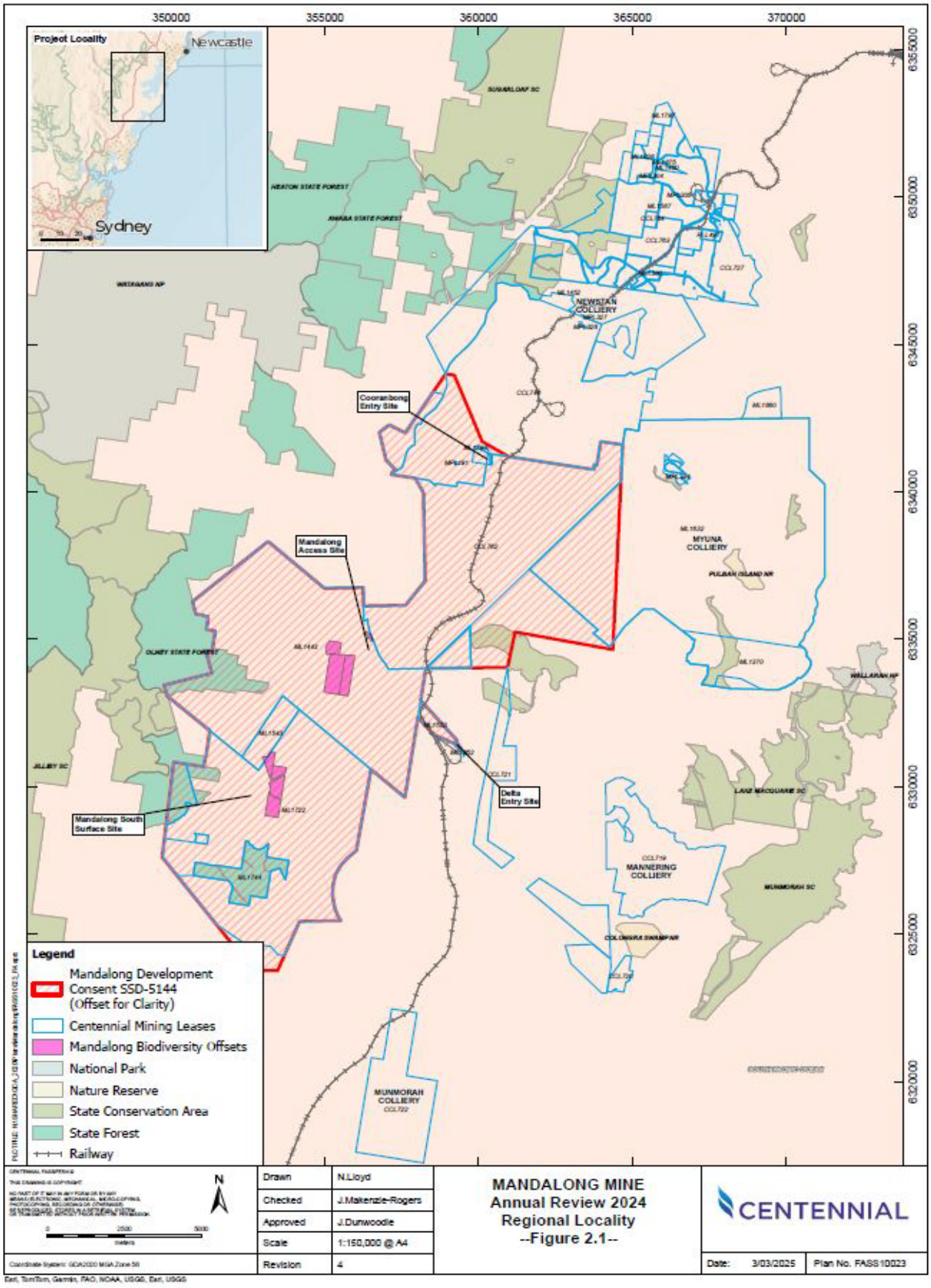


Figure 2-1: Regional Context

2.1 Scope

This Annual Review details the progress of environmental management for Mandalong Mine, including MMAS, MSSS, CES and the DES collectively, for the period 1 January 2024 to 31 December 2024.

The Annual Review has been prepared in accordance with the Mandalong Mine conditions of consent as detailed in SSD-5144. The Annual Review has also been prepared in accordance with the requirements of Schedule 3, Condition 4 of DA35-2-2004 (Mandalong Coal Delivery System – Delta Link Project).

Development Consent SSD-5145 (Northern Coal Logistic Project) was approved by the DPE on 29 September 2015. The approval consolidates the receipt, handling, processing and transport of run-of-mine coal from Centennial Coal's underground operations at Mandalong Mine, Newstan Colliery and Awaba Colliery.

This Annual Review document also addresses the requirements of Schedule 5, Condition 11 of SSD-5145 for the CES. The other operations covered by SSD-5145 are described in the Newstan Annual Review required by SSD-5145.

The Annual Review has been prepared in accordance with the Annual Review Guideline (DPIE, 2015).

2.2 Mine Contacts

The contact details for the personnel responsible for environmental management and community relations at Centennial Site are provided in **Table 2-1.**

Table 2-1: Centennial Site Environmental Contact Details

Name	Position	Phone
Craig Shales	Mine Manager	T: 02 4973 0912
		E: craig.shales@centennialcoal.com.au
Jeffrey Dunwoodie	Environment & Community Superintendent	T: 02 4973 0947
		E: jeffrey.dunwoodie@centennialcoal.com.au
Clint Allen	Approvals Coordinator	T: 02 4973 0948
		E: clint.allen@centennialcoal.com.au

3 APPROVALS

A summary of Project Approvals, Mining Leases, and other Licences relevant to Mandalong Mine is provided in **Table 3-1**. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at https://www.centennialcoal.com.au/operations/mandalong/

Table 3-1: Environmental Approvals held by Mandalong Mine.

Approval	Description	Expiry Date	Change to Approval during Reporting Period
Project Approval – NSW Department of Planning, Housing & Infrastructure			
Mandalong Mine Development Consent No. DA 35-2-2004	Permits construction and operation of the Delta Coal Handling Facility	31/12/2040	Nil
Mandalong Mine Development Consent SSD-5144	Extension of underground operations into the Mandalong Southern Extension Area.	31/12/2040	Nil
Centennial Northern Coal Services Development Consent SSD-5145	Receipt, handling, processing and transport of run-of-mine coal from Centennial Coal's underground operations at Mandalong Mine, Newstan Colliery and Awaba Colliery.	31/12/2045	Nil
Extraction Plans – NSW Department to Planning, Housing & Infrastructure			
Extraction Plan LW30-31	Secondary extraction of LW30 and LW31	N/A	Nil
Extraction Plan LW32	Secondary extraction of LW32	N/A	Nil
Extraction Plan LW34	Secondary extraction of LW34	N/A	Nil
Extraction Plan LW57-60	Secondary extraction of LW57-60	N/A	Variation 1 - reduce length of Longwalls due to geological reasons. Variation 2 – reduce length of Longwall 58 due to geological reasons. Variation 3 – reduce length of Longwall 58 due to geological reasons.

Approval	Description	Expiry Date	Change to Approval during Reporting Period
Extraction Plan LW39-43	Secondary extraction of LW39-43	N/A	Approved by DPHI on 10 December 2024.
Environmental Protection Licence (EPL) – NSW Environment Protection Agency			
EPL365	Permits scheduled activity "coal mining" and discharge of water from licensed discharge points.	Perpetual	Nil
Radiation Licence – NSW Environment Protection Agency			
Radiation Licence 5064217	Radiation management	26/6/2025	Nil
Mining Lease – NSW Department of Regional NSW – Resources Regulator			
Consolidated Coal Lease 762	Title to Cooranbong Workings includes some surface land, some environmental conditions	13/10/2043	Nil
Consolidated Coal Lease 746 (sublease)	Title for Cooranbong Workings includes some surface land – some environmental conditions (Managed by Centennial Newstan)	31/12/2028	Nil
Mining Purposes Lease 191	Title to surface land for water tanks at Cooranbong – requires annual environmental management report on anniversary	24/02/2044	Nil
Mining Lease 1443	Mandalong Project Mining Lease – includes some surface land	01/03/2043	Nil
Mining Lease 1543	Mining Lease – Mandalong Mine Project	25/11/2045	Nil
Mining Lease 1553	Mining Lease Delta Link Project – includes surface land	06/09/2046	Nil
Mining Lease 1722	Mining Lease –Southern Extension Area	17/12/2036	Nil

Approval	Description	Expiry Date	Change to Approval during Reporting Period
Mining Lease 1744	Mining lease associated with proposed mining operations in the Olney State Forest areas within the Southern Extension Area	06/10/2037	Nil
Mining Lease 1793	Ancillary mining activities at the Cooranbong Entry Site.	16/07/2040	Nil
Mining Lease 1852	Ancillary mining activities at the Delta Entry Site	25/05/2044	Nil
Exploration Licences – NSW Department of Regional NSW –Resources Regulator			
Exploration Licence 4443	Exploration Licence	23/10/2025	Nil
Exploration Licence 4969	Exploration Licence	25/03/2026	Nil
Exploration Licence 6317	Exploration Licence	17/03/2026	Nil
Environment Protection and Biodiversity Conservation – Commonwealth Department of Agriculture, Water and the Environment			
Northern Coal Logistics EPBC Approval 2013/6906	To upgrade coal preparation, handling infrastructure, transport and water management activities at the existing Northern Coal Services Site	31/12/2055	Nil
Water Licences – NSW Department of Planning, Industry and Environment – Water			
Cooranbong Borehole WAL39767	Dewatering of Mine Workings	Water access licence continues to be in force until it is cancelled	Nil

3.1 ANNUAL REPORTING

Table 3-2 provides a checklist of reporting requirements and performance conditions addresses within the AR.

Table 3-2: Annual Review Requirements

Approval	Condition No	Requirement	Where addressed in Annual Review
SSD-5144	Schedule 6 Condition 12	By the end of March each year, or as otherwise agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development, to the satisfaction of the Secretary. This review must:	
		a) describe the development (including any rehabilitation) that was carried out in the last calendar year, and the development that is proposed to be carried out over the current calendar year;	**Section 3, Section 8 & Section 12**
		b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of previous years; and • relevant predictions in the documents identified in condition 2(a) and (b) of Schedule 2;	**Section 6, Section 7, & Section 9.3.**
		c) Identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;	**Table 1-1, Table 1-2, & Section 11.**
		d) identify any trends in the monitoring data over the life of the development;	**Section 6, Section 7, & Section 9.3.**
		e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;	**Section 6, Section 7, & Section 9.3.**
		f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	**Section 12**
SSD-5145	Schedule 5 Condition 11	By the end of March each year, or as otherwise agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:	
		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;	**Section 3, Section 8 & Section 12**

Approval	Condition No	Requirement	Where addressed in Annual Review
		b) include a comprehensive review of the monitoring results and complaints records of the development over the past calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of previous years; and • relevant predictions in the documents identified in condition 2(a) of Schedule 2;	**Section 6, Section 7, & Section 9.3.**
		c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;	**Table 1-1, Table 1-2, & Table 11-1.**
		d) identify any trends in the monitoring data over the life of the development;	**Section 6, Section 7, & Section 9.3.**
		e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	**Section 6, Section 7, & Section 9.3.**
		f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	**Section 12**
DA 35-2-2004	Schedule 3 Condition 1	The Applicant may incorporate any plan, audit or Annual Review required by this consent with the plans, audits or Annual Review required for the Mandalong Mine or any other adjoining operation in common ownership or under common management.	Noted.
	Schedule 3 Condition 4	By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development, to the satisfaction of the Secretary. This review must:	
		a) provide monthly records of the amount of coal transported on the MCDS;	**Table 4-3**
		b) include a comprehensive review of the groundwater monitoring results of the development over the previous calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of years prior; and • relevant predictions in the documents listed in condition 2(a) of Schedule 2;	**Section 7.4**

Approval	Condition No	Requirement	Where addressed in Annual Review
		c) evaluate and report on the compliance with the performance measures, criteria and operating conditions in this consent;	**Section 6, Section 7, & Section 9.3.**
		d) detail any non-compliance over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;	**Table 1-1, Table 1-2, & Section 11.**
		e) identify any trends in the monitoring data over the life of the development;	**Section 6, Section 7, & Section 9.3.**
		f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;	**Section 6, Section 7, & Section 9.3.**
		g) describe the measures to be implemented over the current calendar year to improve the environmental performance of the development; and	**Section 12.**
		h) be prepared in accordance with the Department's *Annual Review Guideline (2015)*.	Noted.

3.1.1 Centennial Mandalong Security Arrangements

A summary of the status of the Mandalong Mine security arrangements held by the Department of Planning, Heritage & Infrastructure required under SSD-5144 is provided in **Table 3-3**.

Table 3-3: Status of Mandalong Security Arrangements

Project Approval	Relevant Condition	Security Required	Bank Guarantee Reference	Notes
Mandalong Mine Extension (SSD-5144)	Schedule 3, Condition 20. Conservation Bond	$388,385	BG Ref: GI75002200080	Issued and provided to DPE 5 December 2022 for $388,385

4 OPERATIONS SUMMARY

Details of production and associated waste generated by the site for the report period and next reporting is provided in **Table 4-1**.

Table 4-1: Production Summary & Forecast

Material	Approved Limit (and source)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock/ Overburden	N/A			
ROM Coal	6.5 MTPA	1,833,746 TPA	2,002,055 TPA	2,006,466 TPA
Coarse reject	N/A			
Fine reject (Tailings)	N/A			
Saleable product	6.5 MTPA	1,459,947 TPA	1,719,634 TPA	1,672,723 TPA

4.1 OTHER OPERATIONS

Table 4-2: Operations Summary

	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Comment
Hours of operation	24/7	24/7	24/7	
Transport (rail)	N/A	N/A	N/A	
Product to Vales Point PS	4 MTPA	313,352 TPA	47,509 TPA	
Mandalong to Cooranbong	6 MTPA	1,520,393 TPA	1,954,547 TPA	
Product to Eraring PS	6 MTPA	144,964 TPA	1,111,402 TPA	
Cooranbong to Newstan for Washing	6 MTPA	1,375,429 TPA	1,499,014 TPA	

There were no inconsistencies between the approved limit and actual production for the reporting period.

Table 4-3: Coal Processing, Handling and Transport Summary to Vales Point

Month	Product to Vales Point PS TPA (4 Mtpa limit)
January 2024	35
February 2024	0
March 2024	0
April 2024	36
May 2024	12
June 2024	6
July 2024	4
August 2024	47,416
September 2024	0
October 2024	0
November 2024	0
December 2024	0
Total 2024 CY	**47,509**

4.2 EXPLORATION

During the period January 2024 to December 2024 eleven surface exploration boreholes were completed by Centennial Mandalong. All boreholes are rehabilitated in consultation with the landowner following drilling. Applications for additional exploration drilling will be ongoing as potential sites are identified and landowner access obtained.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Table 5-1 summarises the outcomes of the 2023 Annual Review, including actions issued by Regulators.

Table 5-1: Actions from Previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Include any actions undertaken or proposed as an outcome of each of the complaints received during the reporting period.	DPHI	Included in Section 9 – Community	Table 9-2

6 ENVIRONMENTAL PERFORMANCE

Mandalong Mine implements an Environmental Management Strategy, including management plans, procedures and monitoring programs that provide a framework for managing environment and community risks and impacts. To measure compliance with site approvals and licences, Mandalong Mine undertakes a comprehensive monitoring program. The environmental monitoring program is shown in Plans (CM00315b, CM00315c, CM00315d, CM00315f).

Condition 12 of Schedule 6 of SSD-5144, Condition 11 of Schedule 5 of SSD-5145 and Condition 4 of Schedule 3 of DA35-2-2004 require the presentation and discussion on all monitoring required under the Development Consents and other approvals. **Table 6-1** includes a summary of the monitoring required by the Development Consents, current status and report section in the Annual Review.

Table 6-1: Summary of Monitoring Requirements

Monitoring Type	Status	Report Section
Meteorological Monitoring	Ongoing	**Section 6.1**
Noise Monitoring	Quarterly monitoring	**Section 6.2**
Blast Monitoring	As required	**Section 6.3**
Air Quality Monitoring	Ongoing	**Section 6.4**
Independent Noise and Dust Monitoring	Not Requested	**N/A**
Greenhouse Gas reporting and abatement measures	Ongoing	**Section 6.4.10**
Biodiversity Monitoring	Ongoing	**Section 6.5**
Cultural Heritage Monitoring	Ongoing	**Section 6.6**
Surface Water Monitoring	Ongoing	**Section 7.2**
Groundwater Monitoring	Ongoing	**Section 7.4**
Rehabilitation Monitoring	Ongoing	**Section 8**

6.1 METEROLOGICAL MONITORING

The total monthly rainfall data is shown below in **Table 6-2** and in **Figure 6-1.**

Table 6-2: Rainfall at MMAS, CES and the MSSS for the Period January 2024 to December 2024.

2024 Month	MMAS Total Rainfall (mm)	CES Total Rainfall (mm)	MSSS Total Rainfall (mm)
January	46.2	47.6	55.6
February	109.2	173.8	153.2
March	20.6	21	19.6
April	248.4	334.2	326.2
May	173.8	160.4	230.2
June	96.2	110.4	112.8
July	64.0	59.0	68.2
August	35.2	38.4	38.8
September	69.2	112	97.2
October	42.6	121.4	80.6
November	107.0	134.4	137.4
December	36.4	21.8	24.4
Total	**1048.8**	**1334.4**	**1344.2**

For MMAS, a total of 1048.8 mm of rainfall was recorded at the site during the reporting period. The total annual rainfall for 2024 was lower than the annual average rainfall (1,136.2 mm) recorded at the Cooranbong Station (BOM station number 61012) from 1903 to 2024. The wettest monthly period in 2024 was April recording 248.4 mm.

For CES, a total of 1334.4 mm of rainfall was recorded at the site during the reporting period. The total annual rainfall for 2024 was higher than the annual average rainfall (1,136.2 mm) recorded at the Cooranbong Station (BOM station number 61012) from 1903 to 2024. The wettest recorded monthly period at the Cooranbong Entry Site in 2024 was April recording 334.2 mm.

For the MSSS, a total of 1344.2 mm of rainfall was recorded at the site during the reporting period. The total annual rainfall for 2024 was lower than the annual average rainfall (1,136.2 mm) recorded at the MSSS Station (BOM station number 61012) from 1889 to 2016. The wettest recorded monthly period at the MSSS in 2024 was March recording 326.2 mm.

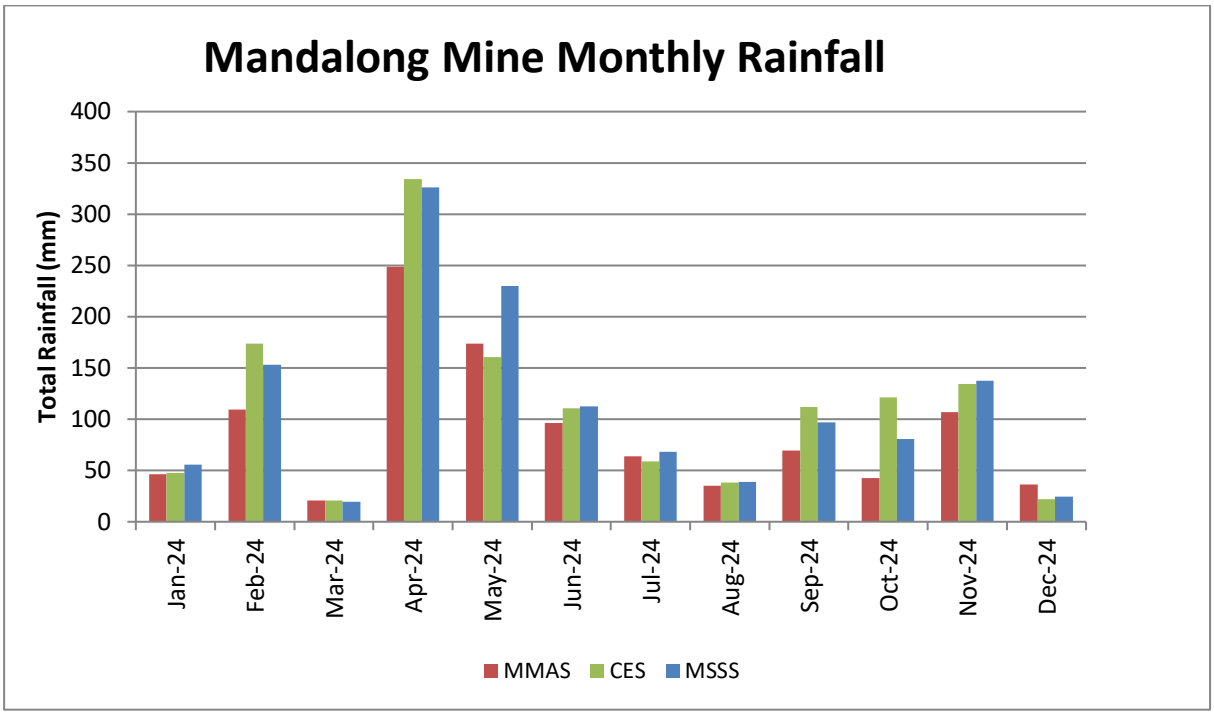


Figure 6-1: MMAS, CES & MSSS Monthly Rainfall

6.2 NOISE MONITORING

Noise monitoring was conducted to assess operational noise levels compared to the noise limits specified by SSD-5144, SSD-5145 and EPL 365 in accordance with the requirements of the Northern Region Noise Management Plan (GHD, 2022d). The Mandalong Mine Noise Monitoring Program now requires Centennial Mandalong to survey noise from the operations at the MMAS, CES and the MSSS (shown in **Figure 6-2**, **Figure 6-3** and **Figure 6-4**) on a quarterly basis.

Measurements were conducted during typical worst-case operational conditions for MMAS, CES and MSSS in order to capture associated typical worst-case noise emission levels. Noise monitoring during the construction of the MSSS commenced in March 2017 on a quarterly basis, however from April 2022 until December 2023 monitoring was undertaken on a monthly basis for operational activities. Since 2024, monitoring for the MSSS has been undertaken on a quarterly basis.

The Mandalong Southern Extension Project Environmental Impact Statement (SLR, 2013) described the results of operational noise modelling for the MMAS and indicated that the relevant intrusive and amenity noise criteria will be achieved at all the nearest sensitive receivers. The noise impact assessment completed as part of the Northern Coal Logistics Project Environmental Impact Statement (SLR, 2014) predicted that operational noise levels at the CES will meet the project-specific noise criteria at all nominated residential locations.

Figure 6-2: MMAS Noise Monitoring Locations

Figure 6-3: CES Noise Monitoring Locations

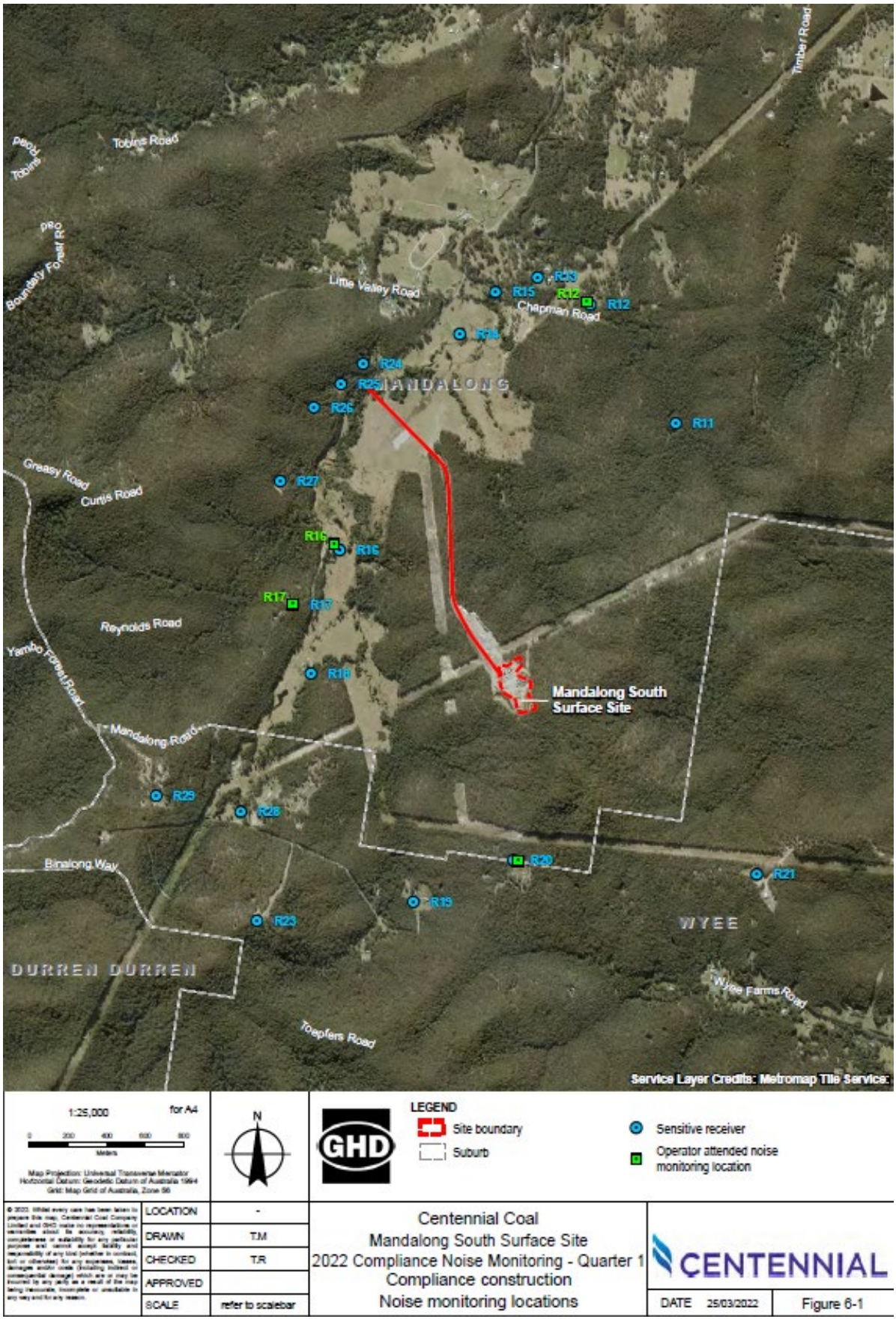


Figure 6-4: MSSS Noise Monitoring Locations

6.2.1 Environmental Performance

6.2.1.1 Attended Noise Monitoring – MMAS & CES

GHD was engaged by Centennial Mandalong to conduct noise compliance assessments for the Mandalong Mine in accordance with the Northern Region Noise Management Plan (GHD, 2022d).

Operator attended noise measurements for the quarterly operator attended noise surveys were conducted on 5-6 March 2024, 17 June 2024, 11 September 2024 and 4 November 2024 at each of the six locations specified in the Noise Management Plan during the night-time period for 15 minutes**.** **Table 6-3** below compares the results of the operator attended noise monitoring with relevant noise goals.

Table 6-3: Noise Monitoring Results Summary 2024

Location	Q1	Q2	Q3	Q4	Criteria Limit
Night (LAeq (15 minute) dBA)					
M1	37	36	37	Not discernible	37
M4	Not discernible	38	N/A	Not discernible	42
M6	32	Not discernible	N/A	<25	41
M7	39	36	N/A	30	43
M8#	Not discernible	38	N/A	Not discernible	43
M10#	Not discernible	39	N/A	Not discernible	39
Night (LA1 (1 minute) dBA)					
M1	41	42	43	Not discernible	45
M4	Not discernible	38	N/A	Not discernible	52
M6	60	Not discernible	N/A	51	61
M7	59	52	N/A	53	61
M8#	Not discernible	38	N/A	Not discernible	61
M10#	Not discernible	39	N/A	Not discernible	61

Residences at monitoring locations M8 and M10 no longer exist. Construction works are currently occurring across this location for an expansion to the Morisset industrial area.

The attended quarterly operational noise monitoring showed that the noise contributions from the MMAS and CES comply with the EPL 365, SSD-5144 and SSD-5145 noise criteria at all monitoring locations.

6.2.1.2 Mandalong South Surface Site

GHD was engaged by Centennial Mandalong to conduct noise compliance monitoring for the operational activities at the MSSS in accordance with the Northern Region Noise Management Plan (GHD, 2022d). The noise monitoring network locations at the MSSS are shown in **Figure 6-4**.

Operator attended noise measurements were conducted on 7 March 2024, 19 June 2024, 10 September 2024 and 5 November 2024. The noise assessment consisted of attended monitoring to quantify operational noise levels at four noise sensitive receivers (R12, R16, R17 and R20) near the MSSS. **Table 6-4** below compares the results of the operator attended noise monitoring with relevant noise goals.

Table 6-4: MSSS Noise Monitoring Results Summary 2024

Location	R12	R16	R17	R20
Night (LAeq (15 minute) dBA)				
March 2024	Not discernible	27	27	Not discernible
June 2024	<25	23	25	<25
September 2024	Not discernible	<29	<30	<28
November 2024	Not discernible	27	27	Not discernible
Criteria Limit	**35**	**35**	**35**	**35**

The results of the MSSS 2024 noise monitoring indicates that operational noise levels were below the relevant noise management levels at the assessment monitoring locations R12, R16, R17 and R20.

In 2022, Centennial Mandalong developed an action plan following the completion of noise investigations and progressed with noise mitigation options for the MSSS ventilation fans. The design, manufacture and installation of three new outlet silencers for Fans 1, 2 and 3 was completed in October 2023.

Noise monitoring of the MSSS operations will continue in 2024 on a quarterly basis.

6.3 BLAST MONITORING

There was no blasting carried out at Mandalong Mine in 2024.

6.4 AIR QUALITY MONITORING

SSD-5144 Schedule 3 Condition 8 and SSD-5145 Schedule 3 Condition 7 provide criteria for particulate matter (PM_{10}), Total Suspended particulates (TSP) and deposited dust cumulative impact and incremental impact. The cumulative impact is the increase in concentrations due to the development plus background concentrations. The cumulative impact is recorded as an annual average. The incremental impact is the increase in concentrations due to the development alone. The incremental impact calculation is the monthly average minus the pre-construction average (PCA). For deposited dust, this is recorded as an annual monthly average and must not exceed 2g/m^2/month.

The location description for each depositional dust gauge is provided in **Table 6-5.**

Table 6-5: Description of Depositional Dust Gauges

Dust Gauge No.	Locality
D4	41 Gradwells Road Dora Creek (near Cooranbong Entry Site)
D6	Mandalong Mine Site Eastern Boundary (Near Sediment Basin)
D8	West of main front entrance (Mandalong Site)
D9	184 Mandalong Road
D10	202 Mandalong Road West of Mandalong Mine
D12	Mandalong South Surface Site
D14	North of Mandalong South entrance road (near wetland)

6.4.1 MMAS Depositional Dust Monitoring

Depositional dust monitoring results are shown in **Table 6-6**. The results are presented as:

- Long-term average (all data since the commencement of monitoring at its present location - September 1999 to present);
- Annual Average during the report period (January 2024 to December 2024); and
- Pre-construction average (PCA) (September 1999 to August 2000).

Table 6-6: Summary of depositional dust results between January 2024 and December 2024 surrounding MMAS.

	Insoluble Solids (Combustible Matter + Ash) g/m^2/month			
	DG6	**DG8**	**DG9**	**DG10**
Long Term Average	1.3	0.7	1.1	1.7
Annual Average (2024 Reporting Period)	1.3	1.0	0.8	3.8
Pre-Construction Average	0.8	0.8	0.9	*
Limit Criteria	4.0	4.0	4.0	4.0

* Not available. Dust gauges installed after commencing construction.

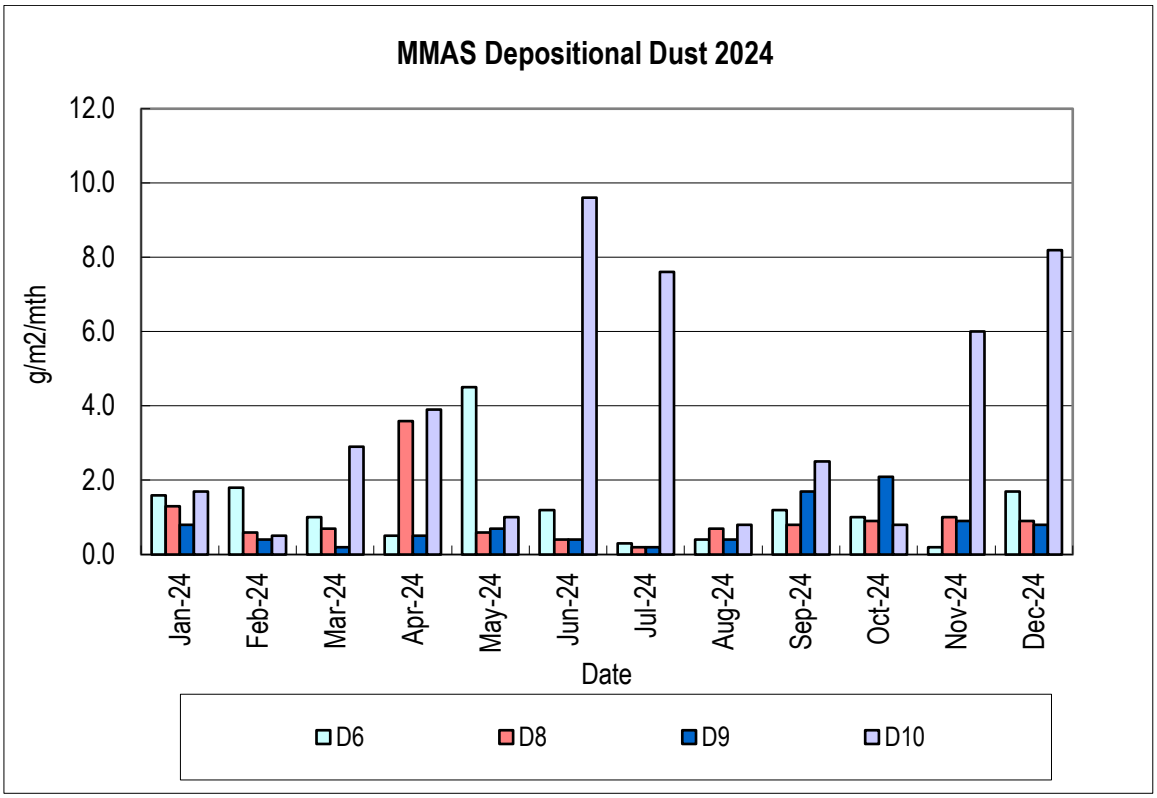


Figure 6-5: Monthly Depositional Dust Results 2024 MMAS

The cumulative impact result is shown in **Table 6-7** and **Table 6-8** as an annual average. All dust gauges were compliant with the condition for the reporting period. The maximum cumulative impact was 1.23 recorded at DG9. The incremental impact result is shown in **Table 6-7** as the change from PCA. All dust gauges were compliant with the condition for the reporting period. The maximum incremental impact for DG6 is 0.5, DG8 is 0.2 and DG9 is 0.3.

Table 6-7: Detailed Dust Monitoring and Analysis showing the Annual Rolling Average and Change in Deposition from the Pre-construction Average (PCA) for Dust Gauges DG6, DG8 and DG9.

	DG6			DG8			DG9		
Date	Monitored Dust	Annual Rolling Average	Change from PCA	Monitored Dust	Annual Rolling Average	Change from PCA	Monitored Dust	Annual Rolling Average	Change from PCA
19/01/2024	1.6	1.07	0.3	1.3	0.97	0.2	0.8	1.00	0.1
10/02/2024	1.8	1.08	0.3	0.6	0.63	-0.2	0.4	1.00	0.1
18/03/2024	1.0	0.85	0.0	0.7	0.56	-0.2	0.2	0.90	0.0
17/04/2024	0.5	0.80	0.0	3.6	0.82	0.0	0.5	0.58	-0.3
16/05/2024	4.5	1.15	0.4	0.6	0.83	0.0	0.7	0.57	-0.3
13/06/2024	1.2	1.21	0.4	0.4	0.84	0.0	0.4	0.58	-0.3
15/07/2024	0.3	1.22	0.4	0.2	0.84	0.0	0.2	0.57	-0.3
15/08/2024	0.4	1.23	0.4	0.7	0.89	0.1	0.4	0.59	-0.3
13/09/2024	1.2	1.28	0.5	0.8	0.90	0.1	1.7	0.71	-0.2
14/10/2024	1.0	1.31	0.5	0.9	0.95	0.2	2.1	0.87	0.0
15/11/2024	0.2	1.20	0.4	1.0	0.97	0.2	0.9	1.23	0.3
16/12/2024	1.7	1.28	0.5	0.9	0.98	0.2	0.8	0.76	-0.1

Table 6-8 Detailed Dust Monitoring and Analysis showing the Annual Rolling Average for Dust Gauge 10

	DG10		
Date	**Monitored Dust**	**Annual Rolling Average**	**Change from PCA**
19/01/2024	1.7	1.30	N/A
10/02/2024	0.5	1.23	N/A
18/03/2024	2.9	1.33	N/A
17/04/2024	3.9	1.58	N/A
16/05/2024	1.0	1.58	N/A
13/06/2024	**9.6**	2.30	N/A
15/07/2024	**7.6**	2.84	N/A
15/08/2024	0.8	2.73	N/A
13/09/2024	2.5	2.78	N/A
14/10/2024	0.8	2.78	N/A
15/11/2024	**6.0**	2.83	N/A
16/12/2024	**8.2**	3.79	N/A

6.4.2 CES Depositional Dust Monitoring

Northern Coal Logistics Project EIS (March 2014) modelling predictions for dust deposition show that incremental and cumulative annual average dust deposition rates are predicted to be well below the impact criteria of 2g/m^2/month and 4g/m^2/month (assuming a background rate of 1.2 g/m^2/month) at the nearest surrounding residences.

Annual average depositional dust results for 2024 and the LTA are provided in **Table 6-6** and **Table 6-7.** The complete monthly dust monitoring data is provided in **Figure 6-6**.

The cumulative impact result for DG4 is shown in **Table 6-10** as an annual average. DG4 was compliant with the condition for the report period. The maximum cumulative impact was 1.23.

The incremental impact result for DG4 is shown in **Table 6-10** as the change from PCA. DG4 was compliant with the condition for the reporting period. The maximum incremental impact for DG4 is -0.8.

Table 6-9: Summary of Depositional Dust Results between January 2024 and December 2024 surrounding the CES.

	Insoluble Solids (Combustible Matter + Ash) g/m^2/month
	DG4
Long Term Average	1.2
Average 2024 (Reporting Period)	0.4
Limit criteria (annual average)	4.0

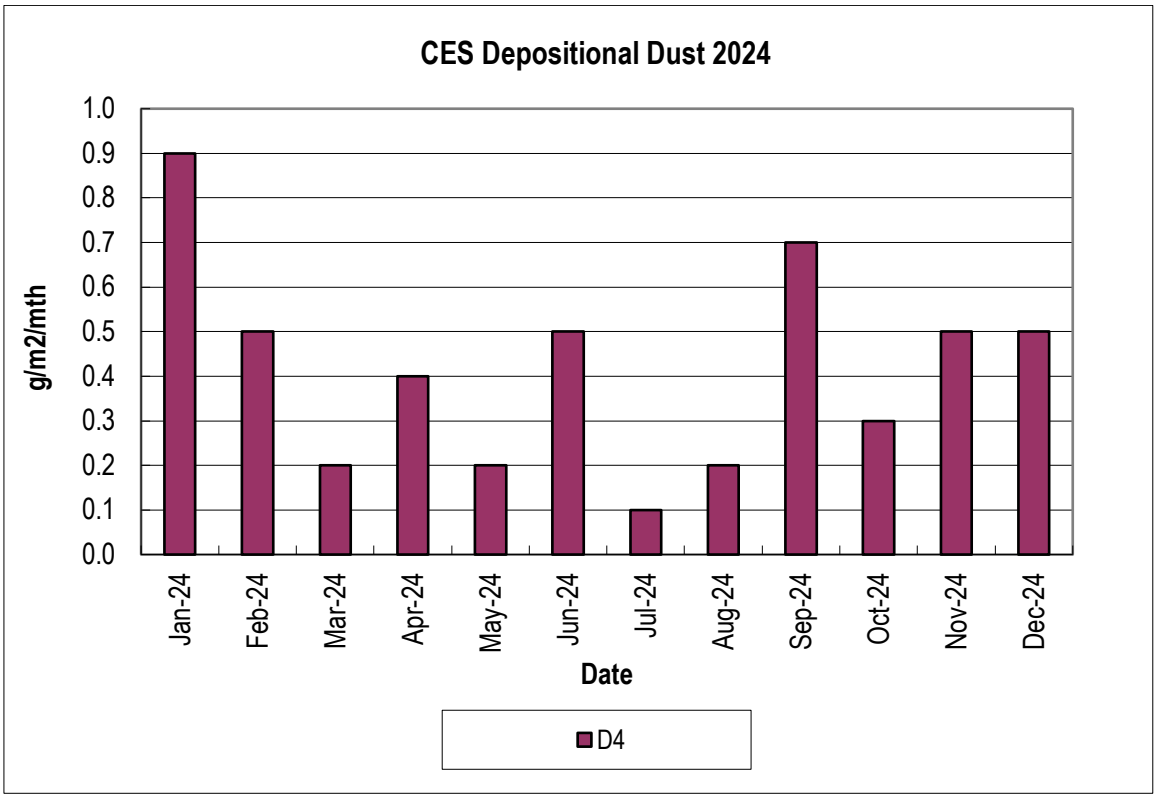


Figure 6-6: Monthly Depositional Results 2024 CES

Table 6-10 Detailed Dust Monitoring and Analysis showing the Annual Rolling Average and Change in Deposition from the Pre-construction Average (PCA) for Dust Gauge 4

	DG4		
Date	**Monitored Dust**	**Annual Rolling Average**	**Change from PCA**
19/01/2024	0.9	1.21	0.0
10/02/2024	0.5	1.21	0.0
18/03/2024	0.2	1.21	0.0
17/04/2024	0.4	1.21	0.0
16/05/2024	0.2	1.20	0.0
13/06/2024	0.5	1.23	0.0
15/07/2024	0.1	1.21	0.0
15/08/2024	0.2	0.66	-0.5
13/09/2024	0.7	0.69	-0.5
14/10/2024	0.3	0.53	-0.7
15/11/2024	0.5	0.45	-0.8
16/12/2024	0.5	0.42	-0.8

6.4.3 MSSS Depositional Dust Monitoring

Depositional dust gauges were installed at the MSSS in June 2014 for the purpose of pre-construction air quality monitoring. Construction of the MSSS access road commenced in February 2017 and construction of the Surface Site commenced in July 2017. The monthly dust deposition results for DG12 and DG14 are provided in **Figure 6-7**. Annual average depositional dust results for 2024 and the consent criteria are provided in **Table 6-11, Table 6-12** and **Figure 6-7**.

Table 6-11: Summary of Depositional Dust Results between January 2024 and December 2024 surrounding the MSSS.

	Insoluble Solids (Combustible Matter + Ash) g/m^2/month	
	DG12	**DG14**
Long Term Average	0.7	1.3
Average 2024 (Reporting Period)	0.7	0.8
Limit Criteria	4.0	4.0

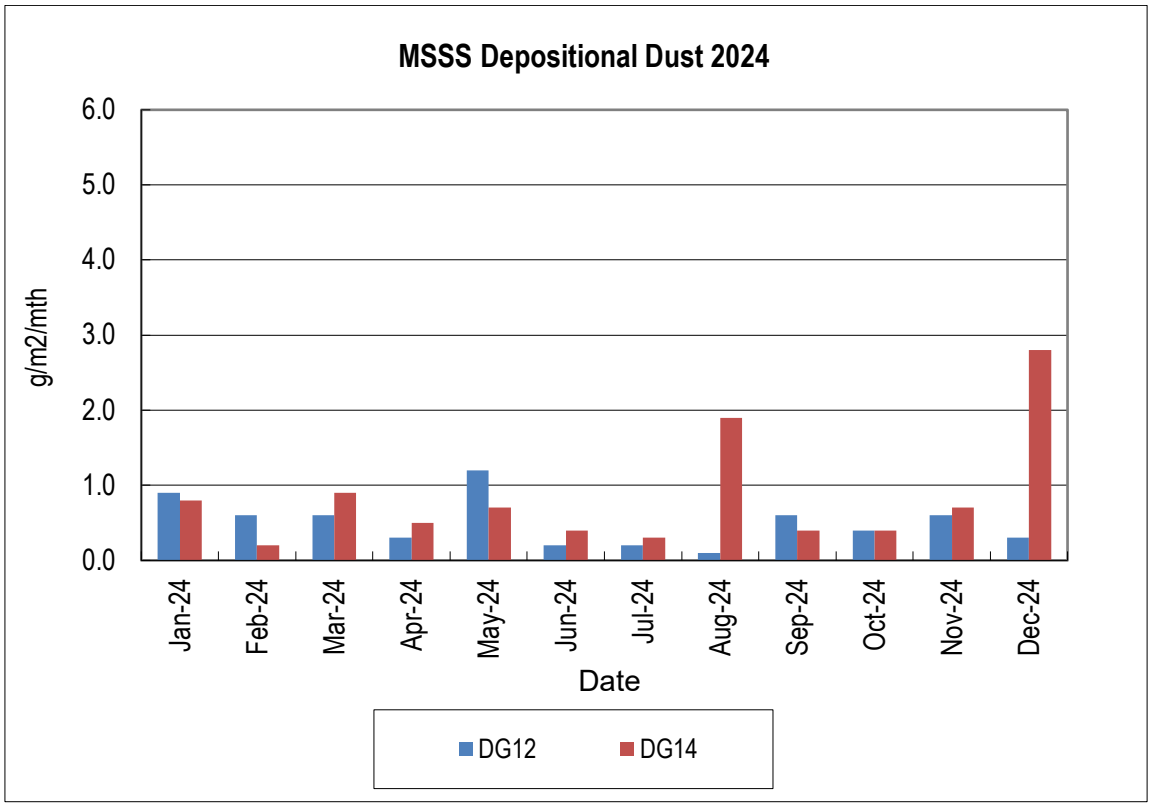


Figure 6-7: Monthly Depositional Results 2024 MSSS

The cumulative impact result is shown in **Table 6-12** as an annual average. The dust gauges were compliant with the condition for the reporting period. The maximum cumulative impact at DG12 was 0.67 and DG14 was 0.66. The incremental impact result is shown in **Table 6-12** as the change from PCA. The dust gauges were compliant with the condition for the reporting period. The maximum incremental impact for DG12 is 0.3 and DG14 is -1.2

Table 6-12 Detailed Dust Monitoring and Analysis showing the Annual Rolling Average and Change in Deposition from the Pre-construction Average (PCA) for Dust Gauge DG12 and DG14

	DG12			DG14		
Date	Monitored Dust	Annual Average	Change from PCA	Monitored Dust	Annual Average	Change from PCA
19/01/2024	0.8	0.49	0.0	0.8	0.50	-1.1
10/02/2024	0.5	0.48	0.0	0.2	0.48	-1.1
18/03/2024	1	0.52	0.0	0.9	0.43	-1.2
17/04/2024	0.3	0.52	0.0	0.5	0.45	-1.2
16/05/2024	0.4	0.45	-0.1	0.7	0.43	-1.2
13/06/2024	0.7	0.49	0.0	0.4	0.45	-1.2
15/07/2024	0.1	0.48	0.0	0.3	0.47	-1.1
15/08/2024	0.2	0.49	0.0	1.9	0.61	-1.0
13/09/2024	0.6	0.49	0.0	0.4	0.60	-1.0
14/10/2024	0.5	0.50	0.0	0.4	0.62	-1.0
15/11/2024	1.5	0.51	0.0	0.7	0.60	-1.0
16/12/2024	1.4	0.67	0.3	2.8	0.83	-1.0

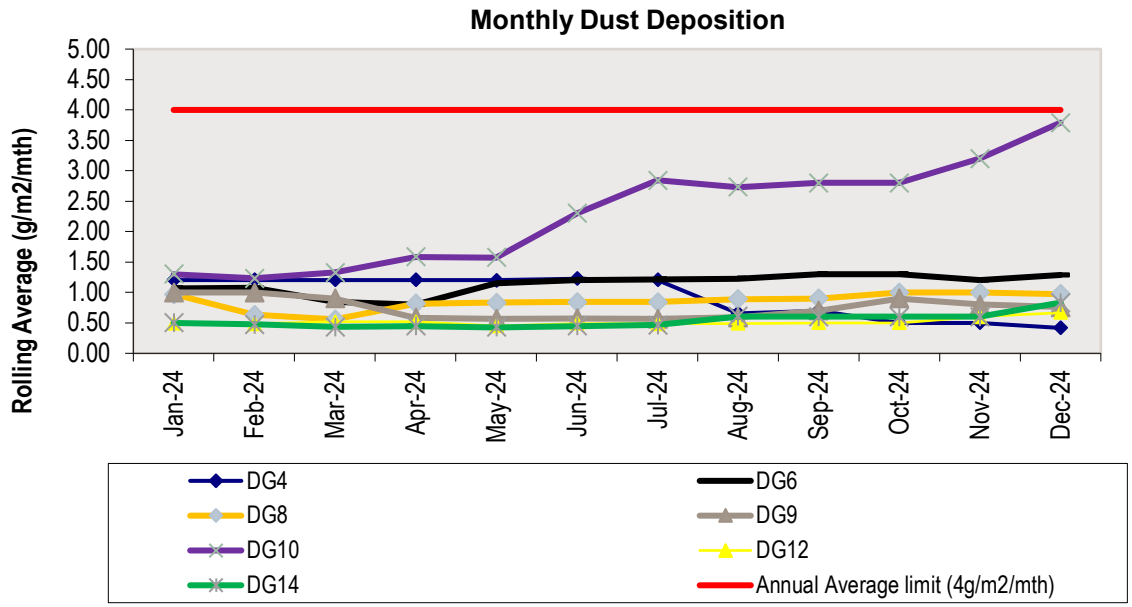


Figure 6-8 Dust Deposition Rolling Annual Average and Limit Criteria

6.4.4 Depositional Dust Monitoring Data Interpretation

MMAS

All dust gauges recorded results below the dust deposition consent limit criteria of 4 g/m^2/month for cumulative impacts and 2g/m^2/month for incremental impacts. Dust levels at DG 6, 8 & 9 show minor or no variation to the pre-construction average, confirming that the activities had minimal impact on surrounding air quality in 2024 as predicted in the Mandalong Southern Extension Project EIS (SLR, 2013).

The annual average for each dust gauge is below or equal to the long-term average except for DG9 & DG10. The greatest difference in averages was at DG10 which has a long-term average of 1.7 g/m^2/month and recorded an annual average of 3.8 g/m^2/month. This elevated reading was due to vegetation maintenance activities, such as lawn mowing, occurring near the dust gauge.

CES

DG4 recorded results well below the dust deposition consent limit criteria of 4g/m^2/month for cumulative impacts and 2g/m^2/month for incremental impacts.

Average annual depositional dust results for DG4 are on average 0.3 g/m^2/month below the pre-construction average. Dust deposition levels at DG4 located at the nearest sensitive receivers and on the operational boundary at CES are below the pre-construction average, confirming that the CES had minimal impact on surrounding air quality in 2024 as predicted in the Northern Coal Logistics Project EIS (SLR, 2014).

The annual average for DG4 for 2024 is 0.8 g/m^2/month lower than the long-term average.

MSSS

DG12 and DG14 recorded results well below the dust deposition consent limit criteria of 4 g/m^2/month for cumulative impacts and 2g/m^2/month for incremental impacts.

Dust levels at DG12 show a slight increase or the same levels as the pre-construction average and DG14 is significantly below the pre-construction average, confirming that the activities had minimal impact on surrounding air quality in 2024 as predicted in the Mandalong Southern Extension Project EIS (SLR, 2013).

DG12 recorded an annual average similar to the long-term average. DG14 recorded an annual average lower than the long-term average

6.4.5 CES Particulate Matter

Continuous dust monitoring was installed in June 2013 at the CES to monitor total suspended particles (TSP) and particulate matter (PM10) as per the condition M2.2 of EPL365. The limit criterion for PM10 annual average concentrations was reduced to 25 µg/m^3 when the Northern Coal Services consent SSD-5145 was approved 29th September 2015. The consent SSD-5145 requires that air quality impacts at the CES do not exceed the limit criteria of:

- 90µg/m^3 annual average for TSP;
- 25µg/m^3 annual average for PM10; and
- 50µg/m^3 24-hour average for PM10.

There were no exceedances of the PM10 and TSP annual average limit criteria for the reporting period. The 2024 annual average for PM10 was 15.87µg/m^3. The 2024 annual average for TSP was 14.92µg/m^3.

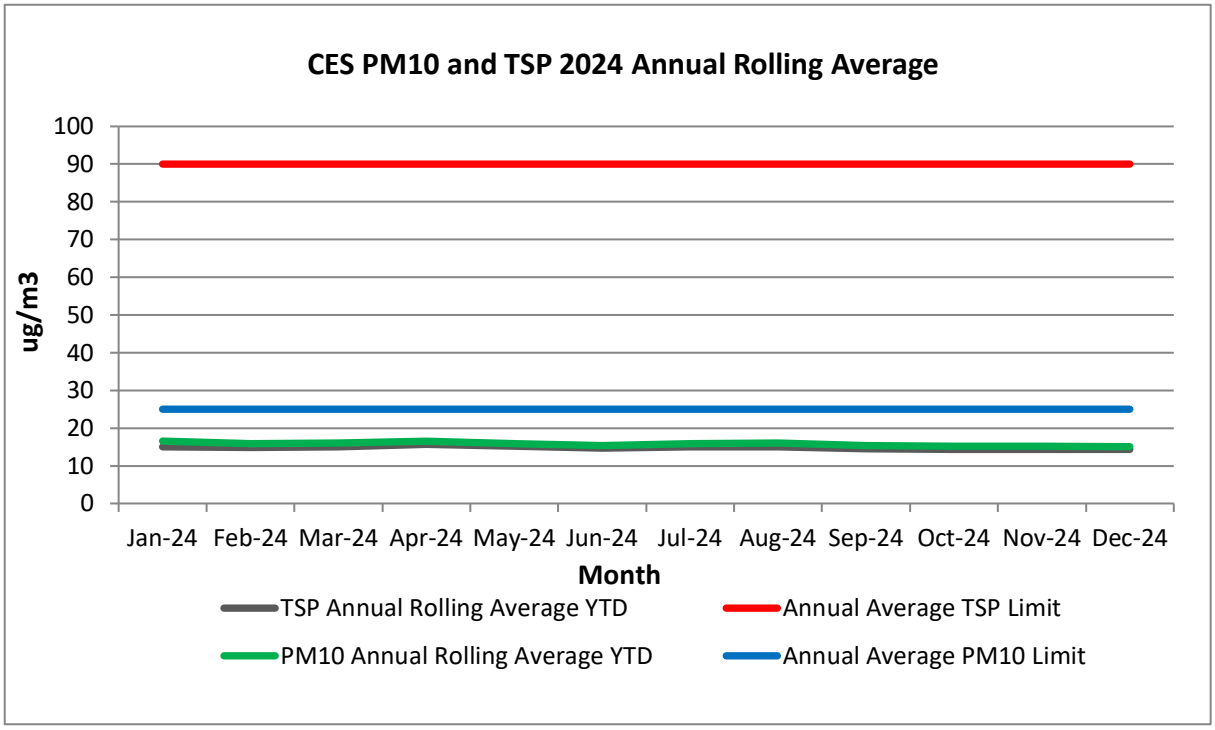
There were no exceedances of the 24-hr average PM10 concentration SSD-5145 24-hr criterion of 50µg/m3 in 2024.

The maximum PM10 concentration of 45.52 µg/m^3 was recorded on 20 July 2024. The maximum TSP recording was 44.83 µg/m3 which occurred on 5 February 2024. There is no maximum 24hr concentration limit for TSP.

6.4.6 CES Particulate Matter Monitoring Data Interpretation

TSP and PM10 monitoring results are shown in **Figure 6-9** and **Figure 6-10**. The results are presented as an annual average for the reporting period (January 2024 to December 2024). The monitoring results for the TSP and PM10 annual and 24 hour average from January to December 2024 are in accordance with the predictions from the air quality impact assessment for the Northern Coal Logistics Project EIS (SLR, 2014).

Figure 6-9: CES PM10 and TSP 2024 Annual Rolling Average and Limit Criteria



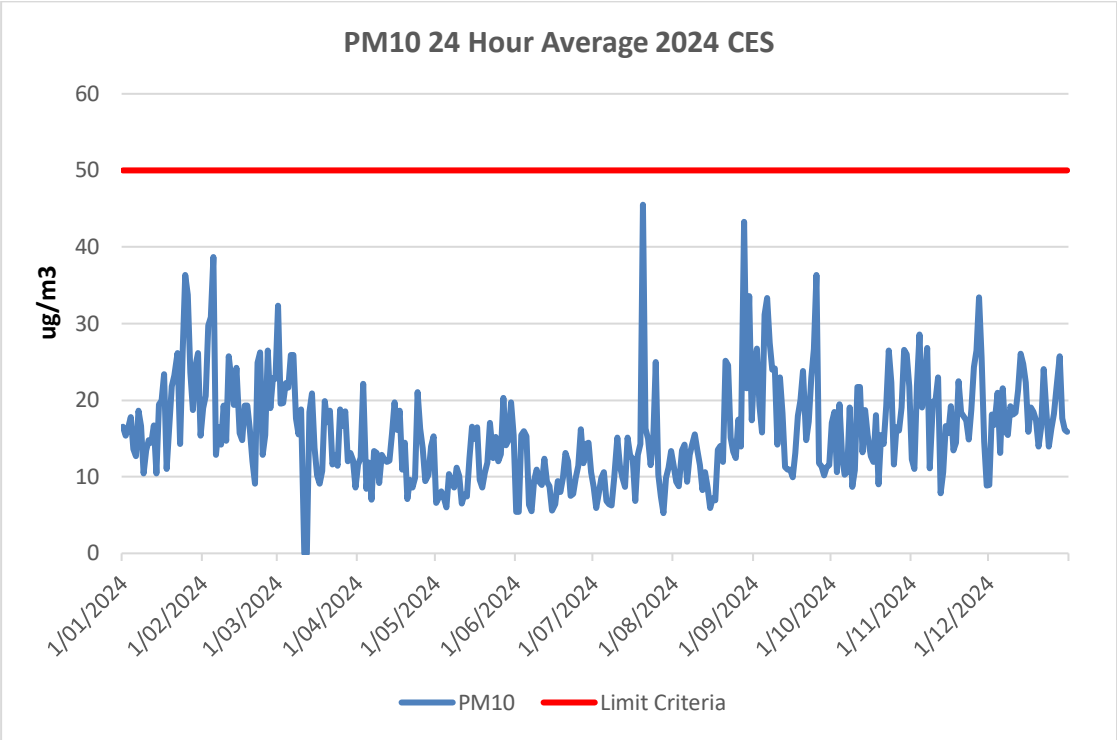


Figure 6-10: CES PM10 24 Hour Average 2024

6.4.7 MMAS HVAS (High Volume Air Samplers)

PM_{10} and $PM_{2.5}$ monitoring results are shown in **Figure 6-11** and **Figure 6-12**. PM_{10} and $PM_{2.5}$ high volume air samplers were installed in January 2014 at MMAS to monitor fine particles from the Site. The limit criterion for PM10 annual average concentrations was reduced from 30µg/m^3 to 25µg/m^3 with approval of Modification 6 of Consent SSD-5144 in April 2019. SSD-5144 requires that air quality impacts at the MMAS do not exceed the limit criteria of:

- 90µg/m^3 annual average for TSP;
- 25µg/m^3 annual average for PM10; and
- 50µg/m^3 24-hour average for PM10.

There were no exceedances of the PM10 and TSP annual average limit criteria for the report period. The 2024 annual average for PM10 was 9.36 µg/m^3. The 2024 annual average for TSP was 23.41µg/m^3. The annual average for TSP is calculated using the HVAS PM10 data. The 2024 annual average for PM2.5 was 4.80µg/m^3.

The 24-hr average PM10 concentrations recorded nil exceedances of SSD-5144 24-hr criterion of 50µg/m3 in the 2024 monitoring period.

The maximum PM10 concentration of 31µg/m^3 and TSP concentration of 77.50µg/m^3 were recorded on 6 January 2024. The maximum PM2.5 concentration of 16µg/m^3 was recorded on 6 January 2024. There is no maximum 24hr concentration limit for TSP and PM2.5.

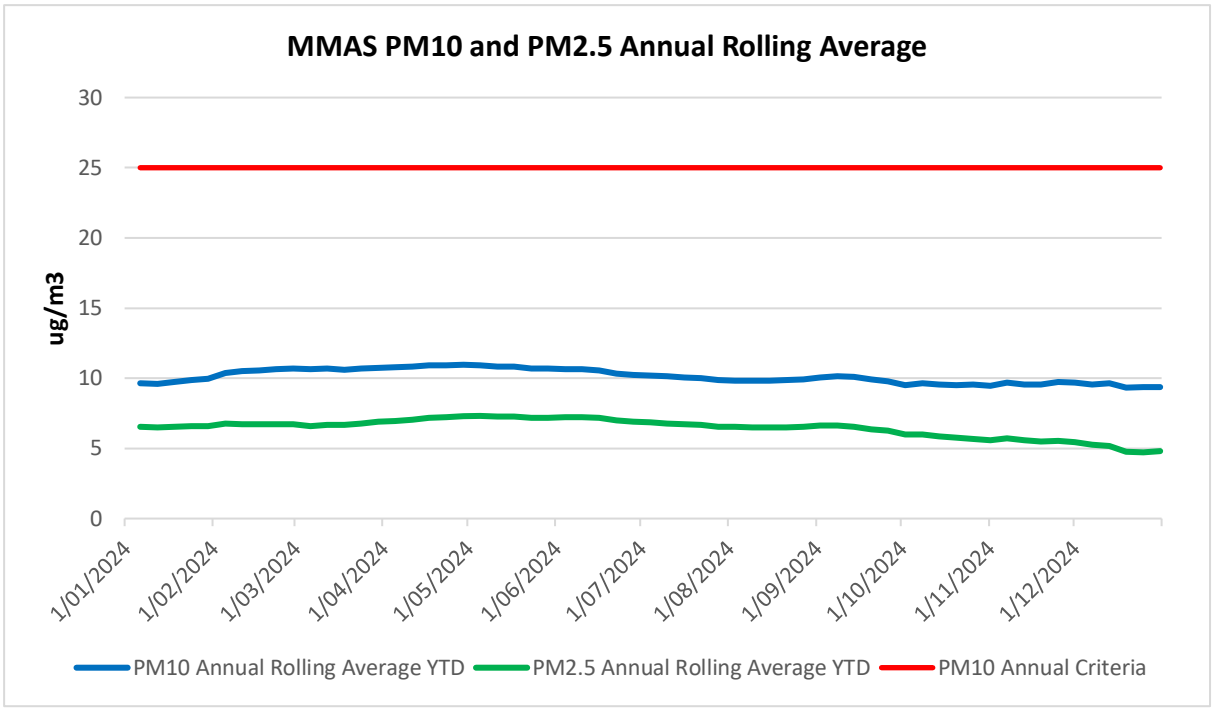


Figure 6-11: MMAS PM10 and PM2.5 Annual Rolling Average and Limit Criteria

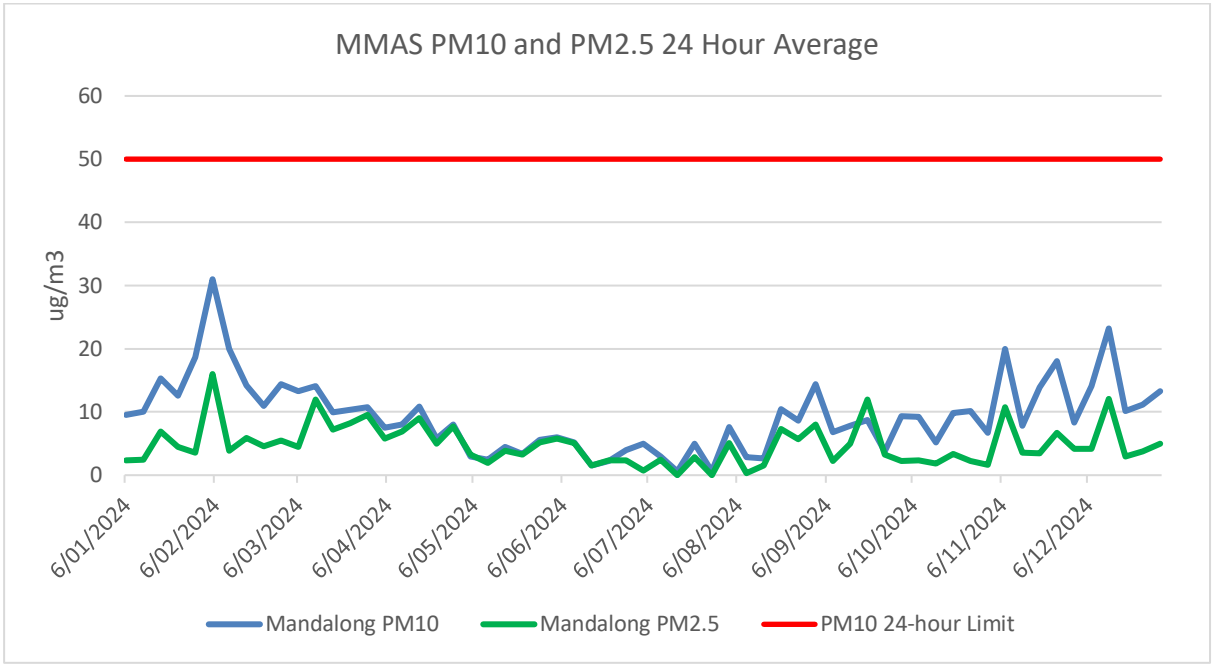


Figure 6-12: MMAS PM10 and PM2.5 24Hour Average and Limit Criteria

6.4.8 MMAS HVAS Air Quality Monitoring Data Interpretation

PM_{10} and $PM_{2.5}$ monitoring results are shown in **Figure 6-11** and **Figure 6-12**. The results are presented as an annual average for the report period (January 2024 to December 2024). The monitoring results for the TSP and PM_{10} annual and 24-hour average from January to December 2024 are compliant with the limits within SSD-5144 and in accordance with the predictions from the air quality impact assessment for the Mandalong Southern Extension Project EIS (SLR, 2013).

6.4.9 Greenhouse Gas Monitoring

In accordance with the Northern Region Air Quality and Greenhouse Gas Management Plan (AQ&GHGMP) the GHG reporting the 2024 financial year (FY 1 July 2023 to 30 June 2024), emissions in CO2 equivalent tonnes (Co2-eT) as defined in the *National Greenhouse and Energy Reporting Act 2007* are provided in **Table 6-13**. **Table 6-13** also includes a comparison against the maximum annual emissions included in the Mandalong Southern Extension Project EIS (SLR, 2013). Total Scope 1 GHG emissions for the 2024 FY period were 742,229 CO2-eT, which is lower than the 2023 FY emissions of 1,009,855 CO2-eT.

The majority of Scope 1 emissions in 2024 were caused by fugitive methane contributing to 99.42% of all GHG emissions. Mandalong Mine is currently working towards GHG reduction measures to abate fugitive methane emissions. This is discussed further in **Section 6.4.11**.

During the 2024 financial year, Mandalong's Stage 1 Gas Flares abated 84.1% of the amount of mine waste gas captured in the drainage system. This resulted in 400,138 CO2-eT of abatement or the equivalent of 35.2% of the total fugitive emissions from the Mandalong Mine.

Table 6-13: Total GHG Emissions from Mandalong Mine in 2024 Financial Year

Emissions Summary (CO2-eT) July 2023 to June 2024	Total	EIS Maximum Annual Emissions (CO2-eT)
Diesel	4,168*	29,424#
Petroleum Based Oils and Greases (PBOG)	138	
SF6	5	
Coal Extraction (Fugitives)	737,918	1,703,872
Surface Fugitive - Post Mining	0	
TOTAL Scope 1 Emissions	**742,229**	**1,813,664**
Electricity	**63,673**	**107,152**
TOTAL Scope 2 Emissions	**63,673**	**107,152**

* Includes CES coal handling / haulage diesel combustion.

Includes 24,144 Co2-eT for Cooranbong haul truck diesel consumption as per NCLP EIS

6.4.10 Greenhouse Gas Abatement Investigations Measures

As reported in previous Annual Reviews, Centennial Mandalong has invested in technologies to reduce fugitive methane GHG emissions from the Mandalong Mine. A four-stage process is planned to address this Greenhouse Abatement. Construction of Stage 1 and Stage 2 were completed in November 2013.

Stage 1 Gas Flares - A consent modification approval was obtained in 2005 to construct multiple enclosed flares planned to be used to reduce fugitive methane GHG emissions from the Mandalong Mine's surface gas drainage plant. Civil works for construction of the gas flares

commenced in October 2012, with final commissioning completed and automated operations commencing in November 2013. The construction of the enclosed gas flares has assisted with abating drainage gas emissions of up to 2,000 litre/sec flow rate.

Stage 2 Ventilation Air Methane Regenerative After Burner (VAM RAB ®) - Approval for a modification to DA97/800 was sought in 2011, to allow for the installation and ongoing operation of a single VAM RAB® unit as a demonstration project to examine the performance capability. Approval was granted by the Planning Assessment Commission (PAC) on behalf of the Minister for the then Department of Planning and Infrastructure (DP&I) on 11 November 2011.

The VAM RAB® technology initially proposed for Mandalong Mine includes installation and operation of a single VAM RAB® unit as part of a demonstration project to demonstrate capture and abatement of approximately 10 cubic metres per second (m^3/s) of the mine's total Ventilation Air Methane (VAM). The VAM is low concentration methane in the mine ventilation stream and the VAM RAB® system overcomes this technical difficulty by directing the mine ventilation air into a large oxidation vessel, oxidising the methane into carbon dioxide. This technology is based on well tested coke-oven principles, utilised in the steel industry.

Civil construction works on the surface pad for the VAM RAB® unit commenced in December 2011 and were completed in November 2013. The VAM RAB® demonstration plant has been heated up on a number of occasions during the last six months of 2014, with some minor configuration changes made in 2015 and 2016.

The VAM RAB® plant is currently impacted by technical issues. From a technical perspective, refinements are required for the VAM RAB® to reach a suitable temperature profile to allow trial abatement of methane. Over the project life, a number of test procedures have been conducted resulting in significant changes to the design and structure of the plant. These have included a rebuild of the VAM RAB® core.

The current status of the Project is that it is on hold in its commissioning phase. It has not progressed to, or completed, the formal experiment Stage 1 (6-week VAM simulation) or Stage 2 (12 months on VAM).

Stage 3 Gas Engines - In July 2009 Mandalong Mine received approval from the then DP&I to construct and operate multiple methane gas engines to generate electricity. When the generation facility was implemented, power can be supplied to the site and excess power sold to the grid. The flare units will remain available as back-up or for peak gas flows.

In 2018, Centennial Mandalong commenced planning and design works for the Gas Engines project. Construction of the Gas Engines by EDL was completed in 2021, with commissioning completed in 2023. The Stage 3 Gas Engines are now in operation at the MMAS. These engines are owned and managed by EDL and are a separate facility under the NGER scheme.

Stage 4 – Centennial Mandalong is currently investigating options to improve methane gas capture from the underground mine. This would then allow increased methane abatement through the Stage 1 Gas Flares or the Stage 3 Gas Engines. If the projects are viable, they are expected to commence in 2025 or 2026.

6.5 BIODIVERSITY MONITORING

Biodiversity Monitoring is undertaken at Mandalong Mine in accordance with the relevant Extraction Plans (EP) and associated Biodiversity Management Plans (BMP). Table 6-14 provides a brief overview of the Extraction Plan Areas, when extraction was completed and when monitoring is expected to be completed.

Table 6-14: Biodiversity Monitoring Timeframes for Extraction Plan Areas

Extraction Plan Areas	Extraction Completion Date	Monitoring Completion Date
LW30-31	01 May 2022	04 November 2024
LW32	04 Nov 2022	04 November 2024
LW34	31 May 2023	31 May 2025
LW39-43	October 2028	TBC
LW57-58	December 2024	December 2026

6.5.1 LW30-31 Extraction Plan Areas

A Biodiversity Monitoring Program is required for Mandalong Mine LW30-31 under the Development Consent SSD-5144, as outlined in the LW30-31 Extraction Plan BMP (RPS 2020).

RPS have completed a 2024 monitoring report (RPS, 2025a) for LW30-31 which concerns the terrestrial biodiversity monitoring, which includes sensitive vegetation communities and threatened species (including threatened flora, amphibians, cave-associated microbats, and the brush-tailed rock wallaby).

Baseline monitoring efforts were undertaken by RPS in 2019 and 2020, with data collected in 2021 onwards representing the initial survey effort following the extraction within the LW30-31 EP Area. Accordingly, the 'impact area' for the monitoring program for LW30-31 is defined as the area within the LW30-31 EP Area boundary (as shown in **Figure 6-13**). At the time of the RPS surveys (September 2024), extraction of both longwalls was completed.

Baseline surveys were undertaken by RPS prior to mining in 2019 and 2020 to initiate the monitoring of sensitive vegetation communities and habitat condition. This monitoring occurred at impact and control sites with the data collected referred to as 'before' data. This data was used to characterise the likely variation in these communities for future post mining comparisons.

The 2024 survey campaign focused on resurveying all plots within the LW30-31 EP Area. This included plots in the EP Area where increases in ponding are predicted due to mining to date (i.e. predicted impact plots), plots in the EP Area outside of areas where increases in ponding are expected or in areas not subject to mining to date (i.e. non-predicted impact plots) and corresponding control plots (in an area away from impacts from mining).

The 2024 survey indicates a trend of ecological recovery following the 2022 flooding, with an increase in species richness observed across the majority of Plant Community Types (PCTs). Despite this overall positive trend, BAM condition scores—including composition, structure, function, and vegetation integrity—did not display a consistent pattern between baseline monitoring and post-extraction assessments. Notably, changes recorded within sensitive ecological communities were negligible. A detailed analysis of each PCT is provided in the following sections.

Monitoring of *R. rubescens* within the EP Area indicates a decline in adult individuals in impact plots, while saplings and juveniles persist. This suggests that factors such as resource availability, rainfall, infection, and exotic species are contributing to reduced lifespans, preventing many trees from reaching reproductive maturity. Height and count data support this, showing that as individual counts increase, average plant height decreases. This decline in mature individuals has been ongoing since baseline monitoring.

Overall, *R. rubescens* are taller and more mature in control plots compared to impact plots. Myrtle Rust infection ratings have increased in control plots but decreased in impact plots since baseline. However, this decline does not account for the reduced number of individuals, which exhibited higher infection rates in 2023. Impact plots have a less established population, and seedlings, saplings, and epicormic growth remain highly susceptible to infection.

Notably, Impact Plots 2 and 5 have experienced a sharp decline in individuals from 2019 to 2024 due to *Lantana camara* and native vine species smothering *R. rubescens*. More broadly, populations throughout Mandalong Valley show high sensitivity to *Lantana camara, Smilax australis,* and *Cissus hypoglauca.*

In 2024, mature individuals were recorded flowering in control plots for the first time. While flowering suggests healthy maturation, all flowering individuals also showed signs of Myrtle Rust, with some flowers succumbing to infection. As Myrtle Rust is likely to prevent viable fruit production, control plots will continue to be monitored for regeneration alongside other LW monitoring programs.

Three patches of *C. dowlingii* (Red Helmet Orchid; BC Act: Vulnerable) were surveyed throughout 2024. Individual counts increased substantially in control plots and remained stable in impact plots between 2021 and 2024. However, percent cover has declined in both plot types since 2022. Given the high observer bias associated with cover estimates, count data is a more reliable indicator of population trends. Plant health scores have remained unchanged in both control and impact plots since 2021.

Genoplesium insigne was first recorded opportunistically in the EP area in 2022. Monitoring is conducted using parallel transects through known habitat. Since the initial survey, population counts have doubled from 79 individuals in 2022 to 158 in 2024.

Amphibian species richness has increased since baseline, with 12 species recorded in impact plots and 10 in control plots. Notably, *Mixophyes iteratus* was recorded in the control area for the second time, suggesting that amphibian species continue to persist in the riparian habitats of LW30-31 post-mining.

Additionally, *Pseudophryne australis* was tentatively detected aurally during the 2023 surveys. However, 2024 surveys aimed at confirming this detection found no further evidence of the species. Given the aural nature of the initial detection, it is likely the call was misidentified, possibly from *Pseudophryne coricea*, which was also recorded at the same location.

Microbat diversity increased since 2020 and remained stable from 2022 to 2024. A potential roost for Rhinolophus *megaphyllus* (Horseshoe bat) was identified in the EP Area, where it has been frequent since 2020. Three threatened microbat species were recorded: *Chalinolobus dwyeri (Large-eared pied bat), Miniopterus australis* (Little bent-wing bat), and *Saccolaimus flaviventris* (*Yellow-bellied sheath-tailed bat).* However, their call frequencies didn't suggest nearby roosting. Additionally, two new species, *Austronomus australis* (*White-striped free-tailed bat*) and *Saccolaimus flaviventris*, were found in both EP and control areas.

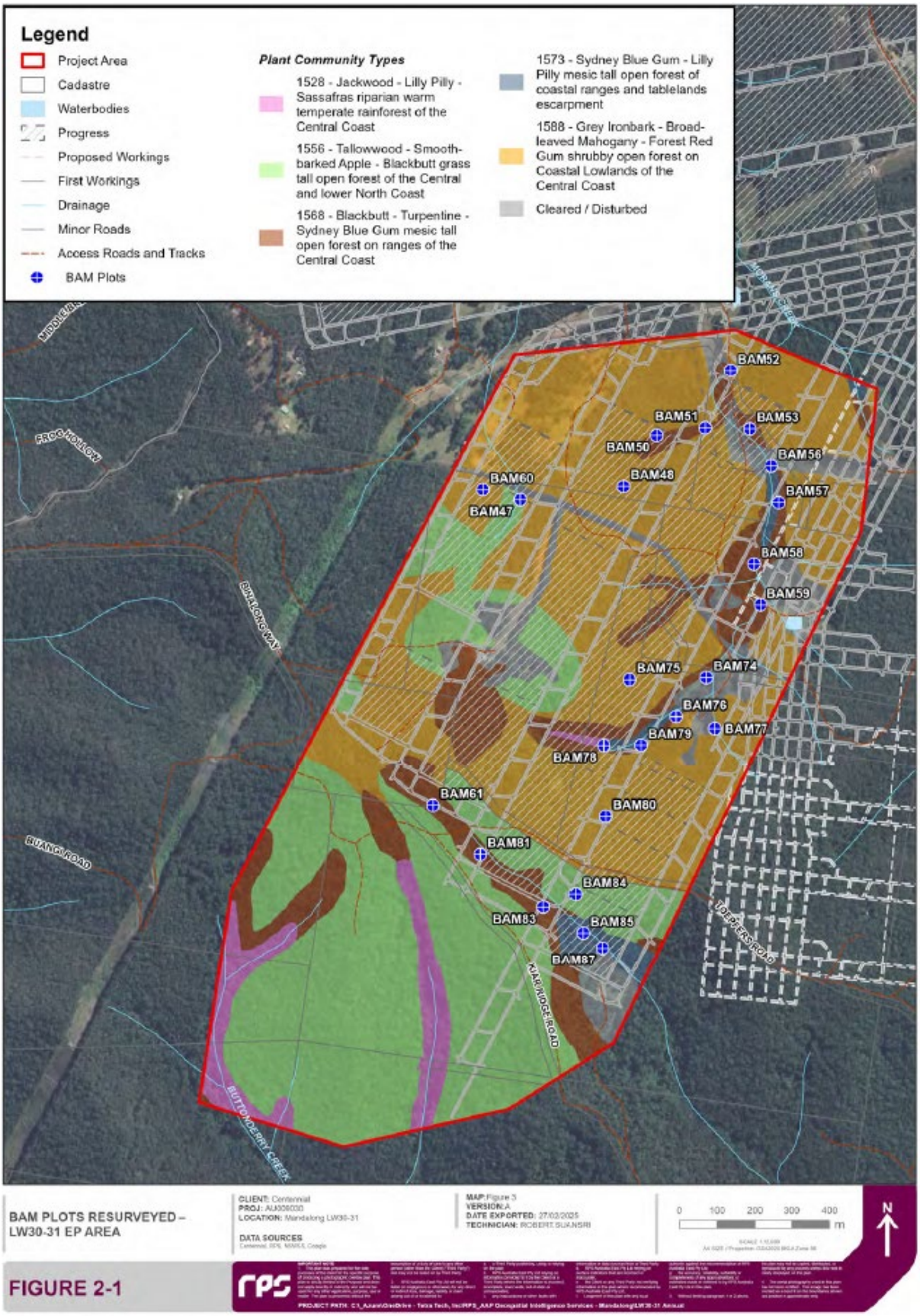
No *Petrogale penicillata* (Brush-tailed Rock Wallaby) were detected by camera trap in either the impact area (i.e., LW30-31 EP Area) or control sites in the Olney State Forest.

RPS (2025a) have presented the results for the 2024 biodiversity monitoring event for the LW30-31 EP area. Biodiversity data collected during 2024 was compared to baseline data (i.e., collected in 2019 and 2020), and data collected in 2022 and 2023 to determine if a non-negligible impact to biodiversity outcomes has occurred since commencement of mining, as required by the consent conditions for Schedule 4 Condition 6(j) of SSD-5144.

No non-negligible changes were detected for the following measured biodiversity outcomes:

- Sensitive ecological communities;
- Threatened species: *R. rubescens*, *C. dowlingii* and *G. insigne*
- Threatened amphibians; or
- Threatened cave-associated microbats

As per the above summary, a TARP under the LW30-31 BMP was not triggered. This is the final annual monitoring report as per Appendix 8 of the Applicant's Statement of Commitments of the Mandalong Southern Extension Project Development Consent (SSD-5144) which states that biodiversity monitoring can be finished two years after completion of mining in the adjacent longwall panel (RPS, 2025a)



Source: **(RPS, 2025a)**

Figure 6-13: Floristic Plots LW30-31 EP Sites

6.5.2 LW32 Extraction Plan Area

A Biodiversity Monitoring Program is required for Mandalong Mine LW32 under the Development Consent SSD-5144, as outlined in the LW32 Extraction Plan BMP.

RPS have completed a 2024 monitoring report for LW32 which concerns the terrestrial biodiversity monitoring, which includes sensitive vegetation communities and threatened species (including threatened flora, amphibians, cave-associated microbats, and the brush-tailed rock wallaby).

Baseline monitoring was conducted in 2020 and 2021, with data collected in 2022 onwards representing survey efforts following extraction within this EP Area. The data collected in 2024 represents the third and final set of monitoring results for LW32. Accordingly, the 'impact area' for the monitoring program for LW32 is defined as the area within the LW32 EP Area boundary (as shown in **Figure 6-14**). At the time of RPS surveys (Spring/Summer 2024), extraction of both longwalls was completed.

The 2024 results (RPS, 2025b) suggest that mining of LW32 has not had a substantial negative impact on sensitive vegetation communities. Species richness showed a slight increase between baseline assessments in 2019/2020 and post-extraction in 2022, indicating recovery from the 2022 and 2024 flooding events and continued stability within PCTs. Similarly, BAM condition scores (composition, structure, function, and vegetation integrity) exhibited a slight increase over the same period, suggesting no detectable change in vegetation condition following the completion of LW32 extraction. Overall, all recorded changes in sensitive ecological communities were negligible, further supporting the resilience of these ecosystems (RPS, 2025b).

Three patches of *C. dowlingii* (Red Helmet Orchid; BC Act: Vulnerable) were surveyed throughout 2024. Count of individuals has increased substantially in control plots and remained stable in impact plots between 2021 and 2024. Percent cover of *C. dowlingii* has decreased in both control and impact plots since 2022. However, individuals, therefore cover analysis may not be the most reliable variable to indicate plant health. Plant health scores have not changed in control or impact plots since 2021 (RPS, 2025b).

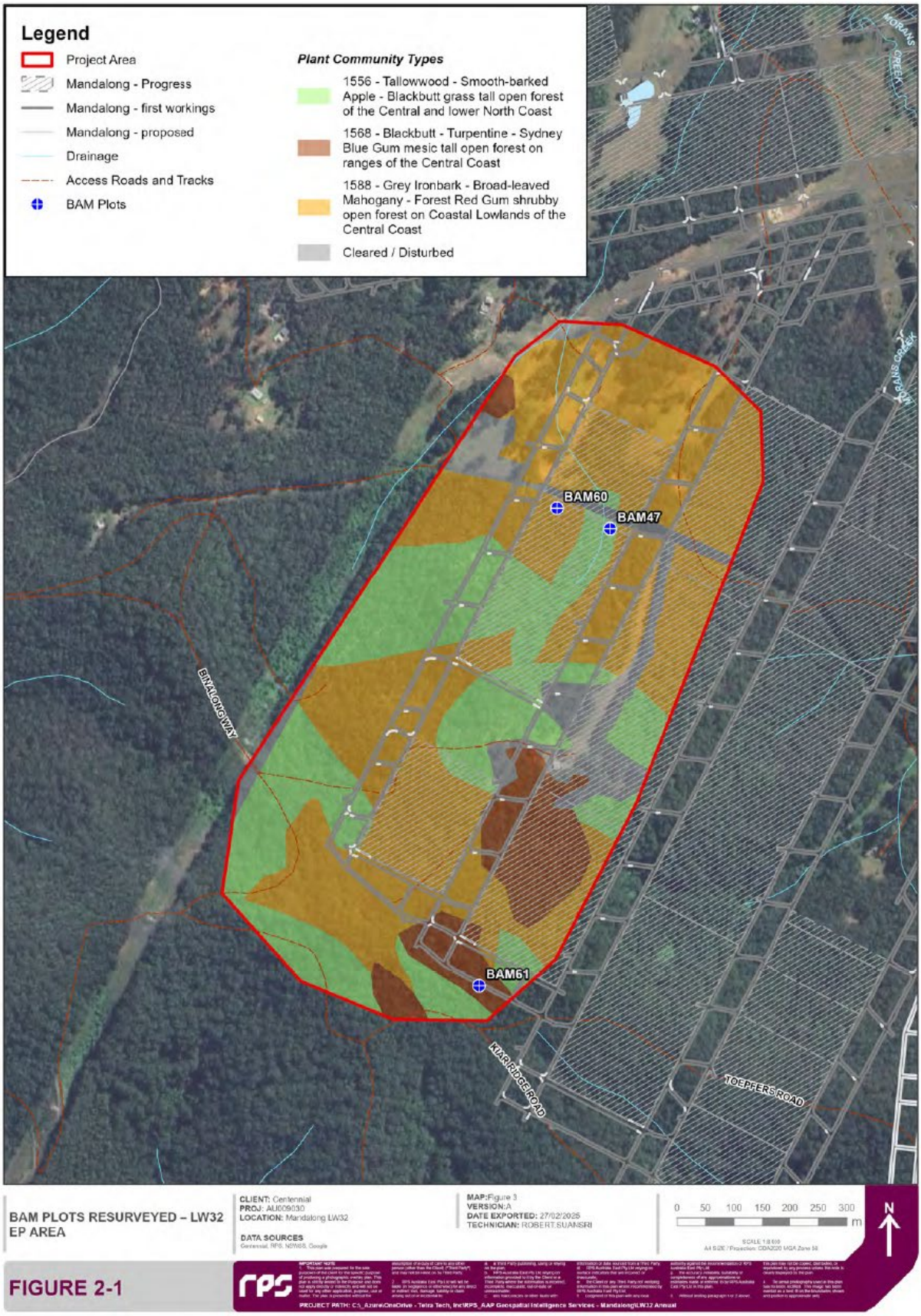
The 2024 LW32 surveys for threatened amphibians were not conducted due to property access changes. Acoustic monitoring detected five microbat species, with Chalinolobus gouldii showing high activity and Rhinolophus megaphyllus declining, likely due to natural factors rather than mining. Species diversity remained above the 2020 baseline, suggesting seasonal influences. No Brush-tailed Rock-wallabies were detected, and monitoring for this species is no longer required

RPS (RPS, 2025b) have reviewed the biodiversity data collected during 2024 and compared to baseline data (i.e., collected in 2020 and 2021), and data collected in 2022 and 2023 to determine if a non-negligible impact to biodiversity outcomes has occurred since commencement of mining, as required by the consent conditions for Schedule 4, Condition 6(j) of SSD-5144.

No non-negligible changes were detected for the following measured biodiversity outcomes:

- Sensitive ecological communities (i.e., GDEs)
- Threatened flora species
- Threatened cave-associated microbats.

As per the above summary, a TARP under the LW32 BMP was not triggered. This is the final annual monitoring report as per Appendix 8 of the Applicant's Statement of Commitments of the Mandalong Southern Extension Project Development Consent (SSD-5144) which states that biodiversity monitoring can be finished two years after completion of mining in the adjacent longwall panel in sensitive environments (which includes floodplains and Groundwater Dependant Ecosystems [GDEs]).



Source: **(RPS, 2025b)**

Figure 6-14: Floristic Plots LW32 EP Sites

6.5.3 LW34 Extraction Plan Area

A Biodiversity Monitoring Program is required for Mandalong Mine LW34 under the Development Consent SSD-5144, as outlined in the LW34 Extraction Plan BMP.

RPS have completed a 2024 monitoring report for LW34 which concerns the terrestrial biodiversity monitoring, which includes sensitive vegetation communities and threatened species (including threatened flora, amphibians, cave-associated microbats, and the brush-tailed rock wallaby) (RPS, 2025c).

Baseline monitoring was conducted in 2019 and 2020 as part of the adjacent LW30-31 EP Area, with further baseline data collected in 2021 following confirmation of the LW34 EP Area. The data collected in 2023 onwards represents survey efforts following extraction in these areas. Accordingly, the 'impact area' for the monitoring program for LW34 is defined as the area within the LW34 EP Area boundary (as shown in **Figure 6-15**). At the time of RPS surveys (Spring 2024), extraction of the longwall was completed.

The 2024 survey results indicate a trend toward recovery from the 2022 flooding, with an increase in species richness across most PCTs. While species richness generally improved, BAM composition and structure scores did not show a clear trend. A decreasing trend in PCT function scores was recorded, driven by a reduction in leaf litter cover and log length, which may impact vegetation health and habitat suitability for native flora and fauna. However, changes observed in sensitive ecological communities were negligible. Further discussion of each PCT is provided in the following sections (RPS, 2025c).

Monitoring within the EP Area shows a decline in *R. rubescens* adults (300 cm+) and saplings (1–100 cm) in impact plots, while juveniles (101–300 cm) have remained stable. The decline in mature individuals suggests factors such as resource availability, infection, and competition from *Lantana camara*, *Smilax australis*, and *Cissus hypoglauca* may be shortening their lifespan. Height and count measurements indicate a continued decline since baseline.

R. rubescens remain taller and more numerous in control plots compared to impact plots. Myrtle rust infection scores have increased in control plots but decreased in impact plots since baseline. However, this does not account for the overall reduction in individuals, as impact plots have fewer established plants and are more vulnerable to infection (Westaway, 2016).

Impact Plot 2 saw a decline from 17 individuals in 2019 to 6 in 2024, likely due to *Lantana camara* overgrowth. Similar trends have been observed in other Mandalong Valley populations.

Notably, 2024 marked the first recorded instance of *R. rubescens* flowering within monitoring plots, with several mature individuals flowering in control plots. However, all flowering individuals also exhibited myrtle rust, and some flowers succumbed to infection. Given myrtle rust's impact on fruit viability, successful regeneration remains uncertain. Control plots will continue to be monitored.

In 2024, surveys aimed at assessing habitat for threatened amphibians in LW34 revealed an increase in frog species richness since the baseline (2019 and 2020), with a total of 8 species observed in impact plots and 10 in control plots. This indicates the ongoing persistence of amphibian species within the riparian habitats of LW34 (RPS, 2025c)

The diversity of microbat species has seen a gradual increase since 2020, holding steady from 2022 to 2024. A potential roosting spot for the *Rhinolophus megaphyllus* (Horseshoe bat) was pinpointed in the EP Area. While *R. megaphyllus* has persisted within the impact area in high frequencies since 2020, 2024 saw a lower count of calls (approximately 20 calls per night). The lower count of calls suggests the roost may no longer be active, this could be due to changes in food availability for the colony however further monitoring is required to confirm the changes to this population. Although three threatened microbat species—*Chalinolobus dwyeri*, *Miniopterus australis*, and *Saccolaimus flaviventris*—were observed in the EP region,

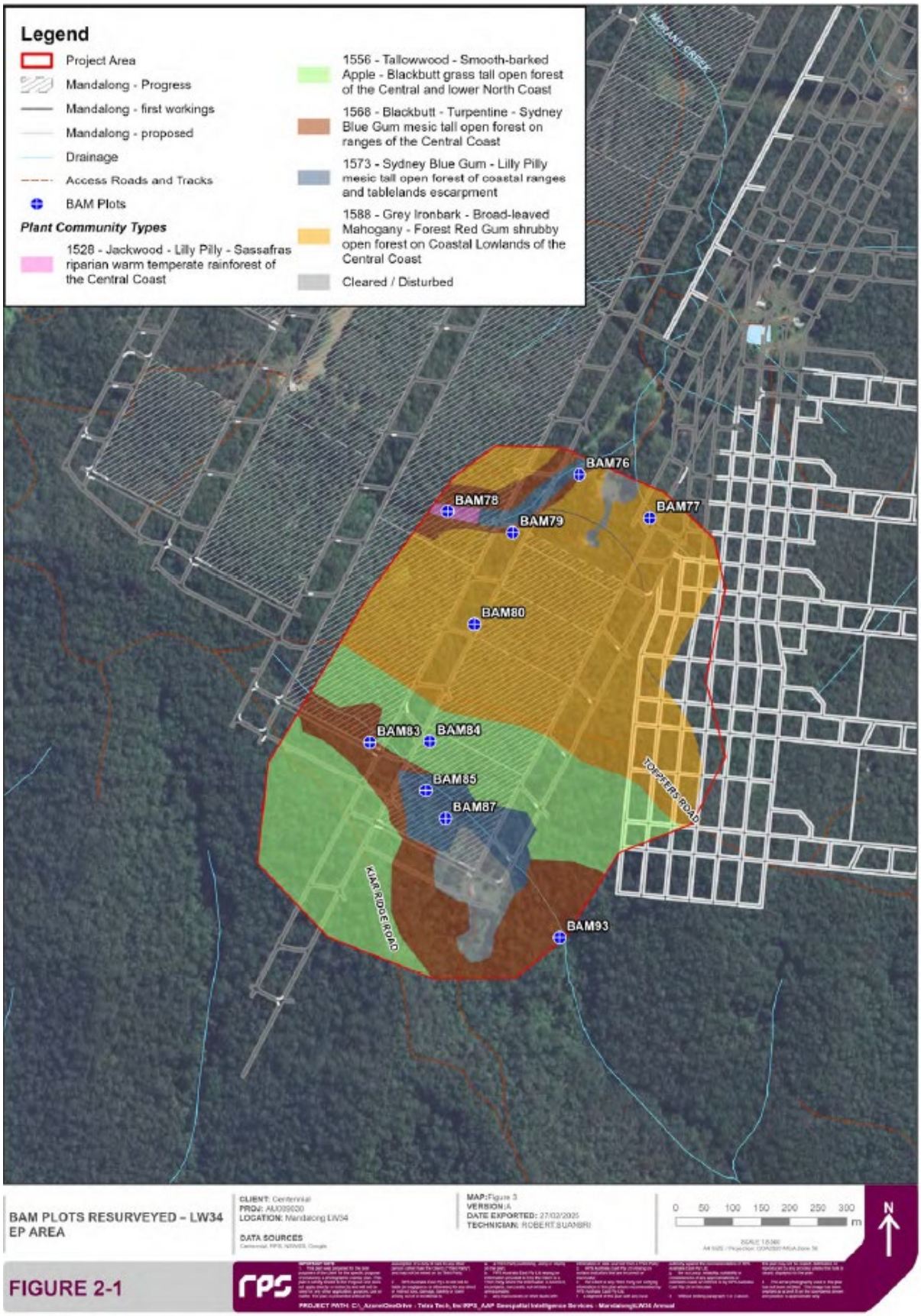
their call frequencies did not suggest nearby roosting. Additionally, Song Meter units detected the presence of threatened Sooty Owls (*Tyto tenebricosa*) within the LW34 EP Area (RPS, 2025c).

RPS (RPS, 2025c) have reviewed the biodiversity data collected during 2024 and compared to baseline data (i.e., collected in 2020 and 2021), and data collected in 2022 and 2023, to determine if a non-negligible impact to biodiversity outcomes has occurred since commencement of mining, as required by the consent conditions for Schedule 4, Condition 6(j) of SSD-5144.

No non-negligible changes were detected for the following measured biodiversity outcomes:

- Sensitive ecological communities;
- Threatened species;
- Threatened amphibians; and
- Threatened cave-associated microbats and;
- Sooty Owl presence.

As per the above summary, a Trigger Action Response Plan (TARP) under the LW34 BMP was not triggered. Monitoring is to continue until biodiversity monitoring can be finished two years after completion of mining in the adjacent longwall panel in sensitive environments (which includes floodplains and GDEs) (RPS, 2025c).



Source: **(RPS, 2025c)**

Figure 6-15: Floristic Plots LW34 EP Sites

6.5.4 LW57-58 Extraction Plan Areas

A Biodiversity Monitoring Program is required for Mandalong Mine Longwall (LW) LW57-58 under the Development Consent SSD-5144, as outlined in the LW57-60 Extraction Plan BMP. Note that boundary changes have occurred since the completion of the EP Area BMP, primarily due to geological reasons. The previous area boundary 'LW57-60' has been reduced to LW57-58, creating the 2024 and finalised EP Area.

RPS have completed a 2024 monitoring report for LW57-58 which concerns the terrestrial biodiversity monitoring, which includes sensitive vegetation communities and threatened species (including threatened flora and amphibians. (RPS, 2025d)

Baseline monitoring efforts were undertaken by RPS in 2022 and 2023, with data collected in 2024 onwards representing the initial survey effort following the extraction within the LW57-58 EP Area. Accordingly, the 'impact area' for the monitoring program for LW57-58 is defined as the area within the LW57-58 EP Area boundary (as shown in **Figure 6-16**). At the time of the RPS surveys (Winter and Spring 2024), extraction of LW57 was complete. Extraction of LW58 was completed after the 2024 monitoring period.

The 2024 results (RPS, 2025d) suggest that mining of LW57-58 has not had a substantial negative impact on sensitive vegetation communities. species richness and BAM attribute scores within both impact and control plots have remained stable compared to baseline values (2022/2023). Differences amongst years are more likely due to broader influences (e.g. climatic shifts) and not potential mining related impacts within the LW57-58 EP Area.

Monitoring of *Rhodamnia rubescens* within the EP Area indicates a steady increase in mature individuals since the 2022 baseline, suggesting juvenile plants are persisting and growing. This may explain the observed decline in the juvenile size class. Population trends in control and impact plots show similar fluctuations, though impact plots contain fewer mature plants and have experienced an overall decline in individuals, whereas control plots show population growth. Rust infection rates have also decreased in both control and impact plots since 2022. However, this decline does not account for the loss of heavily infected individuals, which likely influenced the average rust rating. As seedlings and saplings are particularly vulnerable to Myrtle Rust (*Austropuccinia psidii*), fluctuations within these class sizes are expected.

A significant finding in 2024 was the first recorded flowering of *R. rubescens* within monitoring plots, observed in several mature individuals in control plots. While this suggests reproductive maturity and plant health, all flowering individuals also exhibited Myrtle Rust infection, with some flowers succumbing to rust. Given its impact on reproductive structures, viable fruit production is unlikely, and future monitoring will assess potential regeneration.

Two patches of *Corybas dowlingii* (Red Helmet Orchid) were resurveyed in 2024. Individual counts increased in both impact and control plots compared to baseline; however, percent cover decreased since 2022. As cover values are subject to observer variability, they may not reliably indicate plant health. High cover values recorded in 2022 were likely due to observer bias, with data from 2023 and 2024 reflecting improved calibration. Plant health scores have remained stable since baseline, with no evidence of disease or herbivory (RPS, 2025d).

Amphibian species richness has increased since baseline, with a total of seven species recorded across 2024. This suggests that amphibian species are continuing to persist within the riparian habitats of LW57-58. It was notable that *Mixophyes iteratus* was found during control surveys in Olney State Forest.

RPS (RPS, 2025d) have presented the results for the 2024 biodiversity monitoring event for the LW57-58 EP area. Biodiversity data collected during 2024 was compared to baseline data (i.e., collected in 2022 and 2023), to determine if a non-negligible impact to biodiversity outcomes has occurred since commencement of mining, as required by the consent conditions for Schedule 4 Condition 6(j) of SSD-5144.

No non-negligible changes were detected for the following measured biodiversity outcomes:

- Sensitive ecological communities

- Threatened species
- Threatened amphibians

As per the above summary, a TARP under the LW57-58 BMP was not triggered. Monitoring is to continue until biodiversity monitoring can be finished two years after completion of mining in the adjacent longwall panel in sensitive environments (which includes floodplains and GDEs) (RPS, 2025d).

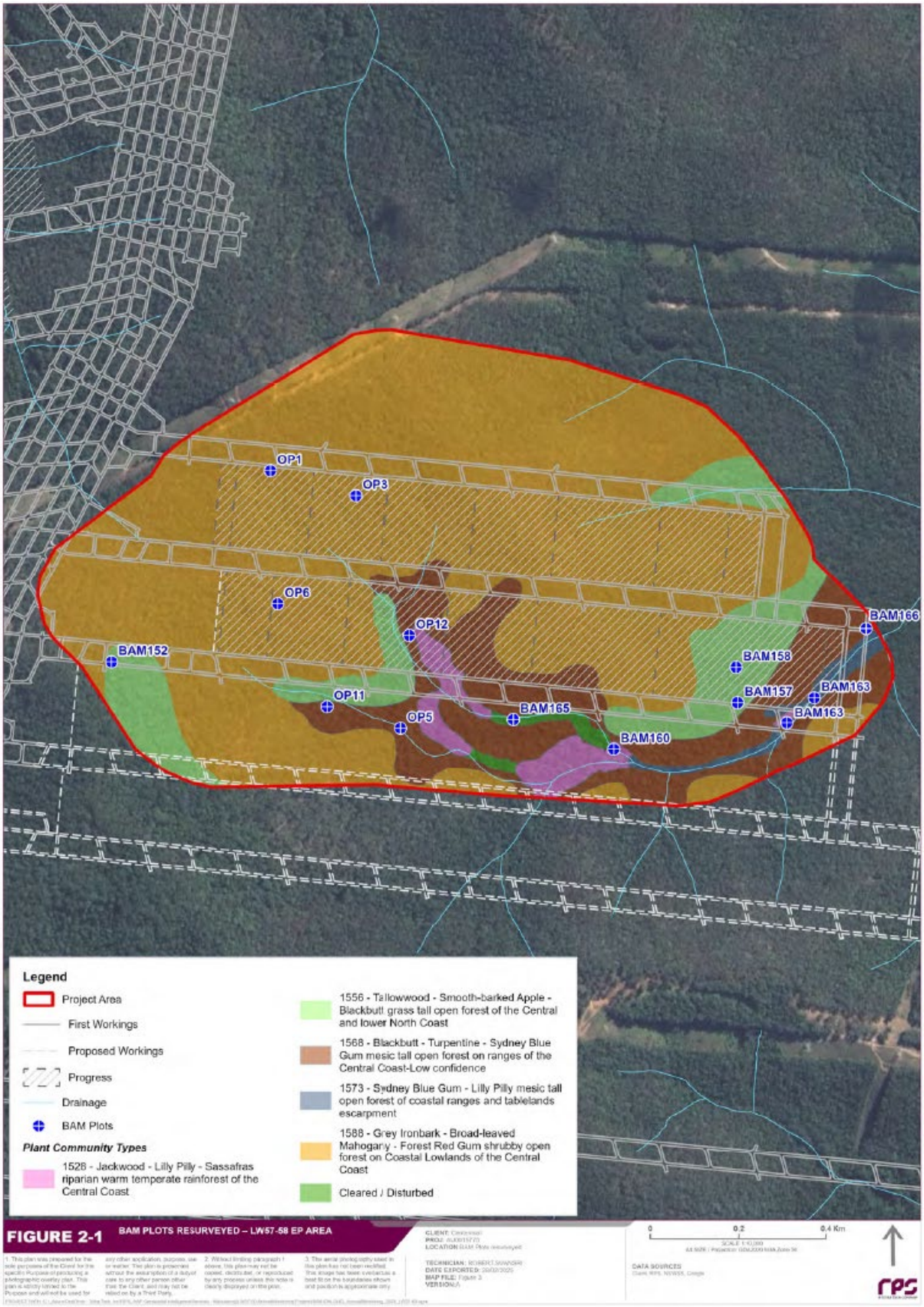


Figure 6-16. Floristic Plots LW57-58 EP Sites

6.5.5 LW39-43 Extraction Plan Areas

During 2024 baseline ecological monitoring has continued for the LW39-43 Extraction Plan area. The monitoring of sensitive environments subject to potential subsidence impacts is a requirement as per Schedule 4, Condition 6 of SSD-5144. This monitoring is to be performed in accordance with the relevant approved Extraction Plan and associated BMP sub-plan. The BMP for LW39-43 defines the monitoring methods for threatened flora and Endangered Ecological Communities (EECs) that may be potentially influenced by subsidence-related impacts arising from the secondary extraction of Longwalls 39-43.

With mining expected to be undertaken within LW39-43 in 2025, ecological monitoring and potential subsidence impacts will be reported within the 2025 Annual Review.

6.5.6 Aquatic Ecology Monitoring

The objectives of the monitoring conducted by RPS in the Spring of 2024 were to build upon an understanding of the macroinvertebrate communities within the downstream receiving environment of LW30-31, LW32, LW34, LW39-43 and LW57-58 Extraction Plan areas. The associated monitoring report identifies spatial and temporal changes in macroinvertebrate community structure; identifies any potential key impacting processes resulting in changes to aquatic ecosystems health; and provides recommendations for the improvement of future monitoring rounds (RPS, 2025e).

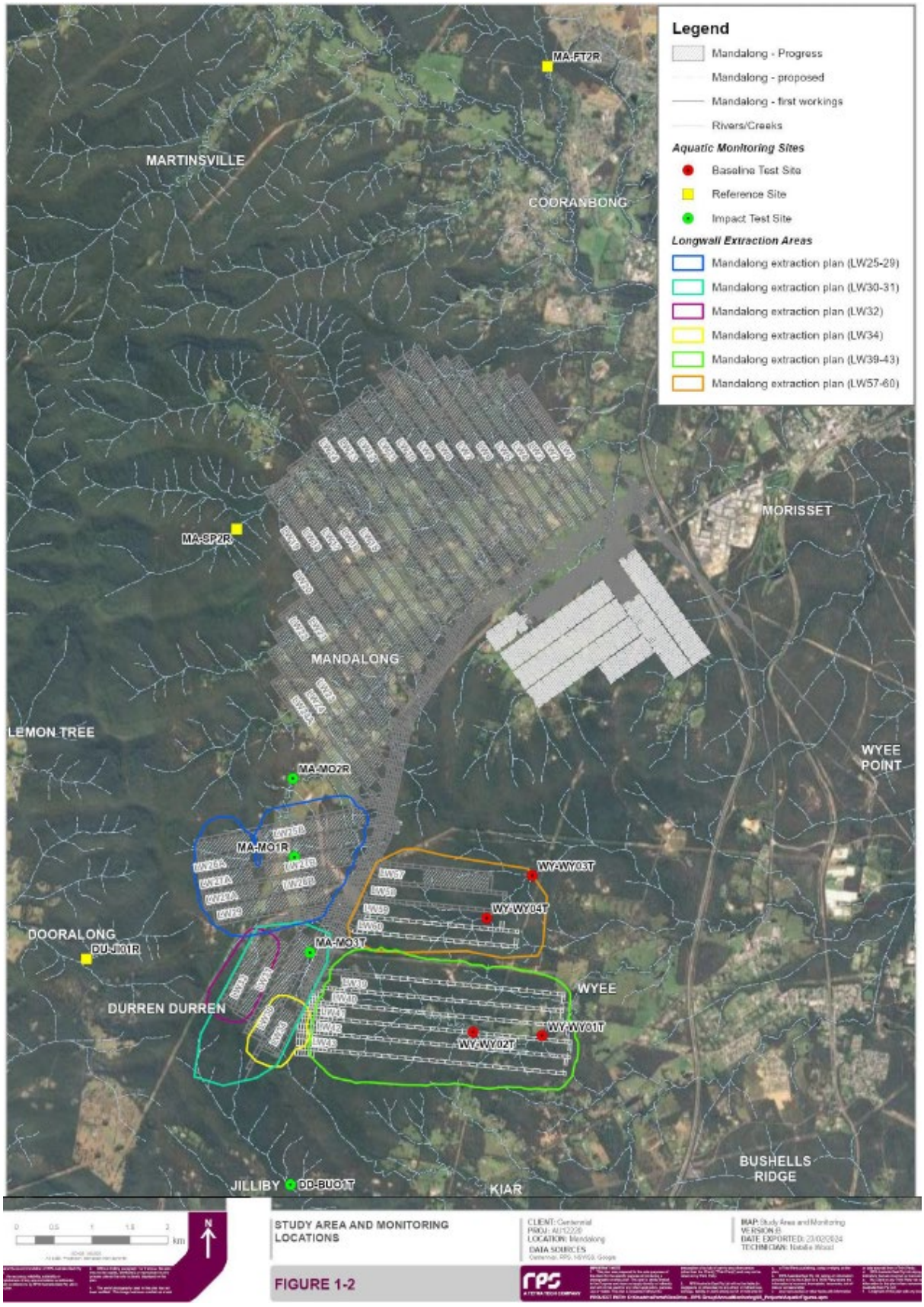
RPS was responsible for conducting the spring sampling event at multiple sites in accordance with the Biodiversity Management Plan (BMP) (**Figure 6-17**).

Key results from the 2024 monitoring were:

- DO concentrations increased in 2024 compared to 2023, likely due to average to above-average rainfall in the months preceding monitoring.
- pH levels were slightly below ANZECC (2000) guidelines for test sites in LW 57-58 but were not similarly observed in other test, baseline, and reference sites. This is likely due to natural variability, as results were still comparable to previous monitoring.
- Nitrogen concentrations greatly reduced in 2024 compared to 2023 at all treatment sites, except for baseline sites in LW 39-43. Increased rainfall in 2024 likely contributed to high water levels, continuous flows, and/or surface water limiting detritus accumulation in streams.
- NOx concentrations exceeded ANZECC (2000) guidelines for test sites in LW 57-58 but were not similarly observed in other test, baseline, and reference sites. Additionally, LW 57-58 recorded a large increase in FRP concentrations in 2024, suggesting a localized impact resulting in increased nutrient concentrations (NOx and FRP), requiring close monitoring in future surveys.
- Macroinvertebrate composition continues to shift in response to fluctuations in water levels and quality due to climatic cycles. nMDS results reflect distinct macroinvertebrate compositions for 2024, 2023, and 2022, corresponding to average to above-average rainfall, below-average rainfall, and record rainfall, respectively.
- Taxonomic richness in baseline site LW 39-43 showed significant change in 2024 compared to 2023, which was not observed in test sites LW 30-31, LW 32, LW 34, and LW 57-58.
- SIGNAL2 scores showed substantial change in 2024 compared to 2023 across test, baseline, and reference sites, likely reflecting the shift from below-average rainfall in 2023 to average to above-average rainfall in 2024, allowing more sensitive macroinvertebrates to occupy these sites.

The 2024 monitoring event was characterised by high water levels and continuous surface water flows through much of the treatment sites. The shift from the below average rainfall conditions experienced in 2023 to average to above average rainfall in 2024 resulted in likely increased DO, decreased N and improved macroinvertebrate composition within most treatment sites. Generally, the 2024 SIGNAL2 results indicate improved stream health from 2023 as more sensitive macroinvertebrates occupy the habitats within the treatment sites.

Despite this, a localised increase in NOx and FRP concentrations was detected in LW 57-58 not similarly observed in other treatment sites. While the localised increase in NOx and FRP concentrations is likely due to land use activities, it is important to monitor this in future surveys as this follows the first year of extraction in LW 57-58 (RPS, 2025e).



Source: **(RPS, 2025e)**

Figure 6-17: Aquatic Ecology Monitoring Locations

6.5.7 Land Management Strategy for the MSSS and TL24 Offset Areas

The construction of the MSSS and access road which was completed in 2017 resulted in the clearing of approximately 11.3 ha of MU 15: Coastal Foothills Spotted Gum – Ironbark Forest, which is not commensurate with any threatened ecological community listed under the *Threatened Species Conservation Act* (TSC Act 1995) or Environmental Protection and Biodiversity Conservation Act (EPBC Act 1999) (SLR, 2013a).

MU 15 is very common and widespread in the locality, occupying approximately 2,502 hectares within the Study Area and approximately 21,094 hectares between Ourimbah and Beresfield (NPWS 2003, cited in (SLR, 2013a). The proposed approved clearing area (which was 15.6 ha), therefore, amounts to approximately 0.6 percent of the total available vegetation community within the immediate area and approximately 0.07 percent of the total available vegetation community within the region. None of the land proposed to be cleared contains threatened flora species or endangered ecological communities.

For these reasons, Centennial Mandalong did not propose to provide a direct offset strategy. Rather, as a substantial landholder in the Mandalong Valley, Centennial Mandalong has developed a Land Management Strategy for land owned by Centennial in the Valley.

In addition, the relocation of TL24 has also resulted in 8.03 ha of vegetation clearing for the establishment of the new easement. Centennial Mandalong has also included in the Land Management Strategy an additional area of 73.6 ha in order to compensate for the loss of vegetation communities.

The Land Management Strategy provides for four lots identified in **Table 6-15**. The four lots form two sites referred to as Mandalong Road and Chapman Road. The two sites have been placed under a Conservation Property Vegetation Plan (PVP) under Native Vegetation Regulation 2013 (Clause 9(1)) in 2017.

Table 6-15: Land Management Strategy Site Locations

Approval Reference	LMS Site Reference	Lot	DP	Ownership	LGA	Area (ha)
SSD-5144	Mandalong Road Northern Lot	580	733227	Centennial Fassifern Pty Ltd	LMCC	18.37
	Mandalong Road Southern Lots	Lot A	110119	Centennial Fassifern Pty Ltd	LMCC	106.52
		902	541065	Centennial Fassifern Pty Ltd	LMCC	
SSD-5144 (MOD 1)	Chapman Road	152	755238	Centennial Fassifern Pty Ltd	LMCC	72.3

The objective of land management at Mandalong Road and Chapman Road are as follows –

- **Mandalong Road Objective** - coexistence of conservation and agricultural practices that retain or improve habitat.

- **Chapman Road Objective** - retain/maintain or improve ecological diversity of land to a self-sustaining system/environment.

RPS Australia East Pty Ltd (RPS) was engaged by Centennial Mandalong to undertake the 2024 annual ecological monitoring of the land management sites as described in the Mandalong Land Management Strategy (LMS). These sites comprise land described as Lot 580 DP733227; Lot A DP110119; Lot 902 DP541065 and Lot 152 DP755238 as shown in **Figure 6-18** and **Figure 6-19** and their total areas indicated in **Table 6-15**.

Baseline flora and fauna surveys were undertaken by RPS ecologists from 9-12, 16-20 and 23-27 March 2015. Repeat annual monitoring surveys of 22 BioMetric plots were undertaken by RPS ecologists in September 2024. Habitat assessment has been completed to determine condition of floristics within the Habitat Enhancement Map Units of the land management sites. Native and exotic plant species were recorded within a 20m x 20m (400 m2) plot nested within the 50m x 20m (1,000 m2). Cover abundance for each plant species was estimated and recorded. Species composition, condition and photographic data was also recorded.

BioMetric (Gibbons et al. 2009), as amended by the NSW BioBanking Assessment Methodology 2014 (BBAM 2014) (Office of Environment and Heritage, OEH 2014), was used as the monitoring method. Calculations were performed using the online NSW BioBanking Credit Calculator (BBCC) to compare monitoring data. The NSW Vegetation Information System (VIS) was interrogated to extract current benchmark data for BioMetric Vegetation Types (BVTs) used to classify each vegetation community examined in the monitoring program.

Within the Mandalong Farm Block Management area, native plant species richness (NPSR) has increased in the Habitat Enhancement Management Unit (MU) for both Plant Community Types (PCTs) 1619 and 1598. In PCT 1716, NPSR scores have remained stable within the Habitat Enhancement area but have shown a notable increase within the Grazing MUs. This suggests that habitat within these MUs is being retained and enhanced. No significant changes have been observed in other MUs, indicating that habitat is being maintained. In the Chapman Road Bush Block area, there was a significant decrease in functional scores within PCT 1588. This decline may be due to observer error and will be closely monitored in 2025. However, NPSR in the Habitat Enhancement MU remained unchanged in PCT 1580 but showed a significant increase in PCT 1556 (RPS, 2025f).

Eight baseline monitoring plots were assessed in 2024 after being established in 2021 and 2022 for the following threatened flora species:

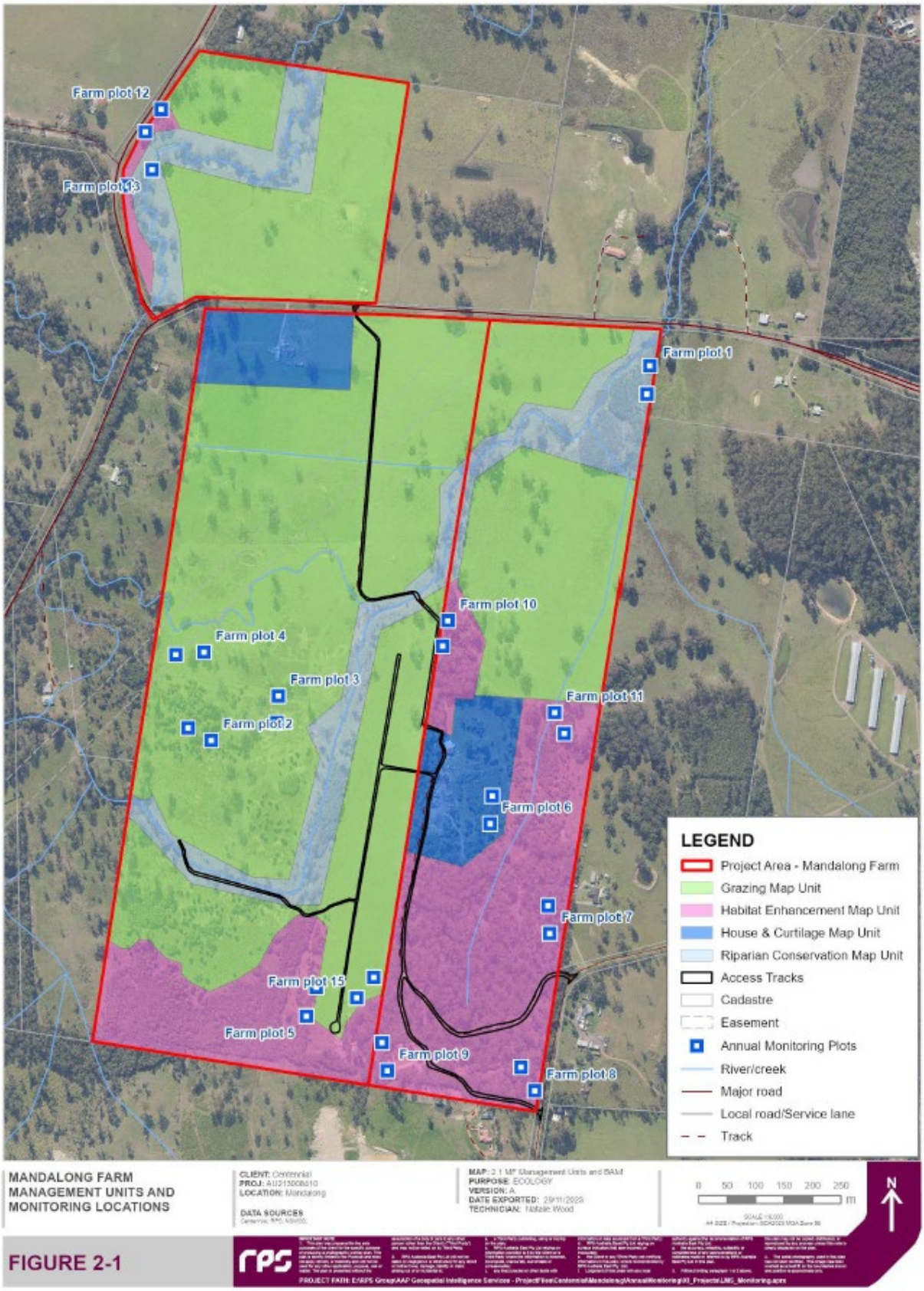
- *Melaleuca biconvexa* (BC Act: Vulnerable);
- *Rhodamnia rubescens* (BC Act: Critically Endangered; EPBC Act: Critically Endangered);
- *Genoplesium insigne* (BC Act: Critically Endangered; EPBC Act: Critically Endangered); and
- *Asperula asthenes* (BC Act: Vulnerable; EPBC Act: Vulnerable).

Key findings from threatened flora monitoring include:

- The *M. biconvexa* population has increased since 2023;
- The *R. rubescens* population has remained stable since 2023 despite rust rating decreasing slightly in 2024. Myrtle Rust infection and being smothered by vines and exotic species is the leading cause of population decline. Recommended the removal of vines which are smothering the individuals to allow them to recover.
- Three *G. insigne* individuals were detected in the 2024 monitoring period, similar to the 2019-2021 results (RPS, 2025f).
- The *A. asthenes* population has increased from previous monitoring periods, particularly in Farm plot 2.

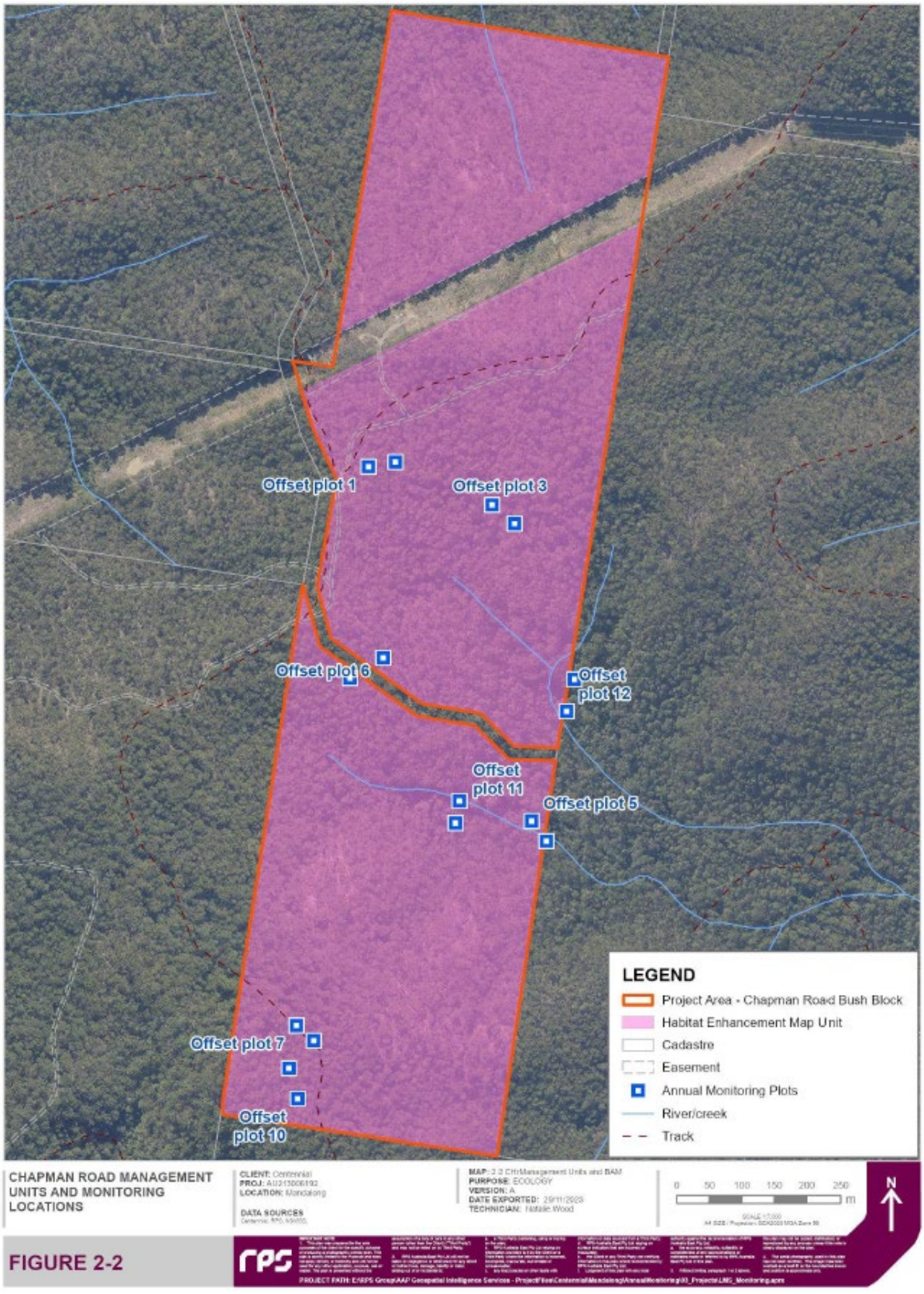
Overall, the condition measures within the Mandalong Farm Blocks suggest that the LMS objective for this site — 'coexistence of conservation and agricultural practices that retain or improve habitat'—is largely being met. However, mowing and slashing within farm plots must be closely monitored to maintain this objective.

Similarly, condition measures within the Chapman Road Bush Block indicate that its objective —'conservation management of land through practices that retain or improve habitat'— has been achieved. To further support this, additional measures such as weed management are recommended in Offset Plots 5 and 11 to reduce infestations of *Lantana camara* (RPS, 2025f).



Source: (RPS, 2025f)

Figure 6-18: Mandalong Farm Offset Area



Source: (RPS, 2025f)

Figure 6-19 : Chapman Road Bush Block Offset Area

6.5.8 MSSS & TL24 Nest Box Monitoring

In June and December 2024 RPS ecologists undertook the bi-annual monitoring of 328 nest boxes. The nest boxes were installed because of hollow-bearing tree loss associated with the MSSS and associated Access Road, the TL24 Relocation Project and the 33kV powerline project (RPS, 2025g).

This nest box monitoring program consists of the following sites:

- 128 nest boxes installed for the Transmission Line off-set (TL24-13 to TL24-139).
- 30 nest boxes previously installed for the MSSS and Transmission Line offset (MSSS-01 to MSSS-18 and TL24-1 to TL24-12).
- 170 nest boxes installed in September 2021 as a mitigation measure following the loss of hollow-bearing trees associated with the 7.7 km, 33kV powerline from MMAS to the MSSS (33. 1 - 170).

All nest boxes were inspected using a wireless nest box inspection camera to minimise disturbance to any fauna potentially occupying the nest boxes whilst also minimising personal safety risks involved with climbing ladders.

A total of ten nest boxes were occupied during the winter 2024 monitoring event with overall occupancy at 5.2%. The results demonstrate an increase in nest box occupancy in comparison to the previous two monitoring events. This suggests a return to levels similar to that of earlier monitoring events. While no frogs were observed during the winter 2024 monitoring event, a high number of brushtail possums, gliders and microbats were observed utilising the nest boxes. The current monitoring season presented the highest number of arboreal mammal occupancy since the nest boxes were established in winter 2017. The presence of nesting material and the utilisation of different nest boxes between monitoring events suggests that arboreal mammal may be present at higher rates than implied by the results. This indicates that nest boxes may be supporting the persistence of local arboreal mammals, which concurrently utilize other habitat in the peripheral landscape (RPS, 2025g).

A total of three nest boxes were occupied during the summer 2024 monitoring event with overall occupancy at 0.9%. The results demonstrate a decrease in nest box occupancy in comparison to the previous four monitoring events for summer. The number of individuals observed deceased from the previous monitoring season and no frogs have been observed in nest boxes for the second summer in a row (RPS, 2025g).

The next box monitoring program will continue in June and December 2025.

6.5.9 VAM-RAB Rehabilitation Off-Set Monitoring

Centennial Mandalong received approval in 2011 (DA97/800 Modification 7) for the trial installation of a ventilation air methane regenerative afterburner unit (VAM-RAB) that would remove and breakdown the exhaust methane.

Installation of the VAM-RAB unit necessitated clearing of some native vegetation. Two endangered ecological communities (EEC) listed in Schedule 3 of the NSW *Threatened Species Conservation Act* 1995 were included in the areas to be cleared. These were: Swamp Sclerophyll Forest (SSF) on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions; and River-Flat Eucalypt Forest (RFEF) on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.

DA97/800 Condition 76A included a requirement for a 1.25-hectare rehabilitation off-set area to be established on cleared land adjoining the VAM-RAB construction site. These EEC were represented by communities described in the regional vegetation mapping and classification (NPWS 2000) as: MU37 Swamp Mahogany Paperbark Forest (SSF); and MU38 Redgum – Rough-barked Apple Swamp Forest (RFEF).

An ecology survey (Hunter Eco, 2011) prepared for the VAM-RAB project application described the area to be rehabilitated as mostly dominated by weeds. This being the case, active regeneration was required, and this was commenced in January 2012 and completed in March 2012.

Further to the requirement to rehabilitate, the consent also required that the progress of the rehabilitation be monitored annually for five years. Centennial Mandalong has opted to continue monitoring beyond the required five years. The December 2024 monitoring event is the 12th year of monitoring the condition of the rehabilitation (Hunter Eco, 2024).

The aim of the monitoring program conducted by Hunter Eco was to collect data that would enable a quantitative comparison between the relatively undisturbed communities and the areas being rehabilitated. This is achieved through the collection of floristic data from 400 m^2 permanently established plots. The normal plot size is 20 m x 20 m but the dimension can vary depending on the configuration of the available space. Two plots were established in each of the two undisturbed communities and two in each of the two areas being rehabilitated to these communities: eight plots in all.

All plots were permanently established with star pickets at each corner in 2012, and floristic data was collected on 19 December 2024. Hunter Eco (2024) has concluded that due to the rehabilitated areas being fenced from herbivores and being left undisturbed, have added a combined 0.43 ha of additional canopy area from the expansion of pre-existing trees along with growth of planted trees. Overall, weeds are continuing to diminish but coverage of the large millet (Setaria sphacelata) is increasing in some locations and should be controlled.

Source: (Hunter Eco, 2024).

Figure 6-20: Location of Floristic Sample Plots

6.5.10 Green & Golden Bell Frog Research Program

In 2016, Centennial Mandalong commenced the preparation and implementation of a research and monitoring program for the Green and Golden Bell Frog (GGBF) in accordance with EPBC approval (2013/6906) conditions of the Northern Coal Logistics Project.

As part of current operations at the CES, underground mine water is pumped from the existing Mandalong Mine underground workings at an average rate of 0.6 to 4.0 ML/day and is discharged into an unnamed creek from Licensed Discharge Point 001 (LDP001) at the CES. The unnamed creek flows into Muddy Lake which is also connected to Lake Macquarie via Lake Eraring.

Ecological surveys were first undertaken at Muddy Lake in October 2015. During these surveys, approximately five Green and Golden Bell Frog *Litoria aurea* (GGBF) individuals were identified. The Green and Golden Bell Frog is listed as an endangered species under the NSW *Threatened Species Conservation Act* 1995 (TSC Act) and as a vulnerable species under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

The GGBFs identified at Muddy Lake are the only known records of the species within a 10 km radius of the CES.

The research project will monitor GGBF populations and habitat quality within Muddy Lake in conjunction with reference populations to fulfil the relevant EPBC approval conditions. Monitoring commenced in late 2016, with approval received from the Department of Environment & Energy on 30 November 2016 for Professor Michael Mahoney to act as an independent peer reviewer for the purpose of reviewing the Green and Golden Bell Frog Research Program's methodology and final report.

In December 2024, Green and Golden Bell Frogs were recorded at all six surveyed sites at Muddy Lake, with a total of 80 individuals observed—an increase from previous years. Unlike prior surveys, where lower numbers were recorded in the central and eastern portions of the lake, similar numbers of frogs were now found across all areas. This improvement is likely linked to the substantial reduction of Salvinia molesta (Salvinia) in these sections, creating more suitable habitat. Notably, one metamorph, six juveniles, and two gravid females were recorded, confirming that Muddy Lake continues to support a viable breeding population (GHD, 2025)

A brief period of nil discharges occurred just prior to the survey, though this is unlikely to have had an immediate impact on habitat conditions. Water quality assessments indicated moderate pH levels, low to moderate salinity (below the SSGV), and low dissolved oxygen levels, consistent with previous monitoring data (GHD, 2025)

Good-quality habitat remains in the western portion of the lake, where high frog numbers were again recorded. Habitat conditions in the central and eastern portions have improved due to the reduction in Salvinia, though small patches of Water Hyacinth persist in the western section. These plants are unlikely to be associated with mine discharges or their absence.

Surveys were conducted over three nights in accordance with the established management plan, and the results align with previous surveys, reinforcing the stability of the local Green and Golden Bell Frog population. As populations of this species naturally fluctuate with environmental conditions, the findings indicate that discharge activities are not contributing to any decline in habitat extent, quality, or population numbers at Muddy Lake (GHD, 2025)

6.6 CULTURAL HERITAGE

6.6.1 Aboriginal Archaeology – LW34, LW57-60 & LW39-43 Extraction Plan Areas

Heritage Management Plans have been prepared to support Extraction Plans for the extraction of coal from Mandalong Mine LW 34, LW 57-60 and LW39-43.

The Study Area for the Heritage Management Plans encompassed the 26.5° angle of draw around these secondary extraction areas and Aboriginal heritage sites/items located within this total area are shown in **Table 6-16.** As these Aboriginal heritage sites/items are located within the mine workings area they may be impacted by subsidence.

In 2024, final post-mining inspections (Phase 3) were undertaken for sites associated with LW34. Baseline inspections (Phase 1) also commenced for sites associated with LW39-43 in 2024.

Table 6-16: Aboriginal Cultural Heritage Sites (LW34, LW57-60 and LW39-43).

AHIMS Number	Artefact No.	Aboriginal Cultural Heritage Site	Mining Location	Predicted Subsidence (m)	Actual Subsidence (m)	Comment
45-3-3596	RPS MAND STH PS30	Habitation Structure (with no deposit or objects)	LW34 AOD	0.62	0.1	Baseline site inspection was conducted on 20/4/21. Phase 2 initial post-mining inspection was conducted on 30/10/23. Phase 3final post-mining inspection was conducted on 23/08/24.
45-3-3643	RPS PS07	Habitation Structure (with no deposit or objects)	LW34 AOD	0.1	0.1	Baseline site inspection was conducted on 2/12/22. Phase 2 initial post-mining inspection was conducted on 30/10/23. Phase 3 final post-mining inspection was conducted on 23/08/24.
45-3-1225	Wyee Creek	Grinding Grooves	LW57-58	0.33	TBC	Baseline site inspection was conducted on 8/11/22.
45-3-3467	RPS AH01	Grinding Grooves	LW58	0.2	TBC	Baseline site inspection was conducted on 8/11/22.

AHIMS Number	Artefact No.	Aboriginal Cultural Heritage Site	Mining Location	Predicted Subsidence (m)	Actual Subsidence (m)	Comment
45-3-3486	RPS MAND STH CYL01	Grinding Grooves	LW39 AOD	0.08	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-4595	Mandalong GG1 2024	Grinding Grooves	LW39 AOD	0.57	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3487	RPS MAND STH CYL02	Grinding Grooves	LW39 AOD	0.03	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3489	RPS MAND STH CYL04A	Grinding Grooves	LW39 AOD	0.15	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3493	RPS MAND STH CYL04C	Grinding Grooves	LW39 AOD	0.25	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3494	RPS MAND STH CYL04B	Grinding Grooves	LW39 AOD	0.19	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3516	RPS MAND STH TBM01	Grinding Grooves	LW39 AOD	0.0	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3519	RPS MAND STH TBM04	Open artefact site	LW39	0.36	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3461	RPS MAND STH TBM03	Open artefact site	LW39	0.31	TBC	Baseline site inspection was conducted on 2/9/24.
45-3-3523	RPS MAND STH TBM08	Grinding Grooves	LW40	0.45	TBC	Baseline site inspection was conducted on 2/9/24.

6.6.2 European Heritage

A Historic Heritage Management Plan was developed for Mandalong in 2016 to address European Heritage items located within the Mandalong lease boundary. The archival recording of the Landing Skid 2 which is located within the MSSS disturbance boundary was completed by RPS in 2016 (RPS, 2017b). Landing Skid 2 was subsequently demolished in 2017 during the construction of the MSSS. There were no further impacts to European Heritage items in 2024.

6.7 MINE SUBSIDENCE

Subsidence monitoring programs are developed, or active subsidence monitoring programs extended for each subsequent Extraction Plan submission. The intent of the Subsidence Monitoring Program(s) is to confirm subsidence performance is in accordance with the predictions and impacts as outlined in the approved Extraction Plan(s). Where measured subsidence is exceeded or impacts experienced during mining differ from that predicted in the approved Extraction Plan, Trigger Action Response Plans (TARPs) are activated to manage the potential non-compliance.

The Subsidence Monitoring Program includes provisions for all relevant built features including private dwellings, public roads, Telstra communications networks, Ausgrid powerlines, TransGrid 330kV transmission towers, NBN fixed wireless infrastructure and natural features such as wetlands, creeks, flood paths, steep slopes and key heritage features.

6.7.1 Subsidence Performance Measures and Reporting

All mining undertaken in 2024 was within mining leases ML1443 and ML1722 as per approved Development Consent SSD-5144. The approved subsidence performance measures are included in Schedule 4, Condition 1, Table 6, and Condition 4, Table 7 of Development Consent SSD-5144 and are included below as **Table 6-17** and **Table 6-18**.

SSD-5144 also includes provisions for Incident Reporting, and Non-compliance Notifications under Schedule 6, Conditions 10 and 10A, as well as Regular Reporting on Centennial's website, and an Annual Review (as per this document) under Schedule 6, Conditions 11 and 12.

Table 6-17: SSD-5144 Subsidence Performance Measures – Natural and Heritage Features

Watercourses	
3rd Order and above streams Groundwater-dependent Ecosystems	• No connective cracking between the surface, or the base of the alluvium, and the underground workings. • No subsidence impact or environmental consequence greater than minor.
1st and 2nd Order streams	• No subsidence impact or environmental consequences greater than predicted in the documents listed in condition 2(b) of Schedule 2. • No connective cracking between the surface and the underground workings.
Aquatic and riparian ecosystems, including affected sections of Morans Creek, Wyee Creek, Tobins Creek and Mannering Creek	• Maintain or improve baseline channel stability. • Develop site-specific in-stream water quality objectives in accordance with ANZECC 2000 and Using the ANZECC Guidelines and Water Quality Objectives in NSW procedures (DECC 2006), or their latest versions.
Land	
Steep slopes and rock outcrops	• No subsidence impact or environmental consequence greater than predicted in the documents listed in condition 2(b) of Schedule 2.
Agriculture	• No loss of agricultural productivity greater than minor.
Biodiversity	
Threatened species, threatened populations and endangered ecological communities	• Negligible environmental consequences.
Heritage sites	

Stone Arrangement RPS TBM 32	• Negligible subsidence impacts or environmental consequences
All other Aboriginal Cultural Heritage sites/items at the site	• No subsidence impact or environmental consequence greater than predicted in the documents listed in condition 2(b) of Schedule 2.
Mine workings	
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible subsidence impacts or negligible environmental consequences	• To remain long-term stable and non-subsiding.
Second workings	• To be carried out only within the approved mine plan, in accordance only with an approved Extraction Plan.

Table 6-18: SSD-5144 Subsidence Performance Measures – Built Features

Key Public Infrastructure	
M1 Motorway	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable and must be fully repaired.
Main Northern Railway	
330 kV power supply infrastructure	
Other Built Infrastructure	
Power lines and power poles	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable and must be fully repaired or else replaced or fully compensated.
Telecommunications infrastructure	
Privately-owned residences	
Local Roads	
Other built features and improvements, (including access roads, farm dams, swimming pools, tracks and fences)	
Public Safety	
Public Safety	Negligible additional risk.

6.7.2 Secondary Extraction Summary

During 2024, secondary extraction was undertaken via longwall mining including half of the outbye section of LW57 and the entirety of LW58. Secondary extraction of LW57 and LW58 was covered by the LW57-60 Extraction Plan approved by DPIE in in July 2023 (refer **Table 6-18** for details).

Table 6-19: Longwall Extraction during 2024

Longwall	Commencement	Completion
LW57	28/08/2023	21/04/2024
LW58	22/05/2024	03/01/2025

6.7.3 Subsidence Performance Results

Subsidence predictions were developed by Ditton Geotechnical Services in both 2023 and 2024, with the most recent assessment undertaken as part of the LW39-43 Extraction Plan which incorporates all mine plan variations up to Modification 10. The extraction plan for LW57-60 was varied three time and predictions were revised each time. The latest predictions include a review of subsidence performance for the last 34 longwalls (i.e., LWs 1-34 and LW24A inclusive)(Ditton Geotechnical Services, 2024).

During 2024, vertical subsidence, tilt and strain were monitored on private properties, Heritage sites, Ausgrid Powerlines, TransGrid towers on TL25/26 & TL24, and the following crosslines and centrelines:

- Crossline 25 (Private Property – LW31-32)
- Crossline 27 (Centennial and privately owned property)
- Crossline 28 (Public Road and privately owned property)
- Crossline 29 (Public Road – Wyee Farms Road)
- Crossline 30 (Privately owed Property)
- Centerline 57 (Centennial Owned Property)
- Area 2 (Centennial Owned Property)
- TL25/26 TW36 and TW37 – Transgrid Towers (Centennial Owned Property)
- TL24 TW25-34x - Transgrid Towers (Centennial and privately owned properties)
- 132Kv Ausgrid Towers (Privately owned Properties)
- Heritage sites – 45-3-1225 and 45-3-3467 (Centennial and privately owned properties)

In conjunction with the above, visual inspections were undertaken on relevant steep slopes, Crown Roads, private access roads, and along easements incorporating the Telstra Communications Network, Heritage sites, Transgrid Towers and Ausgrid Powerlines as per the Subsidence Monitoring Program.

The following tables taken from Ditton Geotechnical Serviced (2024) summarises the predicted *v.* measured subsidence, tilt and strain performance for LWs 13 through to LW57 taking in to account the reorientated LW30-31 mine layout (SSD-5144 MOD10).

Table 6-20 - Summary of Predicted *v.* Measured First Maximum Subsidence

LW Panel No.	Panel Width W (m)	Cover Depth H (m)	Panel W/H	Mining Height T (m)	Subsidence Reducing Potential (SRP)	First Panel Subsidence S_{max} (m)		First Tailgate Chain Pillar Subsidence S_p (m)	
						Predicted U95%CL	Measured	Predicted U95%CL	Measured
13	160	230	0.70	4.0	M	0.59	0.52	0.37	0.18
14	160	235	0.69	4.0	H	0.42	0.38	0.25	0.20
15	160	240	0.67	4.2	H	0.42	0.31	0.42	0.09
16	160	250	0.64	4.2	M	0.61	0.35	0.44	0.25
17	160	250	0.64	4.1	M	0.66	0.54	0.43	0.41
18	160	250	0.64	4.0	M	0.64	0.53	0.43	0.42
19	160	250	0.64	4.2	L	1.00	0.88	0.45	0.49
20	160	250	0.64	4.5	H	0.64	0.48	0.67	0.40
21	160	250	0.64	4.2	M	0.80	0.72	0.68	0.56
22	160	256	0.63	4.3	M	0.84	0.84	0.68	0.65
23	160	258	0.62	4.2	L	1.09	0.86	0.64	0.62
24	160	258	0.62	4.2	L	1.09	0.95	0.64	0.66
24a	160	260	0.62	4.2	L	1.08	0.93	0.64	0.68
25b	180	275	0.65	4.5	M	0.99	0.75	0.45	0.21
25b	180	290	0.62	4.3	M	0.88	0.63	0.61	0.32
26b	180	290	0.62	4.25	M	0.99	0.64	0.45	0.52
26b	180	320	0.56	4.3	M	0.88	0.92	0.61	0.52
27b	180	330	0.55	4.2	M	0.87	0.81	0.56	0.35
28a	180	320	0.56	4.0	M	0.83	0.74	0.55	-
28b	180	290	0.63	4.0	M	1.26	1.18	0.47	0.40
29	180	340	0.53	3.9	M	0.78	0.50	-	-
29	180	280	0.64	4.0	*M*	*1.02*	**1.18**	-	-
29	180	280	0.64	4.0	L	1.46	1.18	-	-
30	200	300	0.65	3.8	L	*1.26*	0.99	-	-
30	200	380	0.53	3.6	*M*	*0.77*	0.35	0.66	0.61
30	200	450	0.44	3.6	*M*	*0.71*	0.53	0.53	0.34
31	200	450	0.44	3.6	*M*	*0.71*	0.67	0.77	0.40
32a	180	490	0.37	3.6	*L*	*0.78*	0.51	0.72	0.35
32b	180	330	0.55	3.7	*L*	*1.03*	0.80	0.43	0.30
34	200	440	0.45	3.8	*L*	*0.62*	0.55	0.73	0.39
57	200	320	0.62	2.0	*L*	*0.50 – 0.61*	0.51	-	-

Underlined - measured value exceeds U95%CL prediction by < 15%. **Bold** - measured data exceed predictions by >15%. *italics* - measured subsidence indicated the SRP was one category lower than the borehole-based SRP. Shaded – predictions based on Mod 10 Report mine geometry; (value) - estimated from 2 x single panel value.

Table 6-21 - Summary of Predicted *v.* Measured Tilt

Panel No.	Panel Width W (m)	Cover Depth H (m)	Panel W/H	Mining Height T (m)	Subsidence Reducing Potential (SRP)	Predicted Maximum First & [Final] Tilt T_{max} (mm/m)		Measured Maximum Tilt T_{max} (mm/m)	
						Mean	U95%CL	Side 1	Side 2
13	160	230	0.70	4.0	M	6	9	5.6	7.2
14	160	235	0.69	4.0	H	3	5	3.9	5.0
15	160	240	0.67	4.2	H	3	5	2.0	5.0
16	160	250	0.64	4.2	M	5	8	2.0	8.5
17	160	250	0.64	4.1	M	6	9	6.1	6.3
18	160	250	0.64	4.0	M	6	9	5.5	6.1
19	160	250	0.64	4.2	L	12	19	6.3	7.4
20	160	250	0.64	4.5	H	4	6	4.5	5.5
21	160	250	0.64	4.2	M	7	10	5.7	10.3
22	160	256	0.63	4.3	M	8	11	7.2	11.2
23	160	258	0.62	4.2	L	13	20	9.0	11.7
24	160	258	0.62	4.2	L	13	19	6.4	12.1
24a	160	260	0.62	4.2	L	13	19	4.0	14.7
25b	180	275	0.65	4.3	M	9 [12]	13 [19]	10.3	13.3
25b	180	290	0.62	4.3	M	7 [13]	11 [19]	8.0	12.7
26b	180	290	0.62	4.25	M	9 [14]	14 [21]	8.9	11.6
26b	180	320	0.56	4.3	M	8 [16]	12 [24]	13.0	19.1
27b	180	330	0.55	4.2	M	7 [15]	11 [23]	9.5	10.8
28a	180	320	0.56	4.0	M	7 [15]	11 [22]	7.8	6.4
28b	180	290	0.63	4.0	M	10 [14]	15 [22]	13.7	18.4
29	180	340	0.53	3.9	M	7 [7]	10 [10]	4.0	2.8
29	*180*	*280*	*0.64*	*4.0*	*M*	*10 [10]*	*15 [15]*	19.0	19.1
29	180	280	0.64	4.0	L	18 [19]	27 [28]	19.0	19.1
30	200	300	0.65	3.8	L	12[17]	18[26]	10.8	-
30	200	380	0.53	3.6	M	6[14]	9[21]	12.2	-
31	200	450	0.44	3.6	M	4[13]	7[20]	4.9	-
34	200	440	0.45	3.8	L	4	6	3.8	3.6
57	200	320	0.63	2.0	L	6	9	5.7	8.2

U95%CL - Upper 95% Confidence Limit; Measured Side 1,2 - Measured peak value(s) above longwall panel on each side;

italics - measured subsidence indicated the SRP was one category below the borehole-based SRP.

Bold - Measured value exceeded maximum prediction by > 15%. underlined - < 15% prediction exceedance. Shaded – predictions based on Mod 10 Report geometry.

Table 6-22 - Summary of Predicted *v.* Measured Tensile Strain

Panel No.	Panel Width W (m)	Cover Depth H (m)	Panel W/H	Mining Height T (m)	Subsidence Reducing Potential (SRP)	Maximum Tensile Strain E_{max} (mm/m)			
						Predicted		Measured	
						mean	*U95% CL*	*Panel Side1*	*Panel Side2*
13	160	228	0.70	4.0	*M*	2	3	2.7	-
14	160	236	0.68	4.0	H	2	3	2.2	2.9
15	160	245	0.65	4.2	H	2	3	1.4	0.2
16	160	247	0.65	4.2	*M*	3	5	0.5	0.6
17	160	250	0.64	4.1	*M*	3	5	0.5	1.7
18	160	240	0.67	4.0	*M*	3	5	0.8	0.4
19	160	249	0.64	4.2	*L*	3	5	1.1	1.4
20	160	254	0.63	4.5	*H*	4	5	2.3	1.0
21	160	255	0.63	4.2	*M*	4	5	1.4	2.1
22	160	255	0.63	4.3	*M*	4	6	2.3	2.3
23	160	257	0.62	4.2	*L*	4	6	3.1	3.1
24	160	258	0.62	4.2	*L*	4	5	3.1	3.5
24a	160	260	0.62	4.2	*L*	4	5	1.5	2.1
25b	180	275	0.65	4.3	M	5	7	4.1	1.0
25b	180	290	0.62	4.3	M	5	7	2.0	4.6
26b	180	290	0.62	4.3	M	4	6	3.3	2.5
26b	180	320	0.56	4.3	M	3	5	3.3	4.3
27b	180	330	0.55	4.2	M	4	6	3.4	-
28a	180	320	0.56	4.0	M	3	5	2.4	1.1
28b	180	290	0.63	4.0	M	4	6	1.5	2.8
29	180	340	0.53	3.9	M	3	4	1.7	1.3
29	180	280	0.64	4.0	M	4	6	2.7	5.1
29	180	280	0.64	4.0	L	6	9	2.7	5.1
30	200	300	0.65	3.8	L	5	8	3.3	-
30	200	380	0.53	3.6	M	2	4	1.7	2.7
31	200	450	0.44	3.6	M	2	3	**5.2**	-
34	200	440	0.45	3.8	L	3	5	**2.6**	-
57	200	320	0.63	2.0	L	2	4	**2.1**	4.1

Bold - Measured value exceeded U95%CL predictions by > 15%. underlined - < 15% prediction exceedance.
Shaded – predictions based on Mod10 Report geometry.

Table 6-23 - Summary of Predicted *v.* Measured Compressive Strain

Panel No.	Panel Width W (m)	Cover Depth H (m)	Panel W/H	Mining Height T (m)	Subsidence Reducing Potential (SRP)	Maximum Compressive Strain E_{max}(mm/m)		
						Predicted		Measured
						mean	*U95% CL*	*Central Panel*
13	160	228	0.70	4.0	*M*	2	3	3.6
14	160	236	0.68	4.0	H	2	3	3.3
15	160	245	0.65	4.2	H	2	3	1.8
16	160	247	0.65	4.2	*M*	4	6	1.3
17	160	250	0.64	4.1	*M*	4	6	0.1
18	160	240	0.67	4.0	*M*	4	6	1.5
19	160	249	0.64	4.2	*L*	4	6	1.9
20	160	254	0.63	4.5	*H*	4	7	3.5
21	160	255	0.63	4.2	*M*	4	7	4.1
22	160	255	0.63	4.3	*M*	5	7	4.8
23	160	257	0.62	4.2	*L*	5	7	7.5
24	160	258	0.62	4.2	*L*	5	7	2.6
24a	160	260	0.62	4.2	*L*	5	7	3.5
25b	180	275	0.65	4.3	M	6	9	4.3
25b	180	290	0.62	4.3	M	6	9	4.5
26b	180	290	0.62	4.3	M	5	7	2.6
26b	180	320	0.56	4.3	M	4	6	5.0
27b	180	330	0.55	4.2	M	4	6	4.9
28a	180	320	0.56	4.0	M	4	6	1.4
28b	180	290	0.63	4.0	M	5	7	5.6
29	180	340	0.53	3.9	M	4	6	2.6
29	180	290	0.64	4.0	M	5	7	5.3
29	180	290	0.64	4.0	L	7	11	5.3
30	200	300	0.65	3.8	L	6	10	9.8
30	200	380	0.53	3.6	M	3	5	**5.9**
31	200	450	0.44	3.6	M	3	4	2.3
34	200	440	0.45	3.8	L	4	6[12]	14(crack)
57	200	320	0.63	2.0	L	3	5	2.8-6.8

Bold - Measured value exceeded U95%CL predictions by > 15%. underlined - < 15% prediction exceedance. Shaded – predictions based on Mod 10 Report geometry.

Table 6-24: Assessment of Subsidence Performance against Performance Measures and Predicted Impacts

Feature	Subsidence Performance Measures	Predicted Subsidence Impact EP LW39-43 and EP LW57-60	Assessment of Performance against Predicted Impact
Private Property			
Dwellings	*Always safe.* *Serviceability should be maintained wherever practicable.* *Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.*	Subsidence predictions below SSR criteria on mean predictions, with all dwellings remaining SSR.	***Impact as predicted. No performance measure exceedances observed (LW57-60).*** ***No extraction yet for LW39-43.***
Flood – dwelling and access	*Dwelling floor level to remain 0.5m above post mining 100 year ARI flood level - acquisition and compensation procedure if subsided floor level is below flood level.*	All dwellings freeboard remains above 100 year flood level at the maximum predicted subsidence and two times maximum predicted subsidence.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Agriculture	*No loss of agricultural productivity greater than minor.*	No loss of landuse to State Forest or agricultural productivity to private property (hobby farms) and Centennial properties.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Infrastructure			
Local Roads and Access	*Always safe.* *Serviceability should be maintained wherever practicable.* *Loss of serviceability must be fully compensated.* *Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.* Public Roads Management Plan LW57-60	Low level of damage predicted Wyee Farms Road, Toepfers Road, Kiar Ridge Road and Binalong Way To remain safe, serviceable and repairable. No change to flood hazard.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***

Feature	Subsidence Performance Measures	Predicted Subsidence Impact EP LW39-43 and EP LW57-60	Assessment of Performance against Predicted Impact
	Public Roads Management Plan LW39-43		
Electricity Transmission Lines (330kV)	*Always safe and serviceable.* *Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.* Transmission Line Management Plan LW57-60 for TL25/26 Towers 36 to 37 Transmission Line Management Plan LW39-43 for TL24 Towers 25 to 34X	No impact to serviceability of transmission lines. Concrete cruciform footings constructed on TL25/26 towers 39 to 42 and TL24 towers 33 & 34. Towers 36 & 37 outside angle of draw, impact to be minor far field strains and possible leg spread. Towers 25 through 32 are located either just inside or just outside the angle of draw. The anticipated impact is minimal, with potential minor far-field strains and possible leg spreading.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Powerlines (132kV,11kV, 440V & 240V)	*Always safe and serviceable.* *Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired* Powerline Management Plan LW57-60 Powerline Management Plan LW39-43	No impact to serviceability of powerlines. Mitigation measures were installed by Ausgrid on powerlines prior to development of subsidence.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Communications (Telstra & NBN fixed wireless tower)	*Always safe and serviceable.* *Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired*	Low impact. No disruption to copper cable buried or aerial networks. Low impact on tower and infrastructure. No impact to serviceability of Fixed wireless tower.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***

Feature	Subsidence Performance Measures	Predicted Subsidence Impact EP LW39-43 and EP LW57-60	Assessment of Performance against Predicted Impact
	Communications Management Plan LW57-60 Communications Management Plan LW 39-43		
Natural Features			
Biodiversity	*Negligible environmental consequences to threatened species, threatened populations and endangered ecological communities*	Negligible environmental consequences.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Floodplain	Floodplain inspection and monitoring	Minimal changes to creek channel flows or alignment. Predicted no surface cracking on floodplain.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Remnant Ponding	Flood Modelling	Minor increase to existing ponding predicted over LW39 to LW43.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Groundwater	Groundwater Monitoring and Management Plan	Predicted no adverse subsidence related impacts on alluvium groundwater levels and water quality.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***
Steep Slopes and rock outcrops	*No subsidence impact or environmental consequence greater than predicted in the documents listed in SSD-5144 Condition 2(b) of Schedule 2.* Public Safety Management Plan LW57-60	One private access tracks in the LW39-43 EP Area directly below the rock faces, are 'Unlikely' to be reached by boulders. The road will therefore not require a management strategy to reduce the exposure of the access road users for rock roll out during mining.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***

Feature	Subsidence Performance Measures	Predicted Subsidence Impact EP LW39-43 and EP LW57-60	Assessment of Performance against Predicted Impact
	Public Safety Management Plan LW39-43		
Heritage			
Heritage and Archaeology	*No subsidence impact or environmental consequence greater than predicted in the documents listed in SSD-5144 Condition 2(b) of Schedule 2.*	No impact to the Aboriginal cultural heritage sites identified within EP LW57-60. Impacts to the Aboriginal cultural heritage sites identified within EP LW39-43 will not exceed the impact percentage given in the EIS report for the Southern Extension area at Mandalong.	***Impact as predicted. No performance measure exceedances observed.*** ***No extraction yet for LW39-43.***

6.8 REMNANT PONDING MONITORING & REMEDIATION

During 2024 flood remediation works were also progressed for one property and is ongoing. Post mining flood modelling (LW1-33) completed in 2021 along with observations confirmed that one creek crossing has been impacted by an increase in flooding hazard. Rehabilitation works are in progress to restore the serviceability of the creek crossing. **Table 6-25** highlights the remediation works conducted during 2024.

Table 6-25: Details of Ponding & Remedial Action

Remnant Ponding and Flooding Remediation						
Location	**Description**	**Remediation Comments**	**Ponding Predicted**	**Subsidence Completed**	**Status**	**Property Ref. Lot & DP**
Longwall 24	Morans Creek Crossing	Increase in flooding at a 1-year event. Investigation works and design for remediation to bridge and approaches. 	No	Yes	In progress. Flood modelling and Geotech completed. Design for replacement culvert or bridge in progress. Currently preparing DA for submission.	Ref. MS0244 3/168774

6.9 FLOODPATH MONITORING

The LW30-31, LW32, LW34, LW57-60 and LW39-43 Extraction Plan – Water Management Plans require the condition of major flood paths be inspected every six months or following a flood event. Floodpath monitoring was conducted in June and December 2024 with survey and photographic records of subsidence induced changes to Morans Creek, Byrons Gully and Wyee Creek recorded. There was no evidence of subsidence inducted changes or impacts to Morans Creek, Byrons Gully and Wyee Creek recorded in 2024.

On the basis of the information obtained from field surveys, the pre mining characteristics of Wyee Creek can be described as having a generally poorly defined channel system, in which creek lines give way to undefined overland flow paths in several areas. The levels of predicted subsidence along the unnamed tributary of Wyee Creek are relatively small over Longwalls 57-58 and 39-43 and it is therefore considered that these will not significantly alter the flow conveyance capacity of the existing channels. The associated impacts on the maximum flood depths and flood hazards that have been modelled are not considered to be significant.

Centennial Mandalong will continue undertaking six monthly floodpath monitoring for Wyee Creek in 2024.

6.10 WASTE MANAGEMENT

All opportunities for waste avoidance and minimisation are considered by all staff and contractors across all areas including contracts, purchasing, equipment procurement and waste generation processes.

Waste oil and greases are stored in tanks and drums within bunded areas for removal by a licenced waste management contractor for recycling or disposal. Oil water separation is achieved using hydro-cyclone oil water separators at MMAS and at the CES on flows from vehicle work and storage areas and the wash down bays.

Hydrocarbon spill kits are inspected weekly by a licenced waste management contractor and re-stocked as required. Oily rag bins and oil filter bins are also serviced on a weekly basis.

Office paper and cardboard is collected and recycled by a licenced waste management contractor on a weekly basis. Metals are collected and stored in steel bins at MMAS and the CES. In 2024, a total of 381.2 tonnes of scrap steel was recycled. This is an increase compared to 2023 during which a total of 348.6 tonnes of scrap steel was recycled.

General refuse and non-recyclable materials are sorted and stored in 30m^3 steel bins at MMAS and the CES. The material was collected by a licenced waste management contractor for disposal. In 2024, 733.606 tonnes of refuse material was taken off-site which is an increase compared with 664.220 tonnes of refuse material in 2023.

Of the total waste collected at MMAS and CES in 2024, 62.36% was recycled including steel, timber, liquid waste, oils, paper and cardboard, filters grease, oily rags and oil filters. This compares with a recycling result of 65.42% in 2023.

7 WATER MANAGEMENT

7.1 WATER EXTRACTION

Mandalong Mine holds a water access licence (WAL39767) permitting the extraction of groundwater from the coal measures encountered during the process of mining. This water access licence permits Mandalong Mine to dewater the underground coal measures via a submersible dewatering pump located at CES. The WAL entitles Mandalong Mine to extract 1825 ML of groundwater annually for the period 1 July to 30 June from North Coast Fractured and Porous Rock Groundwater Sources. This mine water is subsequently discharged at LDP001.

Mandalong Mine extracted a total volume of 1402ML of ground water during the annual period 1 July 2023 to 30 June 2024. There are no other conditions on the Water Access Licence.

The passive take inflow (groundwater make) for the 2024 report period was calculated to be 152ML (GHD, 2025b).

Table 7-1: Water Take

License #	Water Sharing Plan, source and management zone (as applicable)	Entitlement	Passive take / inflows	Active pumping	TOTAL (1 July to 30 June).
WAL39767	North Coast Fractured and Porous Rock Groundwater Sources	1825 ML	152 ML	1402.3 ML	1250.3 ML

7.2 SURFACE WATER MONITORING

7.2.1 MMAS & CES

There is an established surface water quality monitoring program for the Mandalong catchment conducted since periodic sampling commenced in 1996, with the program established on a regular frequency since August 1999. Three surface water monitoring points (SW13-15) above licenced discharge points LDP001 and LDP002 at the CES and two monitoring points (SW16-17) in the receiving waters below the licence discharge points (LDP's) were added in late 2011. The monitoring locations are shown on **Plan CM00315b**, **Plan CM00315C**, **Plan CM00315d, and Plan CM00315f** and are summarised below in **Table 7-3**.

Mandalong Mine currently holds EPL 365, with water licensed to be discharged from the CES, MMAS and MSSS through the following LDPs:

g) LDP001 – Located at the CES and discharges into an unnamed tributary of Muddy Lake.

h) LDP002 – Located at the CES 5 ML Dam and discharges into an unnamed tributary of Muddy Lake.

i) LDP003 – Located at the MMAS Sediment Dam.

j) LDP004 – Located at the MSSS Sediment Dam.

Water volume discharged off site is measured through LDPs. EPL365 limits the maximum volume of water to be discharged at LDP001 to 5000 Kilolitres per day (note: Condition L3.2

of EPL365 permits the volume limit to be exceeded if a rainfall event greater than 10 mm occurred in the prior 24 hours).

The pH, Total Suspended Solids (TSS mg/L), Electrical Conductivity (EC µs/cm), and Oil and Grease (mg/L) are monitored daily at Licenced Discharge Points LDP001, LDP003, and LDP004 during discharge, while LDP002 is monitored weekly during discharge, in accordance with the requirements outlined in EPL 365 and the Water Management Plan. In August 2023, a variation was made to EPL 365 to transition LDP001 from daily monitoring to monthly. However, Centennial Mandalong is currently awaiting approval of the Water Management Plan from DPHI before the monitoring frequency can be adjusted.

An EPL365 water quality limit criterion for LDP001, LDP002, LDP003 and LDP004 is provided in **Table 7-2.**

Table 7-2 LDP Limit Criteria

Pollutant	Units of measure	100 percentile limit
Oil & Grease	mg/L	10
pH	pH	6.5-8.5
Total Suspended Solids	mg/L	50

7.2.2 Cooranbong Haul Road

The Cooranbong Haul Road crosses three ephemeral creeks in the Lords Creek sub-catchment. Six sediment basins have been constructed along the haul road to contain dirty water runoff. Monitoring of the water quality in the haul road sediment control dams was undertaken in 2024 to assess the effectiveness of water treatment prior to controlled releases.

7.2.3 Surface Water Monitoring Results

Surface water quality is monitored at 22 locations on a monthly or quarterly basis. These locations encompass four different catchment areas. The water is tested for pH, Total Suspended Solids (TSS) and Electrical Conductivity (EC). The annual average and long-term average (LTA) results are summarised in **Table 7-4**.

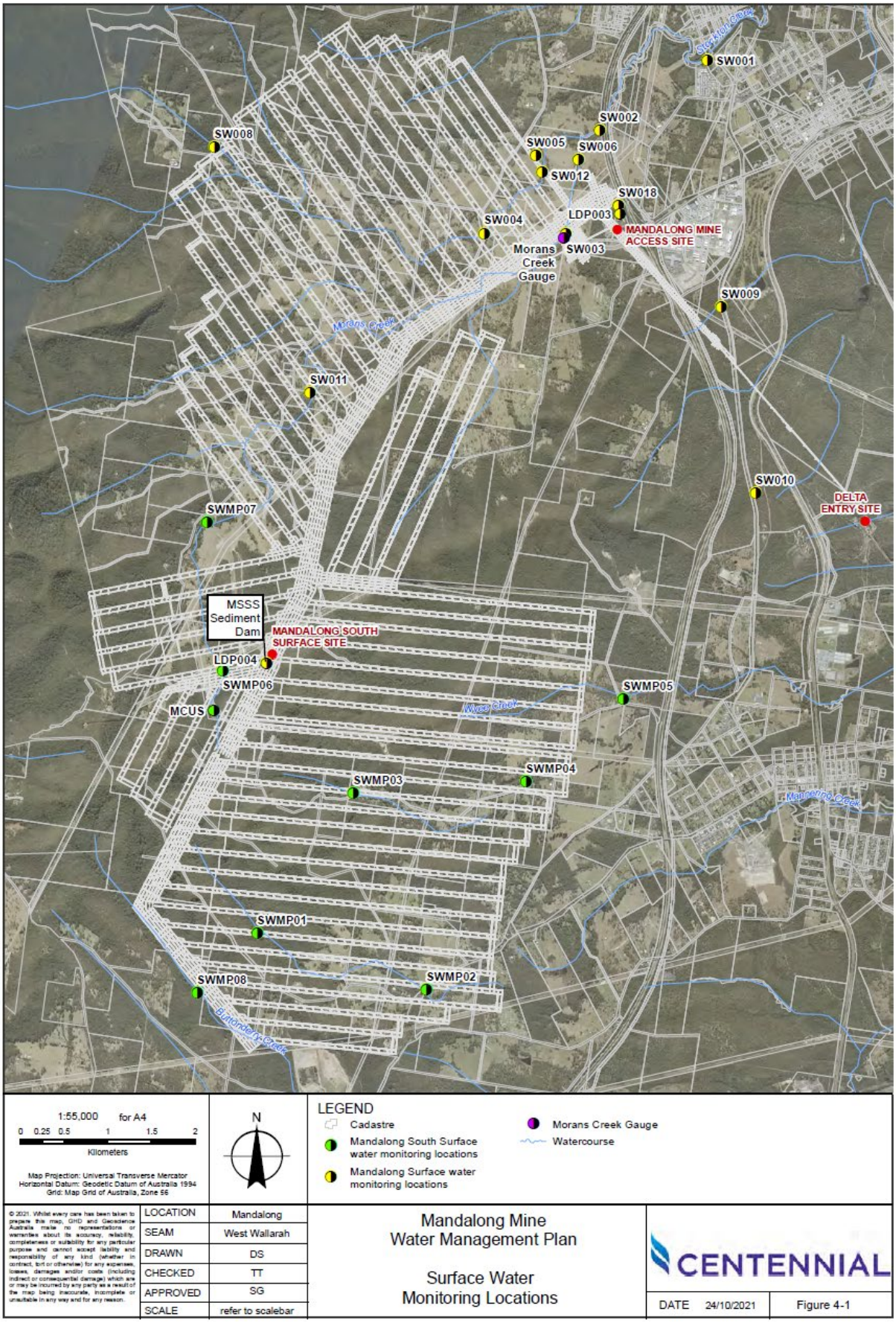


Figure 7-1 Surface Water Monitoring Locations

Table 7-3: Summary of Monitoring Locations with Respect to Position within the Catchments

Location Reference	Creek Sub-catchment
SW008	Upper Stockton Creek
SW004	Mid Stockton Creek
SW012	Lower Stockton Creek
SW011	Upper Morans Creek
SW003	Mid Morans Creek
SW006	Lower Morans Creek
SW002	At confluence of Morans Creek and Stockton Creek
SW001	Downstream confluence on Stockton Creek
SW009	South Pourmalong Creek
SW010	North Pourmalong Creek
SWMP01	Mannering Creek within Olney State Forest
SWMP02	Mannering Creek at Hue Hue Road
SWMP03	Wyee Creek at Wyee Farms Road
SWMP04	Wyee Creek at Wyee Farms Road Bridge
SWMP05	Wyee Creek at junction of Schofield Road and Manhire Road
SWMP06	Morans Creek at Mandalong Road
SWMP07	Upper catchment of Morans Creek
SW13	Muddy Lake (Unnamed tributary upstream LDP001).
SW14	Muddy Lake (Unnamed tributary upstream LDP002).
SW15	Muddy Lake (Unnamed tributary upstream LDP002).
SW16	Muddy Lake (Unnamed water body 1km downstream Simpson Rd Causeway Crossing)
SW17	Muddy Lake (North Dora Creek Village)

Table 7-4: Average Surface Water Quality for the 12 month Period from January 2024 to December 2024 ('Annual') and the Long-term Average ('LTA').

Site Location	Catchment	pH		TSS		Specific Conductance uS/cm	
		Average	LTA	Average	LTA	Average	LTA
SW008	Stockton	6.8	6.2	15.5	28.2	774.5	856
SW004		6.8	6.7	16.8	17.6	606	731.7
SW012		6.5	6.2	16.5	29.6	740.5	1025.3
SW011	Moran's	6.6	6.6	13.0	48	468.5	525.8
SW006		6.6	6.5	13.0	19.4	526.5	499.5
SW003		6.5	6.4	10.8	19.1	502.8	463.3
SWMP06		6.52	6.46	8.67	41.15	800.00	709.07
SWMP07		6.87	6.72	3.5	14.97	551.25	558.25
SW002	Stockton & Moran's Creek (Confluence)	6.9	6.9	11.3	14.2	19244	13030
SW001		7.4	7.1	16.8	12.7	44575	30259
SW009	Pourmalong	6.7	6.5	12.3	17.0	383.5	306.3
SW010		6.7	6.3	33.8	27.4	1093.5	550.9
SWMP01	Mannering Creek	6.33	6.63	7.00	5.26	771.50	512.53
SWMP02		6.68	6.58	21.67	16.18	484.67	456.28
SWMP03	Wyee Creek	6.32	6.64	20.67	14.96	490.67	405.64
SWMP04		6.75	6.74	10.67	14.87	674.67	630.15
SWMP05		6.49	6.57	23.00	26.54	698.50	513.20
SW013	Muddy Lake	7.9	7.2	2.3	4.1	3174.2	3529
SW014		6.58	6.70	11.67	17.12	2164.83	1091.49
SW015		6.55	5.61	64	120.61	102	78.35
SW016		8.26	8.27	20	239.44	2755.17	3214.18
SW017		8.29	8.09	13.63	30.36	2412	2802.83

7.2.4 Surface Water Discharge Monitoring

The maximum daily volume discharged from LDP001 was 4812kL. There was no exceedance of the discharge volume limit of 5000kL per day. The total volume of water discharged from

LDP001 for the 2024 reporting period was 1455ML. The average daily discharge volume was 4358kL.

Table 7-5: LDP001 Discharge Volume

Frequency	No. of measurements made	Lowest result (kL)	Mean result (kL)	High result (kL)
Daily during any discharge	366	1210	4358	4812

There were no exceedances of the water quality limits at LDP001 for the reporting period. During the reporting period three hundred and forty five LDP001 samples were analysed. The maximum recording for oil and grease was 5mg/L, total suspended solids was 16mg/L and pH ranged from 7.7 to 8.02. The average annual results at LDP001 are summarised in **Table 7-6**.

Table 7-6: Water Quality LDP001

Pollutant	Unit of Measure	No of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Oil & Grease	milligrams per litre	334	345	0	0.23	5
pH	pH	334	345	7.70	7.85	8.02
Total suspended solids	milligrams per litre	334	345	0	2.29	16

There were no exceedances of the water quality limits at LDP002 for the reporting period. During the reporting period one sample from LDP002 was analysed. The maximum recording for oil and grease was 0mg/L, total suspended solids was 25mg/L and pH ranged from 6.6 to 6.6. The average annual results at LDP002 are summarised in **Table 7-7**.

Table 7-7: Water Quality LDP002

Pollutant	Unit of Measure	No of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Oil & Grease	milligrams per litre	1	1	0	0	0
pH	pH	1	1	6.6	6.6	6.6
Total suspended solids	milligrams per litre	1	1	25	25	25

There were no exceedances of the water quality limits at LDP003 for the reporting period. Zero samples from LDP003 were analysed as there was no discharge during the reporting period. The average annual results at LDP003 are summarised in **Table 7-8**.

Table 7-8: Water Quality LDP003

Pollutant	Unit of Measure	No of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Oil & Grease	milligrams per litre	0	0	-	-	-
pH	pH	0	0	-	-	-
Total suspended solids	milligrams per litre	0	0	-	-	-

There were no exceedances of the water quality limits at LDP004 for the reporting period. Zero samples from LDP004 were analysed as there was no discharge during the reporting period. The average annual results at LDP004 are summarised in **Table 7-9**.

Table 7-9: Water Quality LDP004

Pollutant	Unit of Measure	No of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Oil & Grease	milligrams per litre	0	0	-	-	-
pH	pH	0	0	-	-	-
Total suspended solids	milligrams per litre	0	0	-	-	-

Table 7-10 LDP Annual Average and Long-Term Average

Site Location	pH		TSS		Oil Grease	
	Average	LTA	Average	LTA	Average	LTA
LDP001	7.85	7.82	2.32	2.08	0.23	0.16
LDP002	6.6	6.94	25	29.53	0	0.13
LDP003	NA	7.55	NA	71.91	NA	2.18
LDP004	NA	7.64	NA	45.01	NA	0.05

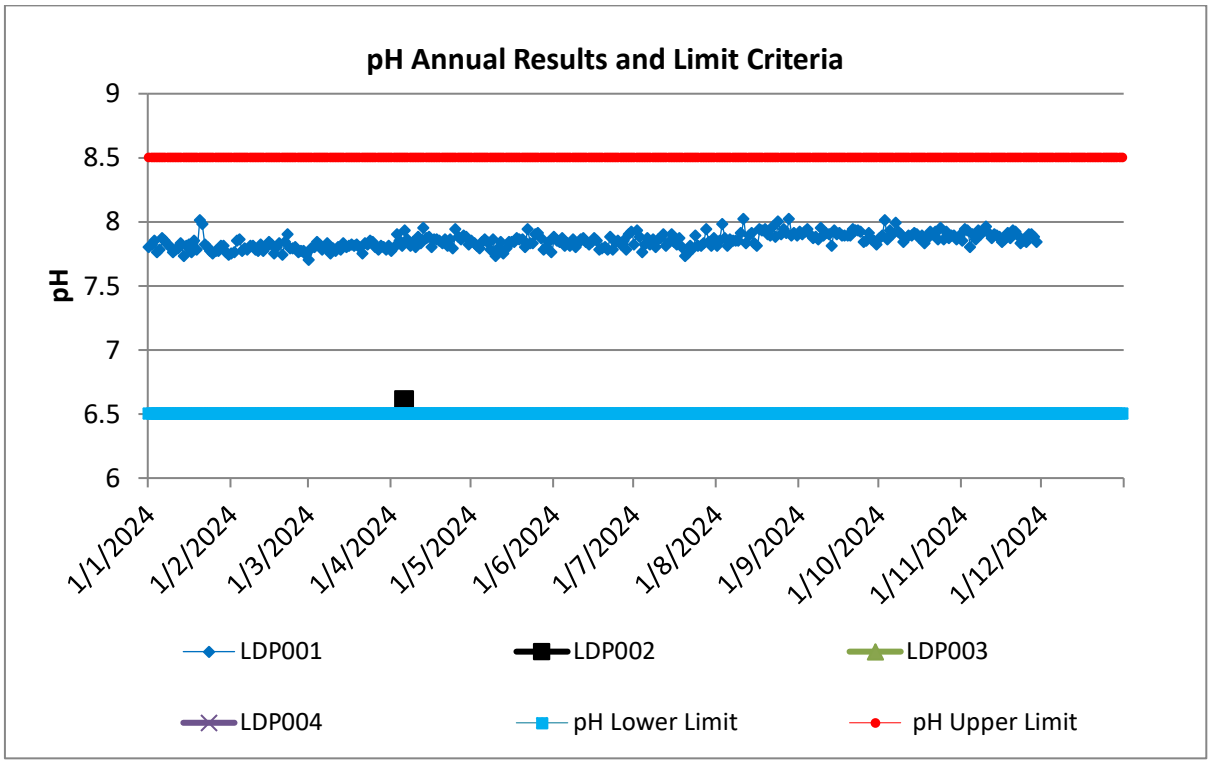


Figure 7-2 Annual pH Monitoring Results and Limit Criteria

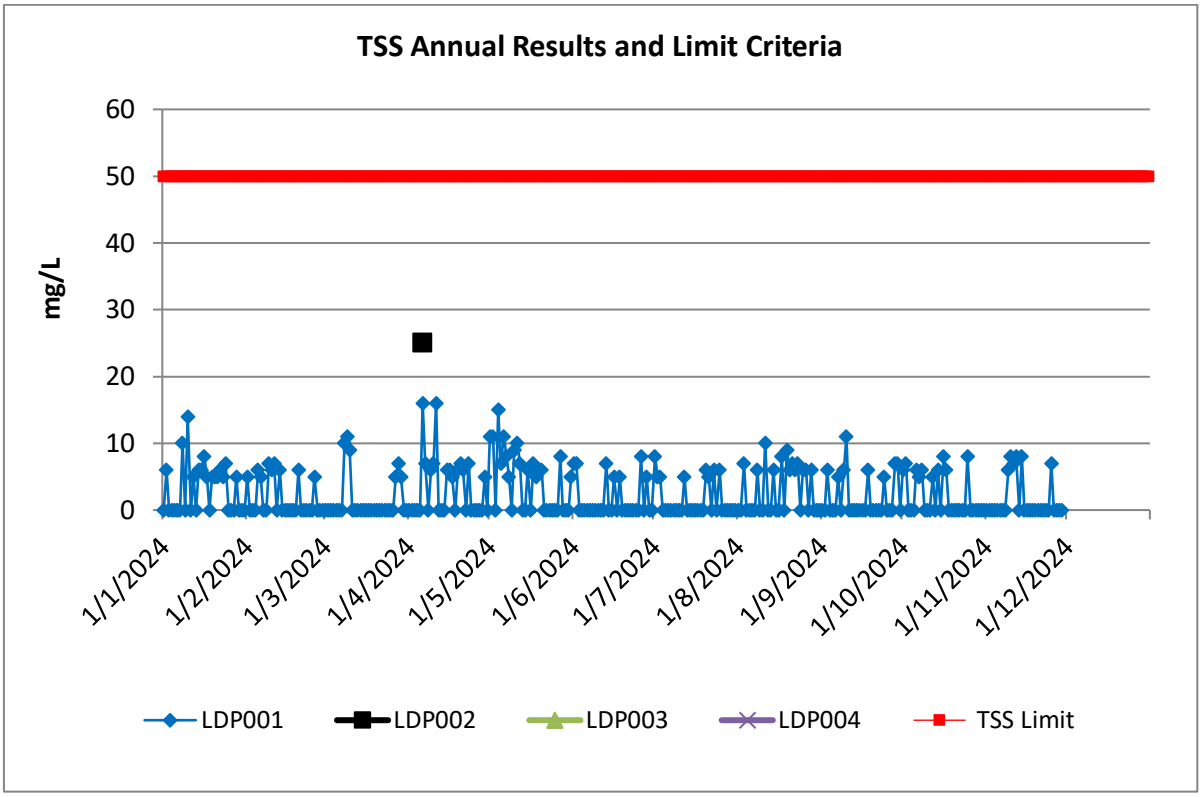


Figure 7-3 Annual TSS Monitoring Results and Limit Criteria

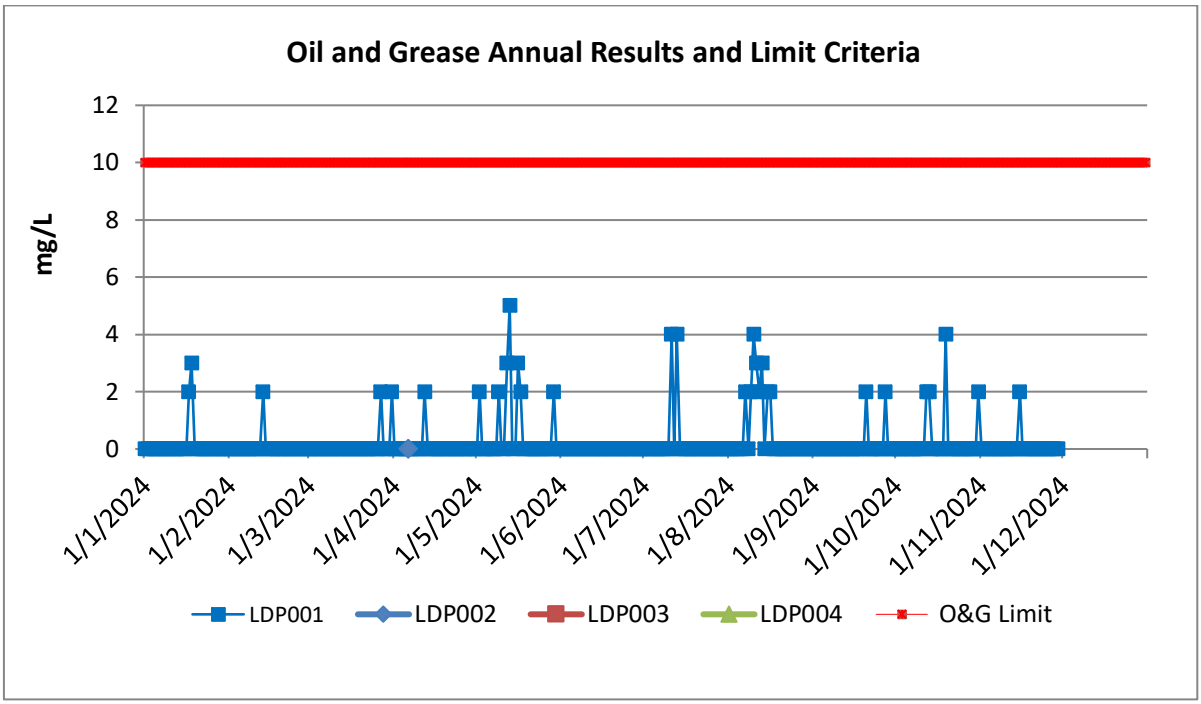


Figure 7-4 Annual Oil & Grease Monitoring Results and Limit Criteria

7.2.5 Data Interpretation

The results presented in **Table 7-4** are characteristic of the natural conditions of the area, particularly for Stockton, Moran's, Mannering & Wyee Creeks. Both Stockton and Morans Creek are the main drainage systems for the Mandalong area. Stockton Creek is located within the longwall mining area (LW1-16) and Morans Creek is also located within the longwall mining area (LW15-34). Both Mannering and Wyee Creek are located within the Mandalong Southern Extension Area current (LW57-60) and future mining areas (LW39-43).

7.2.5.1 Mandalong and Mandalong South Surface Site

Surface waters are tested for pH, TSS and EC and the annual and LTA results are summarised in **Table 7-4**. The CES monitoring sites SW13, SW14, SW15, SW16 and SW17 were sampled monthly. The monitoring sites SW001, SW002, SW003, SW004, SW006, SW008, SW009, SW010, SW011, SW012, and SW018 were sampled quarterly during the reporting period. The Mandalong Southern Extension monitoring sites SWMP01, SWMP02, SWMP03, SWMP04, SWMP05, SWMP06, SWMP07 and SWMP08 were also sampled quarterly during the reporting period.

The EC (salt content) for the 2024 period shows a relatively consistent level compared with the long-term average for many sites.

The annual average TSS for 2024 are relatively low and are characteristic of natural surface water conditions in creeks. All sites had a 2024 annual average that was similar or of a lower level to the LTA. The highest annual average TSS for 2024 was recorded at 33.8 mg/L at SW010. The annual average was similar to the LTA (27.4mg/L).

All monitoring points recorded a pH annual average similar to the LTA. SWMP03 had the lowest pH annual average of 6.32 in 2024. The highest pH annual average during 2024 was 8.29 recorded at SW017.

7.2.5.2 Surface Water Discharge Trends

The water quality results for LDP001 (**Table 7-10**) show the 2024 annual averages for pH, TSS and oil & grease are similar to the long term averages. LDP003 and LDP004 have limited

data for LTA to compare against. LDP001 has a consistent discharge water quality in 2024 as can be seen from **Figure 7-2**, **Figure 7-3** and **Figure 7-4**. The water quality results for LDP001 shows little variation. LDP002, LDP003 and LDP004 discharges occur as a result of high rainfall events and have greater variability.

7.2.5.3 Cooranbong Haul Road

Monitoring for the surface water in the six sediment control dams on the haul road was conducted to determine compliance with the EPL limits prior to discharge. Prior to discharge the sediment control dams were treated by adding a flocculent to the water to remove suspended solids. The water quality of the haul road sediment control dams is required to meet the water quality discharge criteria detailed in the EPL and the Cooranbong Haul Road Surface Water Management Plan.

7.3 WATER BALANCE

The 2024 water balance analysis was prepared by GHD (GHD, 2025c) in the report titled *"Mandalong Mine 2024 Annual Water Balance"*. The water balance for 2024 is shown in **Table 7-11**.

7.3.1 Water Supply, Use & Discharge

The Mandalong Mine is connected to town water and sewer. Potable water for underground use is currently supplied by Hunter Water Corporation (HWC) via pipelines to the CES and to the MMAS. Potable quality water is used underground in mining equipment as uncontaminated water is required for cooling systems on drive motors, in dust suppression sprays on miners and transfer points. The total potable water used in 2024 was 562 ML. A total of 425 ML was supplied via the CES and MMAS to underground equipment. A total of 18.2ML was used on the surface within the Cooranbong CHP and bathhouse, 11.7 ML in the Mandalong Mine bathhouse and 10.7 ML for Mandalong Mine Surface operations.

The total potable water usage (562 ML) for 2024 is similar to the water usage in 2023 (518 ML). Potable water was primarily supplied to the longwall and underground equipment (longwall, continuous miners and conveyors) for coolant on motor transmissions and dust suppression.

GHD's (GHD, 2025c) water balance model reports 1571 ML was discharged in the 2024 reporting period from the Mandalong Mine. The volume of water discharged for the CES at LDP001 is 1469 ML and LDP002 was 4 ML in the 2024 reporting period. 0 ML was discharged from LDP004 at the MSSS and 0 ML from LDP003 at the MMAS in the 2024 reporting period.

Table 7-11: 2024 Summary of Water Inputs and Outputs

Element	2024 (simulated) (ML/year)
INPUTS	
Direct rainfall onto water storages	24
Catchment runoff	233
Potable water supply	562
Groundwater inflows	152
TOTAL INPUTS (rounded)	**971**
OUTPUTS	
Evaporation	25
Spray irrigation	0

Element	2024 (simulated) (ML/year)
Sewage to HWC	32
Discharge through LDP001 (CES)	1469
Discharge through LDP002 (CES)	4
Discharge from Construction Dam (CES)	29
Discharge from LDP003 (MMAS)	0
Discharge from DES	69
Discharge from LDP004 (MSSS)	0
Extracted ROM coal moisture	60
TOTAL OUTPUTS (rounded)	**1688**
CHANGE IN STORAGE	
Cooranbong Underground Storage	-710
Surface water storages	-7
TOTAL CHANGE IN STORAGE (rounded)	-717
BALANCE	
Inputs – outputs – change in storage	0

7.3.2 MMAS

Managing runoff from rainfall events is the only surface water management required at the MMAS. Clean water is diverted around the western area of the site. A dam has been constructed to capture this water. Clean water runoff from Mandalong Road, the M1 Motorway on-ramps and the car park has been diverted around the eastern perimeter of the site.

Water from all other areas of the surface is considered 'dirty' and is directed to sediment control systems. Surface and subsurface drainage directs dirty water to the sediment control system. This system comprises of a gross pollutant trap (GPT) and a sediment control dam. Water from the sediment control dam is used pumped into the Mandalong Mine underground workings. An oil water separator at the GPT removes hydrocarbons from potentially contaminated runoff from the refuelling bay, oil store, workshop, washdown bay and equipment yard.

7.3.3 CES

Water from the hardstand area is directed to the 5 ML dam for treatment before discharge by an overflow culvert at LDP002. A dewatering pump installed in the 5 ML Dam allows low water levels in the dam to be maintained. Contaminated water from the workshop, equipment storage and washdown bay areas drain to an oil water separator used to remove hydrocarbons from wastewater.

Dirty water contaminated with coal fines from the CHP, conveyor gantries and ROM stockpile is directed to dedicated sediment control sumps to remove course fines material. Dirty water is then directed to the large GPT for further settlement of fines. Treated water from the GPT is then pumped to Sediment Dam 1 or directly underground. Sediment Dams 1 and 2 have a capacity of 7.6 ML.

A sediment control dam (ROM Stockpile Dam) and GPT were constructed in 2010 to capture and treat contaminated surface water runoff from the 100,000 T ROM coal stockpile. Sediment

is captured in the ROM Stockpile Dam prior to flowing via pipeline into Sediment Dam 1 (via the Export Bin Sump).

7.3.4 DES

Clean and dirty water systems have been constructed at the DES. Site runoff also utilises the existing stormwater infrastructure at the Wyee Coal Unloader, which includes clean water diversion drainage and two large dirty water settling ponds (9ML capacity) sufficient to treat contaminated water prior to discharge.

Another settling pond was constructed down slope of the decline portal for the pre-treatment of dirty water from the Delta Site. Sediment in runoff is settled out via the Final Sediment Sump and the decline settling pond prior to discharge into the large 9 ML settlings ponds.

7.3.5 Cooranbong Haul Road

Clean and dirty water are separated along the haul road. Clean water is diverted by drains away from the haul road. Dirty water from the haul road and batters, is captured and treated within six sediment basins constructed along the haul road. Dirty water contained within the sediment basins is required to meet specific water quality criteria prior to discharge.

7.3.6 Mine Water Management

7.3.6.1 MMAS

Water from the active underground mining area is pumped to a temporary settling area to reduce suspended solids. All water is then pumped to a goaf area (Cooranbong underground longwall void) in the north-west of the CES. This void area has a significant storage capacity, and also acts as a primary settlement area for the removal of suspended solids. Dirty water from the Cooranbong Sediment Dams is also pumped or decanted via the existing infrastructure to the Cooranbong void to maintain low water levels in the surface dams.

Water in the Cooranbong void is then pumped to the surface through a borehole pump and overland to the Borehole Dam at the CES. Water discharges via a surface pipeline directly to LDP001.

7.3.6.2 DES

No mine water is discharged from the DES, as inseam water from the Delta underground headings and decline tunnel is pumped to the existing Mandalong Mine water system.

7.4 GROUNDWATER MANAGEMENT

7.4.1 Mandalong Mine

An annual review of the groundwater monitoring results was undertaken by GHD titled *"Centennial Mandalong Annual Groundwater Monitoring Review 2024"* (GHD, 2025). An extensive groundwater monitoring network has been developed at Mandalong Mine with monitoring undertaken on many of the bores since August 1997. This program has been established to provide timely warnings of deviations from natural or background levels, so that if necessary, remedial measures and/or management strategies can be put in place.

The network consists of standpipe monitoring bores installed in alluvial and fractured rock groundwater sources. Locations were monitored monthly for groundwater level and limited water quality parameters (electrical conductivity and pH).

Details of the groundwater monitoring bores in the current groundwater monitoring program are summarised in **Table 7-12.** The location of the groundwater monitoring bores is shown in **Figure 7-6** (GHD, 2025b).

Table 7-12: Groundwater Monitoring Bore Details

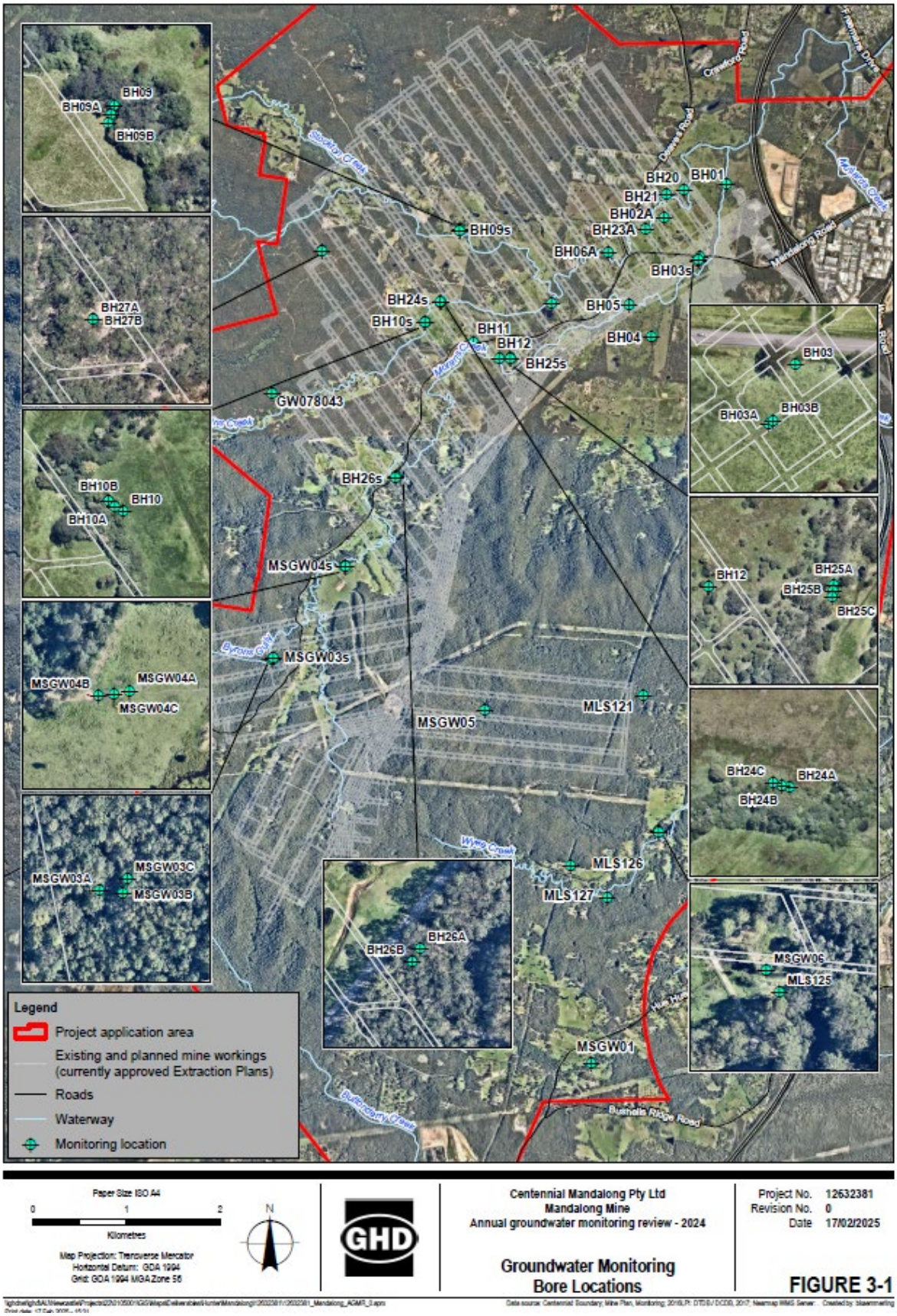
Bore	Monitoring Period	Lithology	Longwall Area
BH01	Aug 1997 – present	Alluvium	–
BH02A	Oct 2005 – present	Sandstone	LW3
BH03	Aug 1997 – present	Alluvium	–
BH03A	Nov 2005 – present	Alluvium	–
BH03B	Dec 2005 – present	Sandstone	–
BH04	Aug 1997 – present	Alluvium	–
BH05	Aug 1997 – present	Alluvium	–
BH06A	Nov 2005 – present	Sandstone	LW7
BH09	Aug 1997 – present	Alluvium	LW12
BH09A	Jun 2010 – present	Mudstone/sandstone	LW12
BH09B	July 2010 – present	Mudstone/sandstone	LW12
BH10	Aug 1997 – present	Alluvium	LW16
BH10A	Jun 2010 – present	Mudstone/sandstone	LW16
BH10B	Jun 2010 – present	Sandstone	LW16
BH11	Aug 1997 – present	Alluvium	LW15
BH12	Aug 1997 – present	Alluvium	LW14/15
BH13	Aug 1997 – present	Alluvium	LW18
BH14	Aug 1997 – present	Alluvium	LW17
BH20	Dec 2003 – present	Conglomerate	LW1
BH21	Dec 2003 –present	Conglomerate	LW2
BH23A	Jan 2006 – present	Mudstone	LW4/5
BH24A	Jun 2010 – present	Alluvium	LW15
BH24B	Jun 2010 – present	Sandstone	LW15
BH24C	Jun 2010 – present	Mudstone/sandstone	LW15
BH25A	Jun 2010 – present	Alluvium	LW14
BH25B	Jun 2010 – present	Sandstone	LW14
BH25C	Jun 2010 – present	Mudstone/sandstone	LW14
BH26A	Oct 2011 – present	Alluvium	LW22
BH26B	Oct 2011 – present	Sandstone	LW22
BH27A	Oct 2011 – present	Alluvium	LW18/19
BH27B	Oct 2011 – present	Sandstone	LW18/19

Bore	Monitoring Period	Lithology	Longwall Area
MSGW01	September 2011 – present	Alluvium	-
MSGW03A	September 2011 – present	Morans Creek alluvium	LW26
MSGW03B	September 2011 – present	Sandstone (Tuggerah)	LW26
MSGW03C	Sept 2011 – present	Conglomerate (Munmorah)	LW26
MSGW04A	Sept 2011 – present	Morans Creek alluvium	-
MSGW04B	Sept 2011 - present	Sandstone (Tuggerah)	-
MSGW04C	Sept 2011 – present	Conglomerate (Munmorah)	-
MSGW05	February 2023 – present	Alluvium	LW58
MSGW06	April 2024 – present	Alluvium (Wyee Creek)	LW39
GW078043	August 2017 – present	Sandstone/Conglomerate	-
MLS121	August 2023 – present	Sandstone/Shale	–
MLS125	March 2024 – present	Triassic Narrabeen Conglomerate (Munmorah)	LW39
MLS126	October 2024 – present	Conglomerate (Munmorah)	LW41
MLS127	May 2024 – present	Conglomerate (Munmorah)	LW42

Source: (GHD, 2025).

7.4.2 DES

Groundwater monitoring at the DES was finalised at the completion of construction in December 2005. No groundwater is discharged at the DES. The Delta underground workings are limited to two Maingate roadways, therefore, inseam groundwater make is minimal and is pumped via the existing inseam dewatering system to the Cooranbong longwall void area and discharged via LDP001 at the CES.



Source: (GHD, 2025).

Figure 7-5: Mandalong Mine Groundwater Monitoring Locations

7.4.3 Groundwater Levels

7.4.3.1 Alluvial Groundwater Sources

In 2024, groundwater levels at BH01, BH03, BH03A, BH04, BH05, BH09, BH10, BH11, BH12, BH25A, BH26A, BH26B, MSGW03B, and MSGW04B increased, reflecting above-average rainfall. BH13 and BH14 were not sampled due to expired landholder access. BH24A fluctuated by over 1 m, decreasing to 15.74 m AHD (March 2024) before rising to 16.52 m AHD (December 2024). BH27B, dry since 2022, recovered to -7.78 m AHD (June 2024) but fell slightly to -8.03 m AHD (December 2024). MSGW01 continued its 2023 decline but recovered by December. MSGW03A, often dry, fluctuated within historical ranges. MSGW04A saw minimal variation. MSGW05 and MSGW06, installed in 2023 and 2024, respectively, showed slight increases, reflecting rainfall trends.

Trigger values for alluvial groundwater levels have been defined in the Water Management Plan (GHD, 2025b).

7.4.3.2 Fractured and porous rock aquifers

Monitoring wells BH02A, BH03B, BH06A, BH09A, BH09B, BH10A, BH10B, BH23A, BH24B, BH24C, BH25B, BH25C, BH26B, BH27B, MSGW03B, and MSGW04B are screened within the sandstone and siltstone layers of the Tuggerah Formation, approximately 120 to 230 meters above the coal seam. A consistent decline in groundwater levels has been observed at most of these sites following undermining activities. This decline suggests the development of discontinuous fractures within the rock overlaying the mine workings, a phenomenon consistent with predictions outlined in the EIS. Groundwater levels at MSGW03B increased from 26.14 m AHD in December 2020 to 28.15 m AHD in December 2022, then dropped slightly to 27.94 m AHD in December 2024. However, with the exception of BH06A, BH10A and MSGW03B, the majority of locations have either stabilised or exhibited slight increases toward pre-mining levels three to five years post-undermining (GHD, 2025b).

Monitoring wells BH20, BH21, MSGW03C, and MSGW04C are equipped with screens positioned within the Munmorah Conglomerate, which lies beneath the sandstone of the Tuggerah Formation. These wells serve to monitor groundwater levels approximately 100 to 170 meters above the coal seam. BH21 has been blocked since early 2023, and MSGW04C has been dry since the same period. However, groundwater levels at MSGW04C remained stable throughout 2024 at approximately -7.9 m AHD, continuing the trend observed since June 2023 (GHD, 2025b).

The Water Management Plan establishes trigger levels for a subset of the porous and fractured rock monitoring wells. According to the modelling outlined in GHD (2016b), it was anticipated that monitoring wells situated within 230 vertical meters of the mining operations would experience drying due to mining. Consequently, it was projected that groundwater levels would decrease below those at most of the porous and fractured rock wells.

No trigger value for MSGW04B have been developed based on a continually decreasing trend since monitoring commenced and the absence of stable criteria. Current levels at MSGW04B are already below the model predicted minimum. BH26B has exhibited a decreasing trend since September 2022, although groundwater levels persist above the trigger threshold. In 2024, MSGW03C was dry, aligning with model projections. While groundwater levels at MSGW03B dropped below the trigger threshold (as per model forecasts) for the first time in December 2020, they rebounded above the trigger level in the initial quarter of 2021. No instances of trigger exceedance were documented at MSGW03B in 2024 (GHD, 2025b).

7.4.4 Groundwater Quality

7.4.4.1 Alluvial Groundwater Sources

During the 2024 reporting period, pH within the alluvial aquifer spanned from acidic to slightly alkaline, ranging between 4.3 and 8.2, with the majority of measurements falling between 5.5 and 7. EC varied from freshwater conditions (<1,000 µS/cm) to saline levels surpassing 10,000 µS/cm.

Prior to 2015, bailing sampling methods were used, resulting in variability in alluvial groundwater salinity that was considered unrelated to mining activity (AGE 2014). However, since January 2015, alluvial groundwater monitoring locations have been sampled by low flow techniques (i.e., peristaltic pump) with purging continuing until pH and EC parameters show stabilisation. This has resulted in a reduction in the variability between observations within the same monitoring well (GHD, 2025b).

Site-specific trigger values for groundwater quality are defined in the WMP (Centennial 2022), which are in accordance with the LW57-60 Extraction Plan WMP for monitoring wells BH26A, MSGW03A, and MSGW04A **(GHD, 2022b)**. Further details regarding the performance criteria can be found in the WMP (Centennial 2022).

Overall, no Stage 1 trigger exceedances (i.e., no instances of three consecutive exceedances of the trigger value) were observed for the alluvial monitoring bores BH26A and MSGW04A, nor were there any exceedances of the 0/100th percentile trigger. However, a stage 1 trigger exceedance occurred for pH at MSGW03A (i.e, three consecutive exceedances of 20th percentile triggers occurred in 2024 (GHD, 2025b).

7.4.4.2 Fractured and porous rock groundwater sources

For 2024, pH within the fractured and porous rock groundwater sources ranged acidic (5.3) to alkaline (8.2). EC ranged fresh (<1,000 µS/cm) to saline (>10,000 µS/cm), consistent with the low potential for beneficial use of groundwater near Mandalong Mine.

Site specific trigger values for groundwater quality were updated in the LW57-60 Extraction Plan - Water Management Plan for BH26B, MSGW03B, and MSGW04B. The following Stage 1 trigger exceedances were identified in 2024:

– pH at MSGW03B: three consecutive exceedances of the 20$_{th}$ percentile trigger, falling below the 0$_{th}$ percentile trigger in September and December 2024. In response, an investigation for MSGW03B was actioned in Q3 2024. The decline in pH was concluded to be resulting from the rewetting of oxidised material as groundwater level recovered post-mining. Ongoing monitoring to confirm cessation of the declining pH, and even recovery, was recommended in the absence of rock mineralogy analysis (GHD, 2025b).

– pH at BH26B has exceeded the 20th percentile pH trigger on three consecutive occasions in Q3 and Q4 2024, constituting further investigation to be actioned.

– EC at BH26B: three consecutive exceedances of the 80$_{th}$ percentile trigger were identified in Q4 2024, constituting a requirement for further investigation to be actioned. These values are noted to be within the historical range (GHD, 2025b).

8 ANNUAL REHABILITATION REPORT

In 2023 a Rehabilitation Management Plan (RMP) was prepared in accordance with the Mining Exploration and Geoscience – Resources Regulator's (RR) Form and Way: Rehabilitation Management Plan for Large Mines (RR, 2021). The RMP was also prepared to satisfy Schedule 3, Condition 33A of SSD 5144 which requires Mandalong to prepare and implement a Rehabilitation Management Plan in accordance with the conditions imposed on mining leases associated with the mine under the NSW *Mining Act* 1992.

As described in the RMP, the conceptual long term mine rehabilitation objective is to provide a low maintenance, geotechnically stable and safe landform. Specific conceptual long-term objectives include:

- Prevent public access to former underground workings;
- Re-establishing land disturbed by the operations of Centennial Mandalong to an appropriate final land use;
- Provide habitat for fauna and corridors for fauna movement within the final landform;
- Monitor rehabilitation success in terms of physical and biological parameters;
- Relinquishment of the surface leases as rehabilitation objectives are achieved; and
- Compliance with appropriate company and regulatory policies and guidelines.

Post-mining land use options for Mandalong (MMAS and MSSS) were assessed in the Mandalong Southern Extension Project Decommissioning and Rehabilitation Strategy which was prepared for the Mandalong Southern Extension Project EIS (SLR, 2013). Post-mining land use options for the CES were assessed in the Northern Coal Logistics Project Decommissioning and Rehabilitation (SLR, 2014) which was prepared for the Northern Coal Logistics Project EIS.

It is intended to re-develop the MMAS and CES for an industrial based land use(s). The option of leaving this infrastructure in the final landform will be discussed in consultation with RR and after discussions with potential buyers have been held.

The intended post-mining land use for the MSSS is native bushland and pasture commensurate with the pre-mining conditions.

Post-mining land use for the DES will be addressed in consultation with Delta Electricity with the intended post-mining land use being native bushland commensurate with adjacent vegetation.

As Mandalong is an underground mine, the majority of the Colliery Holding will not be disturbed. The exception to this might be areas impacted by subsidence which will be addressed and managed on an ongoing basis in accordance with an approved SMP or Extraction Plan.

8.1 PROGRESSIVE REHABILITATION AND COMPLETION

Since the Mandalong Mine is an underground mine, the relatively small disturbance footprint associated with surface infrastructure means that there are limited opportunities for progressive rehabilitation. To what extent is appropriate, rehabilitation will be undertaken progressively on areas that cease to be used for mining or mining related activities as soon as is reasonably practicable.

Forecast rehabilitation activities include:

- Maintenance and monitoring of rehabilitated areas that were disturbed during the construction of the MSSS and access road;
- Progressive rehabilitation of exploration and/or groundwater monitoring sites;

- Rehabilitation of areas affected by subsidence, as required, in accordance with an approved SMP or Extraction Plan;
- Maintenance and monitoring of the VAM-RAB offset area which was established in 2012 at the MMAS;
- Maintenance and monitoring of the MSSS and TL24 offset areas; and
- Maintenance and monitoring of areas of existing rehabilitation.

A summary of the current disturbance and rehabilitation status at the end of the annual reporting period is provided in **Table 8-1**.

Table 8-1: Status of disturbance and rehabilitation at end of reporting period

Annual reporting period	1 January 2024 to 31 December 2024
Total disturbance footprint – surface Disturbance	43.89
Total active disturbance (hectares)	38.56
Rehabilitation – land preparation (hectares)	0
Ecosystem and land use establishment (hectares)	5.33
Ecosystem and land use development (hectares)	0
Rehabilitation completion (hectares)	0

8.2 MANDALONG MINE REHABILITATION

The majority of MMAS has been rehabilitated following the completion of construction activities in 2005. Rehabilitated sections of the Mine's surface area are well established and have provided vegetation cover to effectively minimise the potential for erosion.

Centennial Mandalong received approval in 2011 (DA97/800 Modification 7) for the trial installation of a ventilation air methane regenerative afterburner unit (VAM-RAB) that would remove and breakdown the exhaust methane. Installation of the VAM-RAB unit in 2012 necessitated clearing of some native vegetation. Two endangered ecological communities (EEC) listed in Schedule 3 of the NSW *Threatened Species Conservation Act* 1995 were included in the areas to be cleared. These were: Swamp Sclerophyll Forest (SSF) on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions; and River-Flat Eucalypt Forest (RFEF) on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.

DA97/800 Condition 76A included a requirement for a 1.25 hectare rehabilitation off-set area to be established on cleared land adjoining the VAM-RAB construction site. These EEC were represented by communities described in the regional vegetation mapping and classification (NPWS 2000) as: MU37 Swamp Mahogany Paperbark Forest (SSF); and MU38 Redgum – Rough-barked Apple Swamp Forest (RFEF).

An ecology survey (Hunter Eco, 2011) prepared for the VAM-RAB project application described the area to be rehabilitated as mostly dominated by weeds. This being the case, active regeneration was required and this was commenced in January 2012. Further to the requirement to rehabilitate, DA97/800 Condition 76A also requires that the progress of the rehabilitation be monitored annually for five years. This monitoring was conducted by Hunter Eco in December 2024 and is described in **Section 6.5.9** of the Annual Review.

8.2.1 Longwall Mining Area

The surface areas above the completed longwall mining panels are inspected as per the schedules prescribed in the LW25-29, LW30-31, LW32, LW34, LW57-60 and LW39-43 Extraction Plan Water Management Plans (WMP). The LW25-29, LW30-31, LW32, LW34, LW57-60 and LW39-43 Extraction Plan WMPs require that the floodpaths are to be inspected every six months or after a flood event. During the course of these inspections observations are made on the progress of remedial measures implemented to minimise subsidence related effects (refer **Table 6-25**).

An update on ponding and subsidence remediation completed in 2024 is provided in **Table 6-25**.

8.2.2 Exploration Sites

Eleven surface exploration drill sites were prepared in 2024. Progressive rehabilitation of exploration sites will continue in 2025.

8.2.3 DES

Construction of the Delta coal clearance system was largely completed in 2005 and rehabilitation of the site was completed in 2006. Rehabilitation at the DES was inspected in 2024 to assess the effectiveness of the works to stabilise disturbed areas onsite. The direct seeding rehabilitation methods used have been successful in establishing a substantial area of the site with pasture and tree groundcover. Ground cover on the direct tree seeded areas is approximately ninety percent similar to those recorded in 2023. Ninety-five percent ground cover has been achieved in rehabilitated pasture seeded areas. The area is slashed to maintain access to infrastructure and as part of the asset protection zone.

8.2.4 CES

A total of 3.9 hectares were disturbed for the construction of the upgrades to the CHP and haul road at the CES in 2009. Construction activities were completed in May 2010 with all disturbed areas rehabilitated by the Contractor shortly after. No further rehabilitation works were undertaken in 2024.

8.2.5 Cooranbong Haul Road

The haul road construction resulted in approximately 18 hectares of disturbance. Of this 3.9 hectares of disturbed land associated with the CHP upgrades (stockpile and conveyor) and haul road are located on Mandalong Mine's Mining Lease. 1.25 hectares of disturbed area not occupied with haul road and CHP infrastructure was rehabilitated in 2010. The remaining areas are located on the Newstan Colliery Mining Lease CCL764. Of this, nine hectares along the haul road was rehabilitated in 2009. Six hectares of land will not be rehabilitated as it is occupied by the haul road infrastructure.

As per the requirement of the Mandalong Haul Road Landscape and Rehabilitation Plan, the Mandalong Environment & Community Officer audited the rehabilitation on the haul road in November 2024. The audit assessment required the following issues be addressed: -

- An *assessment of surface and slope stability.*
- *Properties of the soil or root zone media (such as chemistry, fertility and water relations).*
- *Plant community structural attributes (such as cover, woody species, density and height).*
- *Plant community composition (such as presence of desirable species, weeds).*
- *Selected indicators of ecosystem functioning analysis (such as soil microbial biomass).*

The 2024 audit focused on identifying sites where remedial action or maintenance is required. The inspection was completed by surveying the length of the Haul Road to follow up on areas previously identified as needing work, and to identify additional areas requiring attention.

The six reference sites were inspected, and relevant actions were recorded. The highest priorities included maintenance of sediment and erosion controls along the Haul Road drains and at the dam inlets.

The audit provides a useful assessment of baseline rehabilitation completed to date on the haul road following the completion of all construction activities in 2011. In general, rehabilitated areas of the haul road are well established and native vegetation dominates the strata. Weed management contractors are scheduled to continue rehabilitation practices on the Haul Road in 2025. The maintenance and effectiveness of the haul road rehabilitation will be assessed in 2025 and reported in the next Annual Review.

8.2.6 MSSS

The construction of the access road for the MSSS was completed in 2018. The clearing of the MSSS was completed in 2018, with shaft sinking completed in late 2021. The construction of the access road and clearing of the MSSS resulted in approximately 11.3 hectares of disturbance.

The areas disturbed by the construction of the access road were stabilised in 2018 with the application of hydro-mulch and bark-blower mulch / seed which was applied to the road batters. Hydro-mulch and bark-blower mulch was also applied to the batters of the MSSS in 2018.

Shaping earthworks and capping were completed for the MSSS stockpile in 2022. The application of hydro-mulch and pasture seed was applied to the MSSS stockpile in 2022 following the completion of earthworks.

The weekly environmental construction inspection procedure (WP-7154) has been updated to include the rehabilitation areas around the access road, MSSS and the main stockpile area. The monitoring procedure includes a requirement for an assessment of new or increased erosion (including batters), growth improvement, weeds and remedial work if required.

Maintenance and effectiveness of the rehabilitation will be assessed in 2025 and reported in the next Annual Review.

8.2.7 Invertebrate Pest Management

There were no reports of invertebrate pests within the Mandalong operations and rehabilitation areas in 2024 and therefore no invertebrate pest management was undertaken during the reporting period.

8.3 REHABILITATION MONITORING

Centennial are required to conduct rehabilitation, following disturbance, as soon as practicable in accordance with rehabilitation objectives outlined in Schedule 3, Condition 31, and Condition 32 of the Development Consent (SSD-5144).

8.3.1 Mandalong South Surface Site

RPS was engaged to undertake annual monitoring of rehabilitation sites at MSSS. This involved utilising the Ecosystem Function Analysis (EFA) and Biodiversity Assessment Methodology (BAM) to assess ecosystem function of control (C) and rehabilitation (R) sites within MSSS. Field surveys were undertaken on 20, 21 and 22 August 2024.

Existing Control and rehabilitation locations (two plots per treatment) were revisited. A total of three paired monitoring sites were sampled each comprising an impact and control transect.

These sites were permanently marked in the field using surveyors pegs and flagging tape for future repeat monitoring.

Rehabilitation sites exhibited generally lower LFA and BAM scores than control sites, indicating that further rehabilitation (both passive and active) is required before pre-mining conditions are achieved. The existing rehabilitation plots poorly represent PCT 3234 (cleared community) and will not rehabilitate without further intervention (RPS, 2025g).

To improve the trajectory of rehabilitation toward analogous conditions, the following actions are recommended:

- Weed control to be undertaken in all rehabilitation sites. Specific focus should be given to abundant high threat weeds (HTWs), which includes dense grass swards of *Chloris gayana* (Rhodes Grass), *Andropogon virginicus* (Whiskey Grass), and *Eragrostis curvula* (African Lovegrass), as well as various annual and perennial weeds including *Sonchus oleraceus* (Common Sowthistle), *Bidens pilosa* (Cobbler's Pegs), *Cirsium vulgare* (Spear Thistle), *Conyza bonariensis* (Flaxleaf Fleabane), and *Senecio madagascariensis* (Fireweed). Control of these should be the highest management priority as these exotic grasses and weedy forbs smother native species and suppress regeneration. *Andropogon virginicus* is also known to affect other ecosystem-level functions (e.g. it lowers soil evaporation and causes accelerated erosion). These species respond well to a combination of herbicide application and manual extraction. It is recommended that weed management is undertaken twice within the next monitoring year, once in early spring to target emerging seedlings and once in late summer to target mature weeds before flowering and seeding. The implementation of an integrated approach that combines multiple control methods, such as targeted herbicide application and manual removal, is recommended to maximize effectiveness and minimize the risk of herbicide resistance.
- Native undergrowth is to be established and or promoted to further stabilise soil surface. This is most pertinent at rehabilitation site R1, where native grasses and groundcover species are entirely lacking. Seeding and/or planting of native grasses and groundcover species following weed management is recommended, especially in areas where native vegetation is lacking, to accelerate the succession toward a more natural state. Recommended species include the grasses *Entolasia stricta*, Imperata cylindrica, *Oplismenus imbecillis*, and *Themeda triandra*, gramnoids such as *Dianella caerulea* and *Lomandra longifolia*, and shrubs such as *Breynia oblongifolia* (Coffee Bush) and *Indigofera australis* (Australian indigo).
- The success of tube stock planting of canopy species undertaken in rehabilitation areas in mid-2024 should be assessed in late 2024 to ensure these plants are surviving and establishing, and to assess the need for supplementary watering during summer or further planting. Tube stock planting was not undertaken within rehabilitation site R1, likely due to the practicality of planting canopy species on a steep slope. Instead, it is important that seeding or planting of native grasses, groundcover, and shrub species is undertaken in this area following weed management (RPS, 2025g).

Further rehabilitation monitoring at MSSS will be completed in 2025 and reported in the next Annual Review.

8.3.2 DES

All buildings at the DES are associated with the coal conveying system and as such are a permanent fixture. The buildings associated with the construction of the site were decommissioned and removed prior to the site being rehabilitated in 2006. No decommissioning of buildings occurred at the DES in 2024 and as such no rehabilitation of buildings was undertaken.

New portable buildings were installed in 2018 at the DES which included office and lunchroom facilities.

8.3.3 CES

To ensure continuation of coal handling operations and mine support infrastructure, surface buildings and mine related infrastructure have been retained at the CES. The CES, CHP and supporting infrastructure were used in 2024 to supply coal to the Eraring Power Station and to Newstan.

No buildings or infrastructure at the CES were removed or decommissioned in 2024.

8.4 REHABILITATION TRIALS AND RESEARCH

8.4.1 Use of Analogue Sites

Data from analogue rehabilitation sites is an integral part of the monitoring procedure throughout the monitoring process. The purpose of analogue sites is to provide a reference against which to document the progress of rehabilitation towards reaching ecosystem health, structure and composition consistent with undisturbed areas.

In 2024, Centennial Mandalong engaged RPS to select and monitor analogue sites to assess whether they are suitable in the context of the proposed final land use and to suggest the species that will be appropriate for revegetation.

Analogue sites were established within undisturbed areas in the vicinity of the proposed MSSS corresponding with the intended post mining land use of native bushland, commensurate with pre-mining conditions.

The majority of the MMAS and the CES are proposed to be retained as infrastructure and therefore no reference monitoring in the vicinity is deemed necessary.

Specific analogue sites were selected based on the following general criteria:

- Contain vegetation types similar to the rehabilitation sites;
- Secure from future mining related disturbance; and
- Contain vegetation and conditions suitable as a basis for rehabilitation performance criteria.

The monitoring results from analogue sites will provide the basis for comparison to measure the success of the rehabilitation against the relevant closure criteria. Results of analogue site monitoring will be reported in future Annual Reviews.

8.4.2 Mandalong Mine VAM-RAB Offset Area

Refer to **Section 6.5.9** of the Annual Review for details on the Mandalong Mine VAM-RAB Offset Area.

8.4.3 Mandalong South Rehabilitation Monitoring

Refer to **Section 8.2.6** of the Annual Review for details on the MSSS Rehabilitation Monitoring.

8.4.4 Land Management Strategy for the MSSS and TL24 Offset Areas

Refer to **Section 6.5.7** of the Annual Review for details on the Mandalong Mine Land Management Strategy for the MSSS and TL24 Offset Areas.

9 COMMUNITY CONSULTATION

Mandalong Mine consults with the community through forums such as the Mandalong Mine Community Consultative Committee and community organised events.

Meetings of the Mandalong Mine Community Consultative Committee (CCC) were held in March, June and October 2024. Representatives of the Mandalong community, appointed community representatives, relevant government organisations and company representatives attended the meetings. A detailed presentation was provided to attendees at each CCC meeting on the Mine's production, geological update, subsidence results, environmental monitoring, Extraction Plan update, upcoming projects and sponsorship.

Additional agenda items discussed in 2024 included improvements to the MSSS ventilation fans, which significantly reduced the number of noise complaints to only four for the year, a marked improvement from previous years, supply of coal to the Eraring Power Station, progress on the Mandalong Community Association's (MCA) utilisation of the old Fire Shed as a community hub, supported by the council and the plans for the area with the Morisset Place Strategy. The committee was also briefed on the stockpile extension project at the Cooranbong site.

9.1 EXTRACTION PLAN CONSULTATION

Extensive community consultation with landowners in the Mandalong mining area is undertaken for the purpose of monitoring and assessing subsidence effects on private properties. In general, the Mandalong Mine community consultation has included:

- Community consultation in line with the Stakeholder Engagement Strategy;
- Individual landowner notification and consultation associated with the implementation of Extraction Plans LW24-24A, LW25-29, LW30-31, LW32, LW34, LW57-60 and LW39-43 and their associated PSMP's;
- Consultation and general communication with all relevant government agencies and infrastructure owners during the implementation of the Extraction Plans LW24-24A, LW25-29, LW30-31, LW32, LW34, LW57-60 and LW39-43;
- One-month mining notifications were provided to landowners prior to mining beneath their property, with follow-up meetings and inspections undertaken.
- Individual landowner consultation and implementation of PSMPs during mining of Longwalls 57 and 58;
- Individual landowner consultation for rehabilitation of remnant ponding, flooding and subsidence related repairs to property (LW24);
- Continuation of landowner consultation for Extraction Plan LW39-43 in the eastern longwall domain and the associated biodiversity and cultural heritage monitoring requirements.
- Three meetings of the CCC delivered updates on the status of Development Consent modifications, Extraction Plan approvals, monitoring and subsidence management on Centennial property, private property and public infrastructure.
- Ongoing consultation with relevant stakeholders on the development and implementation of Infrastructure Management Plans including Public Roads (LMCC), powerlines (Ausgrid), communication lines (Telstra) and high voltage transmission lines (TransGrid).

9.2 COMMUNITY SPONSORSHIP

The Mandalong Mine continues to support the local community through various sponsorship avenues to the following community activities, groups and associations in 2024 –

- Wyee Point Swim Club
- Toronto Golf Club
- Dora Creek Swampies
- Catherine Hill Board riders
- Southern Lakes Football Club
- Morisset PCYC
- Watagan Mountains Campdraft Club
- Lake Macquarie Autumn Fair
- Paxton ride 2024
- Morisset District Agricultural Association
- LMCC School Environmental Awards
- Cooranbong Public School
- St John Vianney Primary School
- Wyee Rural Fire Brigade
- Southlakes Inc

9.3 COMMUNITY COMPLAINTS

Five community complaints were received in 2024, indicating a decrease compared to the previous reporting period. Four complaints were related to noise from the MSSS ventilation fans, and one complaint was received in 2024 regarding noise from the CES.

Table 9-1: Record of annual community complaints for 2020 to 2024

Community Complaints						
Year	**Air**	**Water**	**Noise**	**Waste**	**Other**	**Total**
2020	0	0	5	0	2	7
2021	0	0	83	0	0	83
2022	0	0	92	0	0	92
2023	0	0	27	0	0	27
2024	0	0	5	0	0	5

Five community complaints were received by Centennial Mandalong from the community during the period January 2024 to December 2024, as described in **Table 9-2**.

Table 9-2: 2024 Community Complaint Details

Mandalong Complaint Log Number	Date Complaint Logged	Type of Complaint	Comments
4/2024/ccapp 1001081	03/01/2024 at 6:19 AM	Noise complaint via email received by the Centennial Group Stakeholder Engagement Manager.	On 3 January 2024, Mandalong received a complaint from a resident regarding constant noise from the MSSS. Follow-up was conducted with the resident and the quarterly compliance monitoring was scheduled.
4/2024/ccapp 1001152	27/08/2024 at 2:43pm	A complaint regarding night-time noise from the CES was received by the Mandalong Environment and Community Superintendent at 2.43pm on 27/08/24.	Audio files for the time of complaint were reviewed, with noise attributed to a general hum from the CHP and stone entering the ROM bin. A follow up call to discuss the findings with the complainant occurred on 29/08/24. The volume of stone being mined will reduce in the coming weeks and therefore reducing the potential impact noise from product entering the ROM bin.
4/2024/ccapp 1001162	4:17 PM on 06/11/2024.	A complaint regarding noise from the MSSS ventilation fans was received by the Mandalong Mine at 4.17pm on Wednesday 6 November 2024	The new outlet silencers installed in 2023 have successfully reduced audible fan noise emissions from site well below the noise criteria. Further investigations are underway on the source of low frequency noise from the site. In 2024, one ventilation fan inlet silencer was removed and noise investigations are underway to determine the success of this trial. If successful, inlet silencers on the remaining two fans will be removed.
4/2024/ccapp 1001163	1:50 PM on 16/11/2024.	A complaint regarding noise from the MSSS ventilation fans was received by the Mandalong Mine at 1:50pm on Saturday 16 November 2024.	The new outlet silencers installed in 2023 have successfully reduced audible fan noise emissions from site well below the noise criteria. Further investigations are underway on the source of low frequency noise from the site. In 2024, one ventilation fan inlet silencer was removed and noise investigations are underway to determine the success of this trial. If successful, inlet silencers on

Mandalong Complaint Log Number	Date Complaint Logged	Type of Complaint	Comments
			the remaining two fans will be removed.
4/2024/ccapp 1001169	6:48 PM on 26/11/2024.	A complaint regarding noise from the MSSS ventilation fans was received by the Mandalong Mine at 6.48pm on Tuesday 26 November 2024.	The new outlet silencers installed in 2023 have successfully reduced audible fan noise emissions from site well below the noise criteria. Further investigations are underway on the source of low frequency noise from the site. In 2024, one ventilation fan inlet silencer was removed and noise investigations are underway to determine the success of this trial. If successful, inlet silencers on the remaining two fans will be removed.

Figure 9-1 shows an increase in the number of community complaints received since 2019 which are associated with the construction and operation of the MSSS. Five noise complaints were received in 2024, showing a significant decrease in noise complaints compared with the previous reporting periods.

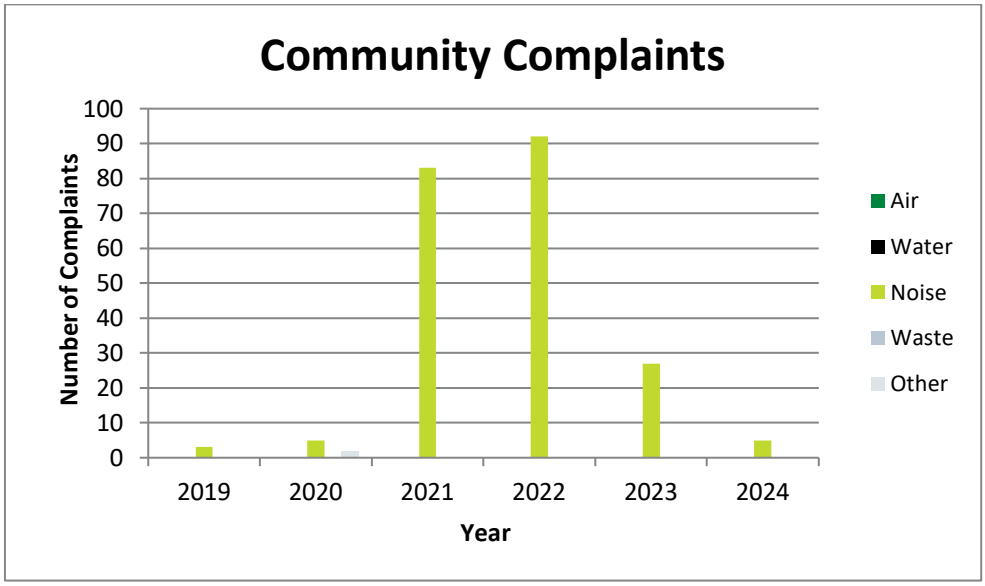


Figure 9-1: Annual Community Complaints

10 INDEPENDENT ENVIRONMENTAL AUDIT

An Independent Environmental Audit (IEMA, 2022) of Mandalong's operations was completed by Integrated Environmental Management Australia (IEMA) in June 2022. The audit report is publicly available on the Centennial Mandalong website.

The Independent Environmental Audit (IEA) completed by IEMA reviewed the consents and associated Statement of Commitments, Environment Protection Licence, mining tenements, Environmental Management Plans, and the status of previous IEA recommendations. In general, the site was considered largely compliant with only one administrative and nine low-level non-compliances identified. A summary of the audit outcomes is provided in **Table 10-1** (IEMA, 2022)

Table 10-1: Audit Compliance Summary

Compliance Status	SSD-5144	SSD-5144 SOC	DA97/800	DA97/800 SOC	DA35-2-2004	EPL 365	ML 1443	ML 1543	ML 1553	ML 1722	ML 1744	ML 1793	MPL 191	Total
Compliant	72	80	79	30	9	50	17	5	6	9	5	4	19	**385**
Not triggered	14	14	45	14	9	14	17	10	13	2	5	3	16	**176**
Admin Non-Compliance	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
Low Non-Compliance	3	1	0	0	0	5	0	0	0	0	0	0	0	**9**
Medium Non-Compliance	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
High Non-Compliance	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Not Verified	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Observation	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Note	1	0	2	0	5	12	2	2	5	1	4	2	2	**38**
Total	**90**	**95**	**126**	**44**	**23**	**81**	**37**	**17**	**24**	**12**	**14**	**9**	**37**	**609**

The Mandalong Mine has prepared an Action Plan in response to the non-compliances and recommendations listed in the 2022 Independent Environmental Audit. The Action Plan was provided to DPE on 27 June 2022 and an updated version is included in **Appendix 1**.

Correspondence from DPE dated 21 September 2022 stated that the Department considered the Independent Environmental Audit report generally satisfies the reporting requirements of the consent. DPE requested that a status update on the IEA Action Plan is included in future Annual Reviews.

The next Independent Environmental Audit of the Mandalong Mine operations in accordance with SSD-5144 Schedule 6, Condition 13 is required to be commissioned prior to 31 March 2025.

11 NON-COMPLIANCES DURING THE REPORTING PERIOD

There were no non-compliances recorded by Centennial Mandalong in 2024.

12 ACTIVITES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Table 12-1: Forecast Operations for 2025

Centennial Mandalong
Implement Environmental Management Plans required by SSD-5144. Implement LW30-31, LW32, LW34, LW57-60 & LW39-43 Extraction Plan Management Plans Continue baseline monitoring for LW39-43 and LW44-48 Extraction Plan
Mandalong Mine Access Site
Continue operating Mandalong Mine Gas Engines. Remove vines smothering *R. rubescens* individuals to assist in recovery within the Chapmans Road Bush Block Offset. Conduct weed management in Offset Plots 5 & 11 to reduce *Lantana camara* infestations.
Cooranbong Entry Site
Nil major targets for 2025.
Delta Entry Site
Nil major targets for 2025.
Mandalong South Surface Site
Nil major targets for 2025.

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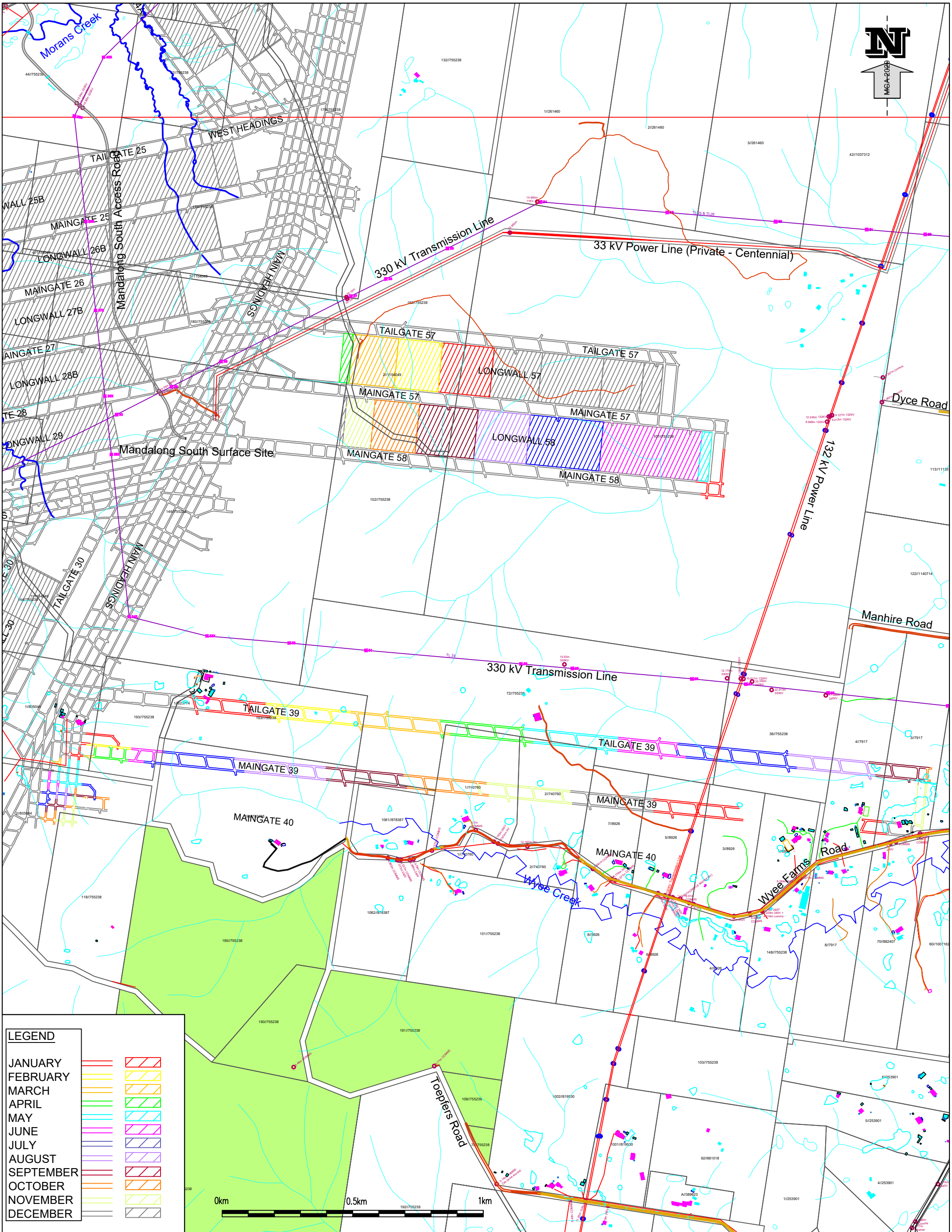
PLANS



LEGEND

- JANUARY
- FEBRUARY
- MARCH
- APRIL
- MAY
- JUNE
- JULY
- AUGUST
- SEPTEMBER
- OCTOBER
- NOVEMBER
- DECEMBER

- Creek
- Drainage Line
- Sealed Road
- 330kV Transmission Line
- Dwelling
- Building
- Olney State Forest

LOCATION	MANDALONG
SEAM	WEST WALLARAH
DRAWN	C.N.A 14.02.2023
CHECKED	
APPROVED	
SCALE	1:12,500

CENTENNIAL MANDALONG

MONTHLY PRODUCTION 2024

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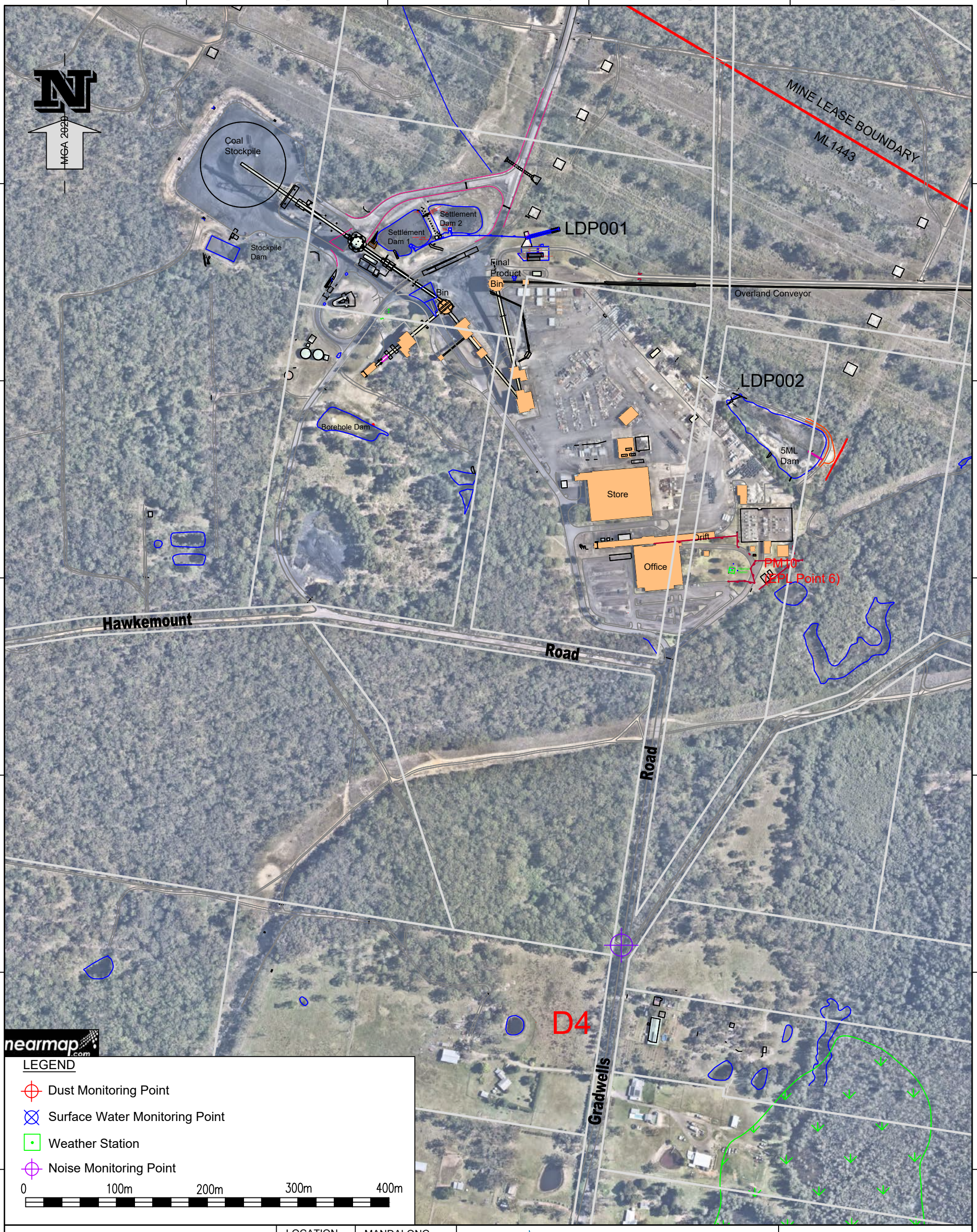

LOCATION	MANDALONG
SEAM	WEST WALLARAH
DRAWN	PJS 08/10/07
CHECKED	
APPROVED	

SCALE 1 : 4000

CENTENNIAL MANDALONG

Cooranbong Pit Top
Location of Environmental Monitoring Points

CONTRACT

PLOTFILE CM00315_rev0.pdf

A3 **CM00315b**

DRAWING REVISION 0 -22.02.23

LEGEND

- Dust Monitoring Point
- Surface Water Monitoring Point
- Weather Station
- Noise Monitoring Point

LOCATION	MANDALONG
SEAM	WEST WALLARAH
DRAWN	PJS 08/10/07
CHECKED	
APPROVED	
SCALE	1: 5000

CENTENNIAL MANDALONG

Delta Entry Site - Location of Environmental Monitoring Points

CONTRACT

PLOTFILE: CM00315c_rev0.pdf

A3 **CM00315c**

DRAWING REV. 0 - 22.02.2023

LEGEND

- Dust Monitoring Point
- Surface Water Monitoring Point
- Weather Station
- Noise Monitoring Point

0 100m 200m 300m 400m

LOCATION	MANDALONG
SEAM	WEST WALLARAH
DRAWN	PJS 08/10/07
CHECKED	
APPROVED	
SCALE	1 : 5,000

CENTENNIAL MANDALONG

Mandalong Mine
Location of Environmental Monitoring Points

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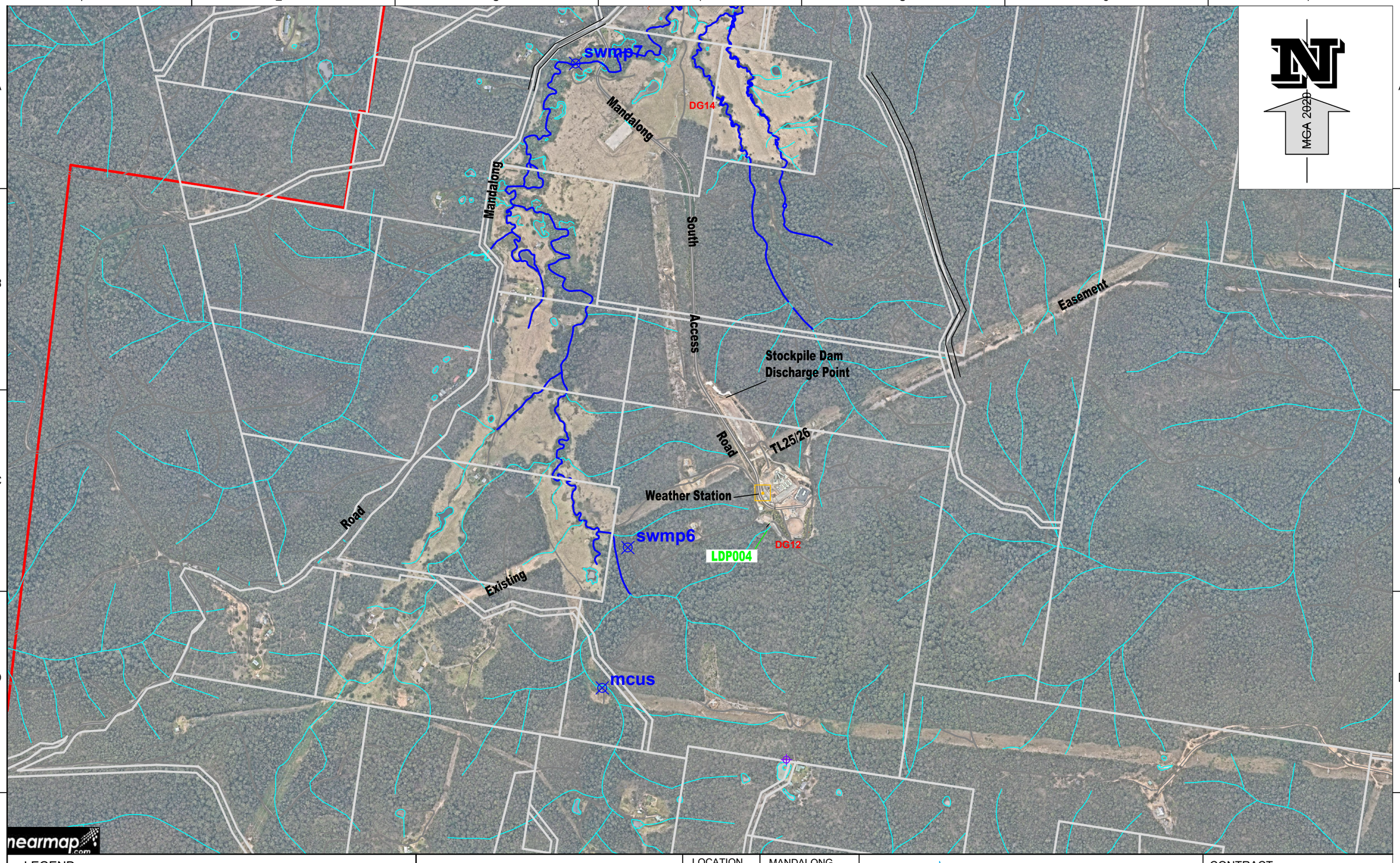
REVISION	Rev 1 13/03/23



LEGEND

- Dust Monitoring Point
- Surface Water Monitoring Point
- Licence Discharge Point
- Weather Station
- Noise Monitoring Point

0 100m 200m 300m 400m

LOCATION	MANDALONG
SEAM	WEST WALLARAH
DRAWN	PJS 08/10/07
CHECKED	
APPROVED	

SCALE 1 : 12,500

CENTENNIAL MANDALONG

Mandalong South Surface Site
Location of Environmental Monitoring Points

CONTRACT	
PLOTFILE	CM00315_rev0.pdf
A3	CM00315F
REVISION	0 22/02/2023

APPENDICES

Appendix 1: Independent Environmental Audit Action Plan

Mandalong Mine Independent Environmental Audit 2022 – Action Plan

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
SSD-5144 S3 – 2	**Operational Noise Criteria** **Low level non-compliance** **Auditor Finding:** Monitoring conducted by GHD at monitoring locations R16 and R17 on 6 December 2021 recorded noise criteria exceedances as follows- • R16 (Day) - 39dBa (criteria 35dBa). • R16 (Night) - 41dBa (criteria 35dBa). • R17 (Night) - 41dBa (criteria 35dBa). The operational ventilation fan speeds at the MSSS were increased from 540 revolutions per minute (rpm) to 615 rpm at 7.30am on 3/12/2021. The increase in fan speed was required to improve ventilation to the underground workings, specifically in Tailgate 34 (TG34) as a result of increased methane emission rates within the panel. The increase in fan speed was undertaken to ensure a safe working environment for underground employees in TG34. A Penalty Notice was issued to Centennial Mandalong on 17 March 2022 in relation to the December exceedances. The Penalty Notice requires the following actions to be undertaken: - increase frequency of monitoring of MSSS locations from quarterly to monthly for 12 months - prepare an Action Plan which commits to a timeline to implement engineering controls	Environmental Coordinator / Mandalong South Project Manager.	a) Implement MSSS Noise Mitigation Action Plan and provide further update to DPE in July 2022. b) Consult with DPE and EPA regarding timing to implement actions as timeframes in MSSS Noise Mitigation Action Plan are longer than EPA requirements in letter dated 10 March 2022.	a) Complete b) Complete	a) Quarterly updates provided to DPE in 2022 and 2023 until project completion (installation of three new outlet silencers) in October 2023. b) Action Plan submitted to DPE on 26 May 2022 and the EPA on 7 June 2022. The consultation with EPA included notification that the MSSS ventilation fan mitigation works were unable to be undertaken by 31 October 2022 (as required by EPA Warning Letter of 10 March 2022).

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
	- maintain ventilation fan speeds at 540rpm until engineering controls are complete. Noise levels were compliant in the March 2022 monitoring. Centennial Mandalong confirmed that the Northern Region Noise Management Plan has been updated in March 2022 to include the requirement for monthly monitoring at MSSS sites, and monthly noise monitoring commenced in April 2022. The updated Northern Region Noise Management Plan was approved by the DPE on 24 March 2022. The Action Plan was provided to the DPE on 26 May 2022, which acknowledged receipt of the Action Plan on 30 May 2022. **Recommendation:** NC REC 1 - Implement MSSS Noise Mitigation Action Plan and provide further update to DPE in July 2022. Consult with DPE and EPA regarding timing to implement actions as timeframes in MSSS Noise Mitigation Action Plan are longer than EPA requirements in letter dated 10 March 2022.				
SSD-5144 S3 – 13	**Water Pollution** **Low level non-compliance** **Auditor Finding:** There were incidents during the audit period as a result of significant rainfall above design parameters. Evidence of flocculation, incident management and reporting was provided by Centennial Mandalong. Non - Compliance 1: Discharge from MSSS Stockpile Dam	Environmental Coordinator	Update the Water Management Plan following recent DPE review and incident to include details on recent water management upgrades.	29 June 2022	Completed. Updated Water Management Plan provided to DPE on 29 June 2022. The Water Management Plan was approved by DPE on 23 December 2022.

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
	on 27 July 2020. Non - Compliance 2: Discharge from MSSS Stockpile Dam on 9 February 2020. Non - Compliance 3: Discharge from MSSS Stockpile Dam on 2/3 March 2022 Centennial Mandalong confirmed that the pumping capacity was upgraded from 30 litres per second to 60 litres per second at the MSSS Stockpile Dam with dedicated diesel pumps in April 2022. The Water Management Plan is currently being updated following the March 2022 non-compliance. **Recommendation**: NC REC 2: Update the Water Management Plan following recent DPE review and incident to include details on recent water management upgrades e.g. pumping capacity.				
EPL 365 M2.2	**Air Monitoring Requirements** **Low level non-compliance** **Auditor Finding:** Non – Compliance - Monitoring Point 6 failed to monitor PM10 continuously in accordance with Condition M2.2 during the reporting period due to equipment malfunction, power outages or planned maintenance activities. Monitoring was conducted on 345 days in 2021 (94.5% availability).	Environmental Coordinator / Cooranbong CHP Superintendent	Investigate options for SMS alarms in the event of equipment malfunction or power outages to ensure a faster response time to faults or power outages.	31 December 2022	Completed. The installation of an electrical apparatus, an uninterruptible power supply (UPS) device that allows the dust monitor to keep running for at least a short time when incoming power is interrupted was completed in July 2022. This will reduce the impact of future unplanned power

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
	Centennial Mandalong stated that In the event of power outages, a reset of the monitoring equipment is undertaken by an environmental technician or site electrical personnel. **Recommendation:** NC REC 3: Investigate options for SMS alarms in the event of equipment malfunction or power outages to ensure a faster response time to faults or power outages.				outages.
SSD-5144 S2 - 13	**Recommendation** IMP REC 1 Continue to work with DPE to surrender DA 97/800 in accordance with EP&A Act.	Environmental Coordinator	DPE have granted an extension to surrender DA97/800 until 30 September 2022.	30 September 2022	Completed. A notice of consent surrender was submitted to DPE on 10 August 2022. The Department notified Centennial Mandalong on 29 August 2023 that DA97/800 had been voluntarily surrendered pursuant to section 4.63 of the Environmental Planning and Assessment Act 1979 and section 68 of the Environmental Planning and Assessment Regulation 2021.
SSD-5144 S3 - 3		Environmental Coordinator	Update Noise Management Plan to address predictions and forecasting (or explain why not required).	24 October 2022	The following advice was provided by a GHD noise expert on this recommendation on 8 August 2022 –

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
	Recommendation IMP REC 2 The Northern Region Noise Management Plan should be updated to address predictions and forecasting (or explain why not required).			Revision of Noise Management Plan to be undertaken within 3 months of the IEA report submission and within 4 weeks of conducting the review in accordance with Condition 7(c) Schedule 6 of SSD-5144	*The recent MSSS calibrated noise model assessment for the mitigation works has generated a calibrated noise model for the existing MSSS vent fan operation. In addition, as part of this assessment the noise modelling will forecast the likely noise levels under worst-case operational conditions under noise enhancing conditions for the MSSS and the proposed mitigation works.* Therefore, an update to the Noise Management Plan is not required at this time.
SSD-5144 S3 - 17	**Recommendation** IMP REC 3 Drain leading to MMAS Helipad Dam needs haybales or similar (possibly small rock structure) to manage heavy flow. Current sediment fence not adequate for concentrated flow.	Environmental Coordinator	Review and upgrade helipad sediment controls.	30 September 2022	The helipad sediment controls have been reviewed by the Environment & Community Superintendent. The sediment controls were installed in 2020 when a drain was installed to reduce water pooling on helipad. The drain is now grassed and stable. The

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
					sediment controls are no longer required and were removed on 20 July 2022.
SSD-5144 S3 - 17	**Recommendation** IMP REC 4 Repair catch drains on the access road to the MMAS ventilation facility (near pit top). The drains have become blocked with gravel and sediment.	Environmental Coordinator	Review and upgrade ventilation fan access road drains.	30 September 2022	Completed. Catch drains were repaired on 24 August 2022.
SSD-5144 S3 - 17	**Recommendation** IMP REC 5 There is some minor erosion along roads at MSSS that can be repaired. There is a drain at MSSS that needs to be re-graded as water from this drain is unlikely to drain to the sediment dam. It appears the grades in the middle of the drain are slightly higher than the at the end of the drain.	Environmental Coordinator / Mandalong South Project Manager.	Repair erosion along MSSS roads and re-grade drain to Sediment Dam.	30 September 2022	Completed. Erosion along MSSS roadway and re-grade of drain to the Sediment Dam were completed in September 2022.
SSD-5144 S3 - 19	**Recommendation** IMP REC 6 Include any details of vertebrate pest (ferals) management in the Annual Review.	Environmental Coordinator	2022 Annual Review to include details on vertebrate pest management	31 March 2023	Completed. Included in Section 8.2.7 of the Mandalong 2022 Annual Review.
SSD-5144 S3 - 19	**Recommendation** IMP REC 7 Check ratio to replace hollow bearing trees with nest boxes is consistent across documentation	Environmental Coordinator	Review ratio to replace hollow bearing trees with nest boxes is consistent across documentation	31 December 2022	Schedule 3 Condition 19 of SSD-5144 requires *"…replace cleared hollow-bearing trees with appropriate nest boxes at a ratio of at least 2:1."*

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
					SSD-5144 Appendix 8: Statement of Commitments Flora & Fauna for the construction of the MSSS includes a commitment that nest boxes will be installed at a ratio of 1:1 (i.e. one nest box for every one habitat hollow removed). SSD-5144 Appendix 8: Statement of Commitments (Mod 7 – construction of a 33kV powerline) includes a commitment that hollow bearing trees are to be replaced by nest boxes at a ratio of at least 1:1. MSSS construction – 18 hollows were removed, and 18 nest boxes were installed. TL24 relocation – 79 hollows were removed, and 140 nest boxes were installed. 33kV powerline construction – 170 hollows were removed, and 170

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
					next boxes were installed.
SSD-5144 S3–31 & ML 1722 Condition 2	**Recommendation** IMP REC 8 The ongoing weed management program should target Rhodes grass in rehabilitation areas and reduce the spread into future rehabilitation areas at the MSSS	Environmental Coordinator	MSSS weed management program to target Rhodes Grass in rehabilitation areas.	31 December 2022	Ongoing. Kleinfelder commenced works at the MSSS targeting Rhodes Grass in August 2022. These works continued in late 2022, 2023, 2024 and will continue in 2025.
SSD-5144 S3-32 & ML 1722 Condition 2	**Recommendation** IMP REC 9 Undertake rehabilitation of the MSSS stockpile to achieve the temporary final landform.	Environmental Coordinator	Complete rehabilitation of the MSSS stockpile.	31 December 2022	Completed Shaping and hydro-seeding completed in October 2022.
SSD-5144 S3-32 & ML 1722 Condition 2	**Recommendation** IMP REC 10 Review cover crops species proposed for MSSS stockpile to ensure includes native species that will survive until mine closure (15 years).	Environmental Coordinator	Complete a review of the cover crops species proposed for MSSS stockpile to ensure includes native species that will survive until mine closure (15 years).	31 August 2022	Completed. Global Soil Systems confirmed seed list for MSSS stockpile rehabilitation is as per the SLR Rehabilitation Management Plan recommendation. Mandalong will monitor the rehabilitation success to determine if future native species seeding is required.

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
SSD-5144 S3-33	**Recommendation** IMP REC 11 Major changes to Schedule 3 Condition 33 as a result of Mod 10 should be addressed in the preparation of the RMP by Centennial Mandalong.	Environmental Coordinator	Prepare Rehabilitation Strategy	30 September 2022	Completed. Rehabilitation Strategy submitted to DPE for approval on 30 September 2022.
SSD-5144 S4-1	**Recommendation** IMP REC 12 The Subsidence Impact Performance Measure table in the Annual Review should include an extra column with current status of each feature	Mining Approvals Coordinator	2022 Annual Review to include status of each feature in Subsidence Impact Performance Measure table.	31 March 2023	Completed. Addressed in Table 6-25 of the 2023 Annual Review.
SSD-5144 S6-7	**Recommendation** IMP REC 13 The date of previous revisions should be included in future management plan updates	Environmental Coordinator	The date of previous revisions will be included in future management plan updates.	Noted	Ongoing
SSD-5144 SOC Flora & Fauna	**Recommendation** IMP REC 14 Dirty equipment to be washed prior to leaving MSSS to prevent spread of sediment offsite.	Mandalong South Project Manager.	Centennial Mandalong to ensure equipment cleaned prior to leaving the MSSS.	Noted	Ongoing
SSD-5144 SOC Bushfire	**Recommendation** IMP REC 15 Investigate options for a dedicated bunker/safe space at	Mandalong South Project Manager.	Following the completion of construction, Centennial Mandalong will investigate options for a dedicated bunker/safe	31 December 2024	Completed – designated safe space has been determined at MSSS and sign-posted. Inspected by RFS in February 2024 and

Approval & Condition Number	Recommendation	Action Owner	Action Description	Action Due Date	Completion Date
	MSSS in consultation with RFS.		space at MSSS in consultation with RFS.		deemed adequate.
ML 1793 Condition 2	**Recommendation** IMP REC 16 Area at Cooranbong above conveyor drift requires additional stabilisation	Environmental Coordinator	Additional stabilisation to be considered above the Cooranbong conveyor drift.	31 December 2022	Completed. Additional seeding was undertaken and the area was stable as of December 2022.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