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## **15. APPENDICES**

### **Appendix 1: EPL 2504 Annual Return - 2022/2023**



## A. Statement of Compliance - Licence Details

**ALL Licence holders must check that the Licence details in Section A are correct.**

If there are changes to any of these details, **you must advise Environment Protection Authority (EPA) and apply as soon as possible for a variation to your Licence or for a Licence transfer.**

Licence variation and transfer application forms are available on the EPA website at: <http://www.epa.nsw.gov.au/licensing-and-regulation/licensing> or from regional offices of the EPA, or by contacting by telephone 02 9995 5700.

If you are applying to vary or transfer your Licence, you must still complete and submit this Annual Return.

### A1. Licence holder

**Licence number** : 2504  
**Licence holder** : ENDEAVOUR COAL PTY LIMITED  
**Trading name (if applicable)** :  
**ABN** : 38 099 830 476  
**ACN** : 099 830 476  
**Reporting period** : From: 1-2-2022 To: 31-1-2023

### A2. Premises to which Licence Applies (if applicable)

**Common name (if any)** : 3. APPIN COLLIERY - NORTH (AND WESTCLIFF COAL PREP PLANT)  
**Premises** : WEDDERBURN ROAD APPIN 2560 NSW

### A3. Activities to which Licence Applies

Mining for coal  
Waste disposal (application to land)  
Coal works

### A4. Other Activities (if applicable)

Electricity generation  
Resource Recovery

### A5. Fee-Based Activity Classifications

**Note** that the fee based activity classification is used to calculate the administrative fee.



Fee-based activity	Activity scale	Unit of measure
Mining for coal	> 3,500,000.00 - 5,000,000.00	T annual production capacity
Waste disposal by application to land	> 0.00	capacity
Coal works	> 2,000,000.00 - 5,000,000.00	T annual handing capacity

## A6. Assessable Pollutants (if applicable)

**Note** that the identification of assessable pollutants is used to calculate the **load-based fee**. The following assessable pollutants are identified for the fee-based activity classifications in the licence:

## B. Monitoring and Complaints Summary

### B1. Number of Pollution Complaints

Pollution Complaint Category	Complaints
Air	0
Water	0
Noise	0
Waste	0
Other	4
<b>Total complaints recorded by the licensee during the reporting period</b>	<b>4</b>

### B2. Concentration Monitoring Summary

For each concentration monitoring point identified in your licence, details are displayed below. If concentration monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

**Note** that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

#### Monitoring Point 4

##### Discharge quality monitoring

Volume Monitoring, Sampling tap in settling chamber of sewage treatment plant.

lat. long. -34.231323 150.829629

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Biochemical oxygen demand	milligrams per litre	11	11	<2	6	25
pH	pH	11	11	7.6	7.9	8.1



## Discharge & Monitoring Point 10

### Discharge to waters

#### Discharge quality monitoring

Volume monitoring, Pipe discharge outlet from Brennans Creek dam to the creek.

lat. long. -34.206432 150.802706

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	12	12	0.09	0.25	0.60
Arsenic (dissolved)	micrograms per litre	12	12	<1	2	4
Bicarbonate alkalinity	milligrams per litre	12	12	354	635	859
Cadmium (dissolved)	micrograms per litre	12	12	<0.1	<0.1	<0.1
Cobalt (dissolved)	micrograms per litre	12	12	<0.1	0.1	0.2
Conductivity	microsiemens per centimetre	12	12	794	1381	1760
Copper (dissolved)	micrograms per litre	12	12	1	3	4
Lead (dissolved)	micrograms per litre	12	12	<1	1	1
Manganese (dissolved)	micrograms per litre	12	12	<1	9	23
Nickel (dissolved)	micrograms per litre	12	12	5	14	20
Nitrogen (ammonia)	micrograms per litre	12	12	<10	21	30
Nitrogen (total)	micrograms per litre	12	12	100	433	900
Oxidised nitrogen	micrograms per litre	12	12	20	193	710
pH	pH	12	12	8.1	8.5	8.9
Total alkalinity	milligrams per litre	12	12	354	701	981
Total dissolved solids	milligrams per litre	12	12	508	862	1060
Total suspended solids	milligrams per litre	12	12	<5	8	34
Turbidity	nephelometric turbidity units	Continuous	Continuous	1.7	23.2	199.7
Zinc (dissolved)	micrograms per litre	12	12	<5	7	12

## Monitoring Point 11

Ambient water quality monitoring, Georges River approximately 50 metres upstream of the confluence with Brennans Creek.

lat. long. -34.204883 150.798824

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	12	12	95	133	166
pH	pH	12	12	5.2	6.2	7.5
Total suspended solids	milligrams per litre	12	12	<5	7	18

## Monitoring Point 12

Ambient water quality monitoring, Georges River approximately 50 metres downstream of the confluence with Brennans Creek.

lat. long. -34.204099 150.798345

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	12	12	188	821	1230
pH	pH	12	12	6.4	7.4	8.8
Total suspended solids	milligrams per litre	12	12	<5	9	32

## Discharge & Monitoring Point 18

Discharge to waters.

Discharge quality and volume monitoring, Underflow from the stormwater filter lagoon discharging through a v-notch weir.

lat. long. -34.210467 150.796312

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	0	0	-	-	-
Total suspended solids	milligrams per litre	0	0	-	-	-



## Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring., Dyna Sand Filter outlet for treated stormwater.

lat. long. -34.211010 150.795734

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	12	12	6.7	7.3	8.0
Total suspended solids	milligrams per litre	12	12	<5	7	13

## Discharge & Monitoring Point 23

Discharge to waters

Water quality monitoring

Discharge volume monitoring, Piped discharge outlet for stormwater.

lat. long. -34.220956 150.719136

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	12	12	7.3	7.7	8.1
Total suspended solids	milligrams per litre	12	12	<5	6	9

## Discharge & Monitoring Point 24

Discharge to waters

Water quality monitoring Discharge volume monitoring, Piped discharge of treated mine water at Appin (West).

lat. long. -34.220870 150.719059

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	12	12	0.0004	0.0032	0.0137
Arsenic (dissolved)	micrograms per litre	12	12	<0.1	0.7	1.2
Bicarbonate alkalinity	milligrams per litre	12	12	46	93	128
Cadmium (dissolved)	micrograms per litre	12	12	<0.02	<0.02	<0.02



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Cobalt (dissolved)	micrograms per litre	12	12	<0.02	0.15	0.30
Conductivity	microsiemens per centimetre	12	12	112	202	292
Copper (dissolved)	micrograms per litre	12	12	<0.05	0.16	0.56
Lead (dissolved)	micrograms per litre	12	12	<0.05	<0.05	<0.05
Manganese (dissolved)	micrograms per litre	12	12	<0.05	0.17	0.33
Nickel (dissolved)	micrograms per litre	12	12	0.20	2.36	4.50
Nitrogen (ammonia)	micrograms per litre	12	12	106	204	296
Nitrogen (total)	micrograms per litre	12	12	140	246	380
Oxidised nitrogen	micrograms per litre	12	12	23	43	102
pH	pH	12	12	7.0	7.6	8.3
Total alkalinity	milligrams per litre	12	12	46	93	128
Zinc (dissolved)	micrograms per litre	12	12	<0.5	2.2	8.4

## Monitoring Point 27

PM10 Monitoring, Photometer "AE-PF1" is located at the NE corner of the property boundary near the truck entry/exit point at Appin East.  
lat. long. -34.209797 150.794101

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	0.36	7.77	38.50

## Monitoring Point 28

PM10 Monitoring, Photometer "AE-PF3" is located at the NW corner of the property boundary Appin East.  
lat. long -34.209197 150.789919



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Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	0.19	3.95	23.80

## Monitoring Point 35

PM10 Monitoring, Photometer "W-PF1" is located at the junction of Appin Road and Wedderburn Road at Appin North.

lat. long. -34.236380 150.833600

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	1.51	9.75	40.75

## Discharge & Monitoring Point 38

Discharge to utilisation area

Water quality monitoring

Volume Monitoring, Pipe discharge to the utilisation area from the stabilisation lagoon of the sewage treatment plant at Appin West.

lat. Long. -34.217742 150.716151

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
BOD	milligrams per litre	12	12	5	12	23
pH	pH	12	12	7.1	7.4	7.7

## Discharge & Monitoring Point 40

Discharge to water

Water quality monitoring

Volume monitoring, Piped discharge of treated mine water at Appin (North).

lat. long. -34.206601 150.802954





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Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	10	10	0.0006	0.0009	0.0016
Arsenic (dissolved)	micrograms per litre	10	10	0.2	0.5	0.8
Bicarbonate alkalinity	milligrams per litre	10	10	66	86	104
Cadmium (dissolved)	micrograms per litre	10	10	<0.02	<0.02	<0.02
Cobalt (dissolved)	micrograms per litre	10	10	<0.02	0.03	0.04
Conductivity	microsiemens per centimetre	10	10	128	174	211
Copper (dissolved)	micrograms per litre	10	10	<0.05	0.08	0.14
Lead (dissolved)	micrograms per litre	10	10	<0.05	0.06	0.17
Manganese (dissolved)	micrograms per litre	10	10	<0.05	0.19	0.32
Nickel (dissolved)	micrograms per litre	10	10	0.30	0.67	1.20
Nitrogen (ammonia)	micrograms per litre	10	10	60	272	405
Nitrogen (total)	micrograms per litre	10	10	130	368	780
Oxidised nitrogen	micrograms per litre	10	10	18	55	90
pH	pH	10	10	7.0	7.7	8.5
Total alkalinity	milligrams per litre	10	10	57	85	104
Turbidity	nephelometric turbidity units	10	10	<0.1	0.1	0.4
Zinc (dissolved)	micrograms per litre	10	10	<0.5	1.6	3.9

## Discharge & Monitoring Point 41

### Discharge to water

Water quality monitoring, Piped discharge outlet from stormwater dam.

Menangle Vent Shaft 7 & 8.

lat. long.



Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	0	0	-	-	-
Total suspended solids	milligrams per litre	0	0	-	-	-

### B2 Concentration Monitoring Comments

Point 4: No discharge for month of June. Point 18: No discharge since 2012. Point 40: The temporary water treatment plant operated inconsistently over the month of July resulting in no sample being taken. The May 2022 data has been removed from the dataset due to the limit of reporting negatively influencing the calculations. The permanent WTP started in Jan 2023 and all the water was discharged to BCD as opposed to LDP40.

### B3. Volume or Mass Monitoring Summary

For each volume or mass monitoring point identified in your licence, details are displayed below. If volume or mass monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

**Note** that this does not exclude the need to conduct appropriate volume or mass monitoring of assessable pollutants are required by load-based licensing (if applicable).

#### Monitoring Point 4

##### Discharge quality monitoring

Volume Monitoring, Sampling tap in settling chamber of sewage treatment plant.

lat. long. -34.231323 150.829629

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	6.7	470.7

#### Discharge & Monitoring Point 10

##### Discharge to waters

##### Discharge quality monitoring

Volume monitoring, Pipe discharge outlet from Brennans Creek dam to the creek.

lat. long. -34.206432 150.802706

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	398	495

#### Monitoring Point 13

Volume monitoring, Flow monitoring location for point 10 discharge

lat. long. -34.207050 150.803135



Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	3065	3794

### Discharge & Monitoring Point 18

Discharge to waters.

Discharge quality and volume monitoring, Underflow from the stormwater filter lagoon discharging through a v-notch weir.

lat. long. -34.210467 150.796312

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	0	-	-	-

### Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring., Dyna Sand Filter outlet for treated stormwater.

lat. long. -34.211010 150.795734

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	626	1468

### Discharge & Monitoring Point 24

Discharge to waters

Water quality monitoring Discharge volume monitoring, Piped discharge of treated mine water at Appin (West).

lat. long. -34.220870 150.719059

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	1153	3852
KL/month	Continuous during discharge	Continuous	17891	35430	75220

### Discharge & Monitoring Point 38

Discharge to utilisation area

Water quality monitoring

Volume Monitoring, Pipe discharge to the utilisation area from the stabilisation lagoon of the sewage treatment plant at Appin West.

lat. Long. -34.217742 150.716151



Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	30	55

## Discharge & Monitoring Point 40

### Discharge to water

#### Water quality monitoring

Volume monitoring, Piped discharge of treated mine water at Appin (North).

lat. long. -34.206601 150.802954

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	360	1140

### B3 Mass Monitoring Comments

No discharge from Point 18 since 2012.

## C. Statement of Compliance - Licence Conditions

### C1. Compliance with Licence Conditions

Were all conditions of the licence complied with (including monitoring and reporting requirements)?	<b>No</b>
-----------------------------------------------------------------------------------------------------	-----------

### C2. Details of Non-Compliance with Licence

<b>Licence condition number not complied with ▼</b>
L2.1
<b>Summary of particulars of the non-compliance ▼</b>
The 50 percentile concentration limit for Nitrogen (total) was exceeded at Point 24 for the reporting period. (Limit = 250 µg/L, calculated 50 percentile concentration = 260 µg/L). There were 6 results that contributed to the non-compliance
<b>Further details on particulars of non-compliance, if required ▼</b>
The 6 results that contributed to the non-compliance occurred on: 21/2/22, 22/3/22, 23/8/22, 20/9/22, 19/10/22, 18/1/23
<b>Number of times occurred ▼</b>
1
<b>Date(s) when the non-compliance occurred, if applicable ▼</b>
N/A



**Cause of non-compliance ▼**

There are elevated levels of ammonia in the underground feed water that are unable to be removed by pre-treatment systems and the reverse osmosis plant.

**Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼**

A study was implemented to assess the cause of elevated levels of Total Nitrogen. The concentrations of Total Nitrogen in water discharged are lower than background levels recorded in Allens Creek.

**Action taken or that will be taken to prevent a recurrence of the non-compliance ▼**

An application for variation of EPL 2504 is planned to be submitted to increase the water quality concentration limit for Total Nitrogen.

**Uploaded Document Name ▼**

**Uploaded Document Description ▼**

**Licence condition number not complied with ▼**

O1.1

**Summary of particulars of the non-compliance ▼**

The Independent Environmental Audit conducted in November 2022 found a non-compliance with Condition O1.1 in relation to the storage of materials at Appin West

**Further details on particulars of non-compliance, if required ▼**

"There were large quantities of materials stored unprotected directly on gravel and soil at Appin West. Several items stored here contained hoses and other vessels with leaking oil and other fluids. There were numerous stains visible across the gravel storage areas that were derived from fluids other than water and indicative of localised ground contamination."

**Number of times occurred ▼**

1

**Date(s) when the non-compliance occurred, if applicable ▼**

Prior to 10 November 2022

**Cause of non-compliance ▼**

Equipment was not placed in designated sealed areas.

**Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼**

The spills identified are considered to be minor in nature and have resulted in localised surface staining only. Areas where spillage was observed report to the on-site water treatment system. It is not considered that these spills have caused actual or have the potential to cause material environmental harm.

**Action taken or that will be taken to prevent a recurrence of the non-compliance ▼**

IMC will investigate and implement reasonable and feasible measures to improve housekeeping, in particular, the storage of items with potential to leak oil and other fluids. Improvements made will be reported within the relevant Annual Review.

**Uploaded Document Name ▼**



Uploaded Document Description ▼

## D. Statement of Compliance - Load Based Fee Calculation

If you are not required to monitor assessable pollutants by your licence, **no data** will appear below.

If assessable pollutants have been identified on your licence, the following worksheets for each assessable pollutant will determine your load based fee for the licence fee period to which this Annual Return relates.

**Loads of assessable pollutants must be calculated using any of the methods provided in EPA's Load Calculation Protocol for the relevant activity.** A Load Calculation Protocol would have been already sent to you with your licence. If you require additional copies, you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

## E. Statement of Compliance - Requirement to Prepare PIRMP

<b>Have you prepared a Pollution Incident Response Management Plan (PIRMP) as required under section 153A of the Protection of the Environment Operations (POEO) Act 1997?</b>	<b>Yes</b>
Is the PIRMP available at the premises?	<b>Yes</b>
Is the PIRMP available in a prominent position on a publicly accessible website?	<b>Yes</b>
Address of the web page where the PIRMP can be accessed ▼	
<a href="https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/management-plans/pollution-incident-response-management-plan-epl-2504.pdf?sfvrsn=62db166f_19">https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/management-plans/pollution-incident-response-management-plan-epl-2504.pdf?sfvrsn=62db166f_19</a>	
Has the PIRMP been tested?	<b>Yes</b>
The PIRMP was last tested on	<b>2-11-2022</b>
Has the PIRMP been updated?	<b>Yes</b>
The PIRMP was last updated on	<b>6-3-2023</b>
Number of times the PIRMP was activated in this reporting period?	<b>0</b>
The PIRMP was activated on	

## F. Statement of Compliance - Requirement to Publish Pollution Monitoring Data



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ENDEAVOUR COAL PTY LIMITED

Licence 2504

Are there any conditions attached to your licence that require pollution monitoring to be undertaken as required under section 66(6) of the Protection of the Environment Operations (POEO) Act 1997?	Yes
Do you operate a website?	Yes
Is the pollution monitoring data published on your website in accordance with the EPA's written requirements for publishing pollution monitoring data?	Yes
Address of the web page where the pollution monitoring data can be accessed ▼	
<a href="https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents</a>	

## G. Statement of Compliance - Environment Management System and Practices

Do you have an ISO 14001 certified Environmental Management System (EMS) OR any other system that EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 certified EMS?	Yes
When was the last check (As per ISO 14001) of the EMS completed?	6-6-2022
Were there any non-conformances related to environmental issues identified in the last check of the EMS?	No
If there were non-conformances identified, were these non-conformances rectified?	

## H. Signature and Certification

This Annual Return may only be signed by person(s) with legal authority to sign it as set out in following categories: an Individual, a Company, a Public authority or a Local council.

It is an offence under section 66 of the Protection of the Environment Operations Act 1997 to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation and \$120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in Section B of this Annual Return application is correct and not false or misleading in a material respect, and
- certify that the information in the Statement and Compliance in sections A, C, D, E, F, G and H and any other pages attached to Section C is correct and not false or misleading in a material respect.

Signature	
Name	



# Annual Return

ENDEAVOUR COAL PTY LIMITED

Licence 2504

<b>Position</b>	
<b>Date</b>	/ /
<b>Declaration</b>	
<p><b>I declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and</b></p>	
<p><b>I certify that the information in the Statement of Compliance in section A,C,D,E,F and G and any pages attached to Section C is correct and not false or misleading in a material respect.</b></p>	





## A. Statement of Compliance - Licence Details

**ALL Licence holders must check that the Licence details in Section A are correct.**

If there are changes to any of these details, **you must advise Environment Protection Authority (EPA) and apply as soon as possible for a variation to your Licence or for a Licence transfer.**

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If you are applying to vary or transfer your Licence, you must still complete and submit this Annual Return.

### A1. Licence holder

**Licence number** : 2504  
**Licence holder** : ENDEAVOUR COAL PTY LIMITED  
**Trading name (if applicable)** :  
**ABN** : 38 099 830 476  
**ACN** : 099 830 476  
**Reporting period** : From: 1-2-2023 To: 30-6-2023

### A2. Premises to which Licence Applies (if applicable)

**Common name (if any)** : 3. APPIN COLLIERY - NORTH (AND WESTCLIFF COAL PREP PLANT)  
**Premises** : WEDDERBURN ROAD APPIN 2560 NSW

### A3. Activities to which Licence Applies

Mining for coal  
Waste disposal (application to land)  
Coal works

### A4. Other Activities (if applicable)

Electricity generation  
Resource Recovery

### A5. Fee-Based Activity Classifications

**Note** that the fee based activity classification is used to calculate the administrative fee.



Fee-based activity	Activity scale	Unit of measure
Mining for coal	> 3,500,000.00 - 5,000,000.00	T annual production capacity
Waste disposal by application to land	> 0.00	capacity
Coal works	> 2,000,000.00 - 5,000,000.00	T annual handing capacity

## A6. Assessable Pollutants (if applicable)

**Note** that the identification of assessable pollutants is used to calculate the **load-based fee**.

The following assessable pollutants are identified for the fee-based activity classifications in the licence:

## B. Monitoring and Complaints Summary

### B1. Number of Pollution Complaints

Pollution Complaint Category	Complaints
Air	1
Water	0
Noise	2
Waste	0
Other	6
<b>Total complaints recorded by the licensee during the reporting period</b>	<b>9</b>

### B2. Concentration Monitoring Summary

For each concentration monitoring point identified in your licence, details are displayed below. If concentration monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

**Note** that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

#### Monitoring Point 4

Discharge quality monitoring

Volume Monitoring, Sampling tap in settling chamber of sewage treatment plant.

lat. long. -34.231323 150.829629

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Biochemical oxygen demand	milligrams per litre	5	5	2	7	18
pH	pH	5	5	7.63	7.82	8.36



## Discharge & Monitoring Point 10

### Discharge to waters

#### Discharge quality monitoring

Volume monitoring, Pipe discharge outlet from Brennans Creek dam to the creek.

lat. long. -34.206432 150.802706

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	5	5	0.04	0.27	0.36
Arsenic (dissolved)	micrograms per litre	5	5	1	5	6
Bicarbonate alkalinity	milligrams per litre	5	5	599	746	958
Cadmium (dissolved)	micrograms per litre	5	5	<0.1	<0.1	<0.1
Cobalt (dissolved)	micrograms per litre	5	5	<1	2	3
Conductivity	microsiemens per centimetre	5	5	1520	1742	1940
Copper (dissolved)	micrograms per litre	5	5	<1	3	4
Lead (dissolved)	micrograms per litre	5	5	<1	<1	<1
Manganese (dissolved)	micrograms per litre	5	5	1	6	11
Nickel (dissolved)	micrograms per litre	5	5	23	27	30
Nitrogen (ammonia)	micrograms per litre	5	5	10	106	400
Nitrogen (total)	micrograms per litre	5	5	400	500	800
Oxidised nitrogen	micrograms per litre	5	5	<10	100	190
pH	pH	5	5	8.26	8.63	8.98
Total alkalinity	milligrams per litre	5	5	698	825	958
Total dissolved solids	milligrams per litre	5	5	876	1010	1160
Total suspended solids	milligrams per litre	5	5	<5	7	11
Turbidity	nephelometric turbidity units	Continuous	Continuous	3.09	23.89	199.91
Zinc (dissolved)	micrograms per litre	5	5	<5	7	14

## Monitoring Point 11

Ambient water quality monitoring, Georges River approximately 50 metres upstream of the confluence with Brennans Creek.

lat. long. -34.204883 150.798824

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	5	5	152	326	672
pH	pH	5	5	6.4	6.94	8.26
Total suspended solids	milligrams per litre	5	5	<5	<5	6

## Monitoring Point 12

Ambient water quality monitoring, Georges River approximately 50 metres downstream of the confluence with Brennans Creek.

lat. long. -34.204099 150.798345

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	5	5	329	639	914
pH	pH	5	5	8.01	8.37	8.78
Total suspended solids	milligrams per litre	5	5	<5	6	10

## Discharge & Monitoring Point 18

Discharge to waters.

Discharge quality and volume monitoring, Underflow from the stormwater filter lagoon discharging through a v-notch weir.

lat. long. -34.210467 150.796312

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	0	0	-	-	-
Total suspended solids	milligrams per litre	0	0	-	-	-



## Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring., Dyna Sand Filter outlet for treated stormwater.

lat. long. -34.211010 150.795734

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	5	5	7.3	7.68	8.42
Total suspended solids	milligrams per litre	5	5	<5	7	10

## Discharge & Monitoring Point 23

Discharge to waters

Water quality monitoring

Discharge volume monitoring, Piped discharge outlet for stormwater.

lat. long. -34.220956 150.719136

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	5	5	7.84	7.98	8.19
Total suspended solids	milligrams per litre	5	5	<5	7	12

## Discharge & Monitoring Point 24

Discharge to waters

Water quality monitoring Discharge volume monitoring, Piped discharge of treated mine water at Appin (West).

lat. long. -34.220870 150.719059

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	5	5	<0.0002	0.0004	0.0006
Arsenic (dissolved)	micrograms per litre	5	5	<0.1	0.2	0.3
Bicarbonate alkalinity	milligrams per litre	5	5	65	85	98
Cadmium (dissolved)	micrograms per litre	5	5	<0.02	<0.02	<0.02



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Cobalt (dissolved)	micrograms per litre	5	5	0.03	0.05	0.09
Conductivity	microsiemens per centimetre	5	5	153	190	236
Copper (dissolved)	micrograms per litre	5	5	<0.05	<0.05	<0.05
Lead (dissolved)	micrograms per litre	5	5	<0.05	<0.05	<0.05
Manganese (dissolved)	micrograms per litre	5	5	<0.05	0.07	0.16
Nickel (dissolved)	micrograms per litre	5	5	0.2	0.5	1
Nitrogen (ammonia)	micrograms per litre	5	5	99	181	269
Nitrogen (total)	micrograms per litre	5	5	190	230	290
Oxidised nitrogen	micrograms per litre	5	5	24	43	70
pH	pH	5	5	7.45	7.75	8.19
Total alkalinity	milligrams per litre	5	5	65	85	98
Zinc (dissolved)	micrograms per litre	5	5	<0.5	0.9	1.6

## Monitoring Point 27

PM10 Monitoring, Photometer "AE-PF1" is located at the NE corner of the property boundary near the truck entry/exit point at Appin East.  
lat. long. -34.209797 150.794101

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	1.31	13.72	119.06

## Monitoring Point 28

PM10 Monitoring, Photometer "AE-PF3" is located at the NW corner of the property boundary Appin East.  
lat. long -34.209197 150.789919



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Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	0.51	5.19	75.65

## Monitoring Point 35

PM10 Monitoring, Photometer "W-PF1" is located at the junction of Appin Road and Wedderburn Road at Appin North.

lat. long. -34.236380 150.833600

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	Continuous	Continuous	2.45	14.58	107.70

## Discharge & Monitoring Point 38

Discharge to utilisation area

Water quality monitoring

Volume Monitoring, Pipe discharge to the utilisation area from the stabilisation lagoon of the sewage treatment plant at Appin West.

lat. Long. -34.217742 150.716151

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
BOD	milligrams per litre	5	5	13	21	28
pH	pH	5	5	7.27	7.51	7.84

## Discharge & Monitoring Point 40

Discharge to water

Water quality monitoring

Volume monitoring, Piped discharge of treated mine water at Appin (North).

lat. long. -34.206601 150.802954



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Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	5	5	0.0003	0.0008	0.0016
Arsenic (dissolved)	micrograms per litre	5	5	<0.1	<0.1	0.1
Bicarbonate alkalinity	milligrams per litre	5	5	16	18	21
Cadmium (dissolved)	micrograms per litre	5	5	<0.02	<0.02	<0.02
Cobalt (dissolved)	micrograms per litre	5	5	<0.02	<0.02	<0.02
Conductivity	microsiemens per centimetre	5	5	19	24	28
Copper (dissolved)	micrograms per litre	5	5	0.14	0.38	0.67
Lead (dissolved)	micrograms per litre	5	5	<0.05	<0.05	<0.05
Manganese (dissolved)	micrograms per litre	5	5	<0.05	0.06	0.07
Nickel (dissolved)	micrograms per litre	5	5	<0.2	<0.2	<0.2
Nitrogen (ammonia)	micrograms per litre	5	5	6	15	36
Nitrogen (total)	micrograms per litre	5	5	10	22	30
Oxidised nitrogen	micrograms per litre	5	5	10	16	27
pH	pH	5	5	6.6	7.04	7.63
Total alkalinity	milligrams per litre	5	5	16	18	21
Turbidity	nephelometric turbidity units	5	5	<0.1	0.2	0.5
Zinc (dissolved)	micrograms per litre	5	5	<0.5	0.9	1.7

## Discharge & Monitoring Point 41

### Discharge to water

Water quality monitoring, Piped discharge outlet from stormwater dam.

Menangle Vent Shaft 7 & 8.

lat. long.





Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
pH	pH	4	4	6.63	7.18	8.2
Total suspended solids	milligrams per litre	4	4	14	57.5	151

### B3. Volume or Mass Monitoring Summary

For each volume or mass monitoring point identified in your licence, details are displayed below. If volume or mass monitoring is not required by your licence, **no data** will appear below.

If data was provided from an uploaded file, the file name will be displayed below instead of any data.

**Note** that this does not exclude the need to conduct appropriate volume or mass monitoring of assessable pollutants are required by load-based licensing (if applicable).

#### Monitoring Point 4

Discharge quality monitoring

Volume Monitoring, Sampling tap in settling chamber of sewage treatment plant.

lat. long. -34.231323 150.829629

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	3.30	195.33

#### Discharge & Monitoring Point 10

Discharge to waters

Discharge quality monitoring

Volume monitoring, Pipe discharge outlet from Brennans Creek dam to the creek.

lat. long. -34.206432 150.802706

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	87.98	250.29

#### Monitoring Point 13

Volume monitoring, Flow monitoring location for point 10 discharge

lat. long. -34.207050 150.803135

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	1198.79	3170.84

## Discharge & Monitoring Point 18

Discharge to waters.

Discharge quality and volume monitoring, Underflow from the stormwater filter lagoon discharging through a v-notch weir.

lat. long. -34.210467 150.796312

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	0	-	-	-

## Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring., Dyna Sand Filter outlet for treated stormwater.

lat. long. -34.211010 150.795734

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	355.08	1443.03

## Discharge & Monitoring Point 24

Discharge to waters

Water quality monitoring Discharge volume monitoring, Piped discharge of treated mine water at Appin (West).

lat. long. -34.220870 150.719059

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous during discharge	Continuous	0	258.28	1497
KL/month	Continuous during discharge	Continuous	3221	7874.2	11981

## Discharge & Monitoring Point 38

Discharge to utilisation area

Water quality monitoring

Volume Monitoring, Pipe discharge to the utilisation area from the stabilisation lagoon of the sewage treatment plant at Appin West.

lat. Long. -34.217742 150.716151

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	29.83	59.67



## Discharge & Monitoring Point 40

Discharge to water

Water quality monitoring

Volume monitoring, Piped discharge of treated mine water at Appin (North).

lat. long. -34.206601 150.802954

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	Highest result
kilolitres per day	Continuous	Continuous	0	1168.45	1800.10

## C. Statement of Compliance - Licence Conditions

### C1. Compliance with Licence Conditions

Were all conditions of the licence complied with (including monitoring and reporting requirements)?	No
-----------------------------------------------------------------------------------------------------	----

### C2. Details of Non-Compliance with Licence

<b>Licence condition number not complied with ▼</b>
Condition L2.4
<b>Summary of particulars of the non-compliance ▼</b>
The Total Suspended Solids water quality concentration limit was exceeded at LDP 41.
<b>Further details on particulars of non-compliance, if required ▼</b>
The Total Suspended Solids limit for LDP 41 in EPL 2504 of 50 mg/L was exceeded on 3 April 2023. The measured water quality concentration was 151 mg/L. LDP 41 is the point the water quality of discharge from the AMVA Project is measured.
<b>Number of times occurred ▼</b>
1
<b>Date(s) when the non-compliance occurred, if applicable ▼</b>
3/04/2023
<b>Cause of non-compliance ▼</b>
The sample taken prior to discharge was not representative of the discharge from the discharge pipe. The sample taken from the discharge pipe indicated that the dosing of the pond had not been effective.
<b>Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼</b>
Discharge had been completed when the water quality results were received. It is not considered that there was any actual or potential for environmental harm.
<b>Action taken or that will be taken to prevent a recurrence of the non-compliance ▼</b>
Discussions were held with the Principal Contractor. Procedures of sampling prior to discharge were reviewed.



<b>Uploaded Document Name ▼</b>
<b>Uploaded Document Description ▼</b>

<b>Licence condition number not complied with ▼</b>
O1
<b>Summary of particulars of the non-compliance ▼</b>
Discharge of turbid water into Foot Onslow Creek.
<b>Further details on particulars of non-compliance, if required ▼</b>
Turbid water was discharged to Foot Onslow Creek from the AMVA Project sediment pond. It is estimated that <5000 L of turbid water was discharged and was observed in approximately 40 metres of the creek. The creek consists of a series of pools and reed beds, that slowed migration of the turbid water downstream and largely contained it to a discrete section of the creek. The creek was not flowing at the time. Apart from suspended solids, there were no other contaminants in the water discharged.
<b>Number of times occurred ▼</b>
1
<b>Date(s) when the non-compliance occurred, if applicable ▼</b>
19 April 2023
<b>Cause of non-compliance ▼</b>
Water was being discharged from the sediment pond to facilitate the final stages of excavation of the pond to its design capacity. As the water level in the sediment pond decreased, the intake pipe for the pump reached the base of the sediment pond and began pumping out turbid water into Foot Onslow Creek. The discharge was not being adequately supervised by the Principal Contractor.
<b>Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼</b>
Clean up activities commenced immediately after identification of the discharge. Sediment on the bank was scraped back and removed, a pump was installed in the creek to pump the turbid water back into the sediment pond, and sediment within the creek was removed by hand. A silt boom was installed to prevent migration of the turbid water further down the creek.
<b>Action taken or that will be taken to prevent a recurrence of the non-compliance ▼</b>
A review was undertaken of the management of the sediment pond. Procedures were revised and have been communicated to the new Principal Contractor on the site. The design of the water discharge system, including consideration of floating offtakes, in-line turbidity monitoring and level sensors is underway.
<b>Uploaded Document Name ▼</b>
<b>Uploaded Document Description ▼</b>

## D. Statement of Compliance - Load Based Fee Calculation



If you are not required to monitor assessable pollutants by your licence, **no data** will appear below.

If assessable pollutants have been identified on your licence, the following worksheets for each assessable pollutant will determine your load based fee for the licence fee period to which this Annual Return relates.

**Loads of assessable pollutants must be calculated using any of the methods provided in EPA's Load Calculation Protocol for the relevant activity.** A Load Calculation Protocol would have been already sent to you with your licence. If you require additional copies, you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

## E. Statement of Compliance - Requirement to Prepare PIRMP

<b>Have you prepared a Pollution Incident Response Management Plan (PIRMP) as required under section 153A of the Protection of the Environment Operations (POEO) Act 1997?</b>	<b>Yes</b>
Is the PIRMP available at the premises?	<b>Yes</b>
Is the PIRMP available in a prominent position on a publicly accessible website?	<b>Yes</b>
Address of the web page where the PIRMP can be accessed ▼	
<a href="https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents</a>	
Has the PIRMP been tested?	<b>Yes</b>
The PIRMP was last tested on	<b>5-7-2023</b>
Has the PIRMP been updated?	<b>Yes</b>
The PIRMP was last updated on	<b>6-3-2023</b>
Number of times the PIRMP was activated in this reporting period?	<b>0</b>
The PIRMP was activated on	

## F. Statement of Compliance - Requirement to Publish Pollution Monitoring Data

<b>Are there any conditions attached to your licence that require pollution monitoring to be undertaken as required under section 66(6) of the Protection of the Environment Operations (POEO) Act 1997?</b>	<b>Yes</b>
Do you operate a website?	<b>Yes</b>
Is the pollution monitoring data published on your website in accordance with the EPA's written requirements for publishing pollution monitoring data?	<b>Yes</b>
Address of the web page where the pollution monitoring data can be accessed ▼	



<https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>

## G. Statement of Compliance - Environment Management System and Practices

Do you have an ISO 14001 certified Environmental Management System (EMS) OR any other system that EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 certified EMS?	Yes
When was the last check (As per ISO 14001) of the EMS completed?	19-6-2023
Were there any non-conformances related to environmental issues identified in the last check of the EMS?	No
If there were non-conformances identified, were these non-conformances rectified?	

## H. Signature and Certification

This Annual Return may only be signed by person(s) with legal authority to sign it as set out in following categories: an Individual, a Company, a Public authority or a Local council.

It is an offence under section 66 of the Protection of the Environment Operations Act 1997 to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation and \$120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in Section B of this Annual Return application is correct and not false or misleading in a material respect, and
- certify that the information in the Statement and Compliance in sections A, C, D, E, F, G and H and any other pages attached to Section C is correct and not false or misleading in a material respect.

### Signed by: Delegate of Company

Name	Chris Schultz
Position	Superintendent Environment
Email Address	Chris.Schultz1@South32.net
Phone Number	0407888423

Signature	
Name	
Position	



# Annual Return

ENDEAVOUR COAL PTY LIMITED

Licence 2504

Date	/ /
<b>Declaration</b>  <b>I declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and</b>  <b>I certify that the information in the Statement of Compliance in section A,C,D,E,F and G and any pages attached to Section C is correct and not false or misleading in a material respect.</b>	



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## **Appendix 2: Rehabilitation Cost Estimate**

Rehabilitation cost estimate provided only for the Resources Regulator. The Rehabilitation Cost estimate is commercial in nature.

Please contact the Resources Regulator or IMC representative for further information.





### Appendix 3: Appin Mine Project Approval Condition Compliance Report

CONDITION OF APPROVAL	STATUS	COMMENTS
<b>SCHEDULE 2: ADMINISTRATIVE CONDITIONS</b>		
<b>OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT</b>		
1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Non-compliant	Management Plans developed and implemented to minimise harm to the environment.  A non-compliance was recorded of Condition 15 of Schedule 4. This is discussed in more detail in Section 11.
<b>TERMS OF APPROVAL</b>		
The Proponent must carry out the project generally in accordance with the: (a) generally in accordance with the EA, Statement of Commitments and PPR; (b) in accordance with the conditions of this approval; and (c) in accordance with any written directions of the Planning Secretary. Note: The general layout of the project is shown in Appendices 2 to 4	Non-compliant	Non-compliance was recorded of Condition 12 of Schedule 2 and Condition 15 of Schedule 4. This is discussed in more detail in Section 11.
3. If there is any inconsistency between the above documents, the more recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Noted	
4. Consistent with the requirements of this approval, the Planning Secretary may make written directions to the Proponent in relation to: (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Planning Secretary; and (b) the implementation of any actions or measures contained in any such document referred to in condition 4(a).	Compliant	Requirements of the Secretary have been addressed as required.
<b>LIMITS ON APPROVAL</b>		
<b>Mining Operations</b>		
5. The Proponent may carry out mining operations on the site until 31 December 2041.  Notes: • Under this approval, the Proponent is required to decommission and rehabilitate the site and perform additional undertakings in relation to mining operations. Consequently, this approval will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily. • Mining operations and rehabilitation are also regulated under the Mining Act 1992.	Compliant	Mining operations were undertaken during the reporting period. The cessation date has not been triggered.
<b>Coal Extraction and Production</b>		
6. The Proponent shall not:	Compliant	Coal extraction and transportation was below



<p>(a) extract more than 10.5 million tonnes of ROM coal from the site in a financial year, or (b) transport more than 9.3 million tonnes of product coal from the site in a financial year.</p>		<p>the limits as specified in the approval during the reporting period.</p>														
<p><b>Appin Ventilation Shaft No. 6</b></p>																
<p>6A. The Proponent may operate Appin Ventilation Shaft No. 6 until 31 December 2041, unless otherwise agreed by the Planning Secretary. Note: Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings, to the satisfaction of the Planning Secretary and DRE. Consequently, this approval will continue to apply in all other respects other than the right to bore and operate the ventilation shaft until the site has been properly rehabilitated.</p>	<p>Compliant</p>	<p>Ventilation occurred during the reporting period. The cessation date has not been triggered.</p>														
<p><b>Hours of Operation</b></p>																
<p>7. The Proponent may undertake mining operations and mine ventilation activities 24 hours a day, 7 days a week</p>	<p>Compliant</p>	<p>Mining operations and construction are in accordance with hours of operation.</p>														
<p>7A The Proponent shall comply with the construction and operating hours listed in Table 1A for the Appin Ventilation Shaft No.6:</p> <p><i>Table 1A. Construction and operating hours</i></p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Hours (Other than for emergency purposes)</th> </tr> </thead> <tbody> <tr> <td><b>Construction</b> Road and site access*, site preparation, liner construction, spoil management, drilling of boreholes, provision of services, related activities, post construction rehabilitation.</td> <td>7.00am to 6.00pm, Monday to Saturday No works on Sunday or Public Holidays</td> </tr> <tr> <td>Shaft drilling and lining and water management works. Any works that are inaudible at residential premises.</td> <td>24 hours per day, 7 days per week</td> </tr> <tr> <td><b>Operation of Ventilation Shaft</b> Including commissioning of fans</td> <td>24 hours per day, 7 days per week</td> </tr> <tr> <td><b>Operation of Service Boreholes</b> Delivery of concrete to the site and associated surface operations</td> <td>24hrs per day, 7 days per week</td> </tr> <tr> <td>Delivery of other materials to the site and associated surface operations</td> <td>7.00am to 6.00pm, Monday to Saturday</td> </tr> <tr> <td>Provision of supplies, consumables or utilities to underground</td> <td>24hrs per day, 7 days per week</td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>*Some road works potentially requiring traffic management measures, such as cutting in the access road to Menangle Road, line marking the intersection and installation of asphaltic concrete, may be undertaken outside these hours (subject to Council's approval) to take advantage of reduced traffic volumes.</li> <li>*Emergency purposes* refers to instances where the cessation of construction or operating activities would have the potential to generate serious harm to the environment or serious safety issues. Should these activities be conducted outside of the hours permitted, a report must be provided to the Department within 7 days of the event containing relevant information and/or to demonstrate the specific emergency purposes and circumstances at the time.</li> </ul>	Activity	Hours (Other than for emergency purposes)	<b>Construction</b> Road and site access*, site preparation, liner construction, spoil management, drilling of boreholes, provision of services, related activities, post construction rehabilitation.	7.00am to 6.00pm, Monday to Saturday No works on Sunday or Public Holidays	Shaft drilling and lining and water management works. Any works that are inaudible at residential premises.	24 hours per day, 7 days per week	<b>Operation of Ventilation Shaft</b> Including commissioning of fans	24 hours per day, 7 days per week	<b>Operation of Service Boreholes</b> Delivery of concrete to the site and associated surface operations	24hrs per day, 7 days per week	Delivery of other materials to the site and associated surface operations	7.00am to 6.00pm, Monday to Saturday	Provision of supplies, consumables or utilities to underground	24hrs per day, 7 days per week	<p>Compliant</p>	<p>Activities at the ventilation shaft have been undertaken in accordance with the listed hours.</p>
Activity	Hours (Other than for emergency purposes)															
<b>Construction</b> Road and site access*, site preparation, liner construction, spoil management, drilling of boreholes, provision of services, related activities, post construction rehabilitation.	7.00am to 6.00pm, Monday to Saturday No works on Sunday or Public Holidays															
Shaft drilling and lining and water management works. Any works that are inaudible at residential premises.	24 hours per day, 7 days per week															
<b>Operation of Ventilation Shaft</b> Including commissioning of fans	24 hours per day, 7 days per week															
<b>Operation of Service Boreholes</b> Delivery of concrete to the site and associated surface operations	24hrs per day, 7 days per week															
Delivery of other materials to the site and associated surface operations	7.00am to 6.00pm, Monday to Saturday															
Provision of supplies, consumables or utilities to underground	24hrs per day, 7 days per week															
<p>7B. The Proponent must comply with the construction and operating hours listed in Table 1B for the Appin Mine Ventilation and Access Site:</p> <p><i>Table 1B: Construction and operating hours</i></p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Hours (Other than for emergency or safety purposes as approved by the Planning Secretary in the Construction Traffic Management Plan required under Schedule 4A Condition 12)</th> </tr> </thead> <tbody> <tr> <td><b>Construction, including:</b> • Appin Mine Ventilation and Access Site early works • fans, evase(s), ancillary site infrastructure and mine access infrastructure (winder, headframe, etc) • Shaft sinking activities prior to the construction of acoustic sheds/mitigation</td> <td>7.00am to 6.00pm, Monday to Friday 8.00am to 1.00pm Saturday No works on Sunday or Public Holidays</td> </tr> <tr> <td>• Shaft sinking activities once the acoustic sheds/mitigation is in place • Any works that are inaudible at residential premises.</td> <td>24 hours per day, 7 days per week</td> </tr> <tr> <td><b>Operation, including:</b> • Operation of the site and site access • Operation and commission of the ventilation shafts</td> <td>24 hours per day, 7 days per week</td> </tr> <tr> <td>• Heavy vehicle movements to and from the site except concrete deliveries during shaft sinking activities once the acoustic sheds/ mitigation is in place</td> <td>7.00am to 6.00pm, Monday to Saturday No movements on Sunday or Public Holidays</td> </tr> <tr> <td>• Concrete deliveries during shaft sinking activities once the acoustic sheds/ mitigation is in place</td> <td>24 hours per day, 7 days per week</td> </tr> </tbody> </table>	Activity	Hours (Other than for emergency or safety purposes as approved by the Planning Secretary in the Construction Traffic Management Plan required under Schedule 4A Condition 12)	<b>Construction, including:</b> • Appin Mine Ventilation and Access Site early works • fans, evase(s), ancillary site infrastructure and mine access infrastructure (winder, headframe, etc) • Shaft sinking activities prior to the construction of acoustic sheds/mitigation	7.00am to 6.00pm, Monday to Friday 8.00am to 1.00pm Saturday No works on Sunday or Public Holidays	• Shaft sinking activities once the acoustic sheds/mitigation is in place • Any works that are inaudible at residential premises.	24 hours per day, 7 days per week	<b>Operation, including:</b> • Operation of the site and site access • Operation and commission of the ventilation shafts	24 hours per day, 7 days per week	• Heavy vehicle movements to and from the site except concrete deliveries during shaft sinking activities once the acoustic sheds/ mitigation is in place	7.00am to 6.00pm, Monday to Saturday No movements on Sunday or Public Holidays	• Concrete deliveries during shaft sinking activities once the acoustic sheds/ mitigation is in place	24 hours per day, 7 days per week	<p>Compliant</p>	<p>Activities at the ventilation shaft have been undertaken in accordance with the listed hours.</p>		
Activity	Hours (Other than for emergency or safety purposes as approved by the Planning Secretary in the Construction Traffic Management Plan required under Schedule 4A Condition 12)															
<b>Construction, including:</b> • Appin Mine Ventilation and Access Site early works • fans, evase(s), ancillary site infrastructure and mine access infrastructure (winder, headframe, etc) • Shaft sinking activities prior to the construction of acoustic sheds/mitigation	7.00am to 6.00pm, Monday to Friday 8.00am to 1.00pm Saturday No works on Sunday or Public Holidays															
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<p><b>SURRENDER OF CONSENTS AND APPROVALS</b></p>																
<p>8. By 31 December 2012, or as otherwise agreed by the Planning Secretary, the Proponent shall surrender all existing development consents and project approvals for</p>		<p>Letters sent on 29 July 2014 to DoPE and 1 Aug 2014 to WSC advising that Illawarra Coal</p>														



<p>mining operations relied on by the Proponent for the site (other than this approval) in accordance with Sections 75YA and 104A of the EP&amp;A Act.</p> <p>Note: This requirement does not extend to the surrender of construction and occupation certificates for existing and proposed building works under Part 4A of the EP&amp;A Act. Surrender of a consent or approval should not be understood as implying that works legally constructed under a valid consent or approval can no longer be legally maintained or used.</p>		<p>Holdings Pty Ltd surrenders all existing development consents and project approvals for mining (including Wollondilly Shire Council approvals for: Shaft and Electrical Substation 22 January 1972; Appin Mine 22 February 1972; West Cliff Mine 17 April 1975; West Cliff Extended 3 September 1986; Washing of Appin Coal at West Cliff 25 March 1997) operations relied on by the Proponent for the site (other than the Project Approval), subject to and in accordance with the regulations. A notice of Modification under Section 75W of the Environmental Planning and Assessment Act 1979 dated 28 October 2016 incorporated the VS#6 Approval requirements into the Project Approval.</p>
<p>9. Prior to the surrender of these consents and/or approvals, the conditions of this approval (including any notes) shall prevail to the extent of any inconsistency with the conditions of these consents and/or approvals.</p>	<p>Compliant</p>	<p>Conditions transferred to updated management plans.</p>
<p><b>STRUCTURAL ADEQUACY</b></p>		
<p>10. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structure, that are part of the project are constructed in accordance with:</p> <p>(a) the relevant requirements of the BCA; and</p> <p>(b) any additional requirements of SA NSW where the building or structure is located on land within declared Mine Subsidence Districts.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>Under Part 6 of the EP&amp;A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.</li> <li>Parts 1-9 of the Environment Planning and Assessment (Development Certification and Fire Safety) Regulation 2021 sets out the requirements for the certification of the project.</li> </ul>	<p>Compliant</p>	<p>New buildings and structures were project managed by the engineering team to the relevant building codes.</p> <p>The only new structures constructed in the reporting period were associated with the Appin North long-term treatment plant.</p>
<p><b>DEMOLITION</b></p>		
<p>11. The Proponent shall ensure that all demolition work is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version</p>	<p>Compliant</p>	<p>Demolition is undertaken to the required standard.</p> <p>The Engineering Building at Appin West and a chemical bund were demolished during the reporting period.</p>
<p><b>OPERATION OF PLANT AND EQUIPMENT</b></p>		
<p>12. The Proponent shall ensure that all plant and equipment used at the site is:</p> <p>(a) maintained in a proper and efficient condition; and</p> <p>(b) operated in a proper and efficient manner.</p>	<p>Non-compliant</p>	<p>Operations are conducted in accordance with approved management plans. Daily, weekly and monthly inspections of plant,</p>



		<p>equipment and site areas are conducted as required. This includes a number of system generated maintenance work orders. Regular site environmental inspections are undertaken to address inspections for leaking machinery and equipment. Mine machinery and equipment are maintained and serviced accordingly.</p> <p>A non-compliance was recorded with the discharge of turbid water from the AMVA Project site (refer to Section 11).</p>
<p><b>STAGED SUBMISSION OF STRATEGIES, PLANS OR PROGRAMS</b></p>		
<p>13. With the approval of the Planning Secretary, the Proponent may submit any strategies, plans or programs required by this approval on a progressive basis.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times; and</li> <li>• If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.</li> </ul>	<p>Compliant</p>	<p>Strategies, plans and programs are submitted as reviewed.</p> <p>Approval was sought and approved for the submission of a Construction Environmental Management Plan (CEMP) for the AMVA Project – Early Works. A CEMP for Construction Works has now been approved.</p>
<p><b>STRATEGIC BIODIVERSITY OFFSETS</b></p>		
<p>14. If the proponent is required to provide a biodiversity offset pursuant to this approval (including any biodiversity offset that is required under the conditions of a subordinate approval issued in accordance with this approval), the Planning Secretary may, in consultation with BCD, accept in satisfaction of the requirement for the biodiversity offset, the provision of land that has conservation values which exceed the conservation values required to meet the relevant offsetting requirement.</p> <p>If the Planning Secretary accepts such an offset under this condition, the Planning Secretary shall issue a written statement to the proponent advising:</p> <p>(a) the details of the proposed offset land;          (b) the offset requirements that are being met;          (c) the conservation values that have been relied upon to meet the offsetting requirements;          (d) that in the opinion of the Planning Secretary:</p>	<p>Compliant</p>	<p>Approved biodiversity offset strategy is in place.</p>



<p>(i) the land has conservation values in addition to those that have been relied upon to meet the offsetting requirement in condition 14(b); or (ii) if the land has been subject to a previous statement from the Planning Secretary under this condition, confirmation that the land continues to have conservation values in addition to those that have been relied upon to meet the previous offsetting requirement or that there are no further conservation values available in respect of the land.</p> <p>If the Planning Secretary has issued a statement under this condition, the proponent can rely on that statement and the residual conservation values that the land subject to the statement may hold, to meet further offsetting requirement(s) that may be required under this approval or the development consent for the Dendrobium Coal Mine (60-3-2001).</p> <p>The Planning Secretary's statement under this condition can be relied on a number of times in respect of the same land until all of the conservation values of the land the subject of the Planning Secretary's statement have been relied upon to meet offsetting requirements under this approval or the development consent for the Dendrobium Coal Mine (60-3-2001).</p> <p>The proponent shall make suitable arrangements to provide appropriate long-term security for the biodiversity offset area(s) accepted under this condition, within 2 years of the date of the Planning Secretary's statement in respect of that land, unless otherwise agreed with the Planning Secretary.</p>		
<p><b>SCHEDULE 3 – SPECIFIC ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING</b></p>		
<p><b>SUBSIDENCE</b></p>		
<p><b>Performance Measures – Natural and Heritage Features, etc</b></p>		
<p>1. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 1, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>For all observed impacts, the appropriate TARPs were applied, actions implemented, and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.14 of this Annual Review for a summary of the predicted vs observed impacts.</p>



Table 1: Subsidence Impact Performance Measures			
<b>Watercourses</b>			
Nepean River	Negligible environmental consequences including: <ul style="list-style-type: none"> <li>• negligible diversion of flows or changes in the natural drainage behaviour of pools;</li> <li>• negligible gas releases and iron staining; and</li> <li>• negligible increase in water cloudiness.</li> </ul>		
Georges River	Negligible environmental consequences including: <ul style="list-style-type: none"> <li>• negligible diversion of flows or changes in the natural drainage behaviour of pools;</li> <li>• negligible gas releases and iron staining; and</li> <li>• negligible increase in water cloudiness</li> </ul> over at least 80% of the stream length subject to vertical subsidence >20 mm. No subsidence impact or environmental consequence greater than minor.		
Other watercourses	No greater subsidence impact or environmental consequences than predicted in the EA and PPR.		
<b>Land</b>			
Dharawal State Conservation Area	Negligible environmental consequences.		
Cliffs of "special significance" (ie cliffs longer than 200 m and/or higher than 40 m; and cliff-like rock faces higher than 5 m that constitute waterfalls)	Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 0.5% of the total face area of such cliffs within any longwall mining domain).		
Other cliffs flanking the Nepean River	Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 0.5% of the total face area of such cliffs within any longwall mining domain).		
Other cliffs	Minor environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 3% of the total face area of such cliffs within any longwall mining domain).		
<b>Biodiversity</b>			
Threatened species, threatened populations, or endangered ecological communities	Negligible environmental consequences.		
<b>Aboriginal heritage</b>			
Sites determined to hold "special significance" as a result of studies required for Extraction Plans	Negligible impact or environmental consequence.		
Sites determined to hold high or moderate significance as a result of studies required for Extraction Plans	Less than 10% of such sites across the mining area are affected by subsidence impacts (other than negligible impacts or environmental consequence).		
Other Aboriginal heritage sites	Less than 10% of such sites (or 1 such site, whichever is the greater) within any longwall mining domain are/is affected by subsidence impacts (other than minor impacts or environmental consequence).		
<b>Historic heritage</b>			
St James Church (Menangle)	Negligible loss of heritage value.		
St Mary's Tower (Douglas Park)	Negligible impact on structural integrity or external fabric.		
Broughtons Pass Weir	Negligible loss of heritage value.		
Other buildings or structures of State or National heritage significance	Negligible loss of heritage value.		
<b>Offsets</b>			
<p>2. If the Proponent exceeds the performance measures in Table 1 and the Planning Secretary determines that:</p> <p>(a) it is not reasonable or feasible to remediate the impact or environmental consequence; or</p> <p>(b) remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;</p> <p>then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Planning Secretary.</p> <p>Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence</p>		N/A	Condition not triggered during reporting period
<b>Performance Measures – Built Features</b>			
<p>3. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 2, to the satisfaction of the Planning Secretary.</p>			For all observed impacts, the appropriate TARPs were applied, actions implemented and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.14 of this Annual Review for a summary of the predicted vs observed impacts.
Table 2: Subsidence Impact Performance Measures			
<b>Built features</b>			
Key public infrastructure: <ul style="list-style-type: none"> <li>• Main Southern Railway;</li> <li>• Hume Highway; and</li> <li>• Key WaterNSW infrastructure (Nepean Tunnel, Cataract Tunnel, Upper Canal, Broughtons Pass Weir and other weirs)</li> </ul>	Always safe and serviceable.  Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.		
Other public infrastructure (including water supply pipelines; high pressure gas pipelines and the gas distribution network; electricity transmission and distribution lines; telecommunications cables and optical fibre networks; roads, trails and associated structures).	Always safe.  Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.		



<p>Houses, industrial premises, swimming pools, farm dams and other built features or improvements</p> <p><b>Public safety</b></p> <p>Public Safety</p>	<p>Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged infrastructure component must be replaced.</p> <p>Negligible additional risk.</p>		
<p>Notes:</p> <p>1) The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 5 below).</p> <p>2) Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Planning Secretary will be the final arbiter.</p> <p>3) The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.</p> <p>4) Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.</p>		Compliant	For all observed impacts, the appropriate TARPs were applied, actions implemented and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.14 of this Annual Review for summary of the predicted vs observed impacts.
<b>Extraction Plans</b>			
<p>5. The Proponent shall prepare and implement an Extraction Plan for first and second workings within each longwall mining domain to the satisfaction of the Planning Secretary. Each extraction plan must:</p> <p>(a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary;</p> <p>(b) be approved by the Planning Secretary before the Proponent carries out any of the second workings covered by the plan;</p> <p>(c) include detailed plans of existing and proposed first and second workings and any associated surface development;</p> <p>(d) include detailed performance indicators for each of the performance measures in Tables 1 and 2;</p> <p>(e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;</p> <p>(f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 1 and 2, and manage or remediate any impacts and/or environmental consequences;</p> <p>(g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:</p> <ul style="list-style-type: none"> <li>• addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;</li> <li>• has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;</li> </ul>		Non-compliant	<p>SMPs and Extraction Plans have been prepared as required to include the required information.</p> <p>Approved plans are available on the IMC website at <a href="#">link</a>.</p> <p>The annual report of seismic events in the BSO Project area was not included in the FY22 Annual Review.</p>



<ul style="list-style-type: none"> <li>• recommends appropriate pre-mining mitigatory measures to reduce subsidence impacts;</li> <li>• recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and</li> <li>• in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;</li> </ul> <p>(h) include a Water Management Plan, which has been prepared in consultation with BCD, WaterNSW and DPE Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including:</p> <ul style="list-style-type: none"> <li>• surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;</li> <li>• a program to monitor and report stream flows and assess any changes resulting from subsidence impacts;</li> <li>• a program to monitor and report groundwater inflows to underground workings; and</li> <li>• a program to predict, manage and monitor impacts on groundwater bores on privately-owned land;</li> </ul> <p>(i) include a Biodiversity Management Plan, which has been prepared in consultation with BCD and DPI (Fisheries), which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities; and water dependent ecosystems, including (for Appin Areas 7, 8 and 9):</p> <ul style="list-style-type: none"> <li>• additional targeted surveys for threatened species, sufficient to identify any actions required to protect significant populations from potential impacts;</li> </ul> <p>(j) include a Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general, with a specific focus on cliffs and steep slopes;</p> <p>(k) include a Heritage Management Plan, which has been prepared in consultation with Heritage NSW and relevant stakeholders for both Aboriginal and historic heritage, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and which:</p> <ul style="list-style-type: none"> <li>• includes additional investigations (such as surveys and current register searches) for Aboriginal heritage items (including previously known sites)</li> </ul>		
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<p>and historic heritage items, sufficient to identify the significance (including “special significance“) of all sites which may be impacted by subsidence and to identify any actions required to ensure that the performance measures in Table 1 are met; and</p> <ul style="list-style-type: none"> <li>is prepared in accordance with the relevant requirements for preparation of the Heritage Management Plan required under condition 23 of Schedule 4;</li> </ul> <p>(l) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety in the mining area;</p> <p>(m) include a subsidence monitoring program, which has been prepared in consultation with DRE, BCD and WaterNSW, to:</p> <ul style="list-style-type: none"> <li>provide data to assist with the management of the risks associated with subsidence;</li> <li>validate the subsidence predictions;</li> <li>analyse the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; and</li> <li>inform the contingency plan and adaptive management process;</li> </ul> <p>(n) include a regional seismic event monitoring program, which has been prepared in consultation with DRE, and which includes analysis of outcomes and proposed triggers for review of potential correlations with mining operations;</p> <p>(o) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 1 and 2, or where any such exceedance appears likely;</p> <p>(p) proposes appropriate revisions to the Rehabilitation Management Plan required under condition 33 of Schedule 4; and</p> <p>(q) include a program to collect sufficient baseline data for future Extraction Plans.</p> <p>Notes: To identify the longwall mining domains referred to in this condition, see Appendix 3. An SMP that is substantially consistent with this condition and which is approved by DRE prior to 30 September 2012 is taken to satisfy the requirements of this condition.</p>		
<p>6. The Proponent shall ensure that the management plans required under condition 5(g)-(l) above include:</p> <p>(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and</p> <p>(b) a detailed description of the measures that would be implemented to remediate predicted impacts.</p>	Compliant	The Subsidence Management Plans and Extraction Plans include the required information and are available on the website at <a href="#">link</a> .
<b>First Workings</b>		
<p>7. The Proponent may carry out first workings within the project area, other than in accordance with an approved extraction plan, provided that DRE is satisfied that the first workings are designed to remain stable and non-</p>	Compliant	First workings have been carried out as required.



<p>subsiding, except insofar as they may be impacted by approved second workings.</p> <p>Note: The intent of this condition is not to require an additional approval for first workings, but to ensure that first workings are built to geotechnical and engineering standards sufficient to ensure long term stability, with zero resulting subsidence impacts.</p>		<p>Subsidence Management Plans and Extraction Plans can be accessed at this <a href="#">link</a>.</p>
<p><b>Payment of Reasonable Costs</b></p>		
<p>8. The Proponent shall pay all reasonable costs incurred by the Department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.</p>	<p>N/A</p>	<p>Condition not triggered during the reporting period.</p>
<p><b>Improved Understanding and Prediction of Subsidence Impacts</b></p>		
<p>9. The Proponent shall prepare and implement a program to improve its prediction and understanding of subsidence impacts (in particular sub-surface impacts and impacts on groundwater resources), to the satisfaction of the Planning Secretary. This program must be prepared in consultation with DRE and be submitted to the Planning Secretary for approval by 30 September 2012 and must include proposals for:</p> <ul style="list-style-type: none"> <li>• testing (including core testing and in situ testing) to further define the mechanical, hydrogeological and geochemical properties of rock strata within each longwall domain, including: <ul style="list-style-type: none"> <li>• testing and validation of assumptions regarding regional continuity of modelled hydraulic properties (including mass porosity and permeability);</li> <li>• identifying hydraulic properties of rock strata close to water-dependent ecosystems; and</li> <li>• identifying the presence and distribution of iron-bearing minerals that might contribute to surface water quality impairment;</li> </ul> </li> <li>(b) installation of a regional network of deep pore pressure monitoring bores with vertical arrays of pore pressure transducers to assess and quantify the height and impacts of subsurface fracturing;</li> <li>(c) a census of boreholes which may be impacted by subsidence, the gathering of relevant borehole and groundwater quality data and a regular monitoring program;</li> <li>(d) regular enhancement, calibration and verification of the project's regional groundwater model, and the further development of this model on a mining-domain scale; and</li> <li>(e) regular recalibration of methodologies and models used for subsidence effect and impact prediction, as they are applied within the project area.</li> </ul> <p>Note: Results of this program are to be incorporated within subsequent Extraction Plans, including the subplans required under condition 5(g)-(l) above.</p>	<p>Compliant</p>	<p>The environmental research program was approved by DPIE on 13 May 2021.</p>
<p><b>Improved Understanding and Prediction of Environmental Consequences on Significant Natural Features</b></p>		
<p>10. The Proponent shall prepare and implement a Research Program to the satisfaction of the Planning Secretary and allocate \$1,000,000 in total to this program for expenditure over a period of seven years from the date of the program's approval. This program</p>	<p>Compliant</p>	<p>The environmental research program was approved by DPIE on 13 May 2021.</p>



must be prepared in consultation with BCD, WaterNSW and DRE, be submitted to the Planning Secretary for approval by 30 September 2012, and be:

(a) directed at research into improving the prediction, assessment, remediation and/or avoidance of subsidence impacts and environmental consequences on significant natural features in the Project Area; and

(b) targeted at genuine research, as opposed to implementing the matters required by this approval.

**SCHEDULE 4 SPECIFIC ENVIRONMENTAL CONDITIONS – GENERAL**  
**NOISE**

**Noise impact Assessment Criteria**

1. From the end of June 2013, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 1 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 1: Interim Noise Criteria dB(A)

Location		Day	Evening	Night	
Area	Receiver Number	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A1</sub> (1 min)
Appin Township	136, 137, 139, 142, 143	44	44	44	52
	135	43	43	43	
	100-134, 141, 146-160, 194-197, 200-209, 211, 236-278, 283-284	42	42	42	

Notes to Tables 1, 2 and 3:

- To identify the locations referred to in Table 1, 2 and 3, refer to Appendix 5; and
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

N/A

This condition has been superseded by Condition 2 of Schedule 4.

2. From the end of December 2014, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise Criteria dB(A)

Location		Day	Evening	Night	
Area	Receiver Number	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A1</sub> (1 min)
Appin West Receivers south-west of Appin West	1-7, 9-11, 13, 184, 188-189	39	39	35	49
Appin West receivers near Hume Highway	185-187, 190	35	35	35	53
All other Appin West Receivers	14, 26	45	45	35	53
	15-25, 27-48, 50-56	43	43	35	
Appin No. 3 Receivers	58, 67, 71, 72	41	41	41	49
	68, 74, 75	40	40	40	
	69, 70, 76,	39	39	39	
	217, 218, 233, 279-282	35	35	35	
Appin No. 1 and No. 2 Receivers	82, 91, 216	42	42	42	50
	83, 85	41	41	41	
	78, 84, 86-90, 199, 212-215, 226, 228-230, 232, 234, 235	40	40	40	
Appin Township	136, 137, 139, 142, 143	44	44	44	52
	135	43	43	43	
	Any other privately owned property	42	42	42	
Douglas Park	All privately owned	45	45	39	49

Compliant

There were no exceedances or non-compliances recorded during the quarterly noise monitoring in FY23.

Location		Day	Evening	Night	
Area	Receiver Number	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A1</sub> (1 min)
	residences				
All other privately-owned land (excluding receivers in Table 3)		35	35	35	45



<p>However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.</p>																					
<p><b>Construction Noise – Appin East Mine Safety Gas Management Project</b></p>																					
<p>2A. The Applicant shall ensure that the noise generated by construction activities relating to the Appin East Mine Safety Gas Management Project is managed in accordance with the requirements of the Interim Construction Noise Guideline (DECC, 2009), as may be updated from time to time.</p>	<p>N/A</p>	<p>No activities relating to this project were conducted during this reporting period.</p>																			
<p>2B The Proponent shall ensure that the construction noise generated by the Appin Ventilation Shaft No. 6 project, does not exceed the noise impact assessment criteria set out in Table 2A at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.</p>	<p>N/A</p>	<p>No construction activities relating to this project were conducted during this reporting period.</p>																			
<p><i>Table 2A: Construction noise criteria dB(A)</i></p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th> <th>Day</th> <th>Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>A</sub> (1 min)</th> </tr> </thead> <tbody> <tr> <td>All privately owned residences – 7.00am to 8.00pm, Monday to Saturday and 8.00 am to 1.00 pm Saturday</td> <td>50</td> <td>45</td> <td>39</td> <td>48</td> </tr> <tr> <td>All privately owned residences – outside the above hours</td> <td>45</td> <td>45</td> <td>39</td> <td>49</td> </tr> </tbody> </table>			Location	Day	Evening	Night		L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A</sub> (1 min)	All privately owned residences – 7.00am to 8.00pm, Monday to Saturday and 8.00 am to 1.00 pm Saturday	50	45	39	48	All privately owned residences – outside the above hours	45	45	39	49
Location	Day	Evening		Night																	
	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A</sub> (1 min)																	
All privately owned residences – 7.00am to 8.00pm, Monday to Saturday and 8.00 am to 1.00 pm Saturday	50	45	39	48																	
All privately owned residences – outside the above hours	45	45	39	49																	
<p><b>Operational Noise - Appin Mine Ventilation and Access Site</b></p>																					
<p>2C. The Proponent must ensure that the noise generated by operational activities at the Appin Mine Ventilation and Access Site does not exceed the noise impact assessment criteria set out in Table 2B at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.</p>	<p>N/A</p>	<p>Early Works construction activities were undertaken in FY23 however they were covered by the Interim Construction Noise Guidelines (ICNG). No construction activities covered by the definition ‘operational’ were conducted during this reporting period.</p>																			
<p><i>Table 2B: Operational noise criteria dB(A)</i></p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th> <th>Day</th> <th>Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>Aeq</sub> (15 min)</th> <th>L<sub>Amax</sub></th> </tr> </thead> <tbody> <tr> <td>All privately owned residences</td> <td>43</td> <td>43</td> <td>39</td> <td>54</td> </tr> </tbody> </table>			Location	Day	Evening	Night		L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Amax</sub>	All privately owned residences	43	43	39	54					
Location	Day	Evening		Night																	
	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Amax</sub>																	
All privately owned residences	43	43	39	54																	
<p>However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement. Notes: • To identify the privately owned residences referred to in Table 2B, refer to titled “Appin Mine Ventilation and Access Project – Sensitive Receivers” in Appendix 5; and • Noise generated by the Appin Ventilation and Access Site is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the Noise Policy for Industry (EPA, 2017).</p>	<p>N/A</p>	<p>Early Works construction activities were undertaken in FY23 however they were covered by the Interim Construction Noise Guidelines (ICNG). No construction activities covered by the definition ‘operational’ were conducted during this reporting period.</p>																			
<p><b>Noise Mitigation</b></p>																					
<p>3. Upon receiving a written request from the owner of any residence listed in Table 3, the Proponent shall implement noise mitigation measures (such as double-glazing, insulation, and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible. If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.</p>	<p>N/A</p>	<p>No requests for noise mitigation measures were received from the receivers listed in Table 3 during the reporting period.</p>																			



<i>Table 3: Land where noise mitigation measures are available on request</i>		
<b>Receiver Number</b>		
57,60, 63, 64, 66, 79, 80, 138, 140, 144, 165		
<b>Operating Conditions</b>		
<p>4. The Proponent shall:</p> <p>(a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and road traffic noise generated by the project;</p> <p>(b) operate a comprehensive noise management system on site that uses real-time noise monitoring data for mining operations and the implementation of noise mitigation measures to ensure compliance with the relevant conditions of this approval; and</p> <p>(c) regularly assess the real-time noise monitoring to ensure compliance with the relevant conditions of this approval,</p> <p>to the satisfaction of the Planning Secretary.</p>	Compliant	<p>Best practice measures and the monitoring program are detailed in the Noise Management Plan. Real-time noise monitoring was undertaken.</p> <p>The plan is available on the website at <a href="#">link</a>.</p>
<b>Noise Management Plan</b>		
<p>5. The Proponent shall prepare a Noise Management Plan for the project to the satisfaction of the Planning Secretary. This plan must:</p> <p>(a) be prepared in consultation with EPA and WSC, and submitted to the Planning Secretary for approval by 30 September 2012;</p> <p>(b) include provisions to ensure that the road haulage fleet attains and maintains best practices in both equipment and operations;</p> <p>(c) seek to minimise road traffic noise generated by employee commuter vehicles on public roads, particularly Douglas Park Drive and Macarthur Road;</p> <p>(d) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval;</p> <p>(e) outline procedures to manage responses to any complaints or issues raised by the owners of affected residences; and</p> <p>(f) include a noise monitoring program that:</p> <ul style="list-style-type: none"> <li>• uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the project, including at the Appin Mine Ventilation and Access Site; and</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this approval and <ul style="list-style-type: none"> <li>• (g) prior to commencement of construction of the operational winder/cage, describe the outcome of investigations into alternatives to the use and implementation of audible warning alarms for the operation of the winder/cage at the Appin Mine Ventilation and Access Site.</li> </ul> </li> </ul>	Compliant	<p>The plan is available on the website at <a href="#">link</a>.</p> <p>The NMP was revised in 2022. Consultation with the EPA was undertaken and the revised NMP submitted to the Department for approval. The NMP was approved on 24 November 2022.</p>
<p>5A. The Proponent must implement the Noise Management Plan approved by the Planning Secretary.</p>	Compliant	The requirements of the plan are being implemented.
<b>Road Traffic Noise Mitigation</b>		
<p>6. If after the end of June 2013, road traffic noise generated by the project (including employee vehicles) results in an exceedance by more than 2 dB(A) of the NSW criteria for road traffic noise on Douglas Park Drive or Macarthur Road at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double-glazing, insulation, and/or air</p>	N/A	<p>There have been no complaints regarding traffic noise on Douglas Park Drive or Macarthur Road during the reporting period and no written requests for noise mitigation received.</p>



<p>conditioning) at the residence in consultation with the landowner. If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.</p>																																					
<p><b>AIR QUALITY &amp; GREENHOUSE GAS</b></p>																																					
<p><b>Odour</b></p>																																					
<p>7. The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.</p>	<p>Compliant</p>	<p>Odour has not been raised as a wider community concern during the reporting period.</p>																																			
<p><b>Greenhouse Gas Emissions</b></p>																																					
<p>8. The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>The Air Quality and Greenhouse Gas Management Plan was reviewed and submitted in FY23. The AQMP was approved on 6 February 2023.</p> <p>The plan is available on the website at <a href="#">link</a>.</p> <p>See Section 6.17.4 for information on the decarbonisation program.</p>																																			
<p><b>Air Quality Criteria</b></p>																																					
<p>9. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 4, 5 and 6 at any residence on privately-owned land or on more than 25 percent of any privately-owned land,, and that the particulate emissions from the Appin Mine Ventilation and Access Site do not exceed the criteria listed in Tables 4 - 6A at any residence on privately-owned land or on more than 25 percent of any privately-owned land..</p> <p><i>Table 4: Long term criteria for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th><sup>a</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td><sup>a</sup> 90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td><sup>a</sup> 30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 5: Short term criterion for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th><sup>a</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td><sup>a</sup> 50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 6: Long term criteria for deposited dust</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td><sup>a</sup> Deposited dust</td> <td>Annual</td> <td><sup>b</sup> 2 g/m<sup>2</sup>/month</td> <td><sup>a</sup> 4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Table 6A: Criteria for Appin Mine Ventilation and Access Site</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th><sup>a</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td><sup>a</sup> 25 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 2.5 µm (PM<sub>2.5</sub>)</td> <td>Annual</td> <td><sup>a</sup> 8 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 2.5 µm (PM<sub>2.5</sub>)</td> <td>24 hour</td> <td><sup>a</sup> 25 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Notes for Tables 4-6A:</i></p> <ul style="list-style-type: none"> <li><sup>a</sup> Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);</li> <li><sup>b</sup> Incremental impact (ie incremental increase in concentrations due to the project on its own);</li> <li><sup>c</sup> Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and</li> <li><sup>d</sup> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Planning Secretary in consultation with EPA.</li> </ul> <p>However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to</p>	Pollutant	Averaging period	<sup>a</sup> Criterion	Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>	Pollutant	Averaging period	<sup>a</sup> Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	<sup>a</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month	Pollutant	Averaging period	<sup>a</sup> Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 25 µg/m <sup>3</sup>	Particulate matter < 2.5 µm (PM <sub>2.5</sub> )	Annual	<sup>a</sup> 8 µg/m <sup>3</sup>	Particulate matter < 2.5 µm (PM <sub>2.5</sub> )	24 hour	<sup>a</sup> 25 µg/m <sup>3</sup>	<p>Compliant</p>	<p>Air quality criteria were achieved during the reporting period. No exceedances of criteria were recorded during the reporting period as a result of hazard reduction activity in the area (excluded as classified as an extraordinary event).</p> <p>Air quality data is reported on the IMC website at: <a href="#">link</a>.</p>
Pollutant	Averaging period	<sup>a</sup> Criterion																																			
Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>																																			
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<p>exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.</p>																												
<p><b>Air Quality Acquisition Criteria</b></p>																												
<p>10. If the particulate matter emissions generated by the project exceed the criteria in Tables 7, 8 and 9 at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall, subject to the independent review procedure in Conditions 2 – 3 of Schedule 5, acquire the land in accordance with the procedures in Conditions –4-5 of Schedule 5.</p> <p><i>Table 7: Long term acquisition criteria for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th><sup>d</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td><sup>a</sup>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td><sup>a</sup>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 8: Short term acquisition criteria for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th><sup>d</sup>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td><sup>a</sup>150 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td><sup>b</sup>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 9: Long term acquisition criteria for deposited dust</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td><sup>c</sup>Deposited dust</td> <td>Annual</td> <td><sup>b2</sup> g/m<sup>2</sup>/month</td> <td><sup>a4</sup> g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Notes for Tables 7 - 9:</i></p> <ul style="list-style-type: none"> <li>• <sup>a</sup>Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);</li> <li>• <sup>b</sup> Incremental impact (ie incremental increase in concentrations due to the project on its own);</li> <li>• <sup>c</sup> Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and</li> <li>• <sup>d</sup> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Planning Secretary in consultation with EPA.</li> </ul>	Pollutant	Averaging period	<sup>d</sup> Criterion	Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>	Pollutant	Averaging period	<sup>d</sup> Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 150 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>b</sup> 50 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	<sup>c</sup> Deposited dust	Annual	<sup>b2</sup> g/m <sup>2</sup> /month	<sup>a4</sup> g/m <sup>2</sup> /month	<p>N/A</p>	<p>Particulate emissions generated by the project did not exceed these criteria on privately owned land.</p>
Pollutant	Averaging period	<sup>d</sup> Criterion																										
Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>																										
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<p><b>Operating Conditions</b></p>																												
<p>11. The Proponent shall:</p> <p>(a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including from any spontaneous combustion on site,</p> <p>(b) minimise any visible air pollution generated by the project; and</p> <p>(c) regularly assess the air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval; to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>Best practice measures are detailed in the Air Quality and Greenhouse Gas Management Plan. The plan is available on the website using this <a href="#">link</a>.</p> <p>The requirements of the plan are being implemented.</p>																										
<p><b>Air Quality &amp; Greenhouse Gas Management Plan</b></p>																												
<p>12. The Proponent shall prepare a detailed Air Quality &amp; Greenhouse Gas Management Plan for the project to the satisfaction of the Planning Secretary. This plan must:</p> <p>(a) be prepared in consultation with EPA, and submitted to the Secretary for approval by 30 September 2012;</p> <p>(b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including consideration of applying a real-time air quality management system that employs both reactive and proactive mitigation measures;</p> <p>(c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; and</p> <p>(d) include an air quality monitoring that evaluates the performance of the project, and includes a protocol for</p>	<p>Compliant</p>	<p>The Air Quality and Greenhouse Gas Management Plan was reviewed and submitted in FY23. The AQMP was approved on 6 February 2023.</p> <p>The plan is available on the website: <a href="#">link</a>.</p> <p>The DustTraks in use provide real time air quality monitoring data.</p>																										



determining exceedances with the relevant conditions of this approval and (e) include a site specific air quality monitoring and management plan for the Appin Mine Ventilation and Access Site which includes: - an odour management plan and gaseous emissions monitoring program for the operation of the ventilation shafts; - a comprehensive air quality management system that uses real-time monitoring and implements both proactive and reactive air quality mitigation measures; and.		
12A The Proponent must implement the Air Quality and Greenhouse Gas Management Plan approved by the Planning Secretary.	Compliant	The requirements of the plan are being implemented.
<b>METEOROLOGICAL MONITORING</b>		
13. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy.	Compliant	Weather stations operate in the vicinity of the operation that generally meet these requirements.
<b>SOIL &amp; WATER</b>		
Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.	Compliant	Water licences have been obtained as required. These are listed in Sections 1 and 3 of the Annual Review.
<b>Compensatory Water Supply</b>		
14. The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project, in accordance with the approved Surface Water Management Plan.  The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified.  If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution. If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Planning Secretary.	Compliant	Compensatory water supplies have been provided as required.
<b>Surface Water Discharges</b>		
15. The Proponent shall ensure that all surface water discharges from the site (including from the Brennans Creek Dam) comply with the discharge limits (both volume and quality) set for the project in any EPL.	Non-compliant	Surface water discharges have generally complied with the relevant water quality criteria for discharge limits.  Non-compliance with EPL criteria was recorded at the





		AMVA Project site. Refer to Section 11 for more details.
<b>Surface Water Management Plan</b>		
<p>16. The Proponent must update the Surface Water Management Plan for the project to the satisfaction of the Planning Secretary. This plan must be prepared in consultation with DPE Water and EPA by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary, and submitted to the Planning Secretary for approval by 31 January 2017. This plan must include:</p> <p>(a) a comprehensive water balance for the project, that includes details of:</p> <ul style="list-style-type: none"> <li>• sources and security of water supply and water make;</li> <li>• water use; and</li> <li>• water discharges; and</li> </ul> <p>(b) management plans for the surface facilities sites, that include:</p> <ul style="list-style-type: none"> <li>• a detailed description of water management systems for each site, including: <ul style="list-style-type: none"> <li>- clean water diversion systems;</li> <li>- erosion and sediment controls;</li> <li>- on-site sewage management systems; and</li> <li>- any water storages;</li> </ul> </li> <li>• measures to minimise potable water use and to reuse and recycle water;</li> <li>• trigger levels for investigating any potentially adverse impacts on water resources or water quality;</li> <li>• a Water Response Plan, which describes the measures and/or procedures that would be implemented to: <ul style="list-style-type: none"> <li>- investigate, notify and mitigate any ground or surface water exceedances;</li> <li>- minimise, prevent or offset any adverse impacts to ground or surface water resources;</li> <li>- provide compensatory water supply to any owner of privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project; and</li> </ul> </li> <li>• measures to comply with surface water discharge limits;</li> <li>• implementation of any pollution reduction program relating to mine water discharges from Brennans Creek Dam and identification of 5, 7 and 10 year commitments to substantially reduce the impacts on biota of salinity and other pollutants in such discharges; and</li> <li>• monitoring and reporting procedures including: <ul style="list-style-type: none"> <li>- collection of baseline data on surface water quality in creeks and other waterbodies that could potentially be affected by the project; and</li> </ul> </li> </ul> <p>- surface water and stream health impact assessment criteria.</p>	Compliant	<p>The plan is available on the website at <a href="#">link</a>.</p> <p>The WMP was reviewed in 2022 to reflect the operation of the temporary water treatment plant at Appin North. It was submitted to the Department for review and approved on 23 December 2023. Consultation was undertaken with the EPA however feedback was not received from DPE Water.</p>
16A. The Proponent must implement the Surface Water Management Plan approved by the Planning Secretary.	Non-compliant	The requirements of the plan are generally being implemented.



<p>Note: This plan must be suitably integrated with the Water Management Plans that form part of Extraction Plans.</p>		<p>Non-compliance with EPL water quality criteria was recorded at the AMVA Project site. Refer to Section 11 for more details.</p>
<p><b>WEST CLIFF COAL WASH EMPLACEMENT AREA</b></p>		
<p>17. The Proponent shall prepare a West Cliff Coal Wash Emplacement Area Management Plan for the project to the satisfaction of the Planning Secretary. This plan must be prepared in consultation with BCD and be submitted to the Planning Secretary for approval by the end of June 2013. This plan must include:</p> <p>(a) detailed design plans which include options for reducing, avoiding and/or managing impacts on Aboriginal heritage sites in and adjacent to the southwestern fringe of the proposed Stage 4 footprint (including sites 52-2-2228/3617, 52-2-1373, 52-2-3533/3613 and 52-2-3506);</p> <p>(b) management strategies to ensure no impacts to Aboriginal heritage site 52-2-3505 other than negligible impacts, including consideration of potential staged development of the emplacement and/or buffer areas;</p> <p>(c) management strategies for the protection and conservation of <i>Persoonia hirsuta</i>;</p> <p>(d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot;</p> <p>(e) a comprehensive water monitoring program for the emplacement;</p> <p>(f) provide for progressive rehabilitation of the emplacement area, including through:</p> <ul style="list-style-type: none"> <li>• maximising opportunities for natural regeneration;</li> <li>• maximising retention of suitable habitat species;</li> <li>• appropriate weed and pest control strategies; and</li> <li>• planting only endemic species in habitat mixes appropriate for soil, slope and aspect; and</li> </ul>	<p>Compliant</p>	<p>The CWEA Management Plan has been submitted and approved.</p> <p>The plan is available on the website at <a href="#">link</a>.</p>
<p>17A. The Proponent must implement the West Cliff Coal Wash Emplacement Area Management Plan approved by the Planning Secretary.</p>	<p>Compliant</p>	<p>The requirements of the plan are being implemented.</p>
<p><b>West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy</b></p>		
<p>18. The Proponent shall provide a suitable biodiversity offset strategy to compensate for the impacts of Stage 4 of the West Cliff Coal Wash Emplacement Area, to the satisfaction of the Planning Secretary. This offset strategy must:</p> <p>(a) be prepared in consultation with BCD;</p> <p>(b) be submitted to the Planning Secretary for approval by the end of December 2012, or as otherwise agreed by the Planning Secretary; and</p> <p>(c) fulfil “maintain or improve” and seek to fulfil “like for like or better” conservation outcomes for the vegetation associations and the <i>Persoonia hirsuta</i> impacted by clearing.</p>	<p>Compliant</p>	<p>Throughout the period from 2013-2016, IMC undertook numerous meetings and held discussions with senior officers of the Department of Environment and Planning, Office of Environment and Heritage, relevant Ministerial Offices and Water NSW in relation to the suitability of the proposed offsets.</p>
<p>19. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas by 31 December 2012, or other date agreed by the Planning Secretary, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>In March 2016, the final Strategic Biodiversity Offset was submitted to the Department of Planning and Environment for approval. The final Strategy was endorsed by OEH.</p>



<b>Underground Coal Wash Emplacement Trial</b>		
<p>20. The Proponent shall prepare and undertake an Underground Coal Wash Emplacement Trial for the project to the satisfaction of the Planning Secretary. The design of the trial must:</p> <p>(a) be undertaken in consultation with BCD;</p> <p>(b) be submitted to the Planning Secretary for approval by the end of December 2012;</p> <p>(c) contain a two year program to undertake both pilot scale and demonstration scale trials of underground coal wash disposal;</p> <p>(d) include commitments for ongoing development and/or implementation of underground emplacement options following this two-year trial; and</p> <p>(e) include 6 monthly progress reporting to the Department and BCD.</p>	<p>Compliant</p>	<p>IMC received advice from DPIE on 3 September 2020 that the Department considers that South32 has met the intent of Condition 20 of Schedule 4.</p>
<b>PROJECT SURFACE INFRASTRUCTURE MANAGEMENT</b>		
<b>Gas Drainage Management Plan</b>		
<p>21. The Proponent shall prepare a Gas Drainage Management Plan in respect of construction and use of future gas drainage infrastructure (ie for any gas drainage not subject to approval at the date of this instrument) to the satisfaction of the Planning Secretary. This plan must be submitted to the Planning Secretary for approval prior to the construction of any future gas drainage infrastructure and must include details of the proponent's commitments regarding:</p> <p>(a) community consultation;</p> <p>(b) landholder agreements;</p> <p>(c) assessment of noise, air quality, traffic, biodiversity, heritage, public safety and other impacts in accordance with approved methods;</p> <p>(d) avoidance of significant impacts and minimisation of impacts generally;</p> <p>(e) flaring or use of drained hydrocarbon gases, wherever practicable;</p> <p>(f) achievement of applicable standards and goals;</p> <p>(g) mitigation and/or compensation for significant noise, air quality and visual impacts; and</p> <p>(h) rehabilitation of disturbed sites.</p>	<p>Compliant</p>	<p>The Gas Drainage Management Plan has been submitted and approved.</p> <p>The plan is available on the website at <a href="#">link</a>.</p>
<p>21A. The Proponent must implement the Gas Drainage Management Plan approved by the Planning Secretary.</p>	<p>N/A</p>	<p>There was no gas drainage infrastructure installed during the reporting period.</p>
<b>Surface Activities Management Plan</b>		
<p>22. The Proponent shall prepare and implement a Surface Activities Management Plan in respect of construction and use of service boreholes, pipelines, electrical infrastructure, works to public infrastructure, communications equipment and monitoring equipment, to the satisfaction of the Secretary. This plan must:</p> <p>(a) be submitted to the Secretary for approval by 30 April 2017, unless the Secretary agrees otherwise; and</p> <p>(b) include the following:</p> <ul style="list-style-type: none"> <li>• a community consultation strategy;</li> <li>• a protocol for landholder agreements;</li> <li>• commensurate assessment of noise, air quality, traffic, biodiversity, heritage, public safety and other impacts in accordance with approved methods;</li> <li>• measures to avoid and/or minimise impacts;</li> </ul>	<p>Compliant</p>	<p>The Surface Activities Management Plan has been submitted and approved.</p> <p>The plan is available on the IMC website at <a href="#">link</a>.</p>



<ul style="list-style-type: none"> <li>measures to achieve performance with applicable standards and goals;</li> <li>mitigation measures and/or compensation for significant noise, air quality and visual impacts at privately-owned residences; and</li> <li>measures for the rehabilitation of disturbance.</li> </ul>		
<p>22A. The Proponent must implement the Surface Activities Management Plan approved by the Planning Secretary</p>	<p>N/A</p>	<p>There were no surface activities as detailed in the plan undertaken during the reporting period.</p>
<p><b>Upper Canal</b></p>		
<p>23. The Proponent shall not cause any damage to the Upper Canal during the construction and operation of the Appin East Mine Gas Safety Management Project.</p>	<p>Compliant</p>	<p>No impacts have been identified to date. This project has been completed.</p>
<p>23A. Prior to construction of the Appin East Mine Gas Safety Management Project, the Proponent shall:</p> <p>(a) undertake a dilapidation survey of the Upper Canal, in consultation with WaterNSW and Heritage NSW;</p> <p>(b) prepare final detailed design plans in consultation with WaterNSW; and</p> <p>(c) undertake vibration monitoring for all earthworks undertaken within 25 metres of the Upper Canal, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>A dilapidation survey of the canal was completed.</p>
<p>23B. Following the completion of construction of the Appin East Mine Gas Safety Management Project, the Proponent shall:</p> <p>(a) undertake a dilapidation survey of the Upper Canal in consultation with WaterNSW and Heritage NSW; and</p> <p>(b) repair, or pay the full costs associated with repairing, any damage to the Upper Canal caused by the project in consultation with WaterNSW and Heritage NSW, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>A dilapidation survey of the canal was completed. No repairs were required.</p>
<p><b>HERITAGE</b></p>		
<p><b>Heritage Management Plan</b></p>		
<p>24. The Proponent prepare a Heritage Management Plan for the project to the satisfaction of the Planning Secretary. This plan must:</p> <p>(a) be prepared in consultation with Heritage NSW, the Aboriginal community, Council, any local historical organisations and relevant landowners;</p> <p>(b) be submitted to the Planning Secretary for approval by 31 January 2017;</p> <p>(c) include the following program/procedures for managing Aboriginal heritage management within the project area:</p> <ul style="list-style-type: none"> <li>recording, salvaging, excavating and/or managing the Aboriginal sites and potential archaeological deposits within the site;</li> <li>conserving, managing, and monitoring the Aboriginal sites outside the site;</li> <li>managing the discovery of any new Aboriginal objects or skeletal remains during the project;</li> <li>maintaining and managing access to archaeological sites by the Aboriginal community; and</li> <li>ongoing consultation and involvement of the Aboriginal communities in the conservation and management of Aboriginal cultural heritage within the project area.</li> </ul>	<p>Compliant</p>	<p>The Heritage Management Plan has been submitted and approved.</p> <p>The plan is available on the IMC website at <a href="#">link</a>.</p> <p>The requirements of the plan are being implemented.</p>



<p>(d include the following program/procedures for managing other heritage on site:</p> <ul style="list-style-type: none"> <li>• preparing conservation management plans and/or photographic and archival recording of potentially affected heritage items;</li> <li>• making the conservation management plans and photographic and archival recording publicly available for buildings or structures of State or National heritage significance once they are completed;</li> <li>• protection and monitoring of heritage items outside the site;</li> <li>• baseline dilapidation surveys of all heritage items potentially affected by subsidence and/or blasting;</li> <li>• monitoring, notifying and managing the effects of subsidence and/or blasting on potentially affected heritage items (including the Mountbatten Group); and</li> <li>• additional archaeological excavation and/or recording of any significant heritage items requiring demolition.</li> </ul>		
<p>24A The Proponent must implement the Heritage Management Plan approved by the Planning Secretary.</p> <p>Note: This plan must be suitably integrated with Heritage Management Plans that form part of Extraction Plans, and the West Cliff Coal Wash Emplacement Area Management Plan.</p>	Compliant	The requirements of the plan are being implemented.
<b>TRANSPORT</b>		
<b>Monitoring of Coal Transport</b>		
<p>25. The Proponent shall:</p> <p>(a) keep accurate records of the amount of coal transported from the site (on a daily basis); and</p> <p>(b) make these records publicly available on its website at the end of each financial year.</p>	Compliant	<p>Records of coal transport are maintained.</p> <p>These records are on the IMC website at <a href="#">link</a>.</p>
<b>Traffic Management Plan</b>		
<p>26. The Proponent shall update the approved Traffic Management Plan for the project to the satisfaction of the Planning Secretary. This plan must be:</p> <p>(a) prepared in consultation with the TfNSW, WCC, WSC and the CaCC;</p> <p>(b) submitted to the Planning Secretary for approval by 31 January 2017;</p> <p>(c) propose an appropriate program and schedule of works for any intersection upgrades to be undertaken or contributed to by the Proponent over the life of the project, including an upgrade of the intersection of West Cliff Mine Access Road and Appin Road that is generally in accordance with the requirements of the RMS and that is to be completed before the Level of Service at this intersection drops below LOS C; and</p> <p>(d) include strategies to manage construction traffic, including road closure protocols, community consultation and measures to avoid potential road safety conflicts with other road users.</p>	Compliant	<p>The Traffic Management Plan was reviewed in FY23 and submitted. The TMP was approved on 20 March 2023. Consultation was undertaken as required.</p> <p>The plan is available on the website at <a href="#">link</a>.</p>
<p>26A. The Proponent shall ensure that safe access to Ventilation Shaft No.6 is provided from public roads.</p>	Compliant	<p>The intersection was constructed to ensure safe access to the site.</p>



<p>26B. If it is determined that the corridor of the proposed Outer Sydney Orbital Stage 1 would intersect with the Appin Ventilation and Access Site, the Proponent must develop a specific Infrastructure Management Plan in consultation with, and to the satisfaction of, TfNSW. The plan must include:</p> <p>(a) detailed design and engineering parameters required for co-existence;</p> <p>(b) measures to ensure the ongoing safety and serviceability of the site and Outer Sydney Orbital Stage 1 during construction and operation;</p> <p>(c) any upgrades or augmentations required to the site associated with the construction and operation of the Outer Sydney Orbital Stage 1;</p> <p>(d) assessment of risks generated by co-location of surface infrastructure; and</p> <p>(e) costings of proposed measures and cost sharing arrangements.</p>	<p>N/A</p>	<p>The route of the Outer Sydney Orbital has not yet been confirmed. IMC continues to liaise with TfNSW.</p>
<p>26C The Proponent must implement the Traffic Management Plan approved by the Planning Secretary.</p>	<p>Compliant</p>	<p>The requirements of the plan are being implemented.</p>
<p><b>VISUAL</b></p>		
<p><b>Visual Amenity and Lighting</b></p>		
<p>27. The Proponent shall:</p> <p>a) minimise the visual impacts, and particularly the off-site lighting impacts, of the main infrastructure area and associated ancillary surface works;</p> <p>b) take all practicable measures to further mitigate off-site lighting impacts from the project; and</p> <p>c) ensure that all external lighting associated with the project complies with Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>Lighting has been installed to minimise off-site impacts.</p>
<p><b>Visual Screening of Appin Mine Ventilation and Access Site</b></p>		
<p>27A. The Proponent must:</p> <p>(a) ensure that the visual appearance of all new buildings, structures, facilities or works (including paint colours and specifications) at the Appin Mine Ventilation and Access Site are aimed at blending as far as possible with the surrounding landscape; and</p> <p>(b) implement site-specific landscaping strategies at the Appin Mine Ventilation and Access Site and at the privately owned residences at 310 Menangle Road and 30 Finns Road, Menangle to minimise the visual impacts of the Appin Mine Ventilation and Access Site, including;</p> <p>i. notification and consultation with affected residents and WSC;</p> <p>ii. carrying out screen tree planting at the residences prior to the commencement of construction of the Appin Mine Ventilation and Access Site;</p> <p>iii. maintenance and/or replacement of the planted trees established over the life of the Appin Ventilation and Access Site to maintain an effective visual screen to the satisfaction of the Planning Secretary.</p> <p>Note: b(ii) and b(iii) do not apply if the Proponent has a written agreement with the landowners at 310 Menangle Road and 30 Finns Road, Menangle in relation to visual impact mitigation, and the Proponent has advised the Department in writing of the terms of this agreement.</p>	<p>Compliant</p>	<p>Tree screening was undertaken to minimise visual impacts at 310 Menangle Road and 30 Finns Road.</p> <p>Due to the redesign of the road and electrical infrastructure, screen trees were required to be removed at the AMVA site. It is planned for new plantings to be undertaken in FY24 when the weather is favourable for planting.</p>



<b>WASTE</b>																				
<p>28. The Proponent shall: (a) minimise the waste (including coal reject) generated by the project; and (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of, and (c) manage on-site sewage treatment and disposal in accordance with the requirements of EPA and WSC; to the satisfaction of the Planning Secretary.</p>	Compliant	Waste management has been undertaken in accordance with the Waste Management Plan. See Section 6.19.																		
<p>29. The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Planning Secretary. This plan must be submitted to the Planning Secretary by 30 September 2012.</p>	Compliant	<p>The Waste Management Plan was reviewed in FY23 and submitted. The WMP was approved on 24 November 2022.</p> <p>The plan is available on the IMC website at <a href="#">link</a>.</p> <p>The requirements of the plan are being implemented.</p>																		
<b>BUSHFIRE MANAGEMENT</b>																				
<p>30. The Proponent shall: (a) ensure that the project is suitably equipped to respond to any fires on site; and (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.</p>	Compliant	<p>Sites are equipped to manage bushfires.</p> <p>Asset protection zones are maintained as required.</p>																		
<b>REHABILITATION</b>																				
<b>Rehabilitation Objectives</b>																				
<p>31. The Proponent shall rehabilitate the site in accordance with the conditions imposed on the mining lease(s) associated with the project under the Mining Act 1992. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA and the PPR, and comply with the objectives in Table 10.</p>	Compliant	<p>Rehabilitation is planned and conducted in accordance with the Rehabilitation Management Plan.</p> <p>Rehabilitation objectives have been submitted to the Resources Regulator and are not yet approved.</p>																		
<p><small>Table 10 Rehabilitation Objectives</small></p> <table border="1"> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Mine site (as a whole)</td> <td>Safe, stable &amp; non-polluting</td> </tr> <tr> <td>Project Surface infrastructure</td> <td>To be decommissioned and removed, unless the Resources Regulator agrees otherwise</td> </tr> <tr> <td>Portals and vent shafts</td> <td>To be decommissioned and made safe and stable. Retain habitat for threatened species (eg bats), where practicable</td> </tr> <tr> <td>Watercourses of 3<sup>rd</sup> order or above subject to subsidence impacts</td> <td>Restore pre-mining surface flow and pool holding capacity as soon as reasonably practicable Hydraulically and geomorphologically stable, with riparian vegetation that is the same or better than prior to mining</td> </tr> <tr> <td>Other watercourses subject to subsidence impacts</td> <td>Hydraulically and geomorphologically stable, with riparian vegetation that is the same or better than prior to mining</td> </tr> <tr> <td>Cliffs</td> <td>No additional risk to public safety compared to prior to mining</td> </tr> <tr> <td>Other land affected by the project</td> <td>Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of:                             <ul style="list-style-type: none"> <li>local native plant species (unless the Resources Regulator agrees otherwise); and</li> <li>a landform consistent with the surrounding environment</li> </ul> </td> </tr> <tr> <td>Built features damaged by mining operations</td> <td>Repair to pre-mining condition or equivalent unless                             <ul style="list-style-type: none"> <li>the owner agrees otherwise; or</li> <li>the damage is fully restored, repaired or compensated for under the Mine Subsidence Compensation Act 1961.</li> </ul> </td> </tr> <tr> <td>Community</td> <td>Ensure public safety Minimise the adverse socio-economic effects associated with mine closure</td> </tr> </tbody> </table> <p><small>Notes:</small></p> <ol style="list-style-type: none"> <li>These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by mining taking place after the date of this approval; and to all project surface infrastructure part of the project, whether constructed prior to or following the date of this approval.</li> <li>Rehabilitation of subsidence impacts and environmental consequences caused by mining which took place prior to the date of this approval may be subject to the requirements of other approvals (eg under a mining lease or an Subsidence Management Plan approval) or the Proponent's commitments.</li> <li>In the case of the West Cliff Emplacement Area, final landform may be significantly different from that existing prior to mining, but must still be safe, stable and non-polluting and generally consistent with the surrounding landforms.</li> </ol>			Feature	Objective	Mine site (as a whole)	Safe, stable & non-polluting	Project Surface infrastructure	To be decommissioned and removed, unless the Resources Regulator agrees otherwise	Portals and vent shafts	To be decommissioned and made safe and stable. Retain habitat for threatened species (eg bats), where practicable	Watercourses of 3 <sup>rd</sup> order or above subject to subsidence impacts	Restore pre-mining surface flow and pool holding capacity as soon as reasonably practicable Hydraulically and geomorphologically stable, with riparian vegetation that is the same or better than prior to mining	Other watercourses subject to subsidence impacts	Hydraulically and geomorphologically stable, with riparian vegetation that is the same or better than prior to mining	Cliffs	No additional risk to public safety compared to prior to mining	Other land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: <ul style="list-style-type: none"> <li>local native plant species (unless the Resources Regulator agrees otherwise); and</li> <li>a landform consistent with the surrounding environment</li> </ul>	Built features damaged by mining operations	Repair to pre-mining condition or equivalent unless <ul style="list-style-type: none"> <li>the owner agrees otherwise; or</li> <li>the damage is fully restored, repaired or compensated for under the Mine Subsidence Compensation Act 1961.</li> </ul>
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Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure																			



<b>Progressive Rehabilitation</b>		
32. The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.	Compliant	Rehabilitation is planned and conducted in accordance with the Rehabilitation Management Plan.  Rehabilitation activities are detailed in Section 8
<b>Rehabilitation Management Plan</b>		
33. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project in accordance with the conditions imposed on the mining lease(s) associated with the project under the <i>Mining Act 1992</i> , with specific reference to all surface facilities sites. This plan must be prepared in consultation with BCD, DPE Water, WCC, WSC and the CCC.  Note: The Rehabilitation Management Plan should address all land impacted by the project, whether prior to or following the date of this approval.	Compliant	A Rehabilitation Management Plan compliant with this condition was prepared in June 2022. The RMP was reviewed in June 2023.
<b>BIODIVERSITY</b>		
<b>Appin East Mine Gas Safety Management Project</b>		
34. By 31 January 2017, the Proponent shall enter into a suitable arrangement to offset the clearing of Cumberland Plain Woodland to develop the Appin East Mine Gas Drainage Project, to the satisfaction of the Planning Secretary.	Compliant	The Appin East Mine Safety Gas Project biodiversity requirements have been incorporated into the Biodiversity Management Plan.  The Biodiversity Management Plan has been submitted and approved.
<b>Ventilation Shaft No. 6</b>		
35. The Proponent shall prepare and implement a biodiversity offset strategy to compensate for the impact of Ventilation Shaft No. 6 on Cumberland Plain Woodland. The offset strategy must: (a) be prepared in consultation with BCD and to the satisfaction of the Planning Secretary; (b) incorporate at least 8.7 hectares of existing Cumberland Plain Woodland vegetation; and (c) make suitable arrangements to protect and manage this offset area in perpetuity.  Note: The 8.7 hectare size for the Biodiversity Offset Area identified above is based on Cumberland Plain Woodland vegetation on shale (HN529) in good condition. An equivalent minimum offset for Cumberland Plain Woodland on flats vegetation (HN528) in good condition is 9.4 hectares.	Compliant	The Ventilation Shaft 6 Biodiversity Offset Strategy has been submitted and approved.
<b>Appin Mine Ventilation and Access Site</b>		
35A. Within 6 months of the commencement of Appin Mine Ventilation and Access Site early works, unless otherwise agreed by the Planning Secretary, the Proponent must retire two (2) ecosystem credits for the clearing of Plant Community Type (PCT) 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion associated with the construction of the Appin Mine Ventilation and	Compliant	Payment into the Biodiversity Conservation Fund for an offset obligation was completed on 27 October 2022 and approved on 3 November 2022 (BCT Reference BCF450).





<p>Access Site. The credits must be retired in accordance with the Biodiversity Offsets Scheme of the BC Act.</p>		
<p><b>Biodiversity Management Plan</b></p>		
<p>36. The Proponent shall prepare and implement a Biodiversity Management Plan for the Appin East Mine Gas Safety Management Project and Ventilation Shaft No. 6 and Appin Mine Ventilation and Access Site, to the satisfaction of the Planning Secretary. The plan must:</p> <p>(a) be prepared in consultation with BCD, and submitted to the Planning Secretary for approval by 31 January 2017;</p> <p>(b) describe how the implementation of offsets would be integrated with the overall rehabilitation of the site;</p> <p>(c) include:</p> <p>(i) a description of the short, medium and long term measures that would be implemented to:</p> <ul style="list-style-type: none"> <li>• implement offset strategy; and</li> <li>• manage the remnant vegetation and habitat on the site and in the offset areas;</li> </ul> <p>(ii) detailed performance and completion criteria for the implementation of the offset strategy;</p> <p>(iii) details of vegetation clearing protocols, including procedures to:</p> <ul style="list-style-type: none"> <li>• minimise the amount of the clearing required;</li> <li>• compensate the loss of hollow-bearing trees for the Appin East Mine Gas Safety Management Project; and</li> <li>• translocate the Cumberland Plain Snail (<i>Meridolum corneovirens</i>) affected by the clearing of Cumberland Plain Woodland for the Appin East Mine Gas Safety Management Project;</li> </ul> <p>(iv) details of location and timing of tree screenings to minimise visual impacts of the project;</p> <p>(v) a description of the measures that would be implemented in ongoing 5 year periods, including the procedures to be implemented to:</p> <ul style="list-style-type: none"> <li>• implement revegetation and regeneration within disturbed areas;</li> <li>• minimise the clearing of native vegetation;</li> <li>• control weeds and feral pests;</li> <li>• manage grazing and agriculture on site; and <input type="checkbox"/> control unauthorised access;</li> </ul> <p>(vi) a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;</p> <p>(vii) a description of the potential risks to successful revegetation, and a description of the contingency measures that would be implemented to mitigate these risks; and</p> <p>(viii) details of who would be responsible for monitoring, reviewing, and implementing the plan.</p>	<p>Compliant</p>	<p>A Biodiversity Management Plans is in place. The plan was reviewed in FY23 and submitted to the Department. It was approved on 20 January 2023.</p> <p>The plan is available on the website at <a href="#">link</a>.</p>
<p>36A The Proponent must implement the Biodiversity Management Plan approved by the Planning Secretary.</p>	<p>Compliant</p>	<p>The requirements of the plan are being implemented.</p>
<p><b>SCHEDULE 4A</b></p>		



<b>CONSTRUCTION SPECIFIC ENVIRONMENTAL CONDITIONS – APPIN MINE VENTILATION AND ACCESS SITE</b>												
<b>CONSTRUCTION NOISE</b>												
1. The Proponent must ensure that the noise generated by the Appin Mine Ventilation and Access Site early works are managed in accordance with the requirements of the Interim Construction Noise Guideline (DECC, 2009), as may be updated from time to time.	Compliant	Noise generated by the AMVA Project was managed in accordance with the ICNG.										
2. The Proponent must ensure that the noise generated by construction of the Appin Mine Ventilation and Access Site does not exceed the noise impact assessment criteria set out in Table 2B of condition 2C, Schedule 4 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.	N/A	Not yet triggered.  Construction activities classified as Early Works were completed in FY23. These works were managed in accordance with the ICNG.  Construction activities to which these impact assessment criteria apply will be undertaken in FY24.										
<b>CONSTRUCTION BLASTING</b>												
<b>Blasting Criteria</b>												
3. The Proponent must ensure that the construction blasting at the Appin Mine Ventilation and Access Site does not cause exceedances of the criteria in Table 11. <small>Table 11: Construction blasting criteria</small>	N/A	Not yet triggered.  Blasting activities were not undertaken in FY23.										
<table border="1"> <thead> <tr> <th>Location</th> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Ground vibration (mm/s)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td></td> <td>120</td> <td>10</td> <td>0%</td> </tr> <tr> <td>Residence on privately owned land</td> <td>115</td> <td>5</td> <td>5% of the total number of blasts over a period of 12 months</td> </tr> </tbody> </table> <p>However, these criteria do not apply if the Proponent has a written agreement with the relevant owner and the Proponent has advised the Department in writing of the terms of this agreement, or if other criteria is agreed by the Planning Secretary</p>			Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance		120	10	0%	Residence on privately owned land	115
Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance									
	120	10	0%									
Residence on privately owned land	115	5	5% of the total number of blasts over a period of 12 months									
<b>Blasting Hours</b>												
4. Unless the Planning Secretary agrees otherwise, the Proponent must only carry out blasting on the Appin Mine Ventilation and Access Site Monday to Friday 9 am to 5 pm and Saturday 9 am to 1 pm. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Planning Secretary unless an additional blast is required following a blast misfire.	N/A	Not yet triggered.  Blasting activities were not undertaken in FY23.										
5. If the Proponent decides to seek the Planning Secretary's approval to carry out blasting outside of the hours specified in condition 5 above, then it must demonstrate that the airblast overpressure levels from the blasting complies with the night-time L <sub>Amax</sub> sleep disturbance maximum noise trigger level criteria specified in Table 2B of condition 2C, Schedule 4.	N/A	Not yet triggered.  Blasting activities were not undertaken in FY23.										
<b>Blasting Frequency</b>												
6. The Proponent may carry out a maximum of 1 blast per 24 hour period at each of the Appin Mine Ventilation and Access Site ventilation shafts, unless an additional blast is required following a blast misfire.  This condition does not apply to blasts required to ensure the safety of the mine or its workers.	N/A	Not yet triggered.  Blasting activities were not undertaken in FY23.										



<p>Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a ventilation shaft of the site.</p>		
<p><b>Property Inspections</b></p>		
<p>7. If the Proponent receives a written request from the owner of any privately-owned land within 1 kilometre of vent shaft no 7 or vent shaft no 8, for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, then within 2 months of receiving this request the Proponent must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to:</p> <p>i. establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and</p> <p>ii. identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and</p> <p>(b) give the landowner a copy of the new or updated property inspection report.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution.</p>	<p>N/A</p>	<p>Not yet triggered.</p> <p>Blasting activities were not undertaken in FY23.</p>
<p><b>Property Investigations</b></p>		
<p>8. If the owner of any privately-owned land within 1 kilometre of vent shaft no 7 or vent shaft no 8 claims in writing that buildings or structures on their land have been damaged as a result of blasting on the Appin Mine Ventilation and Access Site, and the Planning Secretary is satisfied that an investigation is warranted, then within 2 months of receiving this claim in writing from the landowner the Proponent must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and</p> <p>(b) give the landowner a copy of the property investigation report.</p> <p>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent must repair the damages to the satisfaction of the Planning Secretary.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution.</p>	<p>N/A</p>	<p>Not yet triggered.</p> <p>Blasting activities were not undertaken in FY23.</p>
<p><b>Operating Conditions</b></p>		
<p>9. During blasting operations on the Appin Mine Ventilation and Access Site, the Proponent must:</p>	<p>N/A</p>	<p>Not yet triggered.</p> <p>Blasting activities were not undertaken in FY23.</p>



<p>(a) engage suitably qualified and experienced person/s to oversee the process of blasting, including blast planning, design, supervision and monitoring; (b) implement best management practice to: i. protect the safety of people (including road users) and livestock in the surrounding area; ii. protect public or private infrastructure/property in the surrounding area from any damage; and iii. minimise the dust and fume emissions of any blasting; to the satisfaction of the Planning Secretary.</p>		
<p><b>Site Entrance</b></p>		
<p>10. Prior to the commencement of construction on the Appin Mine Ventilation and Access Site, the Proponent must construct the Appin Mine Ventilation and Access Site entrance and its intersection with Menangle Road to the satisfaction of WSC and TfNSW.</p>	<p>Compliant</p>	<p>Construction of the site entrance and its intersection with Menangle Road was completed prior to the commencement of construction on the AMVA Project site.</p>
<p><b>CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN</b></p>		
<p>11. Prior to the commencement of Appin Mine Ventilation and Access Site early works, the Proponent must prepare a Construction Environmental Management Plan for the construction phase of the Appin Mine Ventilation and Access Site to the satisfaction of the Planning Secretary. This plan must: (a) be prepared in consultation with the EPA; (b) provide specific environmental management and monitoring measures for construction works, including for: i. minimising construction-related noise, dust, visual impacts, and surface disturbance; ii. stormwater management including erosion and sediment controls and clean water diversion; iii. monitoring and managing groundwater inflows and impacts to groundwater resources as a result of shaft construction activities at the Appin Mine Ventilation and Access Site; (c) include details of vegetation clearing protocols, including procedures to minimise the amount of clearing required on the Appin Mine Ventilation and Access Site; (d) include a Construction Blast Management Plan prepared by a suitably qualified and experienced person/s in consultation with the EPA that: i. describes the measures that would be implemented to ensure compliance with the relevant conditions of this approval and that best management practice is being employed; ii. includes a real-time automated monitoring program prepared in accordance with the guidelines provided in Australian Standard 2187.2-2006: Explosives-Storage and use, Part 2: Use of explosives to: • evaluate the performance of the project and compliance with the applicable criteria; • control flyrock; and • minimise fume emissions from the site; iii. includes public notification procedures to enable members of the public, particularly surrounding residents, to get up-to-date information on the proposed blast schedule;</p>	<p>N/A</p>	<p>The CEMP – Early Works AMVA Project was prepared and approved on 17 June 2022 prior to the commencement of Early Works on the site.</p> <p>The AMVA Project CEMP was approved by the Department on 19 January 2023.</p>



<p>iv. includes a protocol for investigating and responding to blast-related complaints; and v. includes a protocol for investigating and responding to noise complaints.</p> <p>(e) include a Construction Traffic Management Plan prepared in consultation with the TfNSW and WSC, that:</p> <p>i. includes strategies to manage construction traffic, including road closure protocols, community consultation and measures to avoid potential road safety conflicts with other road users; ii. includes a program for conducting road safety audits, including both pre and post construction, of the intersection of the Appin Mine Ventilation and Access Site entrance with Menangle Road; iii. includes a vehicle movement plan for:</p> <ul style="list-style-type: none"> <li>• managing light, heavy and over-dimensional vehicles during construction works;</li> <li>• transporting construction waste materials; and</li> <li>• restricting construction or transportation hours to avoid road user conflicts; and</li> </ul> <p>(f) include a Construction Noise Management Plan that:</p> <p>i. describes the measures that would be implemented to ensure compliance with the noise conditions of this approval; ii. includes a noise monitoring program that:</p> <ul style="list-style-type: none"> <li>• uses a combination of real-time and supplementary attended monitoring to evaluate noise generated by the project during construction; and</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this approval.</li> </ul> <p>(g) include a Construction Air Quality Management Plan that:</p> <p>i. describes the proactive and reactive air quality mitigation measures that would be implemented to ensure compliance with Condition 9 of Schedule 4 of this approval; ii. includes an air quality monitoring program that:</p> <ul style="list-style-type: none"> <li>• includes real time monitoring to evaluate air quality impacts during construction; and</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this approval.</li> </ul>		
<p><b>SCHEDULE 5: ADDITIONAL PROCEDURES</b></p>		
<p><b>NOTIFICATION OF LANDOWNERS</b></p>		
<p>1. As soon as practicable and no longer than 7 days after obtaining monitoring results showing:</p> <p>(a) an exceedance of any relevant criteria in schedule 4, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and (b) an exceedance of any relevant air quality criteria in schedule 4, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).</p>	<p>N/A</p>	<p>No exceedances of criteria were reported in the reporting period that affected adjacent landholders.</p>
<p><b>INDEPENDENT REVIEW</b></p>		
<p>2. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 4, then he/she may ask the Planning Secretary in writing</p>	<p>N/A</p>	<p>Condition not triggered during reporting period.</p>



<p>for an independent review of the impacts of the project on his/her land.</p> <p>If the Planning Secretary is satisfied that an independent review is warranted, then within 2 months of the Planning Secretary's decision the Proponent shall:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:</p> <ul style="list-style-type: none"> <li>• consult with the landowner to determine his/her concerns;</li> <li>• conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 4; and</li> <li>• if the project is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and</li> </ul> <p>(b) give the Planning Secretary and landowner a copy of the independent review.</p>		
<p>3. If the independent review determines that the project is complying with the relevant criteria in Schedule 4, then the Proponent may discontinue the independent review with the approval of the Planning Secretary. If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall:</p> <p>(a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or</p> <p>(b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Planning Secretary.</p> <p>If the independent review determines that any relevant acquisition criteria in schedule 4 are being exceeded and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 4-5 below.</p>	<p>N/A</p>	<p>Condition not triggered during reporting period.</p>
<p><b>LAND ACQUISITION</b></p>		
<p>4. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the project, having regard to the:</p> <ul style="list-style-type: none"> <li>• existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</li> <li>• presence of improvements on the land and/or any approved building or structure which has been physically commenced on the land at the date of the landowner's written request, and is due to be</li> </ul>	<p>N/A</p>	<p>Condition not triggered during reporting period.</p>



<p>completed subsequent to that date, but excluding any improvements that have resulted from the implementation of any additional noise mitigation measures under Condition 6 of Schedule 4;</p> <p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"><li>• relocating within the Wollondilly local government area, or to any other local government area determined by the Planning Secretary; and</li><li>• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and</li></ul> <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>If the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired within 28 days after the Proponent makes its written offer, then either party may refer the matter to the Planning Secretary for resolution.</p> <p>Upon receiving such a request, the Planning Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to:</p> <ul style="list-style-type: none"><li>• consider submissions from both parties;</li><li>• determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;</li><li>• prepare a detailed report setting out the reasons for any determination; and</li><li>• provide a copy of the report to both parties.</li></ul> <p>Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.</p> <p>However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Planning Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Planning Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report disputing the independent valuer's determination, and any other relevant submissions.</p> <p>Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Planning Secretary's determination.</p> <p>If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's</p>		
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<p>obligations to acquire the land shall cease, unless the Planning Secretary determines otherwise.</p>		
<p>5. The Proponent shall pay all reasonable costs associated with the land acquisition process described in Condition 4 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.</p>	<p>N/A</p>	<p>Condition not triggered during reporting period.</p>
<p><b>SCHEDULE 6: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING</b></p>		
<p><b>ENVIRONMENTAL MANAGEMENT</b></p>		
<p><b>Environmental Management Strategy</b></p>		
<p>1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Planning Secretary. This strategy must:</p> <p>(a) be prepared in consultation with WSC and be submitted to the Planning Secretary for approval;</p> <p>(b) provide the strategic framework for environmental management of the project;</p> <p>(c) identify the statutory approvals that apply to the project;</p> <p>(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;</p> <p>(e) describe the procedures that would be implemented to:</p> <ul style="list-style-type: none"> <li>• keep the local community and relevant agencies informed about the operation and environmental performance of the project, including a specific community and stakeholder notification and engagement strategy during the construction and operation of the Appin Mine Ventilation and Access Site;</li> <li>• receive, handle, respond to, and record complaints;</li> <li>• resolve any disputes that may arise during the course of the project;</li> <li>• respond to any non-compliance;</li> <li>• respond to emergencies; and</li> </ul> <p>(f) include:</p> <ul style="list-style-type: none"> <li>• references to all relevant strategies, plans and programs approved under the conditions of this approval; and</li> <li>• a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.</li> </ul>	<p>Compliant</p>	<p>The Environmental Management Strategy was reviewed and submitted to the Department in FY23. The strategy was approved on 15 November 2022.</p> <p>The plan is available on the IMC website at <a href="#">link</a>.</p> <p>The requirements of the strategy are being implemented.</p>
<p><b>Management Plan Requirements</b></p>		
<p>2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data;</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> <li>• the relevant statutory requirements (including any relevant approval, licence or lease conditions);</li> <li>• any relevant limits or performance measures/criteria;</li> <li>• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;</li> </ul>	<p>Compliant</p>	<p>Management Plans have been prepared in accordance with relevant guidelines.</p> <p>Additional information will be included where identified during the review/approval process.</p>





<p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p> <p>(d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> <li>• impacts and environmental performance of the project;</li> <li>• effectiveness of any management measures (see c above);</li> </ul> <p>(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the project over time;</p> <p>(g) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> <li>• incidents;</li> <li>• complaints;</li> <li>• non-compliances with statutory requirements; and</li> <li>• exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>(h) a protocol for periodic review of the plan.</p> <p>Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</p>		
<p><b>Adaptive Management</b></p>		
<p>3. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:</p> <p>(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</p> <p>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</p> <p>(c) implement remediation measures as directed by the Planning Secretary, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>Actions have been implemented to address exceedances of criteria as required.</p>
<p><b>Annual Review</b></p>		
<p>4. By 30 September 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Planning Secretary. This review must:</p> <p>(a) describe the development (including any rehabilitation) that was carried out in the past financial year, and the development that is proposed to be carried out over the next year;</p> <p>(b) include a comprehensive review of the monitoring results and complaints records of the project over the past financial year, which includes a comparison of these results against the:</p>	<p>Compliant</p>	<p>The FY22 Annual Review was submitted by 30 September 2022.</p> <p>This condition has been addressed in this and previous Annual Reviews.</p>



<ul style="list-style-type: none"> <li>• relevant statutory requirements, limits or performance measures/criteria;</li> <li>• requirements of any plan or program required under this approval;</li> <li>• monitoring results of previous years; and</li> <li>• relevant predictions in the EA;</li> </ul> <p>(c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;</p> <p>(d) identify any trends in the monitoring data over the life of the project;</p> <p>(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and</p> <p>(f) describe what measures will be implemented over the current financial year to improve the environmental performance of the project.</p>		
<p><b>Revision of Strategies, Plans and Programs</b></p>		
<p>5. Within 3 months of:</p> <p>(a) the submission of an annual review under Condition 4 above;</p> <p>(b) the submission of an incident report under Condition 7 below;</p> <p>(c) the submission of an audit report under Condition 9 below; and</p> <p>(d) any modification to the conditions of this approval, (unless the conditions require otherwise), or</p> <p>(e) a direction of the Planning Secretary under Condition 4 of Schedule 2;</p> <p>the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary.</p> <p>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.</p>	<p>Compliant</p>	<p>Management Plans are reviewed as required by this condition.</p> <p>Improvements identified during the reviews are recorded in the Management Plan Review Log.</p> <p>The approved versions of management plans required under the Project Approval are listed in Section 13.2.</p>
<p><b>Community Consultative Committee</b></p>		
<p>6. The Proponent shall establish and operate a new Community Consultative Committee (CCC) for the project to the satisfaction of the Planning Secretary. This CCC must be operated in general accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007, or its latest version), and be operating by 30 September 2012.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.</li> <li>• In accordance with the guideline, the Committee should be comprised of an independent chair and appropriate representation from the Proponent, Council, recognised environmental groups and the local community.</li> </ul>	<p>Compliant</p>	<p>The Appin Mine Community Consultative Committee is in place and operating in accordance with the Department's <i>Community Consultative Committee Guidelines: State Significant Projects</i>.</p>
<p><b>REPORTING</b> <b>Incident Notification, Reporting and Response</b></p>		



<p>7. The Planning Secretary must be notified in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. The notification must identify the project (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 7.</p>	<p>Compliant</p>	<p>The Department was notified as required of the turbid water discharge at the AMVA Project site. This was considered to be a material incident.</p> <p>Exceedances of limits were notified to the Department as required.</p>
<p><b>Non-Compliance Notification</b></p>		
<p>7A. The Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance. A non-compliance notification must identify the project and the application number for it, set out the condition of approval that the project is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.</p> <p><i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a noncompliance.</i></p>	<p>Compliant</p>	<p>No non-compliances (that were not reported as incidents) were recorded in FY23.</p>
<p><b>Regular Reporting</b></p>		
<p>8. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.</p>	<p>Compliant</p>	<p>Monitoring data is reported in the 14-day EPL Report, Annual Review and End of Panel Reports. This data is available on the IMC website at <a href="#">link</a>.</p>
<p><b>INDEPENDENT ENVIRONMENTAL AUDIT</b></p>		
<p>9. By the end of December 2013, and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:</p> <ul style="list-style-type: none"> <li>(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary;</li> <li>(b) include consultation with the relevant agencies;</li> <li>(c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);</li> <li>(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and</li> <li>(e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.</li> </ul> <p><i>Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Planning Secretary.</i></p>	<p>Compliant</p>	<p>Environmental Resources Management Australia Pty Ltd (ERM) was engaged by IMC to carry out an Independent Environmental Audit of Appin Mine in FY23.</p> <p>A copy of the Audit findings and Response to Recommendations can be found on the IMC webpage at <a href="#">link</a>.</p>
<p>10. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Planning Secretary, the Proponent shall submit a copy of the audit report to the</p>	<p>Compliant</p>	<p>The audit report, dated 21 December 2022, was provided to the Department within the required timeframe.</p>



<p>Planning Secretary, together with its response to any recommendations contained in the audit report.</p>		
<p><b>ACCESS TO INFORMATION</b></p>		
<p>11. From 30 June 2012, the Proponent shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> <li>• the documents referred to in Condition 2 of Schedule 2;</li> <li>• all current statutory approvals for the project;</li> <li>• all approved strategies, plans and programs required under the conditions of this approval;</li> <li>• a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;</li> <li>• a complaints register, updated on a monthly basis;</li> <li>• minutes of CCC meetings;</li> <li>• the annual reviews of the project;</li> <li>• any independent environmental audit of the project, and the Proponent’s response to the recommendations in any audit;</li> <li>• any other matter required by the Planning Secretary; and</li> </ul> <p>(b) keep this information up-to-date, to the satisfaction of the Planning Secretary.</p>	<p>Compliant</p>	<p>All approved plans, strategies and monitoring results are on the IMC webpage at <a href="#">link</a>.</p>
<p><b>APPENDIX 7: INCIDENT NOTIFICATION AND REPORTING REQUIREMENTS</b></p>		
<p><b>WRITTEN INCIDENT NOTIFICATION REQUIREMENTS</b></p>		
<p>1. A written incident notification addressing the requirements set out below must be submitted to the Planning Secretary via the Major Projects website within seven days after the Proponent becomes aware of an incident.</p>	<p>Compliant</p>	<p>Written notifications were provided to the Department as required.</p>
<p>2. Written notification of an incident must:</p> <p>(a) identify the project and application number;</p> <p>(b) provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);</p> <p>(c) identify how the incident was detected;</p> <p>(d) identify when the Proponent became aware of the incident;</p> <p>(e) identify any actual or potential non-compliance with conditions of approval;</p> <p>(f) describe what immediate steps were taken in relation to the incident;</p> <p>(g) identify further action(s) that will be taken in relation to the incident; and</p> <p>(h) identify a project contact for further communication regarding the incident.</p>	<p>Compliant</p>	<p>Written notifications were provided to the Department as required.</p>
<p>3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Proponent must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.</p>	<p>Compliant</p>	<p>Written notifications were provided to the Department as required.</p>
<p>4. The Incident Report must include:</p> <p>(a) a summary of the incident;</p> <p>(b) outcomes of an incident investigation, including identification of the cause of the incident;</p>	<p>Compliant</p>	<p>Written notifications were provided to the Department as required.</p>



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<p>(c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and (d) details of any communication with other stakeholders regarding the incident.</p>		
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## Appendix 4: Independent Environmental Audit Progress - FY23

### Project Approval 08\_0150

Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
<b><i>Obligation to Minimise Harm to the Environment</i></b>					
Condition 1 of Schedule 2	The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.	<p>While site containment structures were relatively old, reflecting the age of the operation, they appeared to work effectively in general. Several containment areas and drains contained significant amounts of coal dust and other waste materials. However, they were still functioning and site personnel informed the auditor that they were about to be serviced and emptied.</p> <p>Pit tops drainage and water recycling and treatment systems were inspected and appear to be functioning well.</p> <p>Solid waste segregation bins were observed at most pit tops. Where waste is deposited into a single bin, this is segregated at the landfill site for recycling, as evidenced from monthly Waste and Recycling Reports by the contractor.</p> <p>Relatively large quantities of varied materials were stored outside of buildings at each of the pit tops. While these</p>	NC	Whilst material harm has not been identified, it is recommended that items that have the potential to cause contamination (such as items containing oil and fuels) should be placed on bunded concrete pads that drain to treatment facilities.	<p>The spills identified are considered to be minor in nature and have resulted in localised surface staining only. Areas where spillage was observed report to the on-site water treatment system. It is not considered that these spills have caused actual or have the potential to cause material environmental harm.</p> <p>IMC will investigate and implement reasonable and feasible measures to improve housekeeping, in particular, the storage of items</p>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>included inert materials stored on concrete pads connected to the stormwater collection system at Appin North and East, there were large quantities of materials stored unprotected directly on gravel and soil at Appin West. Several items stored here contained hoses and other vessels with leaking oil and other fluids. There were numerous stains visible across the gravel storage areas that were derived from fluids other than water and indicative of localised ground contamination.</p> <p>There is an opportunity to erect roofs above waste deposition areas to divert rainwater away from these areas, reducing the volume of water that would need treating.</p> <p>A reverse osmosis plant has been constructed at West Cliff to treat water. At the time of the audit, the plant had not been commissioned. Site management reported that commissioning of the plant was imminent.</p>			<p>with potential to leak oil and other fluids. Improvements made will be reported within the relevant Annual Review.</p> <p><b>Date:</b> Ongoing</p> <p>Compliance will be reported in future Annual Reviews.</p> <p><b>Closed</b></p>
Condition 12 of Schedule 2	<p>The Proponent shall ensure that all the plant and equipment used on site is:</p> <ul style="list-style-type: none"> <li>(a) Maintained in a proper and efficient condition; and</li> <li>(b) Operated in a proper and efficient manner.</li> </ul>	<p>The example pre-start light vehicle (2020, 2021, 2022) and truck (2022) checklist indicated the vehicles were in</p>	NC	<p>Modification to the ferric chloride bund was undertaken during the audit period to re-instate adequate secondary containment. No further actions are necessary.</p>	<p>No further action is required.</p> <p><b>Closed</b></p>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>good working order and routinely checked.</p> <p>Example inspection records from a range of locations (including Brennans Creek Dam, STP, emplacement rehabilitation area (2020, 2021, 2022) demonstrated improvement and maintenance activities.</p> <p>A sample work order for pH probe replacement demonstrated replacement of faulty equipment.</p> <p>However, on 3 January 2022, there was a release of a small volume of ferric chloride to the sediment pond, associated with modification works to the concrete bund containing the ferric chloride. However, no release to the environment occurred. Due to the failure to properly provide containment for the ferric chloride, BSO is considered non-compliant with this condition.</p>			
<b>Extraction Plans</b>					
Condition 5 of Schedule 3	The Proponent shall prepare and implement an Extraction Plan for first and second workings within each longwall mining domain to the satisfaction of the Planning Secretary. Each extraction plan must:	There appears to have been a systematic overprediction of the vertical subsidence above the chain pillars whilst the maximum subsidence has been well predicted. This implies that there is an underprediction for the components above the	NC	Attach the Seismic Monitoring Annual Reports to Annual Reviews	Seismic Event Monitoring Reports will be attached to future Annual Reviews or the Seismic Event Monitoring Program will be





Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>extraction panels themselves. A possible consequence of this systemic overprediction is that tilts and curvatures may have been slightly underpredicted.</p> <p>The prediction method is apparently based on interpretation of a large data base without any resort to engineering principles. The prediction method does not separate pillar subsidence from sag above the extraction.</p> <p>The prediction method was modified in 2022 for the predictions related to 709-711 and 905.</p> <p>Maximum vertical subsidence is being acceptably predicted but the component above the pillars is being overpredicted which implies that there is an underprediction for the components above the extraction panels themselves.</p> <p>According to the Bulli Seam Seismic Regional Seismic Event Monitoring Program S6.3, an annual report will be produced to be included in the Annual Review. Although ERM understands the Seismic Monitoring Reports have been prepared, no Seismic Event Monitoring reports are included in the</p>			<p>revised to remove this requirement.</p> <p><b>Proposed Date:</b> 30 September 2023</p> <p><b>Progress update:</b> Summary of Seismic Event Monitoring Report included in Annual Review in accordance with revised requirement in Extraction Plan.</p> <p><b>Closed</b></p>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022																																		
		Annual Reviews and none have been able to be reviewed by auditor as required by this condition, therefore BSO is non-compliant.																																					
<b>Noise Impact Assessment Criteria</b>																																							
Condition 2 of Schedule 4	From the end of December 2014, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land. <i>Table2: Noise Criteria dB(A)</i>	<p>The following non-compliances were recorded during the audit period:</p> <ul style="list-style-type: none"> <li>27 Nov 2019 (Location AE-NS5) at night-time period</li> <li>20 May 2020 (Location AE-NS5) at night-time period</li> <li>11 Aug 2020 (Location AE-NS5) at day, evening and night-time</li> <li>10 Nov 2020 (Location AE-NS5) at day, evening and night-time</li> <li>18 May 2021 (Location AE-NS5) at evening and night-time</li> </ul> <p>The above exceedances were all at the same location. The exceedances were investigated by Spoke Acoustics (March 2021), resulting in the implementation of noise reduction and measures. A significant contributor to the noise exceedances was the gas circulation valve. The exceedance on 18 May 2021 was attributed to a loose weld at Fan 3 in Vent Shaft 2 fans. After being repaired no further</p>	NC	Issue resolved during audit period, therefore no further recommendations are made at this time.	No further action is required.  <b>Closed</b>																																		
	<table border="1"> <thead> <tr> <th colspan="2">Location</th> <th>Day</th> <th>Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>Area</th> <th>Receiver Number</th> <th>LAeq (15min)</th> <th>LAeq (15min)</th> <th>LAeq (15min)</th> <th>LA1 (1min)</th> </tr> </thead> <tbody> <tr> <td>Appin West Receivers south-west of Appin West</td> <td>1-7, 9-11, 13, 184, 188-189</td> <td>39</td> <td>39</td> <td>35</td> <td>49</td> </tr> <tr> <td>Appin West receivers near Hume Highway</td> <td>185-187, 190</td> <td>35</td> <td>35</td> <td>35</td> <td>53</td> </tr> <tr> <td rowspan="2">All other Appin West receivers</td> <td>14, 26</td> <td>45</td> <td>45</td> <td>35</td> <td rowspan="2">53</td> </tr> <tr> <td>15-25, 27-48, 50-56</td> <td>43</td> <td>43</td> <td>35</td> </tr> </tbody> </table>					Location		Day	Evening	Night		Area	Receiver Number	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)	Appin West Receivers south-west of Appin West	1-7, 9-11, 13, 184, 188-189	39	39	35	49	Appin West receivers near Hume Highway	185-187, 190	35	35	35	53	All other Appin West receivers	14, 26	45	45	35	53	15-25, 27-48, 50-56	43	43	35
	Location					Day	Evening	Night																															
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Item No.	Assessment Requirement						Comment	IEA Classification	Recommendations	IMC Response December 2022
	Appin No. 3 receivers	58, 67, 71, 72	41	41	41	49	exceedances were recorded during the audit period.			
		68, 74, 75	40	40	40					
		69, 70, 76	39	39	39					
		217-218, 233, 279-282	35	35	35					
	Appin No.1 and No.2 Receivers	82, 91, 216	42	42	42	50				
		83, 85	41	41	41					
		78, 84, 86-90, 199	40	40	40					
		212-215, 226, 228-230, 232, 234, 235	35	35	35					
	Appin Township	136, 137, 139, 142, 143	44	44	44	52				
		135	43	43	43					
All other privately owned property		44	44	44						
Douglas Park	All privately owned residences	45	45	39	49					
All other privately owned land (excluding receivers in Table 3)		35	35	35	45					
<p>However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.</p>										



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
<b>Operating Conditions</b>					
Condition 11 of Schedule 4	<p>The Proponent shall:</p> <ul style="list-style-type: none"> <li>a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including from any spontaneous combustion on site,</li> <li>b) minimise any visible air pollution generated by the project; and</li> <li>c) regularly assess the air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval;</li> </ul> <p>to the satisfaction of the Planning Secretary.</p>	<p>Water trucks were observed by the auditor and truck washing areas were observed to be operational. The site escort was observed sending water trucks to different areas during the site inspection to address dry roads, indicating personnel vigilance in suppressing dust.</p> <p>Meteorological stations were observed in various locations. Meteorological data is used to inform evaluation of compliance with air quality criteria, as well as when evaluating noise data.</p> <p>On 22 August 2020, a release of stone dust occurred at Ventilation Shaft 6, which resulted in visible air pollution. Dust emissions occurred at approximately 9.45 am for approximately one hour. Following an investigation it was concluded that no environmental harm occurred.</p> <p>The cause was attributed to a change in underground ventilation system – and was addressed through the change management process.</p> <p>An external meteorological contractor is used to warn the site of impending adverse</p>	NC	Addressed during audit period via changes to the underground ventilation system. No further recommendations made.	<p>No further action is required.</p> <p><b>Closed</b></p>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		weather conditions for dust so that preventive road and haul road watering can be undertaken.			
<b>Surface Water Discharges</b>					
Condition 15 of Schedule 4	The Proponent shall ensure that all surface water discharges from the site (including from the Brennans Creek Dam) comply with the discharge limits (both volume and quality) set for the project in any EPL.	<p>The following non-compliances were identified:</p> <ul style="list-style-type: none"> <li>■ On 5 November 2019 and 8 January 2020, 137 mg/L and 56 mg/L BOD respectively, were recorded at Appin West, representing exceedances of the 100th percentile water quality criteria of 50 mg/L. The first event was related to erroneous re-direction of effluent water due to tripping from control equipment power failure. The second event was caused by inefficient treatment system set-up.</li> <li>■ On 7 February 2020, 51 mg/L BOD was recorded at Appin North, representing an exceedance of the 100th percentile water quality criteria of 50 mg/L. Excessive quantities of soap entered the sewage system, affecting the STP microbial flora and its effectiveness.</li> <li>■ On 31 July and 1 August 2020, discharge volumes</li> </ul>	NC	Changes were made to the monitoring system during the audit period and no further recommendations are made at this time.	No further action is required.  <b>Closed</b>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>recorded were 106.6 kL/day and 105.8 kL/day respectively, exceeding the allowable limit of 80 kL/day.</p> <p>Changes were made to the monitoring system during the audit period to address the various causes of non-compliance, including adjustments to the control system, pond/tank functionality and personnel education on the impacts of excessive soap use.</p>			
<b>Access to Information</b>					
Condition 11 of Schedule 6	<p>From 30 June 2012, the Proponent shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> <li>• the documents referred to in Condition 2 of Schedule 2;</li> <li>• all current statutory approvals for the project;</li> <li>• all approved strategies, plans and programs required under the conditions of this approval;</li> <li>• a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;</li> <li>• a complaints register, updated on a monthly basis;</li> <li>• minutes of CCC meetings;</li> <li>• the annual reviews of the project;</li> <li>• any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;</li> <li>• any other matter required by the Planning Secretary; and</li> </ul> <p>(b) keep this information up-to-date,</p> <p>to the satisfaction of the Planning Secretary.</p>	<p>On 20<sup>th</sup> April 2020, a community member notified the Community Consultative Committee that minutes had not been updated recently on the IMC website. BSO rectified the situation at the time of the complaint and up to date minutes were available on the website at the time of the audit. The website was up to date at time of audit.</p>	NC	<p>The website was updated during the audit period and no further recommendations are made at this time.</p>	<p>No further action is required.</p> <p><b>Closed</b></p>



## Schedule 8A Mining Regulation

Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
4	<p>Must prevent or minimise harm to environment</p> <p>(1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease.</p> <p>(2) In this clause— harm to the environment has the same meaning as in the Protection of the Environment Operations Act 1997.</p>	<p>This condition is assessed as non-compliant in the Project Approval, Sch 2, C1.</p>	NC	N/A – Duplicate NC	<p>Duplicate non-compliance. Refer to response to Project Approval, Sch 2, C1 above (Item No. 2.1).</p> <p><b>Closed</b></p>
16	<p>Certain documents to be made publicly available</p> <p>(1) This clause applies to the following documents— (a) a rehabilitation management plan, (b) a forward program, (c) an annual rehabilitation report.</p> <p>(2) The holder of a mining lease must make a document to which this clause applies publicly available by— (a) publishing it on its website in a prominent position, or (b) if the holder does not have a website— providing a copy of it to a person— (i) on the written request of a person, and (ii) without charge, and (iii) within 14 days after the request is received.</p> <p>(3) If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— (a) for a rehabilitation management plan—within 14 days after it is prepared or amended, or (b) for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended,</p> <p>(4) Personal information within the meaning of the <i>Privacy and Personal Information Protection Act 1998</i> is not required to be included in a document made available to a person under this clause.</p>	<p>(1) The Rehabilitation Management Plan, Forward Program, and annual rehabilitation report (in Annual Review) are available on the IMC website, as verified by the auditor. The Forward Program was not published within 14 days of being provided to the Resources Regulator.</p> <p>(2) Noted (3) Noted (4) Noted</p>	NC	N/A	<p>Requirements under Schedule 8A of the Mining Regulation have been included in the IMC obligations management system and allocated to be actioned by the Environment Team to satisfy these requirements.</p> <p>No further action is required.</p> <p><b>Closed</b></p>



**Consolidated Coal Leases 724 and 767**

Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
2. CCL 724 and 767	<p><b>Environmental Harm</b></p> <p>a) The lease holder must implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of any activities under this lease.</p> <p>b) For the purposes of this condition:</p> <p>i. Environment means components of the earth, including:</p> <ul style="list-style-type: none"> <li>• Land, air and water, and</li> <li>• Any layer of the atmosphere, and</li> <li>• Any organic or inorganic matter and any living organism, and</li> <li>• Human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs (A)-(C).</li> </ul> <p>ii. Harm to the environment includes any direct or indirect alteration of the environment that has the effect of degrading the environment and, without limiting the generality of the above, includes any act or omission that results in pollution, contributes to the extinction or degradation of any threatened species, populations or ecological communities and their habitats and causes impacts to places, objects and features of significance to Aboriginal people.</p>	<p>This condition is assessed as non-compliant in the Project Approval, Sch 2, C1.</p> <p>The lease holder did not implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the operation of any activities under this lease. ERM observed non-compliances related to the storage of materials used to carry out the activities, which included: materials stored unprotected directly on gravel and soil; hoses and other vessels with leaking oil and other fluids; and numerous stains visible across the gravel storage areas that were derived from fluids other than water.</p>	NC	N/A – Duplicate NC	<p>Duplicate non-compliance. Refer to response to Project Approval, Sch 2, C1 above (Item No. 2.1).</p> <p><b>Closed</b></p>





Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
36. CCL 724	<p style="text-align: center;"><b>SCHEDULE 'A'</b></p> <p>The leaseholder must comply with the <i>Persoonia hirsuta</i> Offset Management Plan approved (and modified if applicable) in accordance with the requirements of the Bulli Seam Operations Expansion, Bulli, NSW (EPBC 2010/5350) Approval dated 15 May 2012, made under sections 130(1) and 133 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act Approval).</p> <p>The leaseholder must provide the Secretary of the Department of Trade and Investment, Regional Infrastructure and Services with a copy of the Compliance Report required by condition 14 of the EPBC Act Approval at the same time that the report is published in accordance with the requirements of condition 14. The leaseholder must also provide the Secretary with a copy of the Audit Report required by condition 18 of the EPBC Act Approval as soon as practicable following confirmation that the Audit Report addresses the audit criteria to the satisfaction of the Minister responsible for the administration of the EPBC Act (or their delegate)</p>	<p>ERM reviewed Correspondence from IMC to EPBC and the Resource Regulator dated 12 August 2022 submitting respective Annual Compliance Report. Non-compliances were identified for the submission of the Compliance Reports 2020 and 2021 to the NSW Resource Regulator at the same time that the report is published in accordance with the requirements of Condition 14.</p> <p>ERM reviewed Correspondence from IMC to EPBC and the Resource Regulator dated 24 December 2019 submitting a copy of the Independent Environmental Audit Report.</p>	NC	No further action required	<p>No further action is required.</p> <p>Resources Regulator issued an Official Caution on 29 June 2023.</p> <p><b>Closed</b></p>



**Environmental Protection Licence 2504**

Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022																																																					
L2.1	For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	Duplicate of non-compliance for item L2.4.	NC	Duplicate of non-compliance for item L2.4.	Refer to item L2.4.																																																					
L2.4	Water and/or Land Concentration Limits:																																																									
	<p>Point 3</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>80 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Biochemical oxygen demand</td> <td>Milligrams per litre</td> <td>30</td> <td></td> <td></td> <td>50</td> </tr> <tr> <td>Oil and Grease</td> <td>Milligrams per litre</td> <td></td> <td></td> <td></td> <td>10</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>6.5-8.5</td> <td></td> <td></td> <td>6.0-9.0</td> </tr> </tbody> </table> <p>Point 10</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>80 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Aluminium (dissolved)</td> <td>Micrograms per litre</td> <td>-</td> <td>-</td> <td>800</td> <td>-</td> </tr> <tr> <td>Arsenic (dissolved)</td> <td>Micrograms per litre</td> <td>-</td> <td>-</td> <td>19</td> <td>-</td> </tr> <tr> <td>Cadmium (dissolved)</td> <td>Micrograms per litre</td> <td></td> <td>-</td> <td>0.5</td> <td>-</td> </tr> <tr> <td>Cobalt (dissolved)</td> <td>Micrograms per litre</td> <td></td> <td>-</td> <td>20</td> <td>-</td> </tr> </tbody> </table>	Pollutant	Units of Measure	50 percentile concentration limit	80 percentile concentration limit	90 percentile concentration limit	100 percentile concentration limit	Biochemical oxygen demand	Milligrams per litre	30			50	Oil and Grease	Milligrams per litre				10	pH	pH	6.5-8.5			6.0-9.0	Pollutant	Units of Measure	50 percentile concentration limit	80 percentile concentration limit	90 percentile concentration limit	100 percentile concentration limit	Aluminium (dissolved)	Micrograms per litre	-	-	800	-	Arsenic (dissolved)	Micrograms per litre	-	-	19	-	Cadmium (dissolved)	Micrograms per litre		-	0.5	-	Cobalt (dissolved)	Micrograms per litre		-	20	-	<p>Non-compliances were identified with this requirement.</p> <ul style="list-style-type: none"> <li>Point 3: exceedance of BOD above 50 mg/L in FY2021 on 7 February 2020, reported to be caused by excess soap in the system that may have impacted the microbe community in the sewage treatment plant. No environmental harm was reported.</li> <li>Point 38: FY21 daily discharge volumes for LDP 38 were exceeded on two (2) days as a result of the same event. The exceedances were recorded on 31 July and 1 August 2020. Based on the information provided, pooling and</li> </ul>	NC	No recommendations given that non-compliances have been identified, notified, investigated, mitigated and reported.
Pollutant	Units of Measure	50 percentile concentration limit	80 percentile concentration limit	90 percentile concentration limit	100 percentile concentration limit																																																					
Biochemical oxygen demand	Milligrams per litre	30			50																																																					
Oil and Grease	Milligrams per litre				10																																																					
pH	pH	6.5-8.5			6.0-9.0																																																					
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Aluminium (dissolved)	Micrograms per litre	-	-	800	-																																																					
Arsenic (dissolved)	Micrograms per litre	-	-	19	-																																																					
Cadmium (dissolved)	Micrograms per litre		-	0.5	-																																																					
Cobalt (dissolved)	Micrograms per litre		-	20	-																																																					



Item No.	Assessment Requirement						Comment	IEA Classification	Recommendations	IMC Response December 2022
	Copper (dissolved)	Micrograms per litre		-	18	-	<p>runoff in the effluent application area was noticed along with a small amount of runoff on pit top.</p> <ul style="list-style-type: none"> <li>Point 38: two exceedance of BOD above 50 mg/L in FY2021 on 8 January 2020 and 5 November 2019 caused by equipment failure (which was repaired). According to the Report, no environmental harm was identified and no exceedance was observed following the event.</li> <li>Point 38: An exceedance was recorded on 5 November 2019 of BOD above 50 mg/L in FY2020, this was attributed to a failure in the programming of the system, corrective action to reprogram the system was taken. A second exceedance occurred on 5 December 2019 that was attributed to either</li> </ul>			
	Lead (dissolved)	Micrograms per litre		-	6	-				
	Manganese (dissolved)	Micrograms per litre		-	40	-				
	Nickel (dissolved)	Micrograms per litre		-	200	-				
	pH	pH		-	-	6.5-9.3				
	Total suspended solids	Milligrams per litre		-	-	50				
	Zinc (dissolved)	Micrograms per litre		-	84	-				
	Point 18									
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>				
	pH	pH	-	-	-	6.5-8.5				
	Total suspended solids	Milligrams per litre	-	-	-	50				
	Point 19									
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>				
	pH	pH	-	-	-	6.5 – 8.5				



Item No.	Assessment Requirement						Comment	IEA Classification	Recommendations	IMC Response December 2022	
	Total suspended solids	Milligrams per litre	-	-	-	50	<p>the improvement actions made following the previous exceedance or increased warm weather evaporation. No corrective actions were taken.</p> <ul style="list-style-type: none"> <li>An exceedance occurred on 3 June 2020 with BOD exceeding the 50<sup>th</sup> percentile limit likely due to slow turnover of the treated effluent discharge pond. No corrective actions were taken.</li> </ul> <p>No other non-compliances were identified. Based on the information provided, Point 18 did not discharge during FY 2022, FY2021 or FY2020.</p>				
Point 23											
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>					
	pH	pH	-	-	-	6.5 – 8.5					
	Total suspended solids	Milligrams per litre	-	-	-	50					
Point 24											
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>					
	Aluminium (dissolved)	Micrograms per litre	-	55		-					
	Bicarbonate Alkalinity	Milligrams of calcium carbonate per litre	-	185		-					



Item No.	Assessment Requirement						Comment	IEA Classification	Recommendations	IMC Response December 2022
	Cobalt (dissolved)	Micrograms per litre		1.4		-				
	Copper (dissolved)	Micrograms per litre		1.4						
	Electrical conductivity	millisiemens per centimetre				600				
	Nickel (dissolved)	Micrograms per litre		11	-	-				
	Nitrogen (total)	Micrograms per litre	250							
	pH	pH		-	-	6.5-8.5				
	Zinc (dissolved)	Micrograms per litre		8		-				
Point 38										
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>				
	BOD	Milligram per litre	30	-	-	50				
	pH	pH	-	-	-	6.0-9.0				
Point 41										
	<b>Pollutant</b>	<b>Units of Measure</b>	<b>50 percentile concentration limit</b>	<b>80 percentile concentration limit</b>	<b>90 percentile concentration limit</b>	<b>100 percentile concentration limit</b>				
	pH	pH	-	-	-	6.5 – 8.5				
	Total suspended solids	Milligrams per litre	-	-	-	50				



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022																		
L3.1	<p>For each discharge point or utilisation area specified below (by a point number), the volume/mass of:</p> <p>a) Liquids discharged to water, or; b) Solids or liquids applied to the area;</p> <p>Must not exceed the volume/mass limit specified for that discharge point or area.</p> <table border="1"> <thead> <tr> <th>Point</th> <th>Units of Measure</th> <th>Volume/Mass Limit</th> </tr> </thead> <tbody> <tr> <td>18</td> <td>Kilolitres per day</td> <td>1000</td> </tr> <tr> <td>19</td> <td>Kilolitres per day</td> <td>2000</td> </tr> <tr> <td>22</td> <td>Kilolitres per day</td> <td>80</td> </tr> <tr> <td>24</td> <td>KL/month</td> <td>93000</td> </tr> <tr> <td>24</td> <td>Kilolitres per day</td> <td>4700</td> </tr> </tbody> </table>	Point	Units of Measure	Volume/Mass Limit	18	Kilolitres per day	1000	19	Kilolitres per day	2000	22	Kilolitres per day	80	24	KL/month	93000	24	Kilolitres per day	4700	<p>Non-compliances were identified for this requirement.</p> <p>ERM reviewed Section 6 Environmental Performance of the Annual Return FY2022, FY2021 and FY2020.</p> <p>Point 19 and Point 24 were found to be compliant however it was noted that Point 18 had not been discharged from in the audit period. Point 22 was found to be non-compliant with discharge volumes per day exceeding on 31 July to August 2020. This was reported to be from a programming failure which has been fixed. No non-compliances were identified in the FY2022 period for point 22.</p>	NC	No recommendations as the programming failure was investigated and addressed.	<p>No further action is required.</p> <p><b>Closed</b></p>
Point	Units of Measure	Volume/Mass Limit																					
18	Kilolitres per day	1000																					
19	Kilolitres per day	2000																					
22	Kilolitres per day	80																					
24	KL/month	93000																					
24	Kilolitres per day	4700																					
O1.1	<p>Licensed activities must be carried out in a competent manner. This includes:</p> <p>a) The processing, handling, movement and storage of materials and substances used to carry out the activity; and b) The treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.</p>	<p>Refer to Table A1 – Project Approvals item #1.</p> <p>ERM observed non-compliances related to the storage of materials used to carry out the activity in a competent manner, which included: materials stored unprotected directly on gravel and soil; hoses and other vessels with leaking oil and other fluids; and</p>	NC	Refer to Table A1 – Project Approvals item #1.	<p>Duplicate non-compliance. Refer to response to Project Approval, Sch 2, C1 above (Item No. 2.1).</p> <p><b>Closed</b></p>																		



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>numerous stains visible across the gravel storage areas that were derived from fluids other than water.</p>			
O2.1	<p>All plant and equipment installed at the premises or used in connection with the licensed activity:</p> <ul style="list-style-type: none"> <li>a) Must be maintained in a proper and efficient condition; and</li> <li>b) Must be operated in a proper and efficient manner</li> </ul>	<p>A spill of ferric chloride into a sediment pond occurred on 3 January 2022 due to modifications made to the dosing shed bund at Appin East. No environmental harm was identified. The Site reported that as a result of this event the bund was repaired and a review of all bunds across the Illawarra Metallurgical Coal sites was undertaken. EPA issued an Official Caution on 21 February 2022 in relation to this incident.</p> <p>Maintenance documents provided by the Site show that prestart checklists are used and daily inspections of the Allman truck occur. The Site also provided work orders for replacement and maintenance of equipment used at the site. Workplace interaction reports provided also found the Site to be satisfactory or compliant against the assessment criteria.</p>	NC	<p>The loss of containment issue was rectified and a bund review conducted across the wider business as a result. Non-compliances have been addressed during the audit period and no ongoing recommendations are made as a result.</p>	<p>No further action is required.</p> <p><b>Closed</b></p>
O3.1	<p>The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.</p>	<p>A non-compliance against this condition was identified.</p>	NC	<p>The causes of non-compliances were addressed during the audit period via</p>	<p>No further action is required.</p> <p><b>Closed</b></p>



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		<p>On 22 August 2020 a release of stone dust occurred at Ventilation Shaft 6, resulting in visible air pollution. The non-compliance was caused by a change in ventilation underground. The primary material that was ventilated was stone dust, an inert non-hazardous material. No environmental harm was identified.</p>		<p>changes to the underground ventilation system, therefore no recommendations are made at this time.</p>	
O4.1	<p>Effluent application must not occur in a manner that causes surface runoff.</p>	<p>A volume limit exceedance was reported to have occurred on 31/7/20 and 1/8/20. According to the Event Report (EVT-0038973), pooling was identified in surface water control channel and small amount of runoff on pit top was identified. The cause was irrigation system logic, which was rectified and further exceedances were not identified.</p> <p>According to the information provided by the Site Management, the runoff was minor in nature and did not extend outside the effluent application area; however, this Condition also applies to</p>	NC	<p>No further recommendations as the logic error was rectified and further instances of surface runoff did not occur.</p>	<p>No further action is required.</p> <p><b>Closed</b></p>





Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022								
		runoff within the effluent application area.											
O4.3	The quantity of effluent/solids applied to the utilisation area must not exceed the capacity of the area to effectively utilise the effluent/solids.  For the purpose of this condition, 'effectively utilise' include the use of the effluent/solids for pasture or crop production, as well as the ability of the soil to absorb the nutrient, salt, hydraulic load and organic material.	Duplicate of non-compliance for item O4.1. The incident resulted in the exceedance of the capacity of the area to absorb the hydraulic load.	NC	Refer to item O4.1.	Refer to item O4.1.  <b>Closed</b>								
M2.2	Air Monitoring Requirements <b>POINT 27, 28, 35</b> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling method</th> </tr> </thead> <tbody> <tr> <td>PM10</td> <td>Micrograms per cubic metre</td> <td>Monthly</td> <td>Continuously</td> </tr> </tbody> </table>	Pollutant	Units of measure	Frequency	Sampling method	PM10	Micrograms per cubic metre	Monthly	Continuously	Air Quality Monitoring Equipment failed on 3 March 2020 at Point 28 which was suspected to be due to a power failure. The 24 hr average from 9 February 2020 did not show that exceedances occurred and the issue was subsequently rectified.  On 24 September 2020 it was found that DustTrak equipment was not functioning correctly. The equipment was experiencing a flow blockage, however no error message was raised. This resulted in data not being available continuously, however no environmental impacts were identified.  All other points were monitored continuously, with the exception of occasional daily estimations for Point	NC	The causes of non-compliances were rectified during the audit period and therefore no further recommendations are made at this time.	No further action is required.  <b>Closed</b>
Pollutant	Units of measure	Frequency	Sampling method										
PM10	Micrograms per cubic metre	Monthly	Continuously										



Item No.	Assessment Requirement	Comment	IEA Classification	Recommendations	IMC Response December 2022
		35, which were inferred from the adjacent Point 27 or Point 28 monitoring stations when equipment has been offline at Point 35 for servicing.			



## Appendix 5: Community Complaints Report - FY23

Date	Nature of Complaint	Actions / Follow Up
June	No complaints were received for the month.	
May	No complaints were received for the month.	
21/04/2023	A resident approached an IMC Exploration drill rig crew to complain about drill rig noise, the smell of diesel fumes, and privacy.	The Exploration Team met with the resident to address their concerns. Sound panels were installed around the site to help mitigate noise, prevent perceived odour issues and maintain the privacy of the landholder. The community member was satisfied with the actions.
28/03/2023	A member of the community called the community line at 3:30 pm regarding open Menangle Road as South32 upgrade works are completed. They attempted to dial the publicly displayed phone numbers of the Principal Contractor, however after several attempts, no answer was received.	The Community Team contacted the Community Member to explain that the road can't be opened until the Wollondilly Shire Council have signed off on the work. The displayed phone numbers from the Principal Contractor will be removed after the completion of the roadworks. On the 30 March 2023, the Community Team called the complainant to advise that Menangle Road was now opened to the public. He was satisfied with the outcome but raised concerns about upgrading other roads in the area.
13/03/2023	A member of the community called the Community Line at 4:50pm and members of the Community Team directly to advise that our traffic control lights along Menangle Road was causing further traffic issues. A vehicle fatality caused the shutdown of the Hume Highway, meaning additional traffic was diverted along Menangle road.	The Community team contacted the Principal Contractor and the Wollondilly Council regarding the traffic flow on Menangle Road. Traffic controllers were dispatched at 6pm to help the flow, and at 6:30pm traffic flows returned to normal. The outcome was provided to the Community member, and they were satisfied. Additional concerns regarding the road quality was raised. Feedback was provided to the relevant Managers to address the community member concerns.
20/02/2023	Resident emailed at 5:25pm to report dust from the Project site blowing toward their property during a strong windstorm. Video footage filmed by the resident was circulated on social media prior to the complaint being received.	The wind event occurred when no activities were occurring at the Project site. A review of the real-time air quality monitors showed elevated particulate matter during a 15-min average at the time of the storm, however no exceedance of the 24hour criteria - the parameter the Project is measured against. When activities are occurring, 3-4 water carts continuously operate to reduce dust. Additional dust mitigation during periods of no activity will be implemented, including the application of additional soil binding agents into the water carts prior to end of shift and weekends. The resident was advised of the outcome.
14/02/2023	Resident called the Community Call Line at 3.47pm regarding vehicles crossing double yellow lines to the south of the Project site, ignoring traffic control and doing Uturns. The resident mentioned a traffic controller on his phone as a tipper truck performed a U-turn.	Investigations confirmed public vehicles perform U-turns at the Southern side of the Project site to avoid the traffic controlled area. South32 cannot control public driving behaviour. The traffic controller on the phone would be addressed at the next toolbox meeting, re-enforcing the Driver's Code of Conduct and on the job expectations. The resident was advised of the outcome.



Date	Nature of Complaint	Actions / Follow Up
11/02/2023	Resident called the Community Call Line about noise starting before 8am on Saturday with reversing trucks, and a refuelling truck speeding on Menangle Road.	The noise reported prior to 8am was investigated. Light vehicles parking at the Project site for the day were identified as the reversing vehicles heard prior to 8am. On 13 February, the Project team were reminded to limit reversing prior to 8am where possible. The alleged speeding vehicle could not be confirmed if it related to the Project, however the team were briefed on driver behaviour. The resident was advised of the outcome.
4/2/2023	Resident emailed South32 to report a near miss between a Project-related truck and public vehicle at the Menangle and Finns Roads intersection. The resident threatened to call police regarding driver behaviour.	The incident was investigated, and an updated Vehicle Movement Plan was issued where no Project-related vehicles would use Finns Road as a waiting bay. Emergency bays along Menangle Road were to be used instead. CCTV was repositioned at the intersection to monitor compliance. The resident was satisfied with outcome.
3/02/2023	Resident emailed South32 regarding trucks continual use of the Menangle and Finns Roads intersection as turning area, causing road damage.	The concern was investigated, and an updated Vehicle Movement Plan was issued where no Project-related vehicles would use Finns Road as a waiting bay. Outcomes aligned in addressing similar issue that was raised on 4/2/2023. The resident was advised of the outcome.
2/02/2023	Resident emailed South32 regarding trucks using their driveway as a turnaround point. Concerned with potential damage to the driveway and the safety risk to exiting traffic.	An investigation confirmed that trucks related to the roadwork activities were using the area as a holding point whilst waiting for instructions to pick up material from the road profiler. The contractor was directed to cease using the area for this purpose, with inspections conducted to ensure compliance. The resident was satisfied with the response.
19/01/2023	A community member advised by email: At 7:45am within the roadwork area when proceeded through the temporary traffic lights (green), were confronted by two trucks with trailers travelling the opposite direction causing a near miss.	An investigation identified the trucks involved were not related to the Project. The trucks followed a slower moving street sweeper through the traffic-controlled area which contributed to the interaction. The Principal Contractor added an additional 30 seconds on each light to mitigate a repeat occurrence.
17/01/2023	The Community Member sent an email to the Project Manager at 10:24am to advise trucks speeding along Menangle Road.	South32 reinforced the driver code of conduct at the following shift prestart. Given other T&R trucks not associated with the Project are using Menangle Road, it was requested the number plates or truck identifiers be included with future reports so a detailed investigation could be completed.



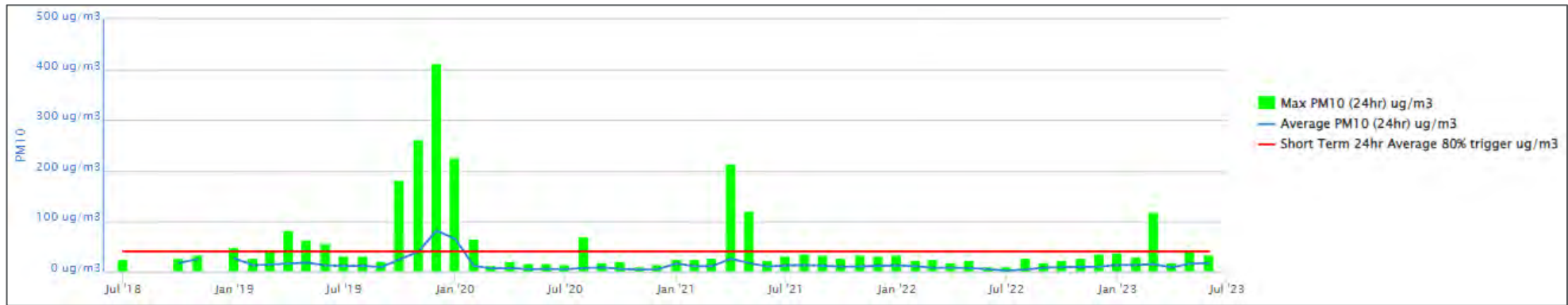
Date	Nature of Complaint	Actions / Follow Up
23/12/2022	A resident contacted the Community Line and Appin Control Room at 9am regarding 10-15 Appin workers congregating at their driveway at the end of shift over the last few weeks. The resident felt threatened after some words were exchanged.	The Community Team notified internal staff of the issue and Human Resources were notified. A notice was issued to the workforce with a reminder of what is expected when leaving and arriving to the site. The resident was satisfied with the outcome.
November	No complaints were received for the month.	
October	No complaints were received for the month.	
September	No complaints were received for the month.	
August	No complaints were received for the month.	
July	No complaints were received for the month.	



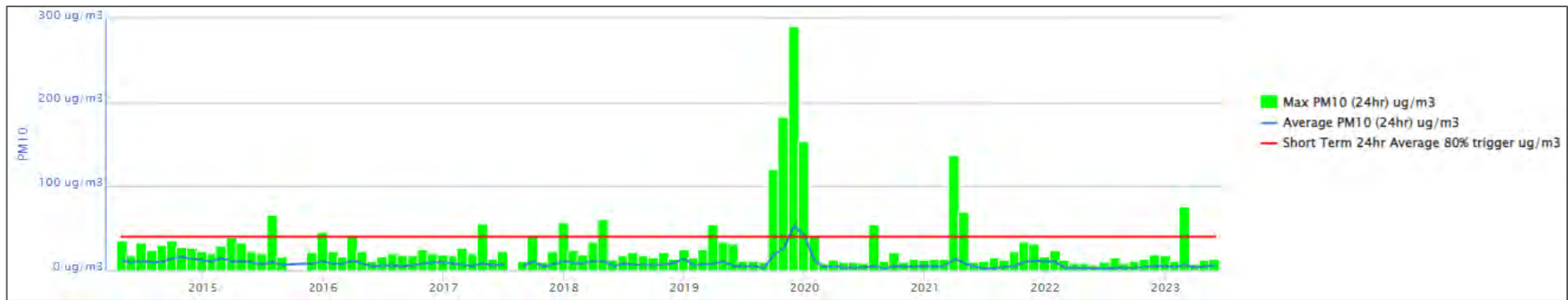
## Appendix 6: Appin Mine Long-Term Environmental Monitoring Data

### Dust Monitoring

#### Optical Photometer (DustTrak) – AE-PF1 – 24-hour average (PM<sub>10</sub>)

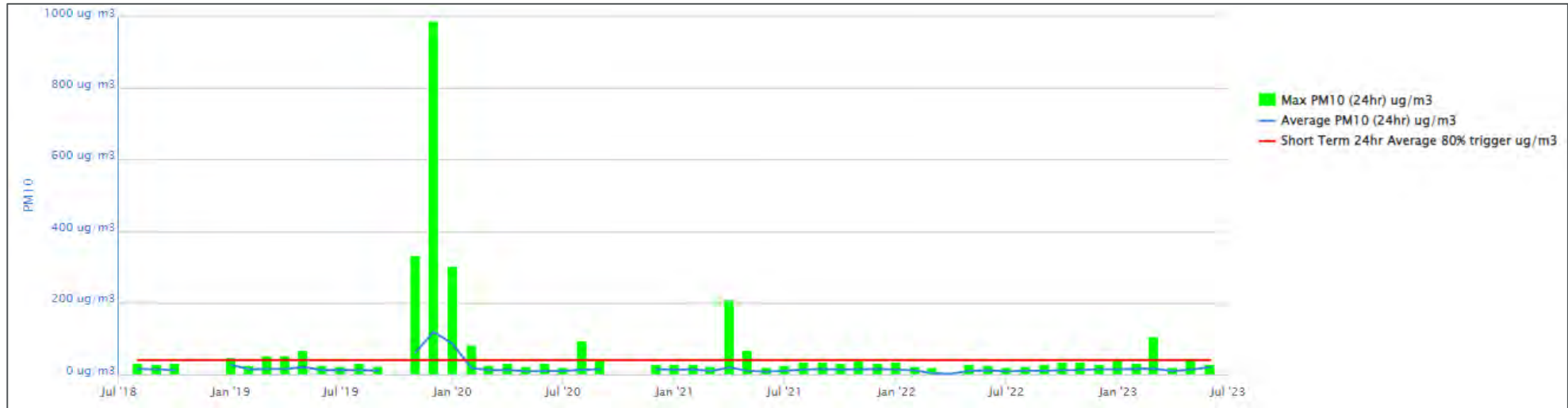


#### Optical Photometer (DustTrak) – AE-PF3 – 24-hour average (PM<sub>10</sub>)

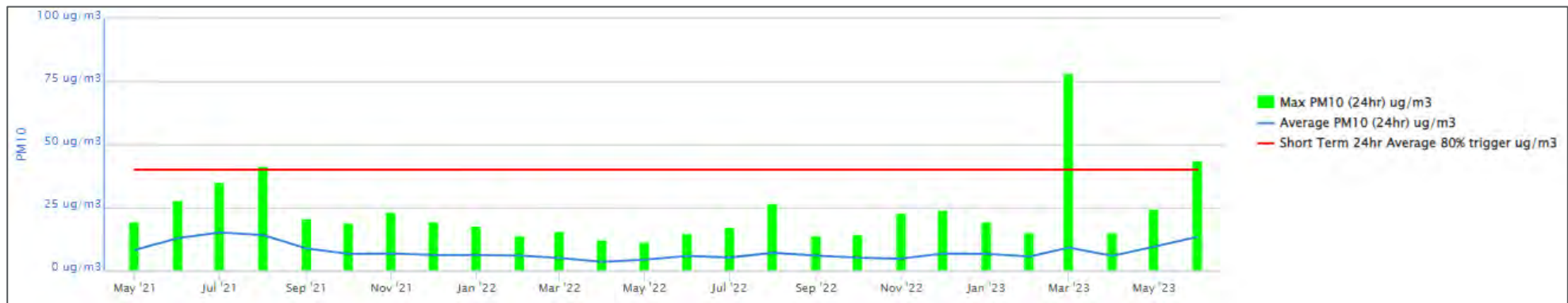




### Optical Photometer (DustTrak) – W-PF1 – 24-hour average (PM<sub>10</sub>)



### Optical Photometer (DustTrak) – VS6-PF1 – 24-hour average (PM<sub>10</sub>)



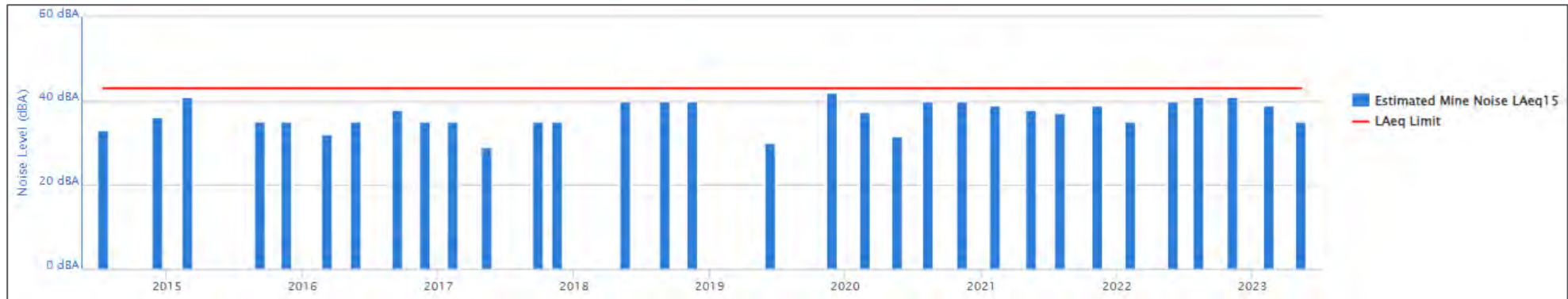


**Noise Monitoring**

**Appin East**

**Noise Monitoring Results – AE-NS4**

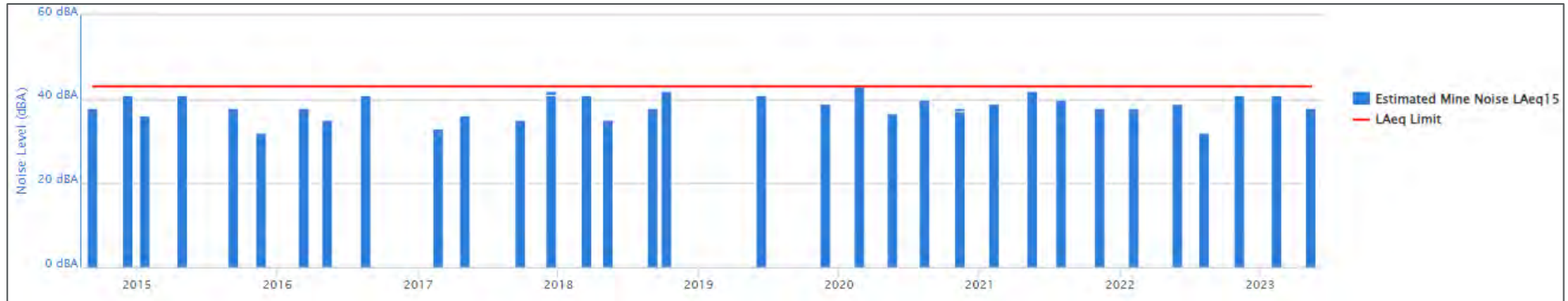
**Day**



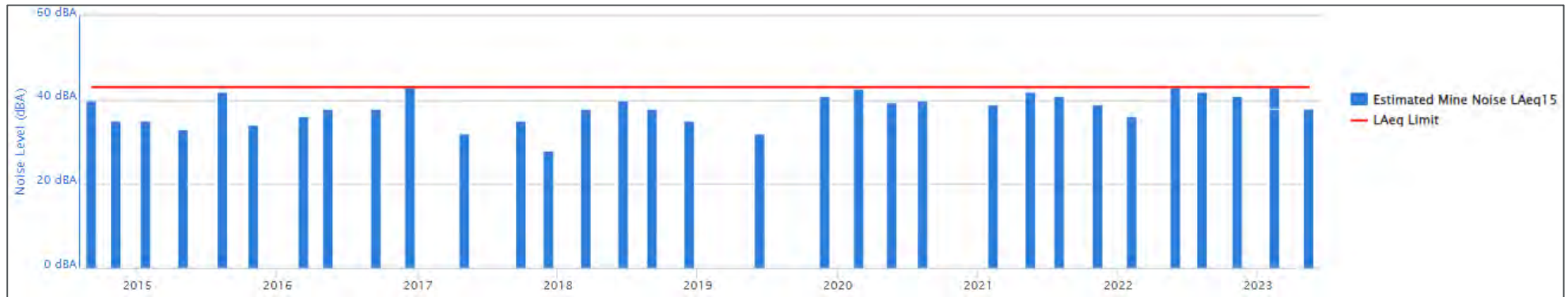




## Evening

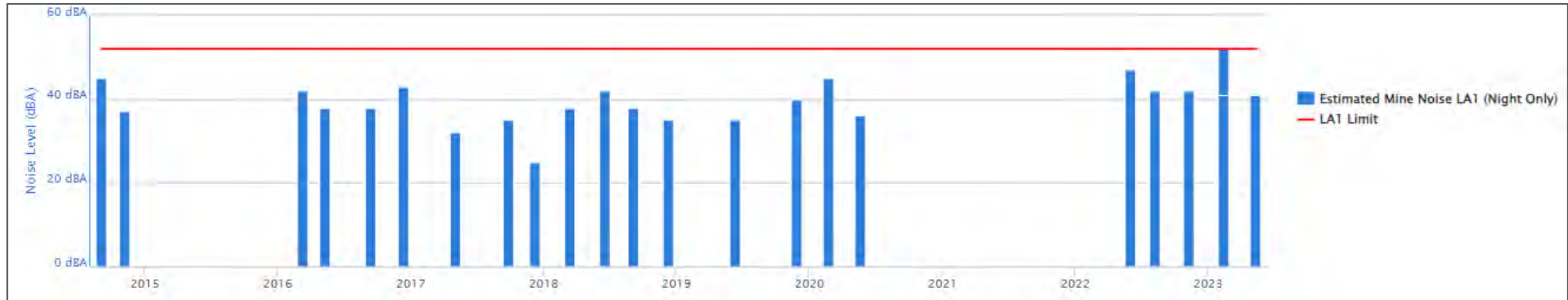


## Night



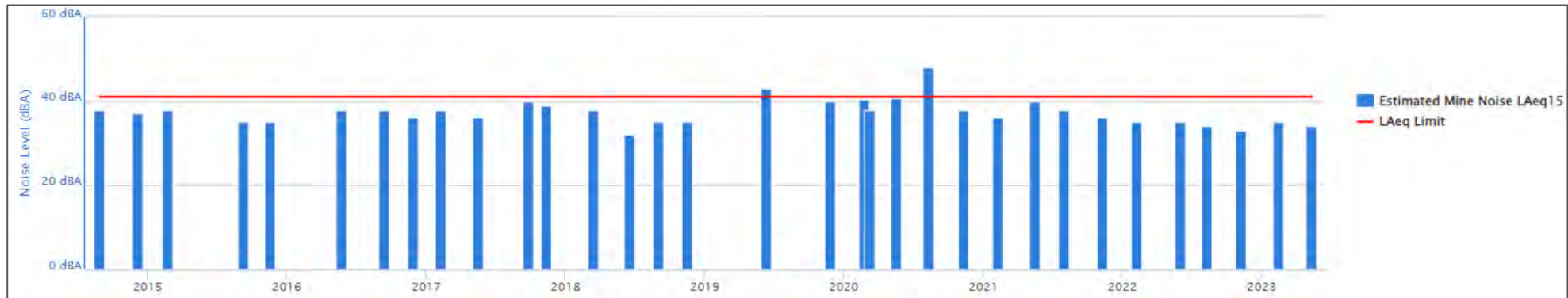


### Night – LA1



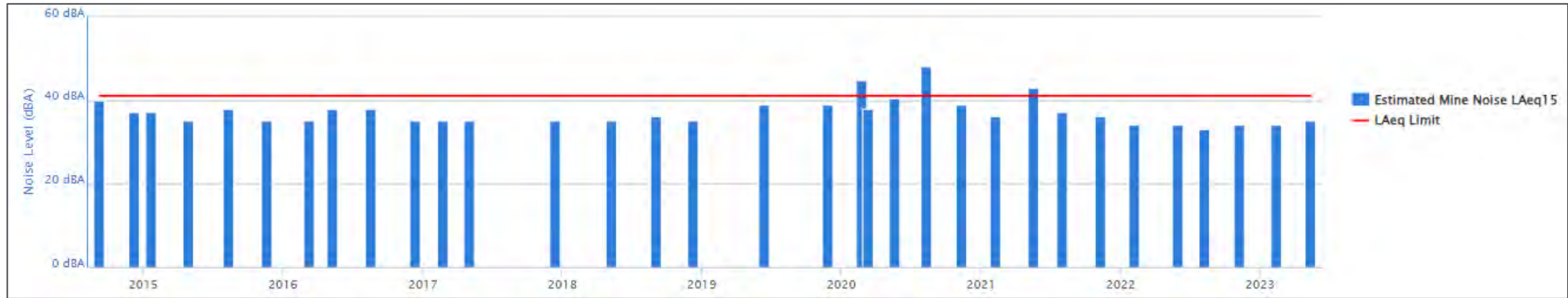
### Noise Monitoring Results – AE-NS5

#### Day

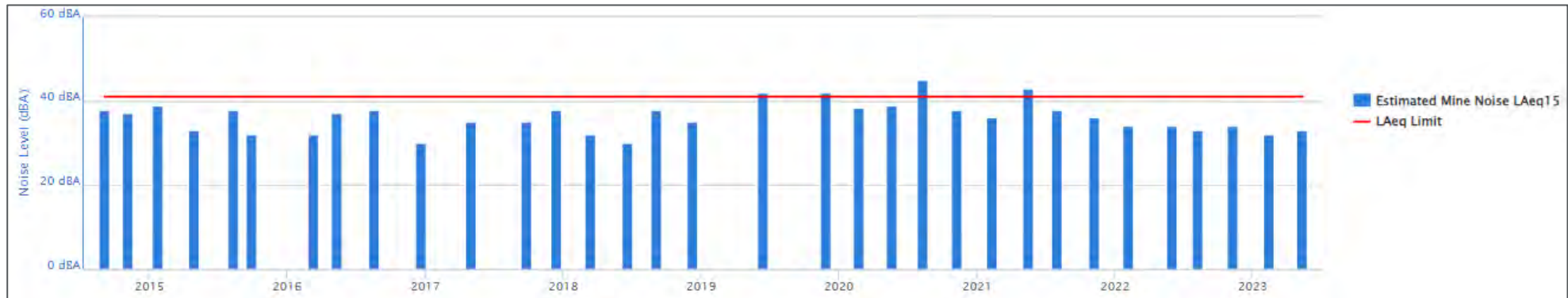




## Evening

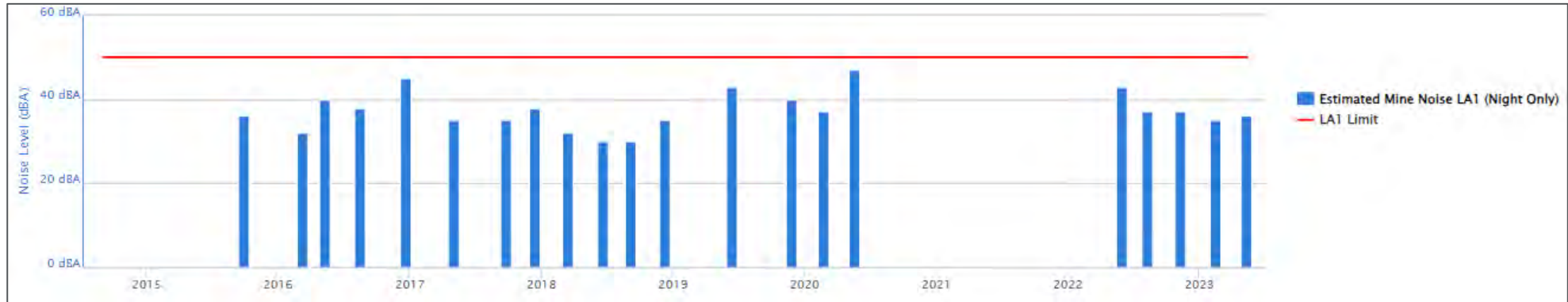


## Night





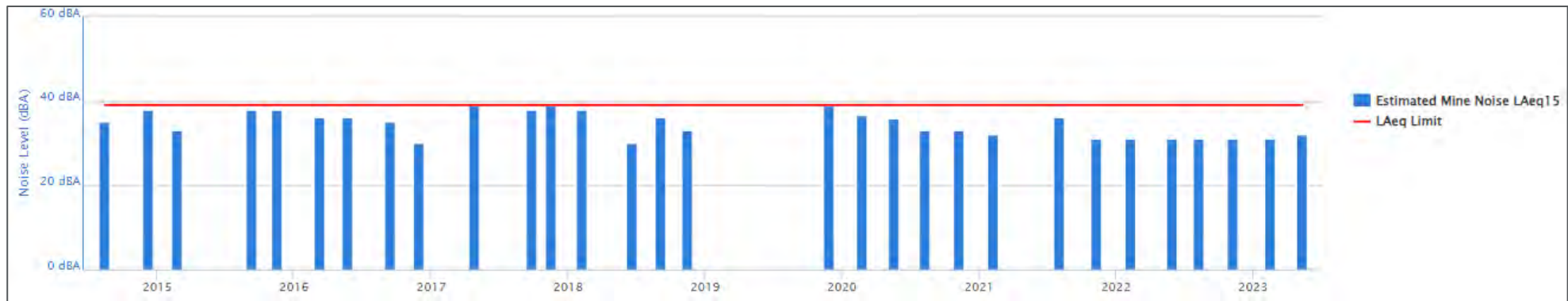
### Night – LA1



### Appin West

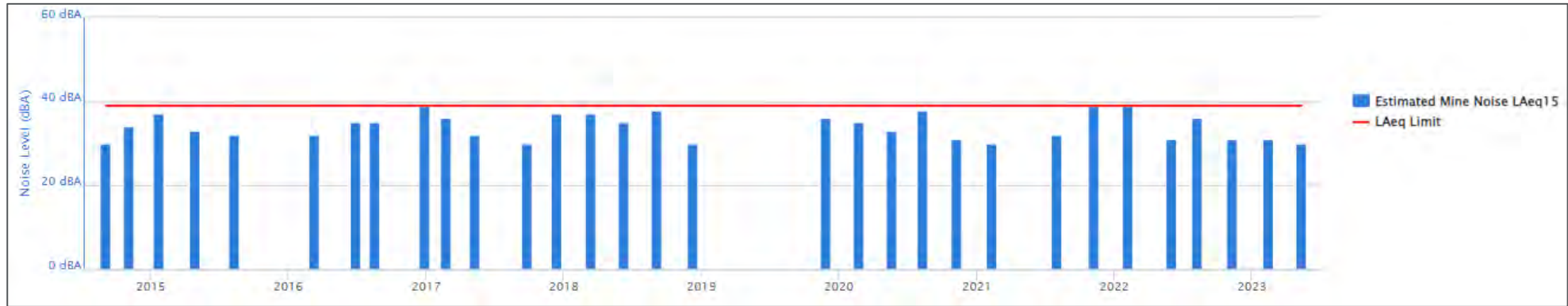
### Noise Monitoring Results – AW-NS4

### Day

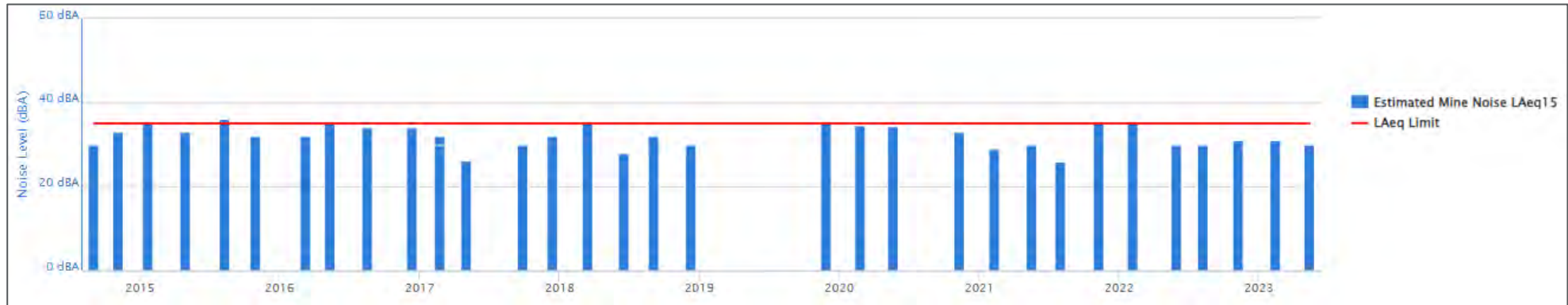




## Evening

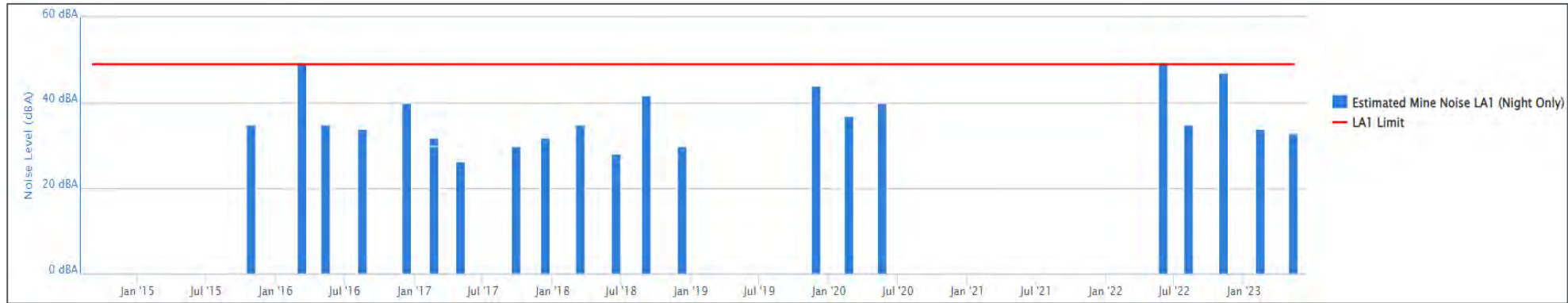


## Night



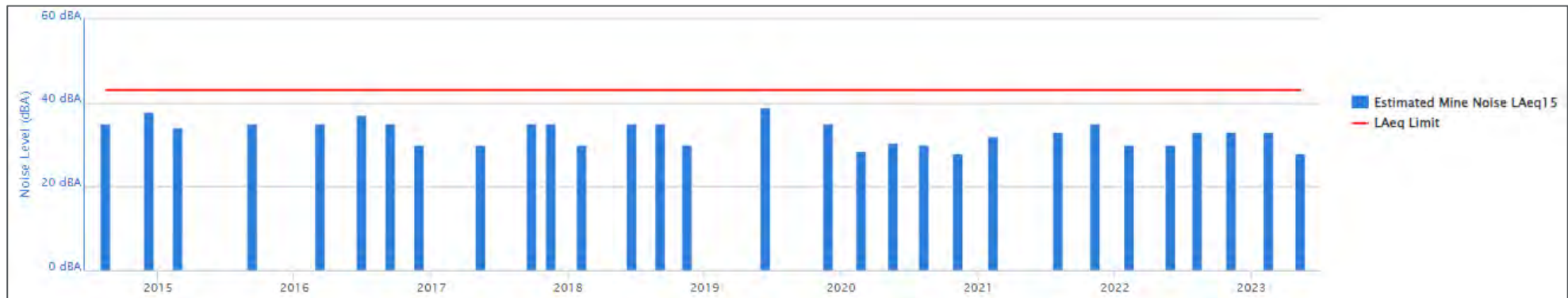


### Night – LA1



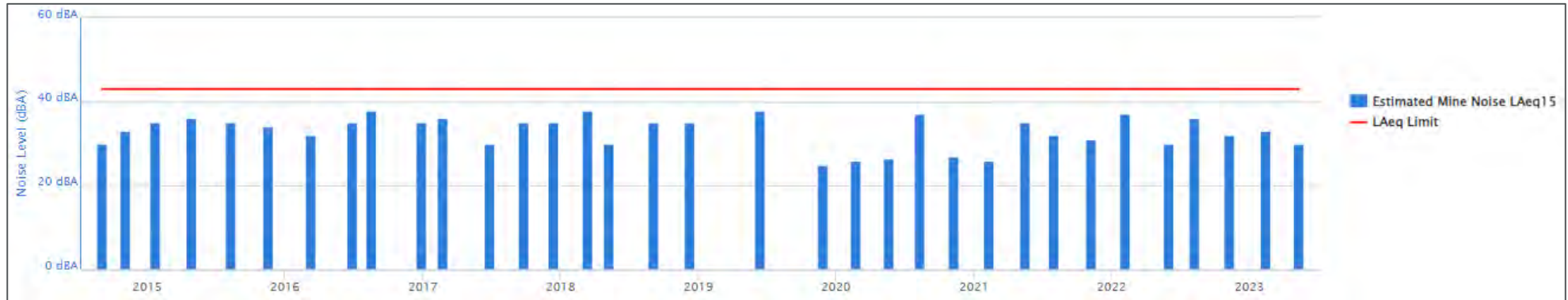
### Noise Monitoring Results – AW-NS5

#### Day

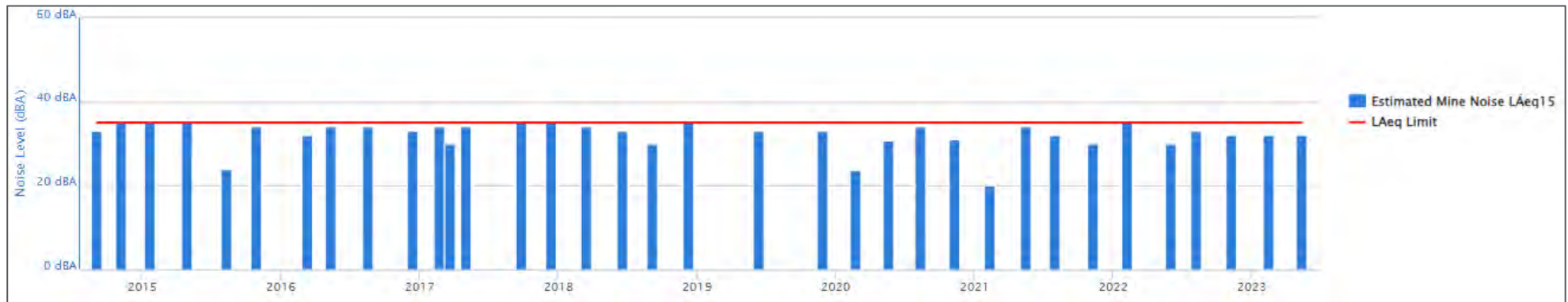




## Evening

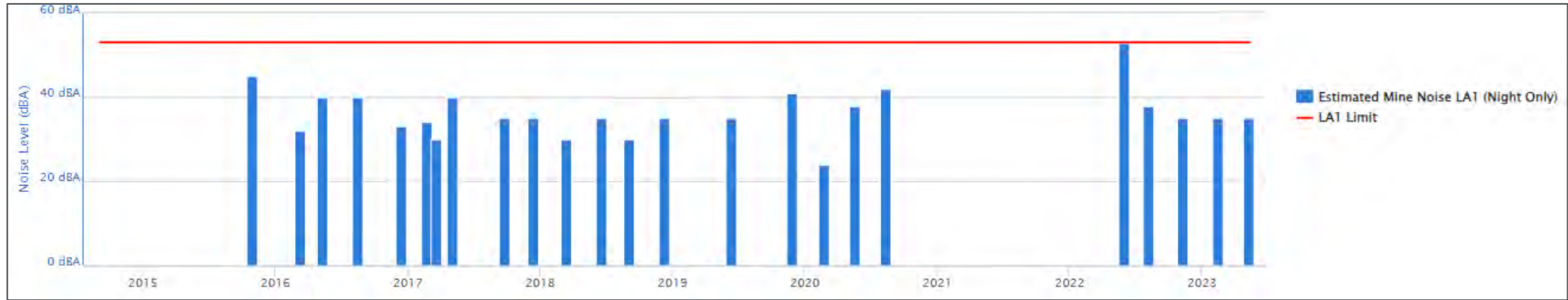


## Night



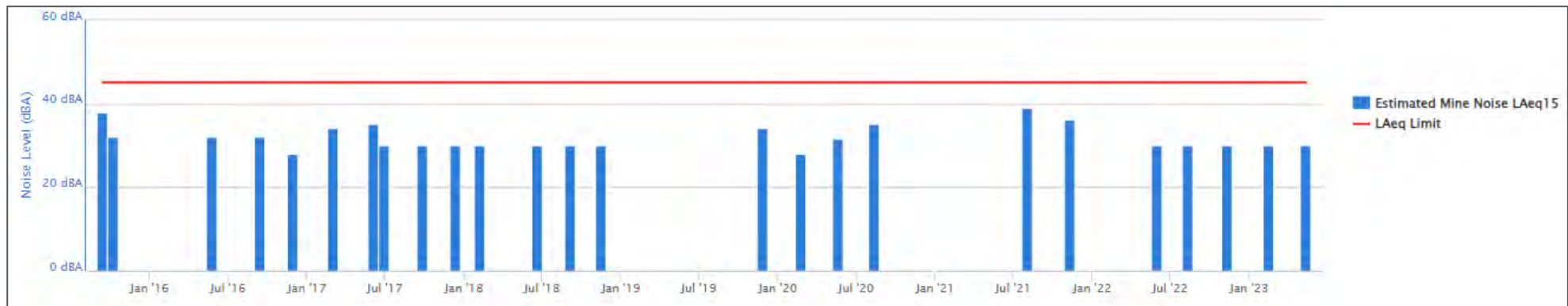


### Night – LA1



### Noise Monitoring Results – VS6 Central

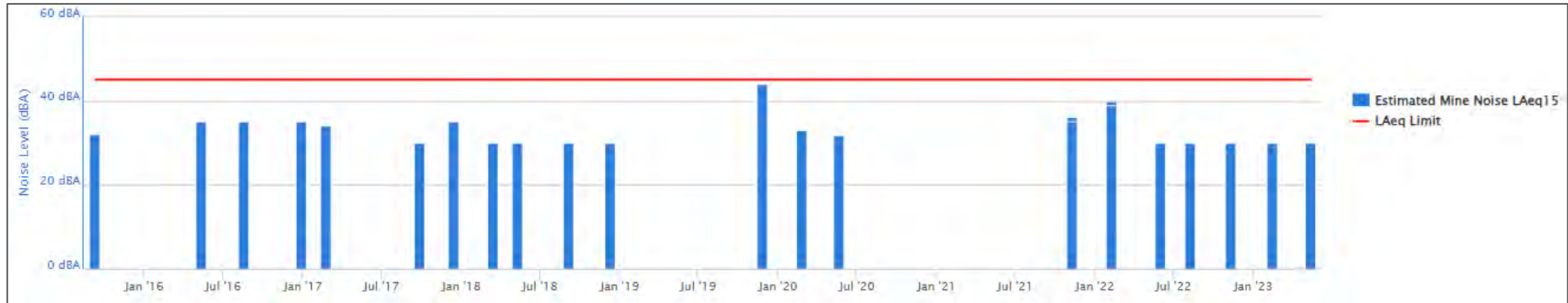
#### Day



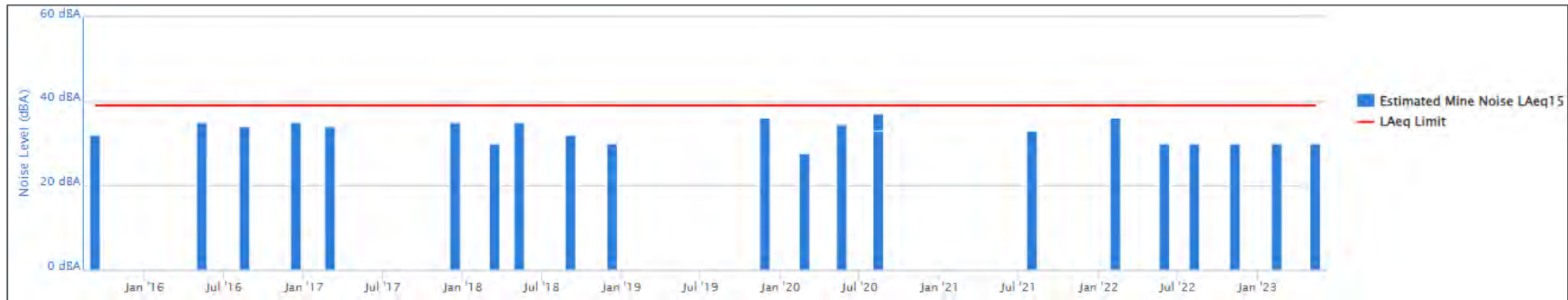




### Evening

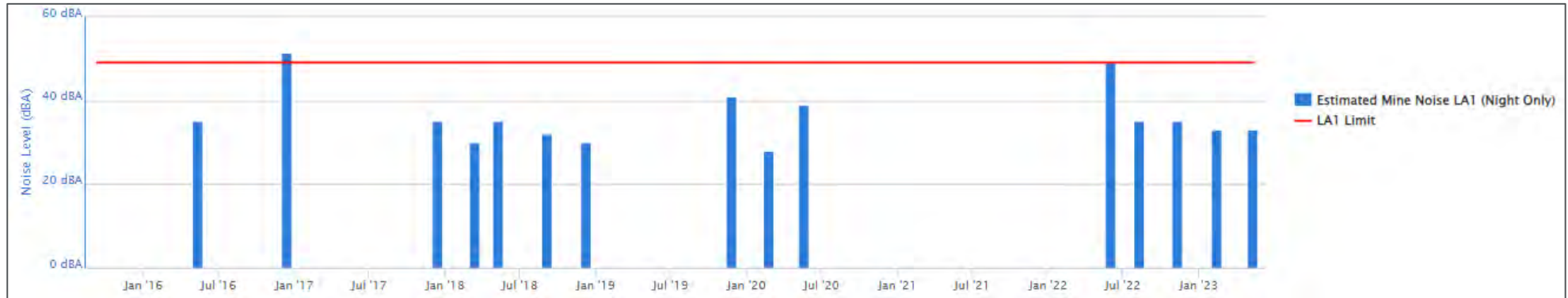


### Night





## Night – LA1

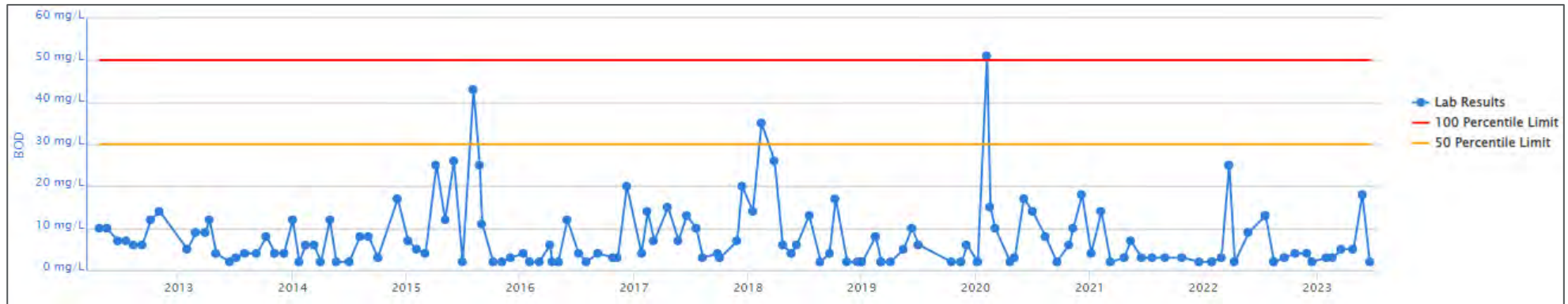




**Water Quality Monitoring**

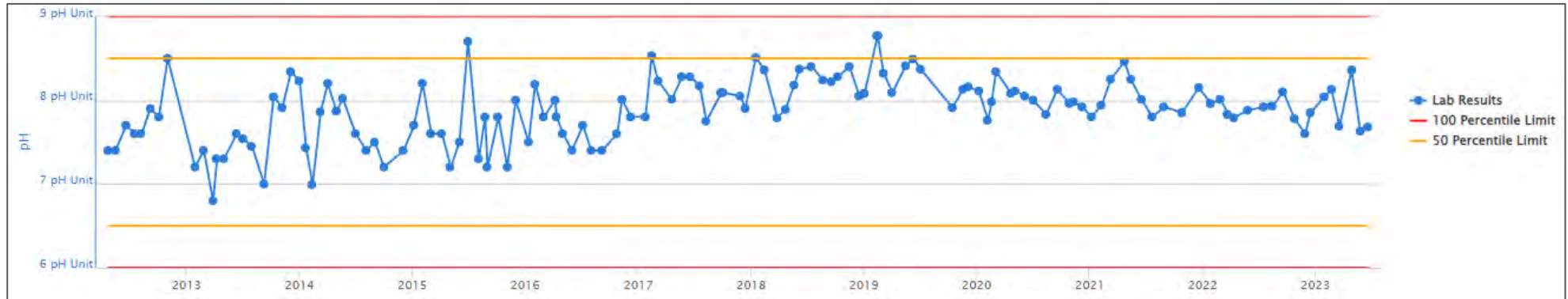
**Water Quality Monitoring Results – Point 3/4**

**BOD**



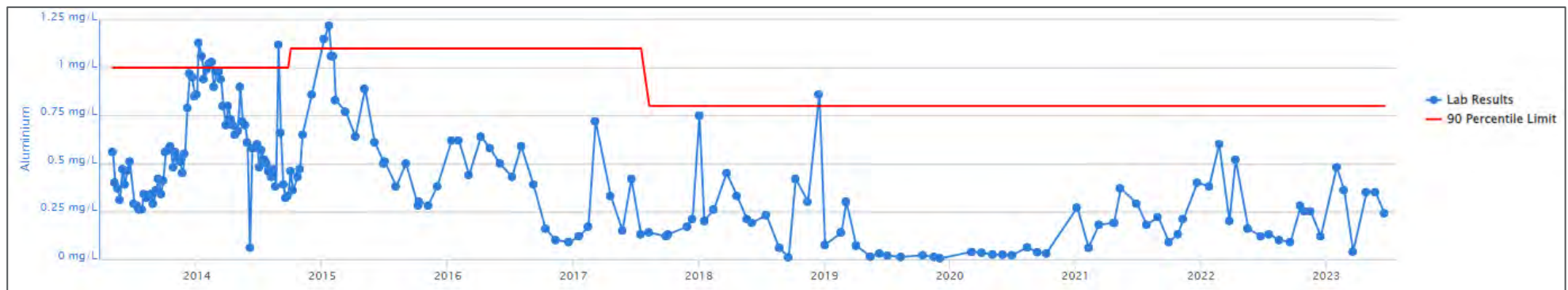


## pH



## Water Quality Monitoring Results – Point 10 – Grab Sample

### Aluminium





## Arsenic

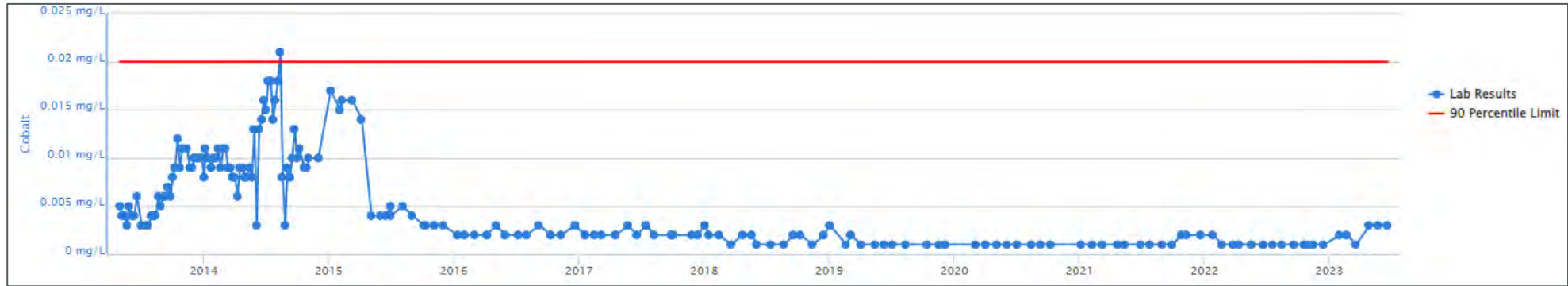


## Cadmium





### Cobalt



### Copper

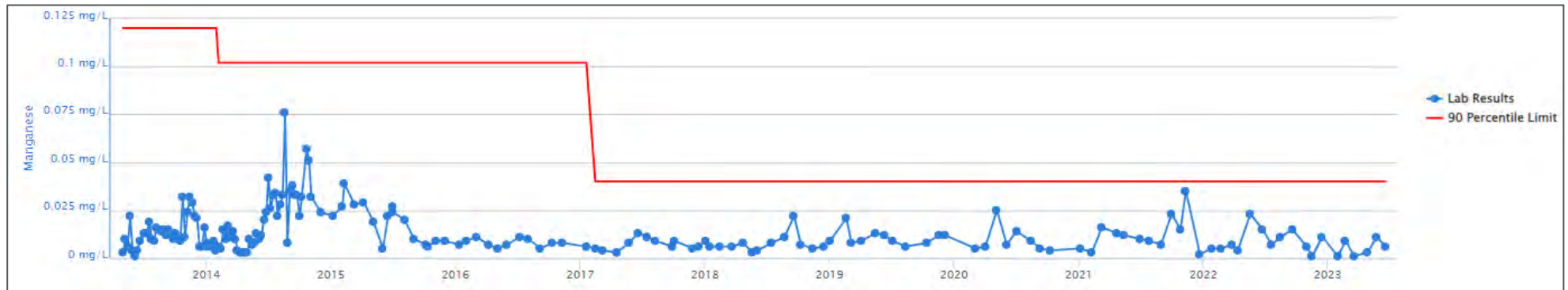




## Lead

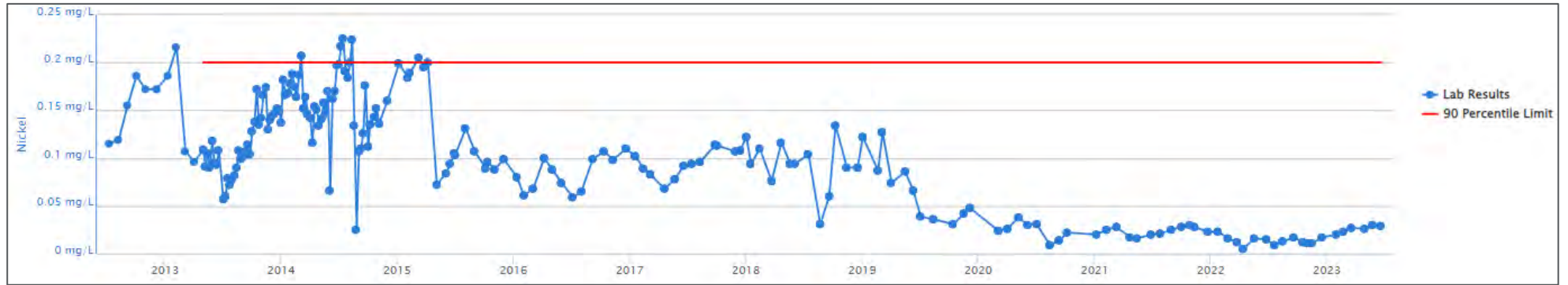


## Manganese





## Nickel



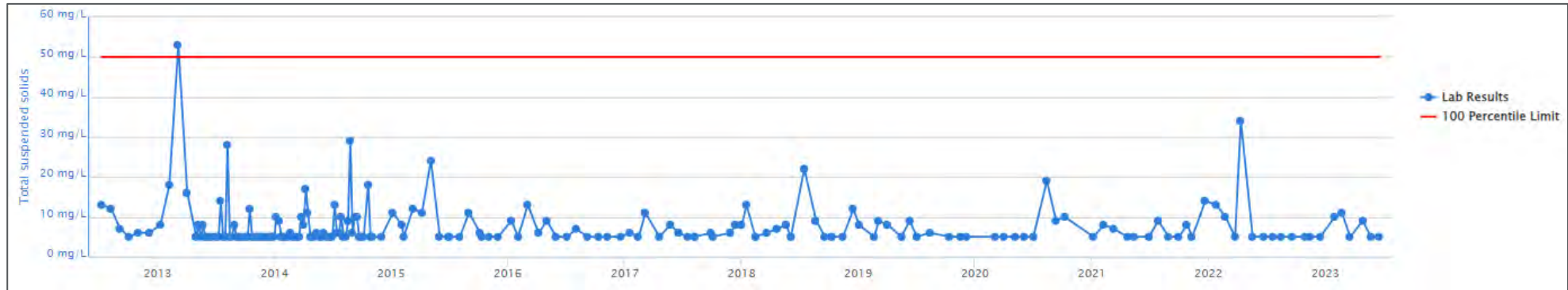
## pH







### Total Suspended Solids

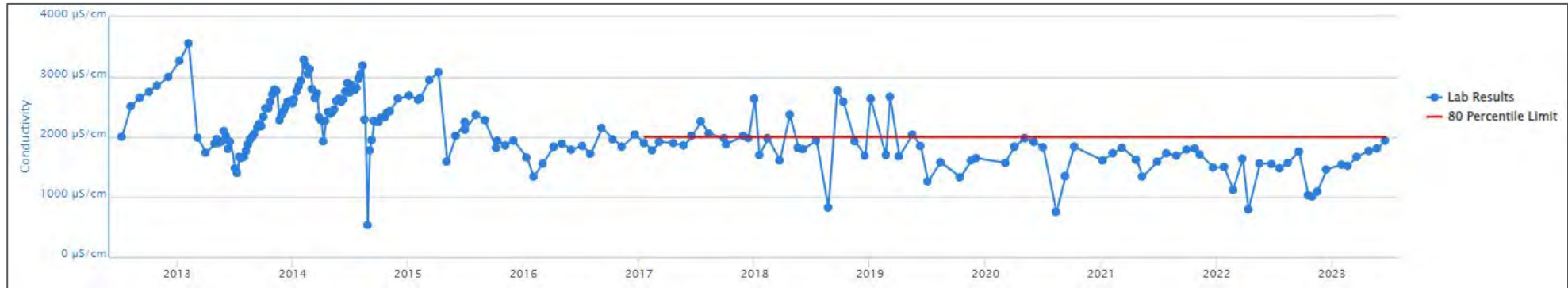


### Zinc

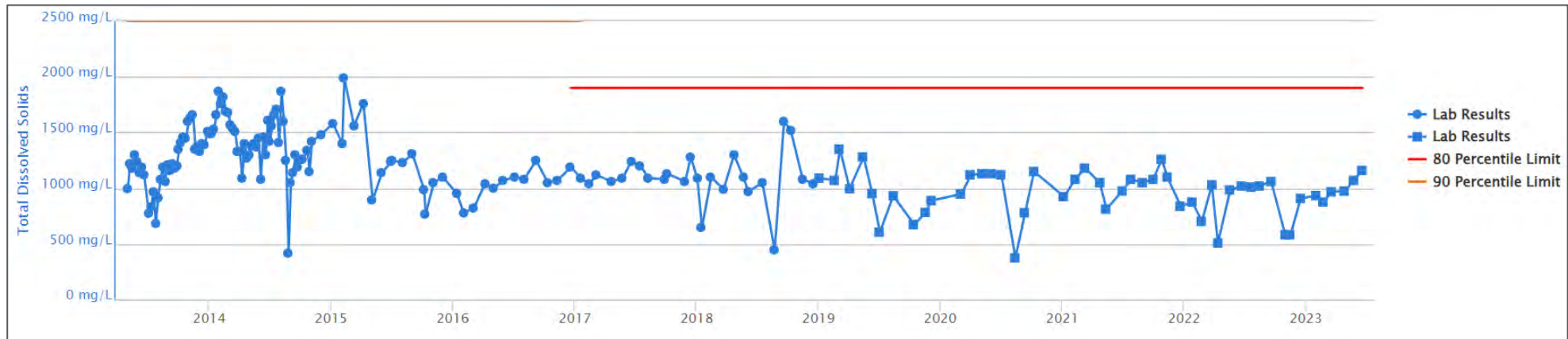




### Electrical Conductivity



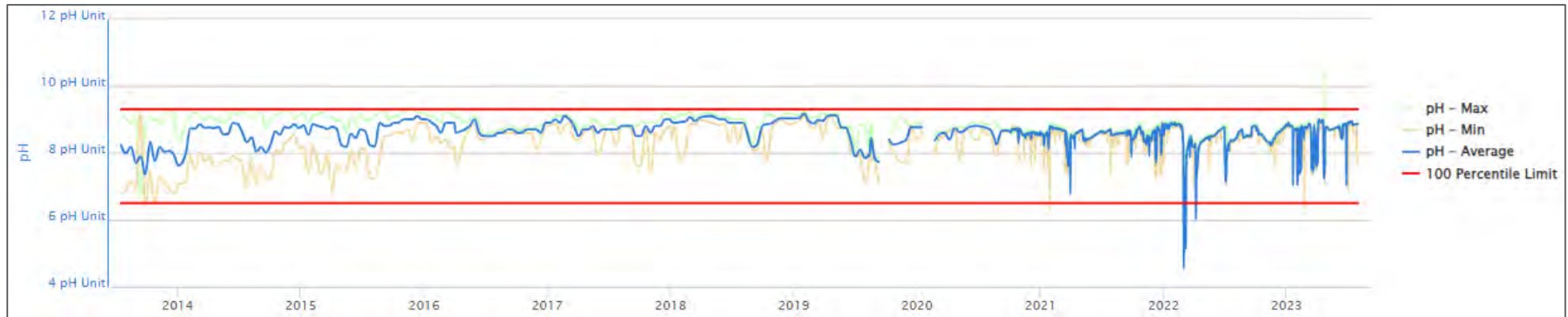
### Total Dissolved Solids



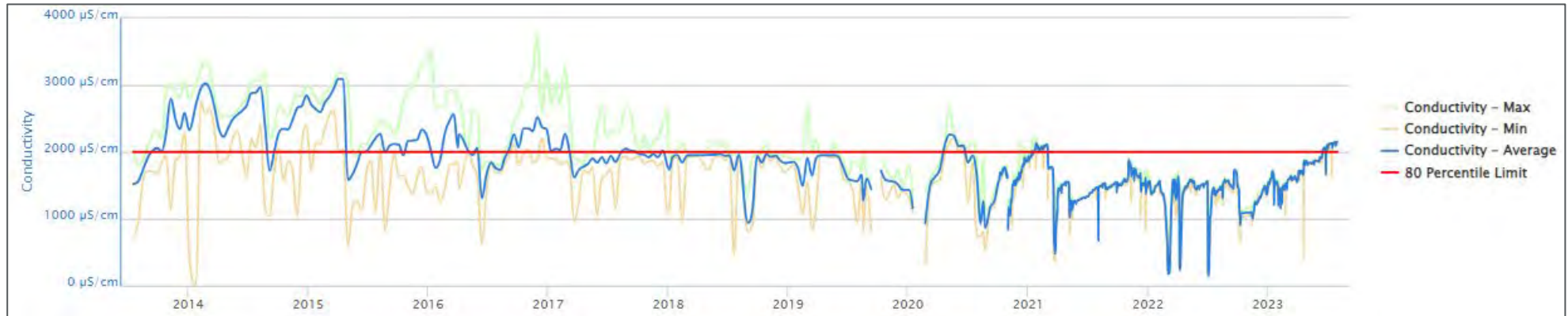


## Water Quality Monitoring Results – Point 10 – Continuous Monitoring

### pH

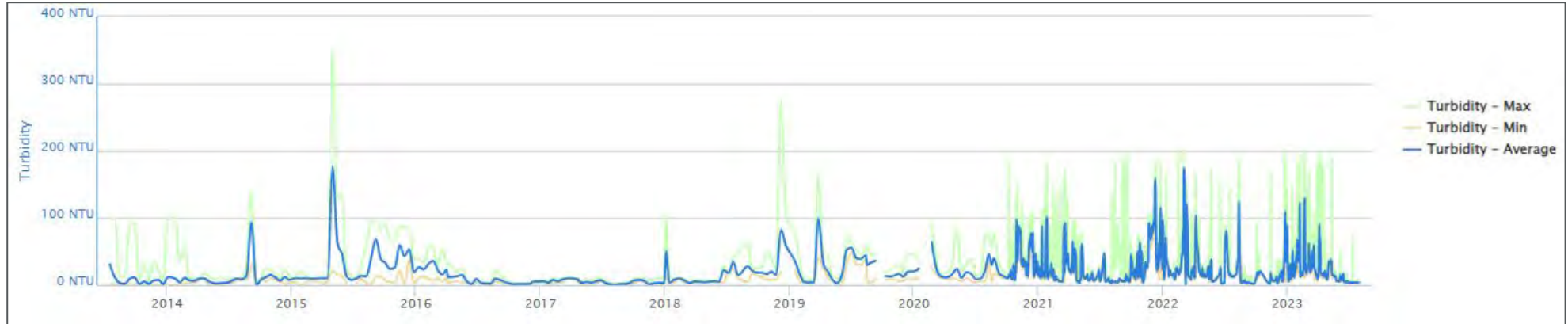


### Conductivity



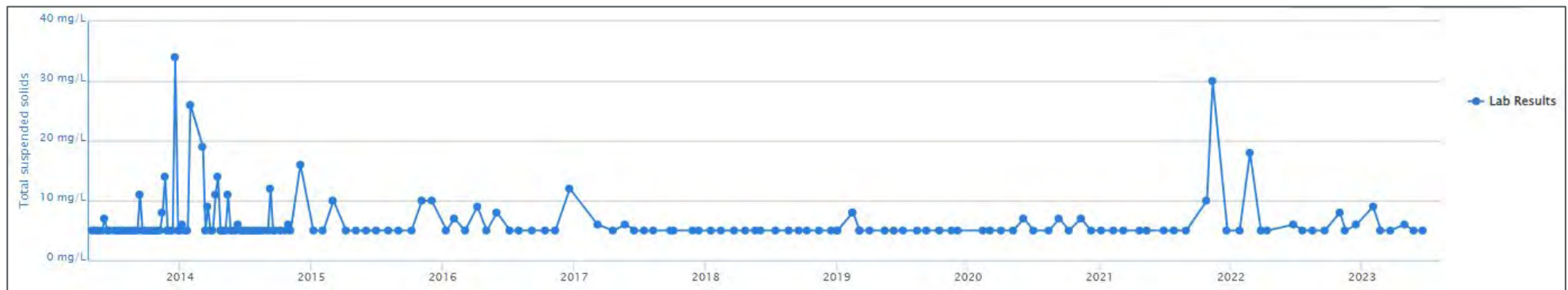


## Turbidity



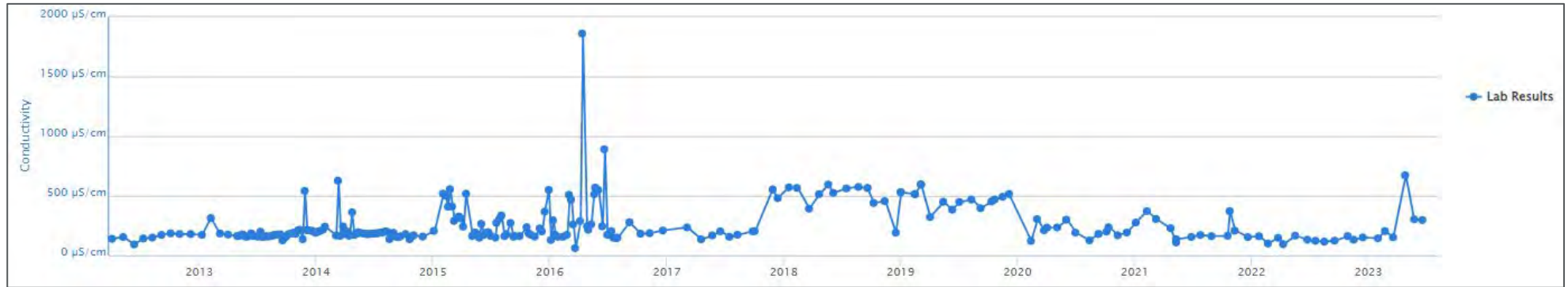
## Water Quality Monitoring Results – Point 11 (Grab)

### Total Suspended Solids

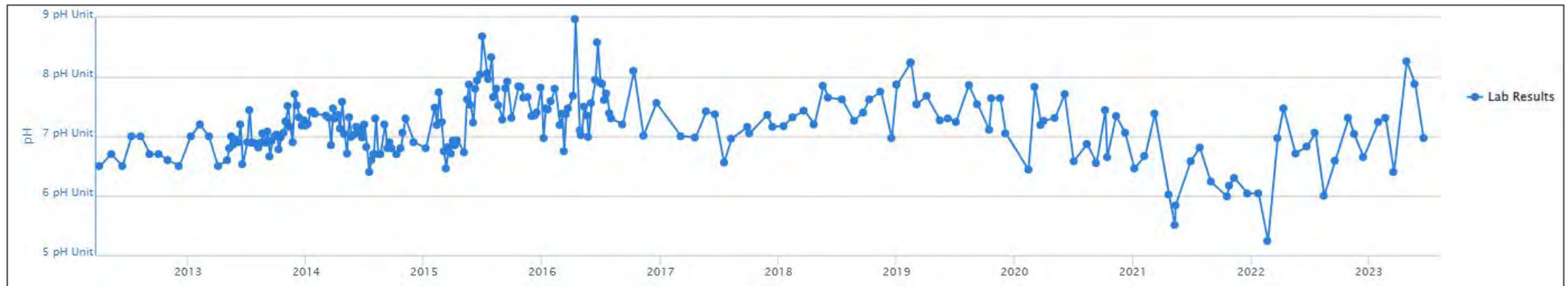




## Conductivity



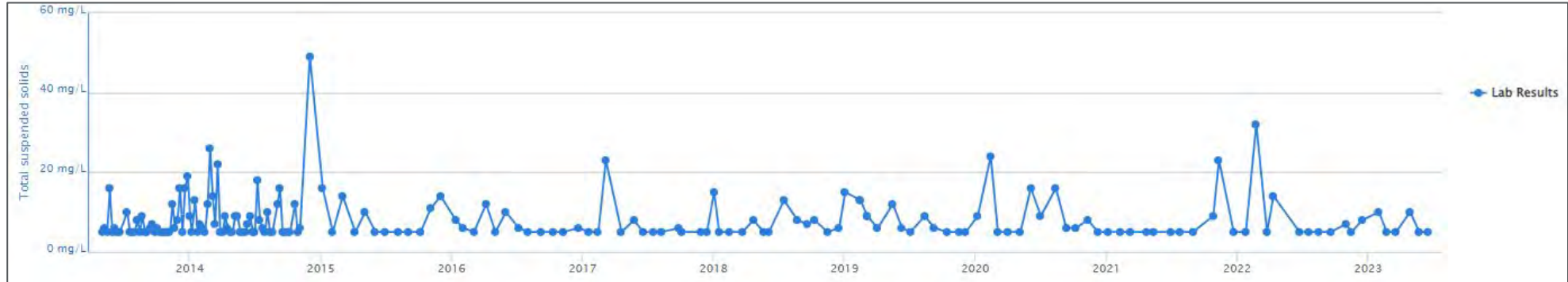
## pH



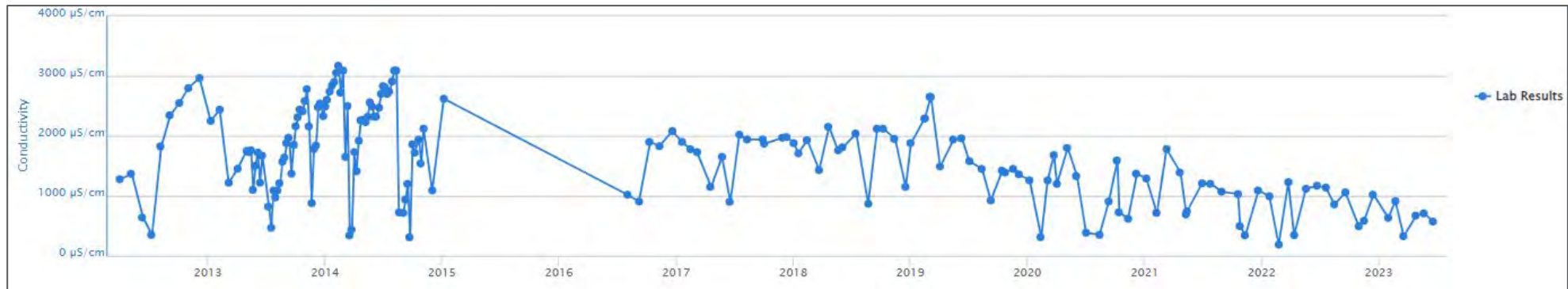


## Water Quality Monitoring Results – Point 12 (Grab)

### Total Suspended Solids

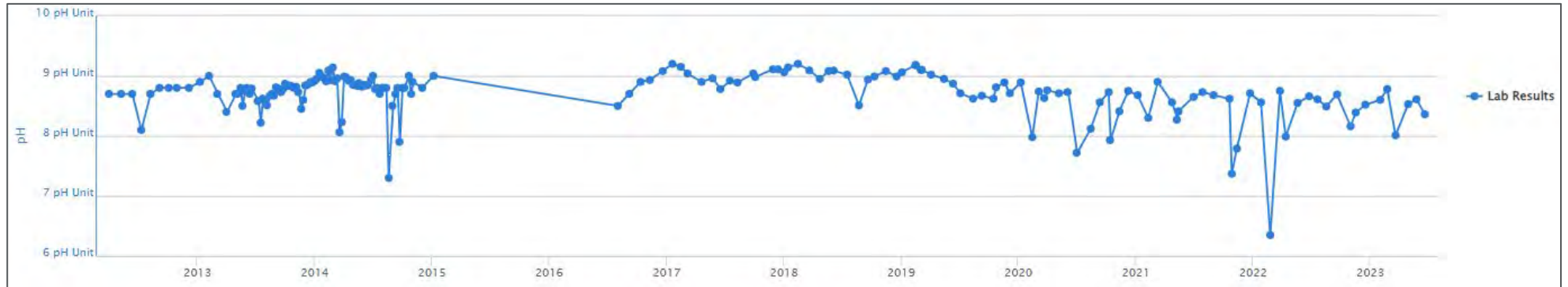


### Conductivity



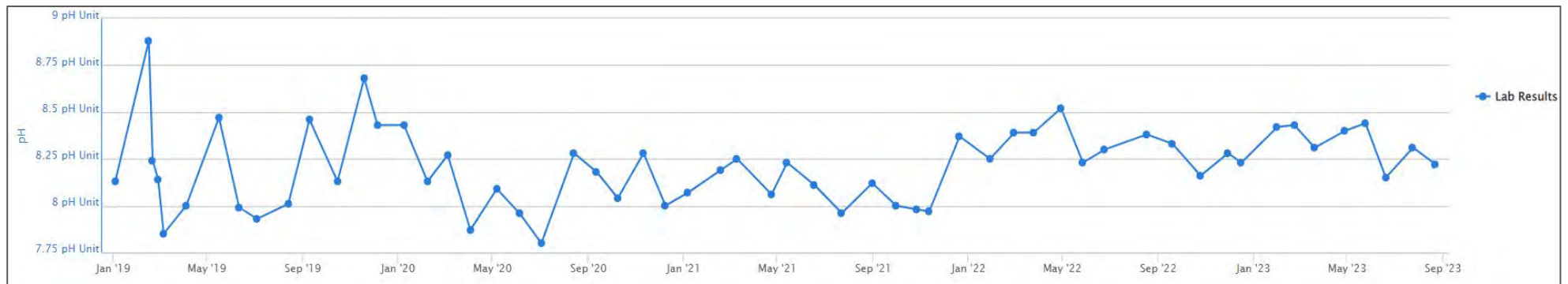


## pH



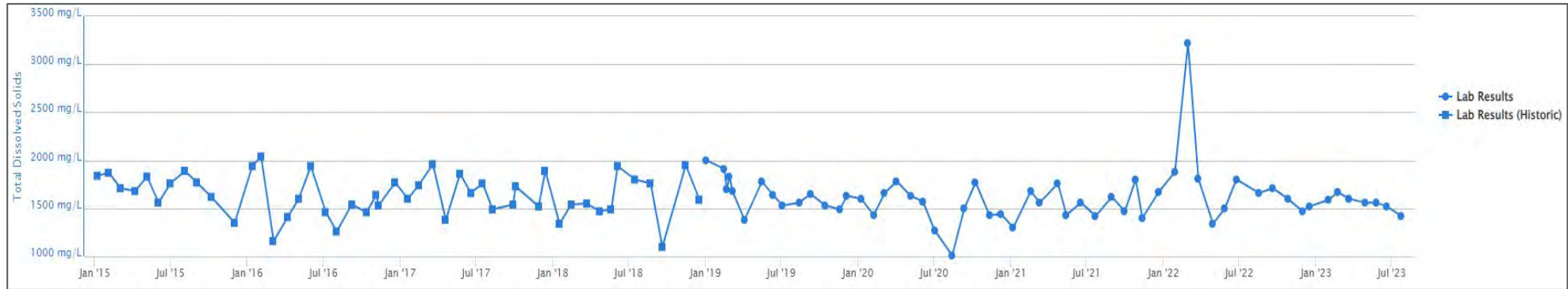
## Water Quality Monitoring Results – Point 16

## pH

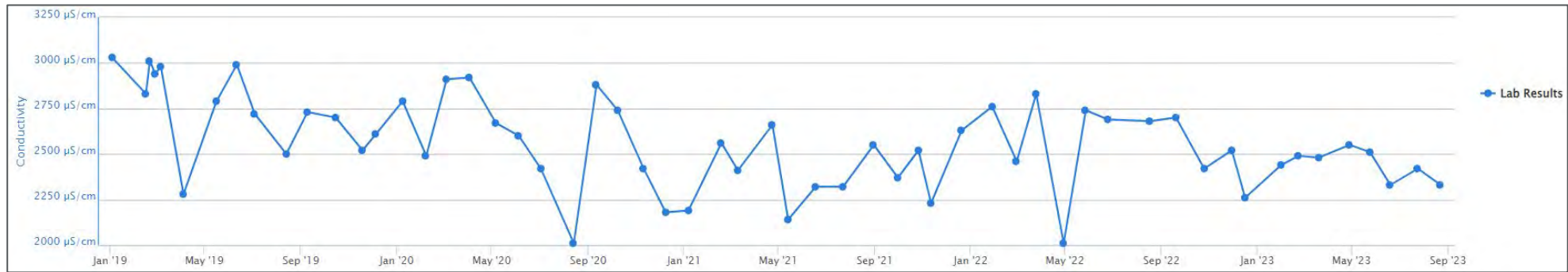




### Total Dissolved Solids



### Electrical Conductivity





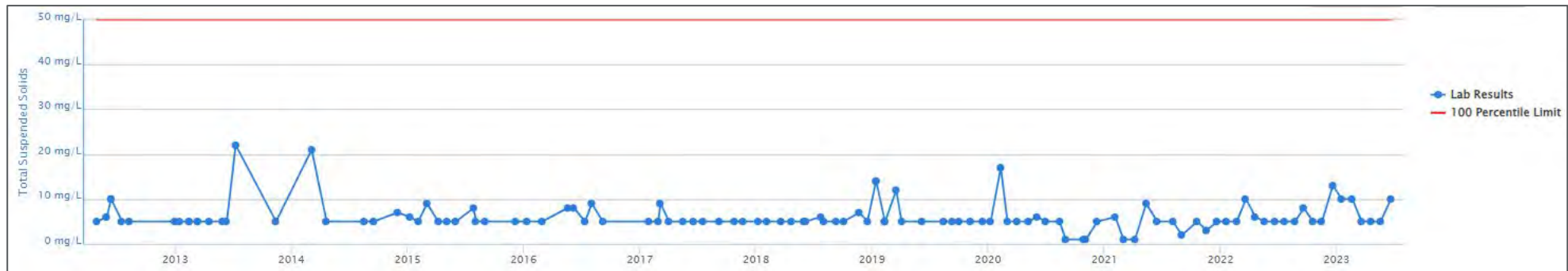


## Water Quality Monitoring Results – Point 19

### pH



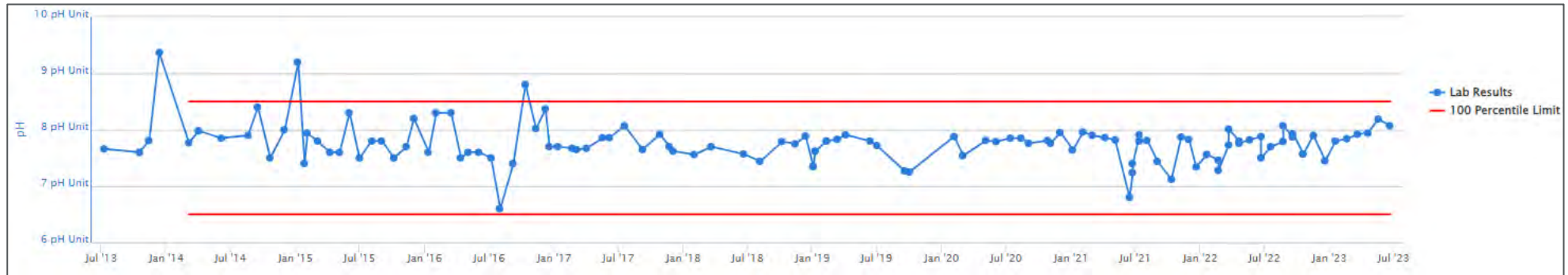
### Total Suspended Solids



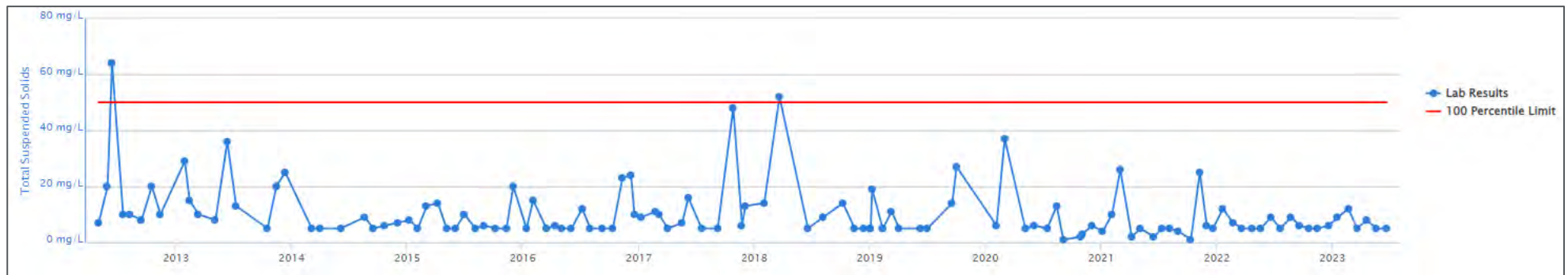


## Water Quality Monitoring Results – Point 23 (Grab)

### pH



### Total Suspended Solids



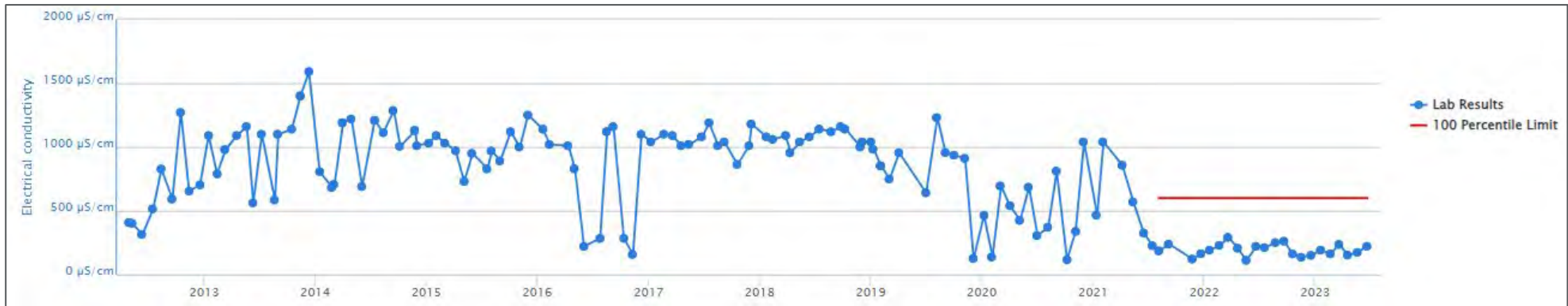


## Water Quality Monitoring Results – Point 24 (Grab)

### pH

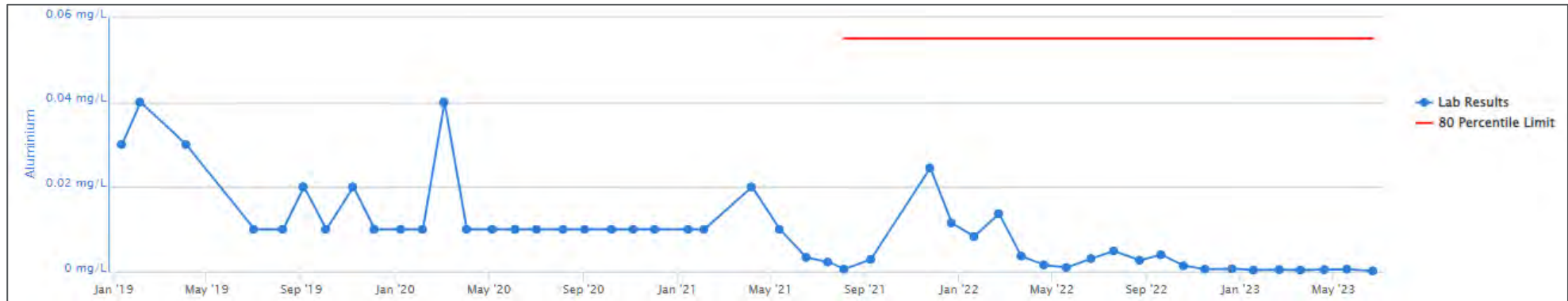


### Electrical Conductivity

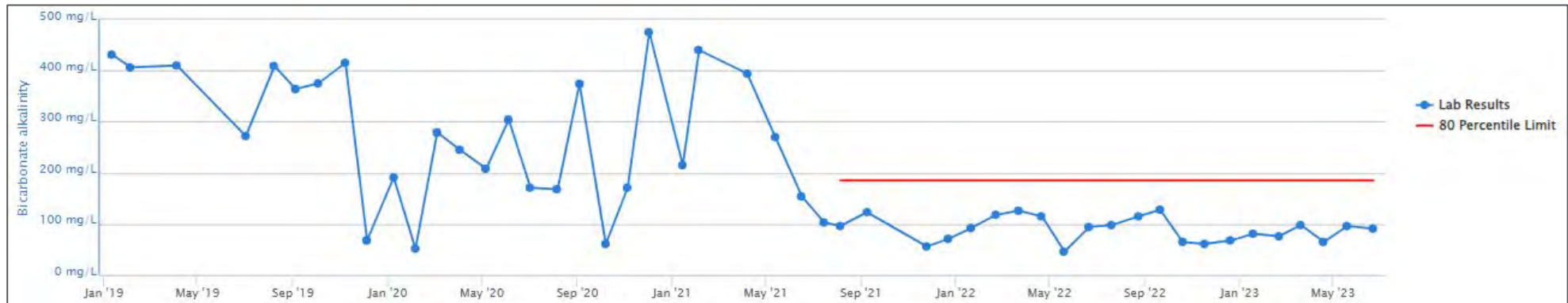




### Aluminium

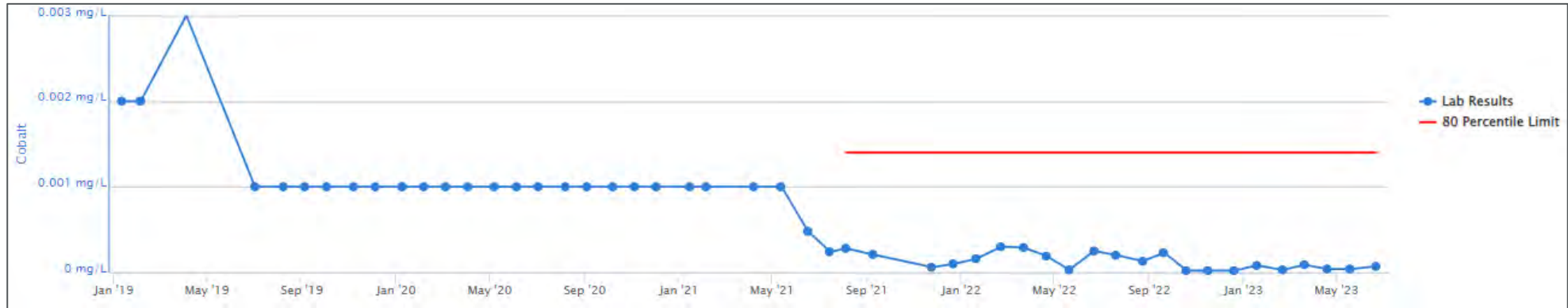


### Bicarbonate Alkalinity





### Cobalt

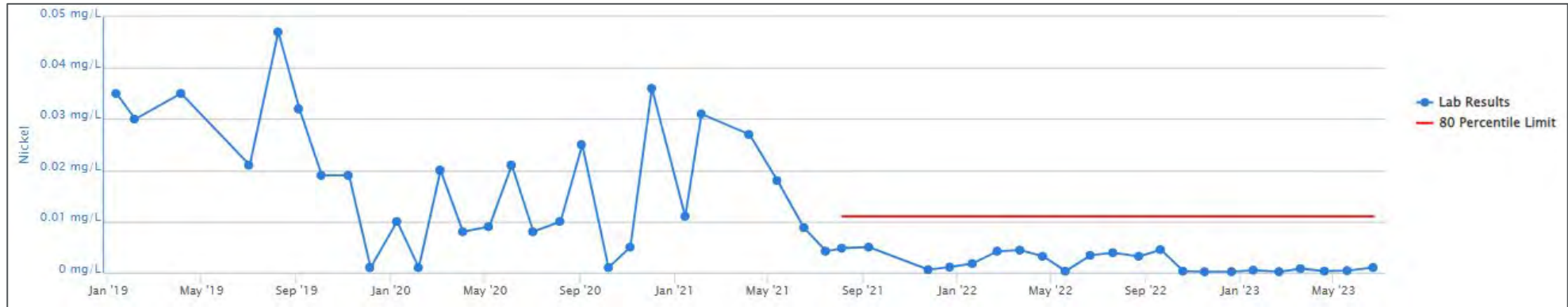


### Copper

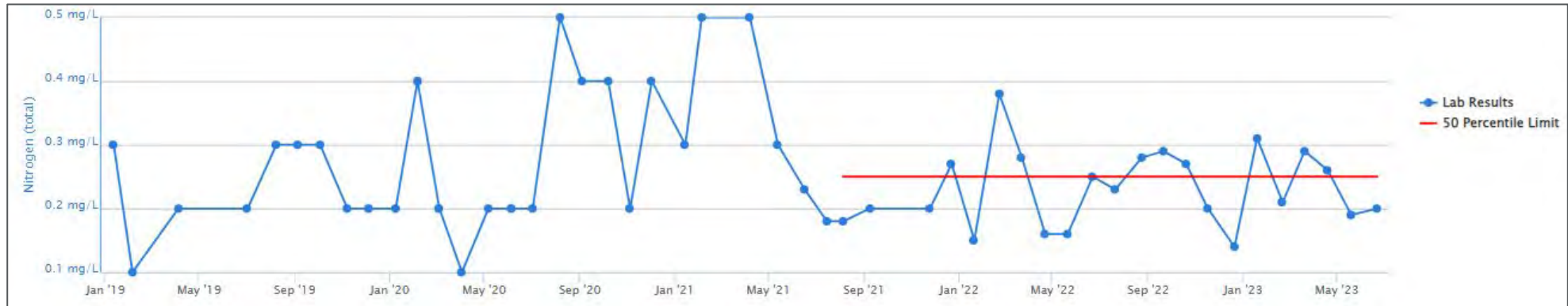




## Nickel

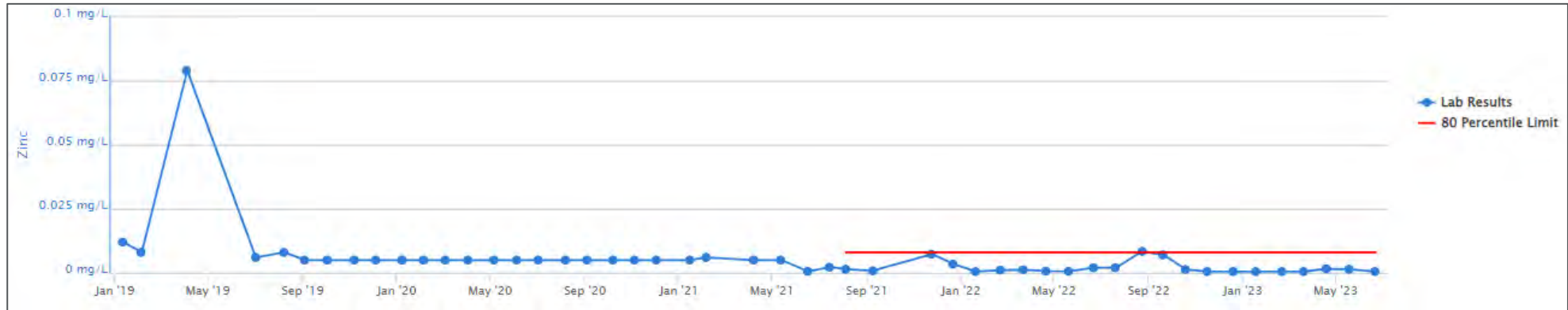


## Total Nitrogen



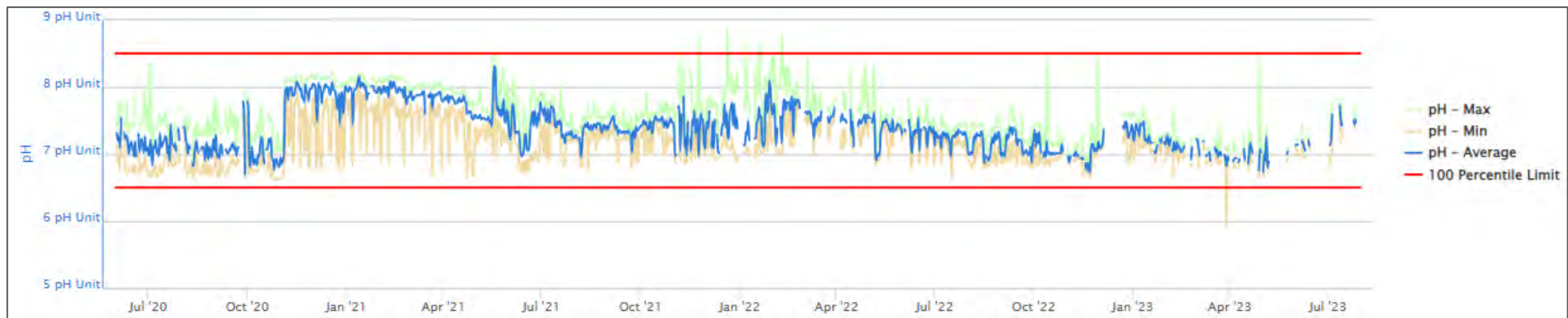


## Zinc



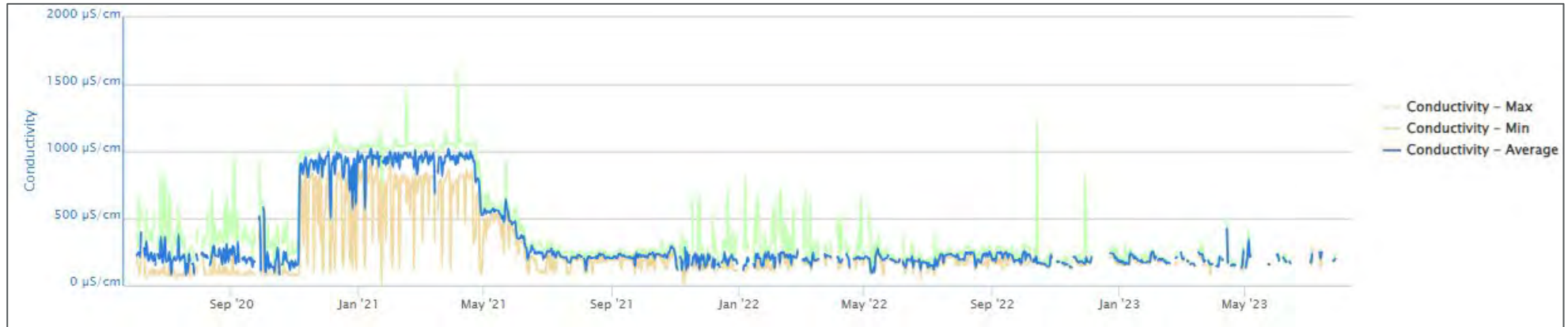
## Water Quality Monitoring Results – Point 24 (Continuous)

### pH





## Conductivity



## Water Quality Monitoring Results – Point 38 (Grab)

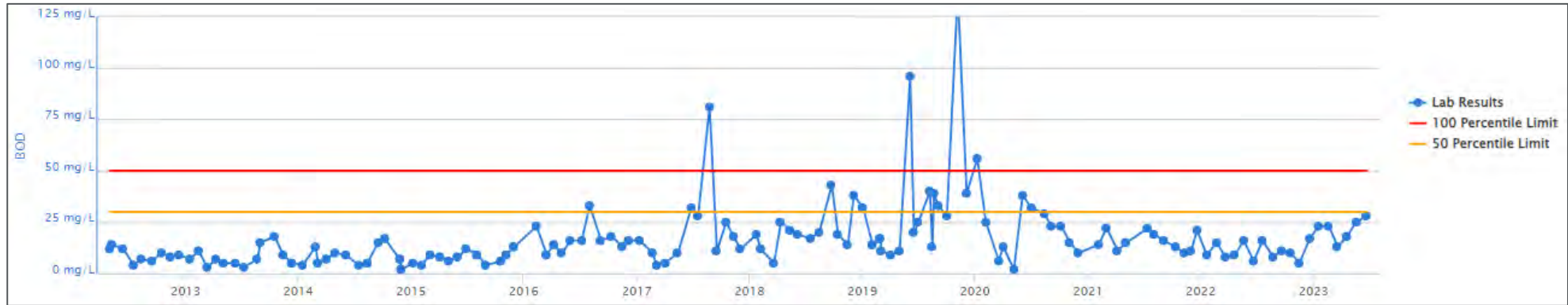
### pH







## BOD



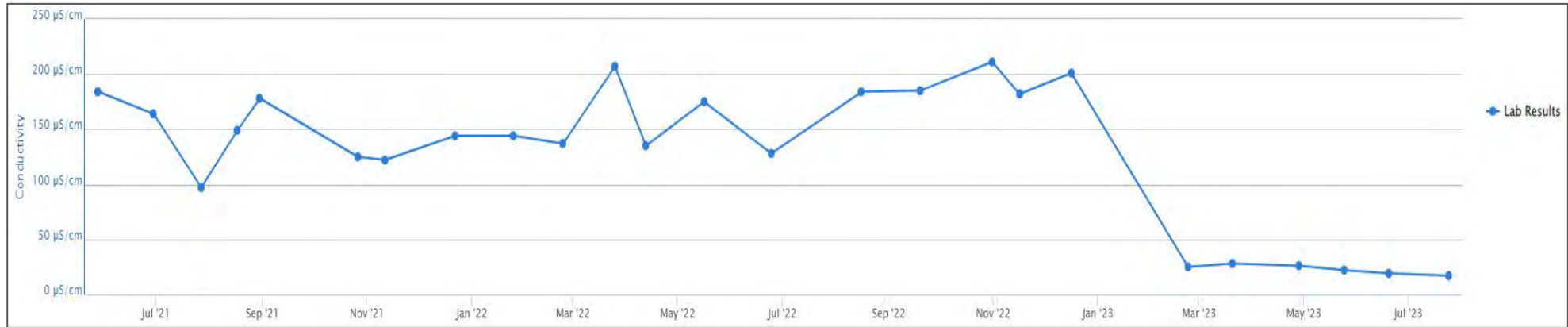
## Water Quality Monitoring Results – Point 40 (Grab)

### pH

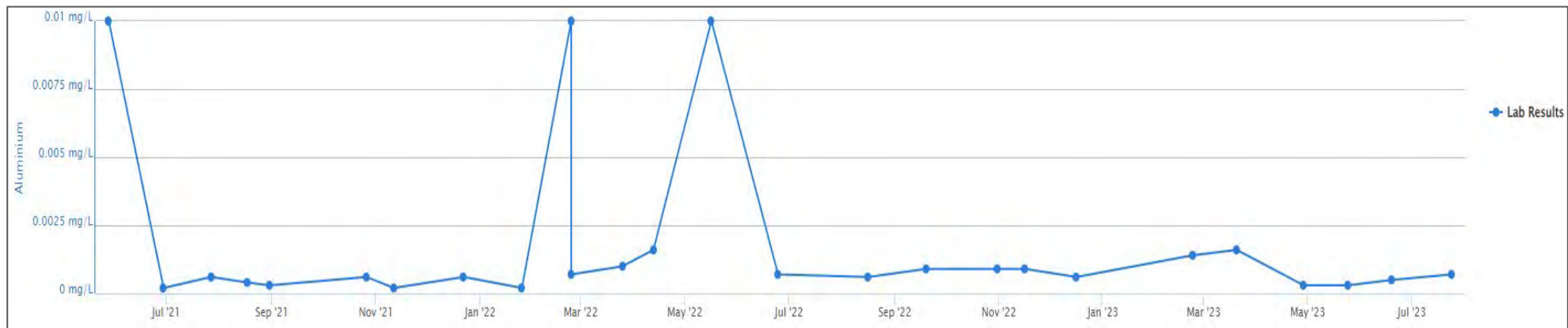




## Conductivity

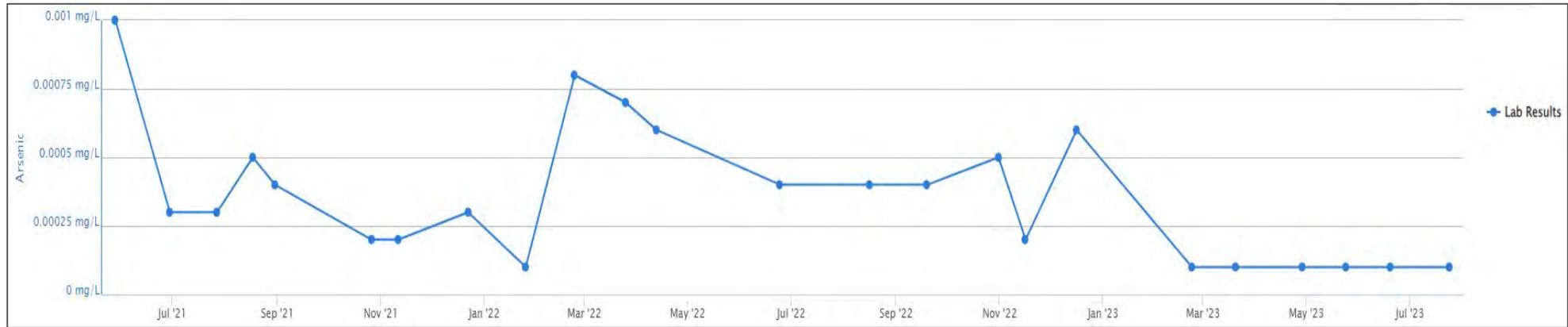


## Aluminium

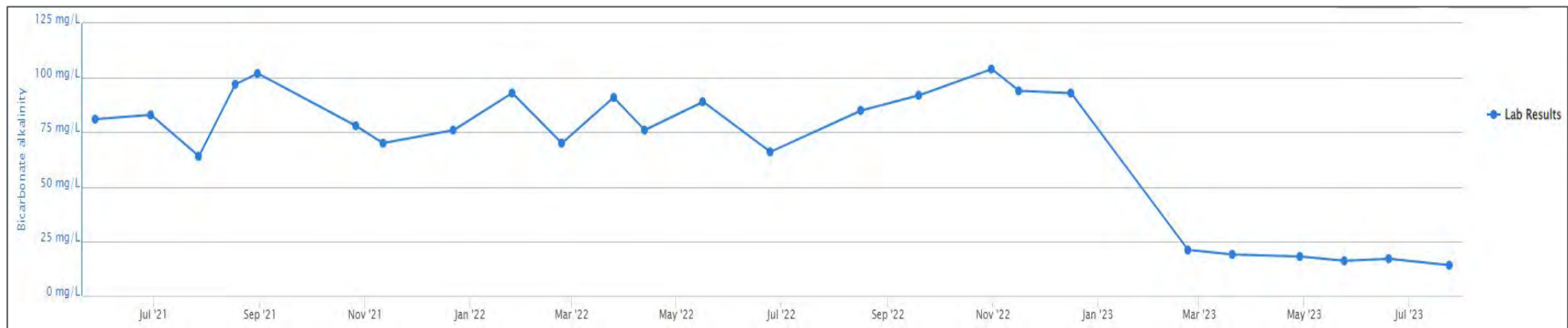




### Arsenic

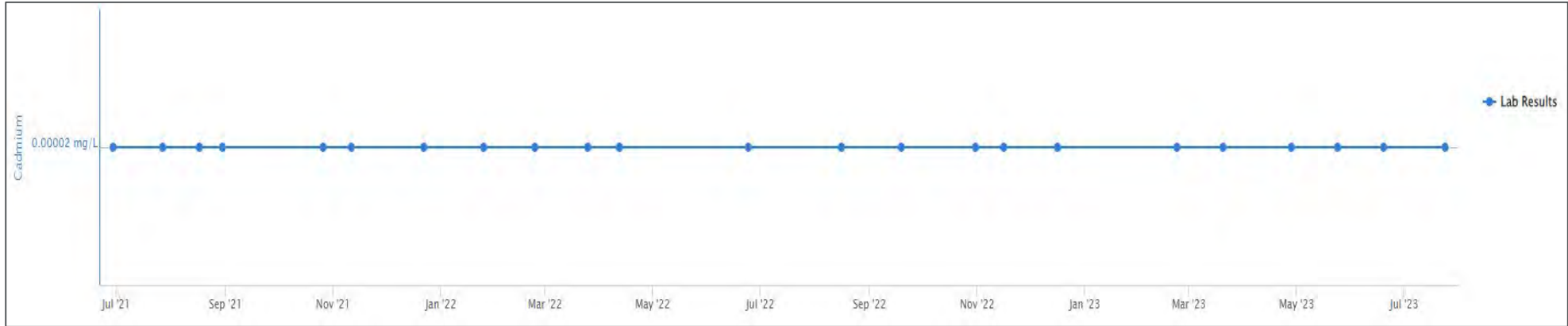


### Bicarbonate alkalinity

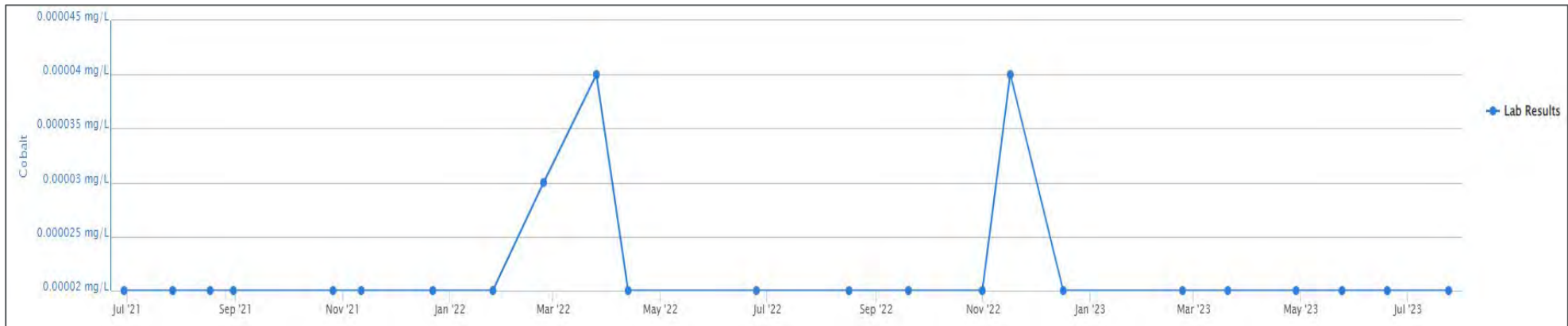




### Cadmium

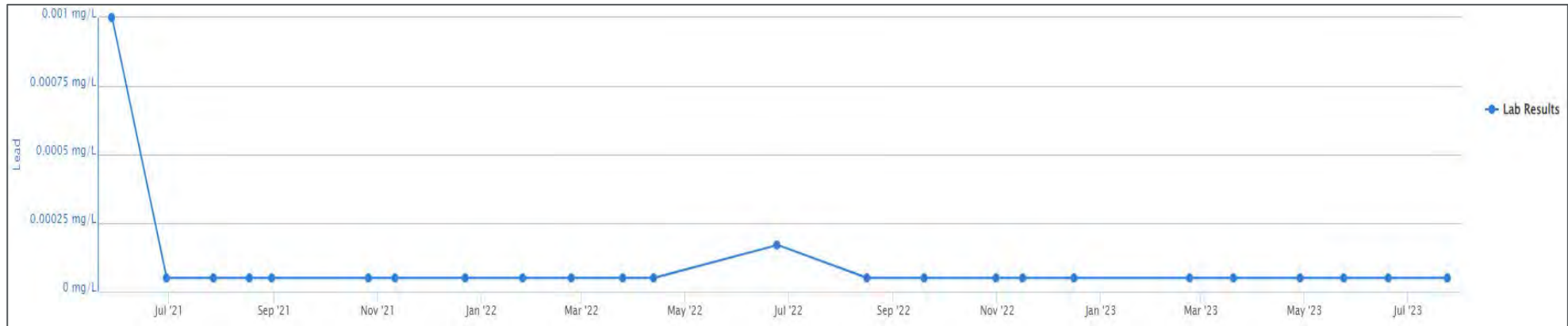


### Cobalt

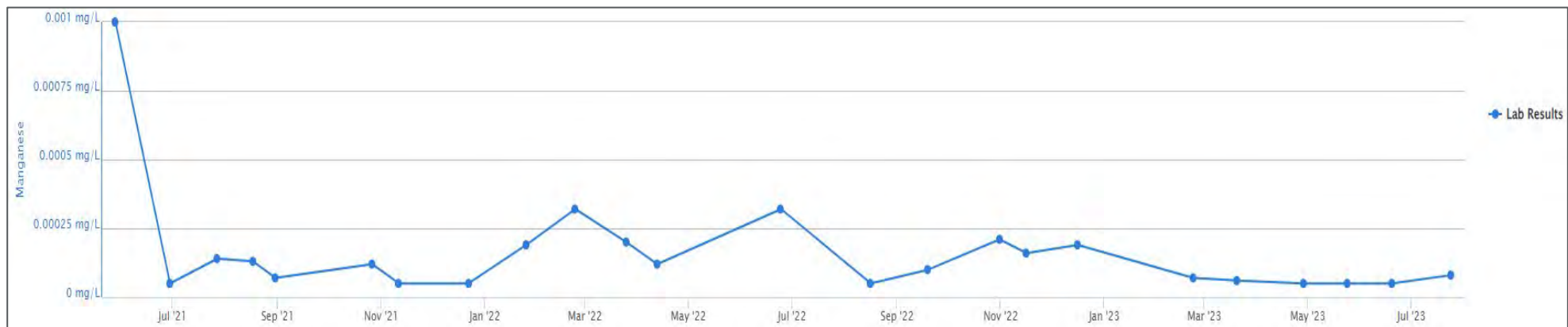




## Lead

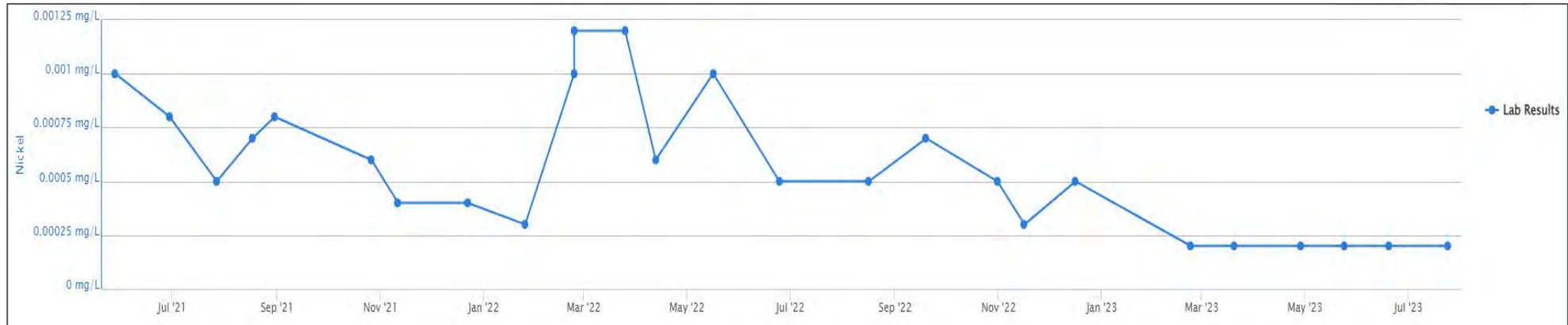


## Manganese





## Nickel

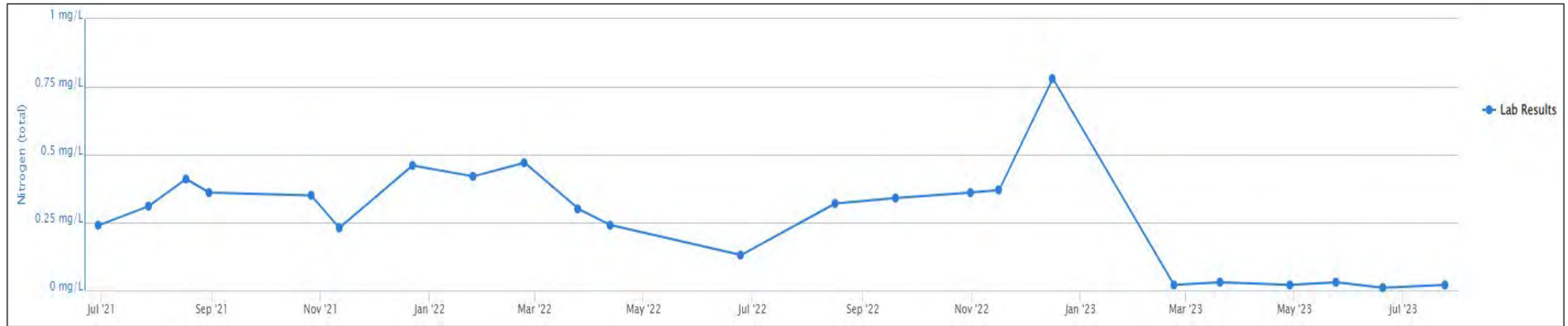


## Nitrogen (ammonia)

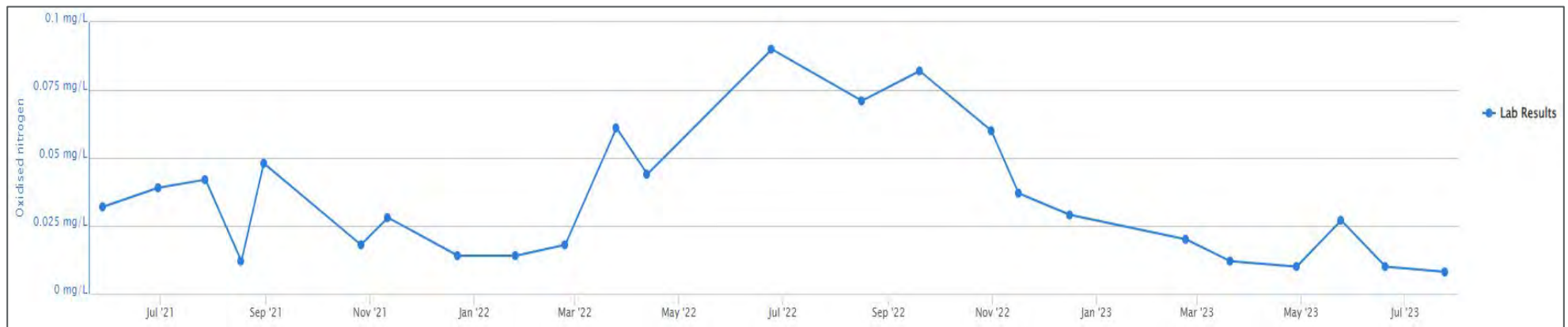




### Nitrogen (total)

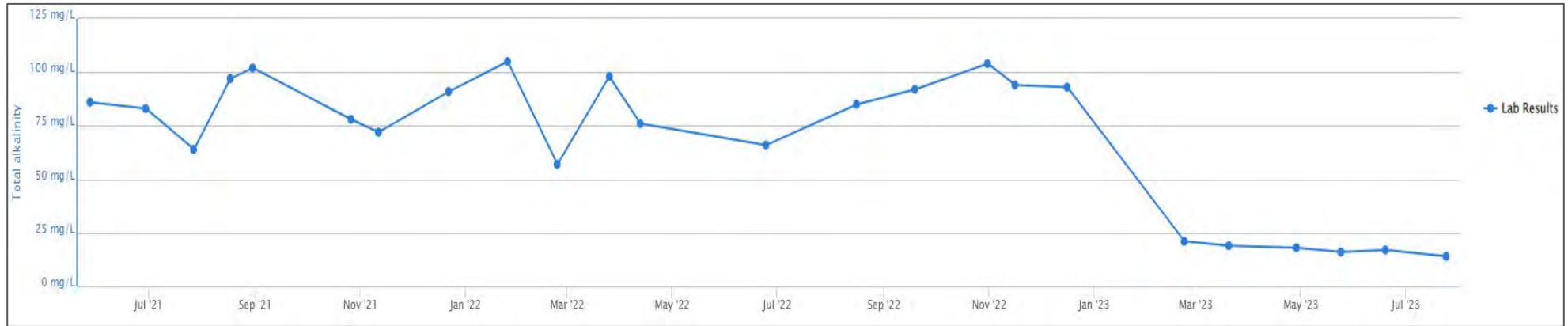


### Oxidised nitrogen

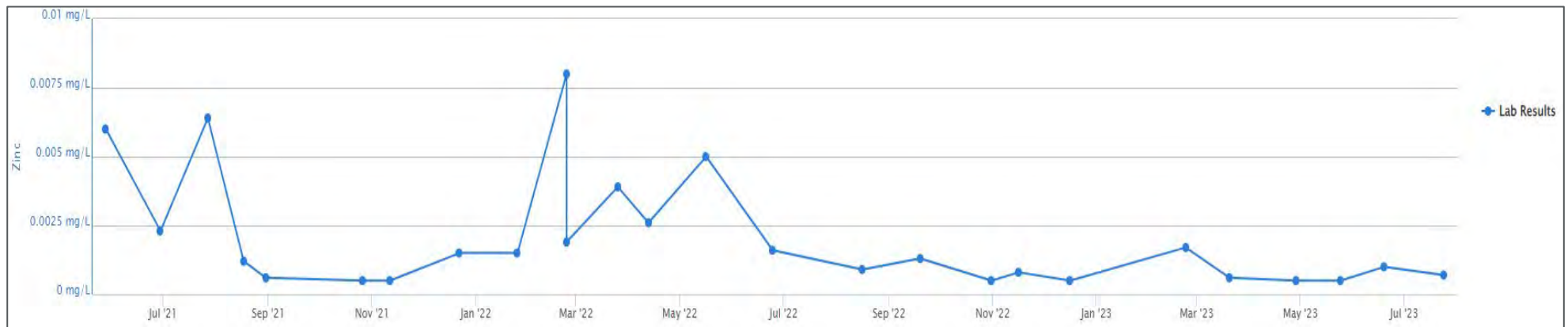




### Total Alkalinity



### Zinc





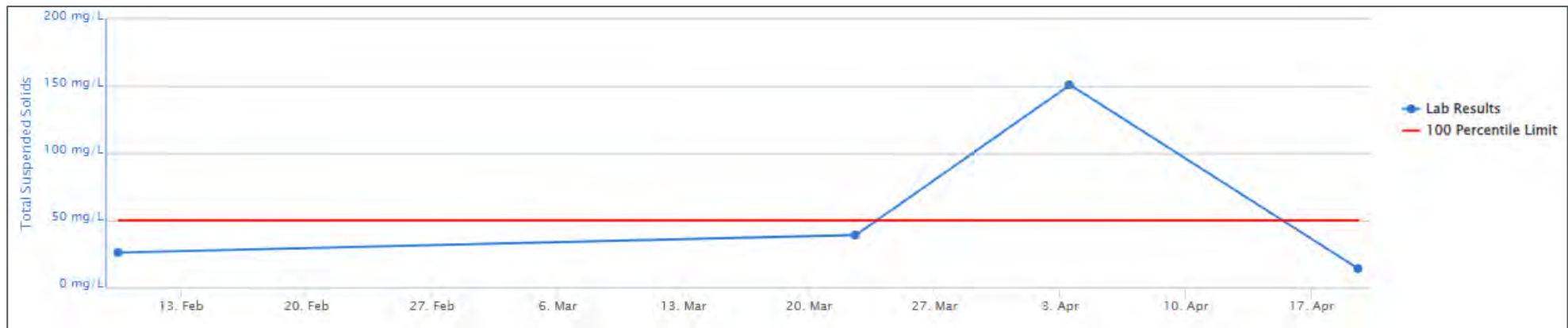


## Water Quality Monitoring Results – Point 41 (Grab)

### pH



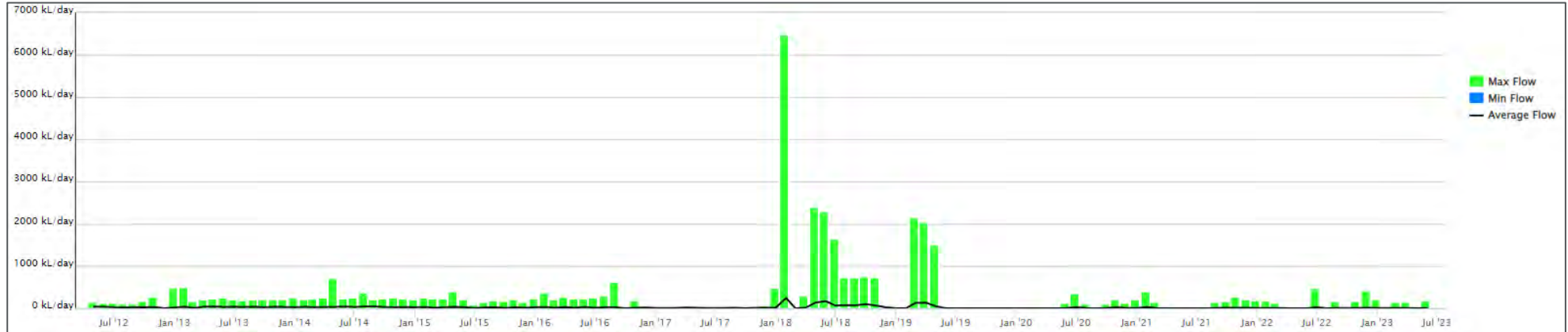
### Total Suspended Solids



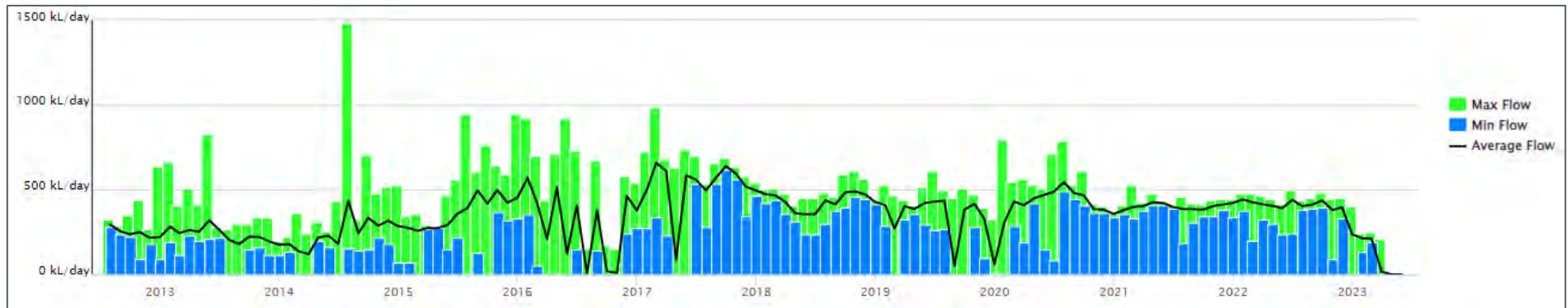


**Discharge Monitoring**

**Volume Monitoring Results – Point 4**

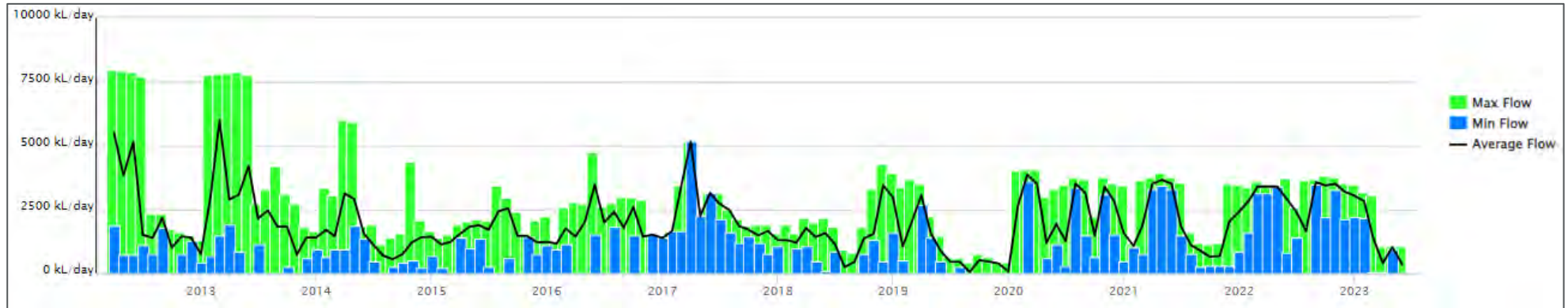


**Volume Monitoring Results – Point 10**

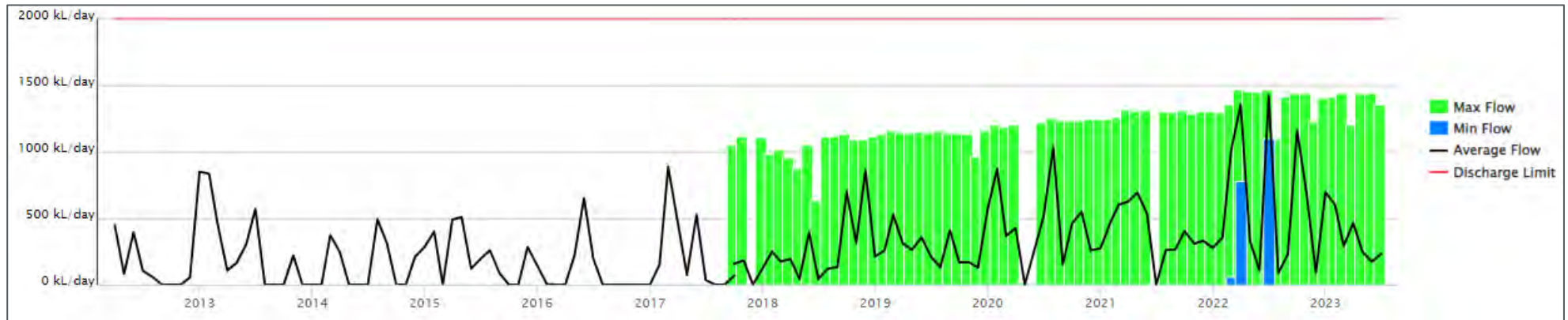




### Volume Monitoring Results – Point 13

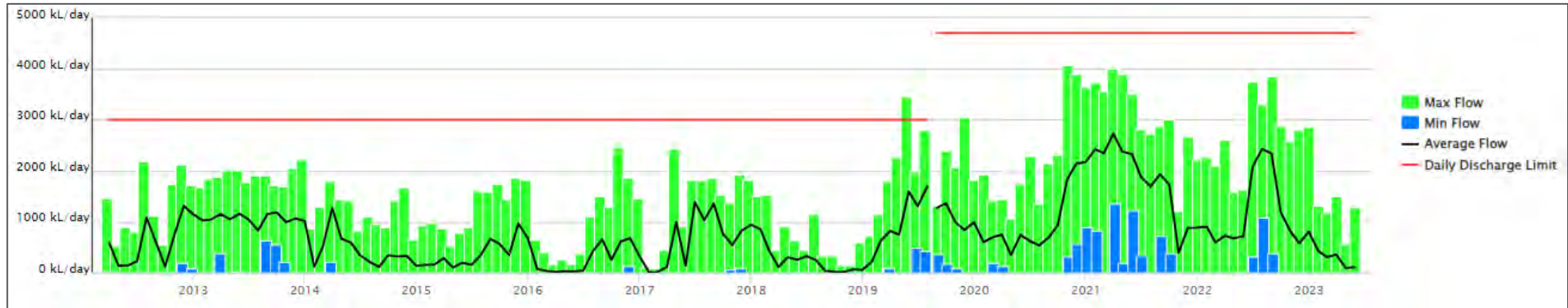


### Volume Monitoring Results – Point 19

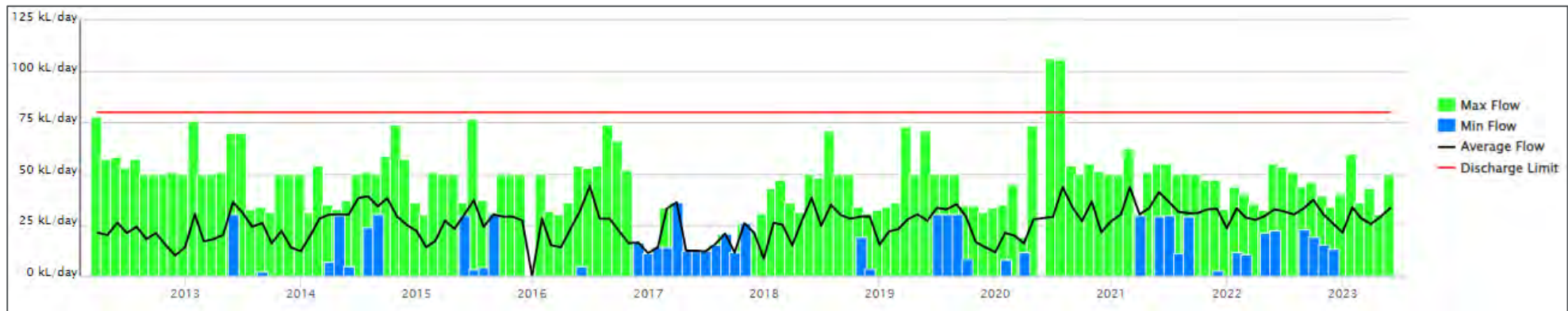




### Volume Monitoring Results – Point 24



### Volume Monitoring Results – Point 38





### Volume Monitoring Results – Point 40





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**Appendix 7: Annual CWEA Rehabilitation Report**

# MONITORING REPORT - EMPLACEMENT REHABILITATION YEAR 12

Illawarra Metallurgical Coal 2023



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# INTRODUCTION

## REQUIREMENT FOR MONITORING

### Stage 3 Consent

The development consent for the Stage 3 Emplacement at Appin North Colliery (formerly West Cliff) with the Coal Wash Emplacement Area (CWEA) (the site) required Illawarra Metallurgical Coal (IMC) to implement a formal monitoring program for all past, present and future emplacement rehabilitation activities on the site. The Stage 3 consent was replaced by the Bulli Seam Operations (BSO) Part 3A and EPBC Act approvals in 2011.

### BSO Part 3A and EPBC Act Approvals

IMC received Project Approval for current and proposed operations within the BSO for 30 years from the:

- NSW Department of *Planning* and Environment (DPE) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in December 2011; and
- Department of the Environment (DoE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in May 2012.

Both contain conditions relating to the CWEA operations, as summarised in Table 1.

**Table 1: Condition requirements of the EPBC Act and EP&A Act Part 3A approvals relating to CWEA rehabilitation**

BSO Project Approval Condition 17	EPBC Act Project Approval Clause 6:
<p>The Proponent shall prepare and implement a West Cliff Emplacement Area Management Plan for the project to the satisfaction of the Director-General. This plan must be prepared in consultation with OEH and be submitted to the Director-General for approval by the end of June 2013. This plan must include:</p> <p>a) detailed design plans which include options for reducing, avoiding and/or managing impacts on Aboriginal heritage sites in and adjacent to the south-western fringe of the proposed Stage 4 footprint (including sites: 52-2-2228/3617, 52-2-1373, 52-2-3533/3613 and 52-2-3506</p> <p>(b) management strategies to ensure no impacts to Aboriginal heritage site 52-2-3505 other than negligible impacts, including consideration of potential staged development of the emplacement and/or buffer areas;</p> <p>(c) management strategies for the protection and conservation of <i>Persoonia hirsuta</i>;</p> <p>(d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot;</p> <p>(e) a comprehensive groundwater monitoring program for the Brennan's Creek valley, including the area of the emplacement;</p> <p>(f) provide for progressive rehabilitation of the emplacement area, including through:</p> <ul style="list-style-type: none"> <li>- maximising opportunities for natural regeneration;</li> <li>- maximising retention of suitable habitat species;</li> <li>- appropriate weed and pest control strategies; and</li> </ul>	<p>The person taking the action must provide a Coal Wash Emplacement Staging and Rehabilitation Plan (the Staging Plan) for the stage 4 coal wash emplacement area to the Minister for approval. Clearing of vegetation for stage 4 coal wash area must not occur until the Staging Plan has been approved by the Minister. The Staging Plan must include, but not be limited to:</p> <p>Measures to limit the clearing of native vegetation to no more than 60 hectares;</p> <p>Provision for the progressive staging of coal wash emplacement to ensure at all times a minimum 100 m wide habitat corridor is maintained linking the <i>Persoonia hirsuta</i> core population with habitat adjacent to the Stage 4 coal wash emplacement area;</p> <p>Measures to ensure that, if the corridor is to include land previously used as emplacement areas (either in whole or part), native re-vegetation is established to the extent that it facilitates the movement of pollination vectors for <i>Persoonia hirsuta</i>;</p> <p>Staging of emplacement from east to west;</p> <p>Provision for progressive rehabilitation of the emplacement area, including through:</p> <p>Staged clearing of native vegetation within the stage 4 coal wash emplacement area;</p> <p>Maximising opportunities for natural regeneration, including through salvage, storage and re-use of site top soil and maximising the retention time of suitable habitat species within the stage 4 coal wash emplacement area adjacent to active emplacement areas to assist re-colonisation of native species to rehabilitated areas;</p>

BSO Project Approval Condition 17	EPBC Act Project Approval Clause 6:
<p>- planting only endemic species in habitat mixes appropriate for soil, slope and aspect.</p>	<p>Key performance objectives for site rehabilitation, including indicative timelines, performance measures, management actions and responsibilities and accountabilities;            Planting only endemic species in habitat mixes appropriate for the local surrounding environment, soil, slope and aspect, in accordance with relevant published guidelines; and            Appropriate weed and pest control strategies.            Monitoring and rehabilitation actions including but not limited to, measures to assess the success of management actions, natural regeneration and revegetation. The reporting of monitoring results must be submitted to the department within 30 days of every 12 month anniversary of the implementation date of the Staging Plan; and            Unless otherwise agreed to in writing by the Minister, the Staging Plan must be implemented and remain implemented for a minimum period of 10 years at which point a revised plan taking into account the monitoring referred to above must be submitted to and approved by the Minister.</p>

### CWEA Management Plan

The BSO CWEA Area Management Plan was approved on 16<sup>th</sup> November 2016 by the Department of Planning and Environment (DPE).

The rehabilitation monitoring commitments outlined in this plan are detailed in Table 2.

**Table 2: Monitoring requirements from the Coal Wash Emplacement Area (CWEA) Management Plan**

Type	Who	Frequency	Aspects monitoring	Output
Quarterly Inspection	Site Environmental Representative	Quarterly	Photographic records at pre-determined sites located within the rehabilitated area of the CWEA.	Report (internal) and photographic database.
Annual Inspection	Qualified ecologists or suitably trained site environmental representative	Annual	Quadrat monitoring in rehabilitation and surrounding areas* Fixed photo points throughout the CWEA ** Random meander transects (every three years) in rehabilitated areas*** Fauna Monitoring****	Report (internal). Outcomes from monitoring summarized in the BSO Annual Review Report appended to the BSO Annual Review.

\*Biometric assessments are required annually, starting at 1 year after translocation. Surveys at control sites required once every three years and benchmarks as calculated remain so for the ensuing three-year period.

\*\*Photo point monitoring is required annually and done in conjunction with the above.

\*\*\*Meanders for threatened plants are undertaken every three years.

\*\*\*\*Fauna monitoring using camera traps is required annually, starting 5 years after translocation or as deemed appropriate depending on the maturity of the revegetation.

### PURPOSE OF THIS REPORT

The purpose of this report is to provide the results of the 2022 annual monitoring for the CWEA rehabilitation works.

# SURVEY DESIGN

## AIM

To measure, over time, the success of the rehabilitation of the CWEA, particularly the regeneration of natural vegetation and placement of specific habitat features including rocks and logs.

This will be achieved through monitoring of biometric attributes, fixed photo points and threatened plant meander surveys, as well as measuring the presence/absence of fauna within the various rehabilitation sites of varying age.

## KEY PERFORMANCE CRITERIA

The monitoring program is designed to monitor the success of the following Key Performance Indicators (KPI):

1. Adequate regeneration of translocated communities: Exposed Sandstone Scribbly Gum Woodland (ESSW) and Sandstone Gully Peppermint Forest (SGPF). Regeneration to reflect the composition and structure of the two communities.
  - i. Biometric attributes within local benchmarks
  - ii. No more than 20 percent weed cover in translocated compartments.
2. The degree to which fauna (native) use the rehabilitated CWEA including constructed habitats and nest boxes.

This report will also advise any recommendations to assist implementing actions for the objectives outlined in the Completion Criteria, as detailed in Table 9.

## METHODS

### Biometric Vegetation Assessment

This assessment utilises the BioBanking Assessment Methodology (OEH 2014). This methodology is used as it is a ready-made vegetation condition assessment, incorporating parameters (known as 'site attributes') that reflect changes in condition over time against benchmarks. Furthermore, the methodology allows for the calculation of local benchmark data, thereby providing a more accurate picture of the condition of the suitable vegetation types locally.

Vegetation plots (50 x 20 metres) were established within each of the monitoring zones and data for the following site attributes was collected:

- Native Plant Species Richness
- Native Overstory Cover
- Native Midstory Cover
- Native Groundcover (Grasses)
- Native Groundcover (Shrubs)
- Native Groundcover (Other)
- Exotic Plant Cover
- Total Length of Fallen Logs.

### Control Sites

Six locations were chosen as control sites (Table 3, Plan A). Monitoring the controls sites will:

- Allow measurement of the success of soil translocation within the CWEA through the comparison of a range of site condition attributes with local benchmark conditions;
- Provide long term data regarding the condition of local vegetation types and the targets for rehabilitation; and
- Account for any stochastic variability within the local ecosystems (e.g., bushfire, climate, etc.) and allow for the consideration of such variability in relation to the outcomes on the site.

**Table 3: Control site locations**

Site	Easting	Northing
c253	297696	6212022
c255	297825	6211821
c256	297518	6212778
c257	297518	6212934
c258	297152	6213052
c259	297283	6212899

### Monitoring Sites

Stratification of the monitoring sites within the CWEA occurred according to their treatment histories, age, and the respective areas they occupied in hectares. Accordingly, 11 monitoring sites were chosen across three different treatment types in 2011. This was expanded to 15 plots across four separate treatments in 2014, 17 plots across five treatments in 2017 (Plan A & Plan B) and 19 plots in 2019. Monitoring sites are listed in Table 4 and shown in Plan A.

**Table 4: Monitoring site locations**

Site	Easting	Northing	CWEA Stage	Area
a1-228	299842	6210193	One	A1
a1-230	299758	6210171		
a1-232	299857	6210092		
a2a-237	299578	6210253	Two	A2a
a2a-239	299649	6210350		
a2a-240	299509	6210386		
a2b-241	299515	6210493		A2b
a2b-242	299322	6210565		
a2b-243	299136	6210510		
a2b-244	299093	6210408		
a2b-245	299388	6210627		
a2c-042	299259	6210803		
a2c-043	299223	6210746		
a2d-001	298798	6210768		A2d
a2d-002	298848	6210678		
a2e-001	299093	6210797		
a2e-002	299018	6210885		
a3a-001	298755	6211092		Three
a3a002	298932	6211007		

### Local Benchmarks

Local benchmark data was collected at six control sites (Table 3). The BioBanking Local Benchmark Calculator is used to calculate the benchmark levels and the range of values for each of the collected attributes. The control sites were nominated based on Revised Biometric

Vegetation Types (RBVTs as defined by OEH in the Biometric Vegetation Types Database) as either Red Bloodwood – Scribbly-Gum Heathy Woodland RBVT or Sydney peppermint – Smooth-Barked Apple – Red Bloodwood Shrubby Open Forest RBVT of the Sydney Metropolitan Catchment Management Authority (CMA). It was considered that the CWEA was likely to regenerate to a state that was an artificial combination of both RBVTs and therefore no attempt has been made to stratify the survey on the basis of these types.

Table 5 shows the local benchmark values for each of the biometric attributes using data from the control sites collected in 2015 (and utilised from 2015-2017). Table 6 shows the local benchmark values for each of the biometric attributes using data from the control sites collected in 2020. Data from 2020 was used as the Local Benchmark in this report. The data was entered into the Local Benchmark Calculator to generate the benchmarks.

**Table 5: Local benchmarks 2015, 2016, 2017**

Attribute	Benchmarks (2015)	
	Lower	Upper
Native Plant Species	-	>= 42
Native Overstorey Cover	1.9	17.7
Native Midstorey Cover	4.4	16.0
Native Ground Cover (Grasses)	0.0	75
Native Ground Cover (Shrubs)	30.0	72.6
Native Ground Cover (Other)	28.8	66.6
Number of Trees with Hollows*	-	>= 2
Total Length of Fallen Logs	-	>= 34

\* Included here for completeness only. As discussed above, trees with hollows are unlikely to develop within the life of the project.

**Table 6: Local benchmarks 2020**

Attribute	Benchmarks (2020)	
	Lower	Upper
Native Plant Species	-	>= 43
Native Overstorey Cover	6.6	12
Native Midstorey Cover	4.9	11
Native Ground Cover (Grasses)	29	71
Native Ground Cover (Shrubs)	24	49
Native Ground Cover (Other)	1	14
Number of Trees with Hollows*	-	>= 2
Total Length of Fallen Logs	-	>= 49.25

\* Included here for completeness only. As discussed above, trees with hollows are unlikely to develop within the life of the project.

### Photo Point Vegetation Monitoring

Permanent photographic points have been established at each of the biometric vegetation plots.

### Threatened Plant Random Meander

A random meander for threatened plants (Cropper 1993) is conducted throughout the CWEA every three years. This method is the most appropriate for the purposes of the monitoring survey. The meander method was undertaken in 2020, thus it was not undertaken this year. The next meander method is scheduled to be conducted in 2023.

### Fauna Using Camera Traps

Camera traps are becoming the preferred survey method over traditional cage traps or hair tubes as they are more efficient, less labour intensive and non-invasive. The method is well documented

for monitoring small to medium sized mammals. Some useful resources are Eyre et al. (2018) and Meek et al. (2012).

Camera traps are deployed to the rehabilitating areas, using a passive survey approach (i.e., non-baited). The sites target specific habitat features i.e., logs, log hollows and rock crevasses/overhangs to determine occupation. As a rule, a minimum of one trap is placed per rehabilitation compartment. Refer to Plan B for camera trap locations in 2022 monitoring.

Infra-red cameras are used and are placed to aim the lens at the core body zone of the animal. The cameras are placed approximately 20-30 cm above the ground and no more than 2-3m from the feature (Meek *et al.* 2012). The recommended minimum deployment time is 12 nights (Meek et al. 2012).

### **Timing**

Biometric assessments are required annually, starting at one year after translocation. Surveys at control sites are only required once every three years (next due in 2023) and the benchmarks are used for the ensuing three year period (see Table 6 for 2020 benchmarks to be used in this report). Photo point monitoring is required annually and done in conjunction with the above. Meanders for threatened plants are undertaken every three years (next due in 2023).

Fauna monitoring using camera traps is required annually, starting five years after translocation or as deemed appropriate, depending on the maturity of the revegetation.

Criteria can be measured most easily in spring by noting flowering, seed production, seedling growth and establishment.

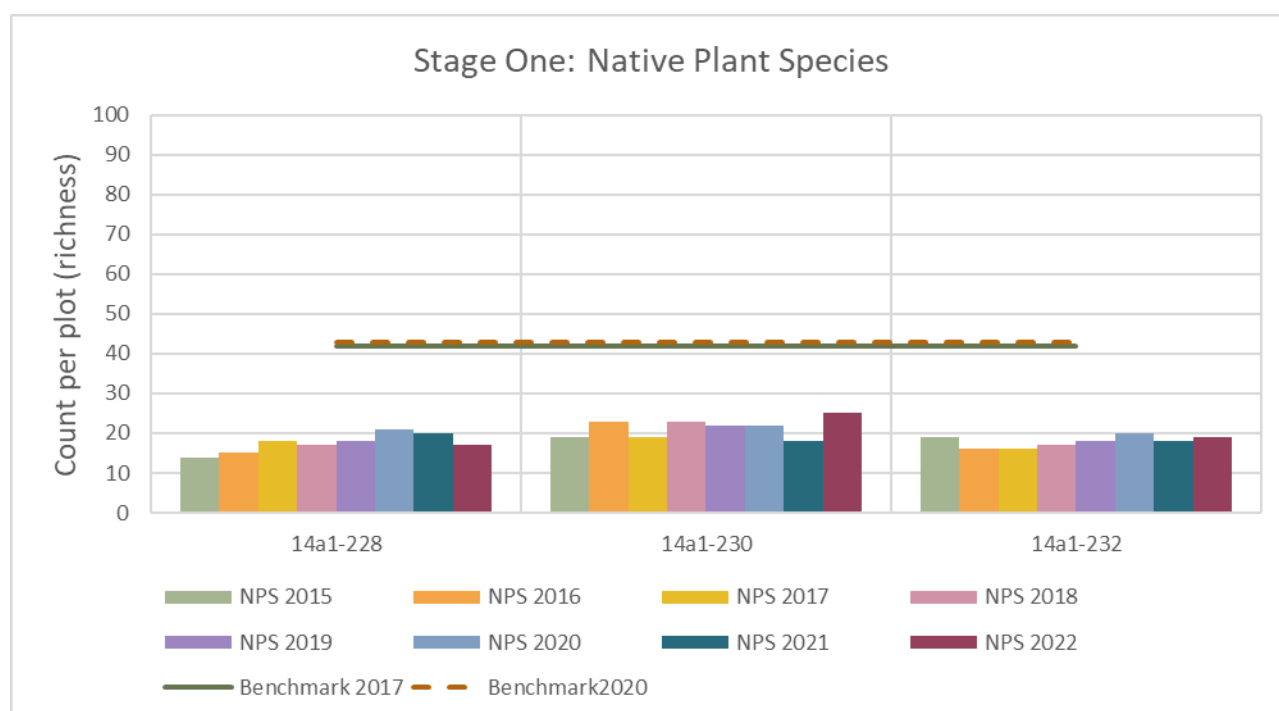
# 2022 RESULTS AND DISCUSSION

## BIOMETRIC VEGETATION ASSESSMENT

The treatments in Stages One, Two and Three differ in their longevity; in Stage One all treatments were established in 2014, in Stage Two treatment Areas 2a – 2d were established in 2014 while treatment Area 2e was established in 2017, and in Stage Three both treatments were established in 2019.

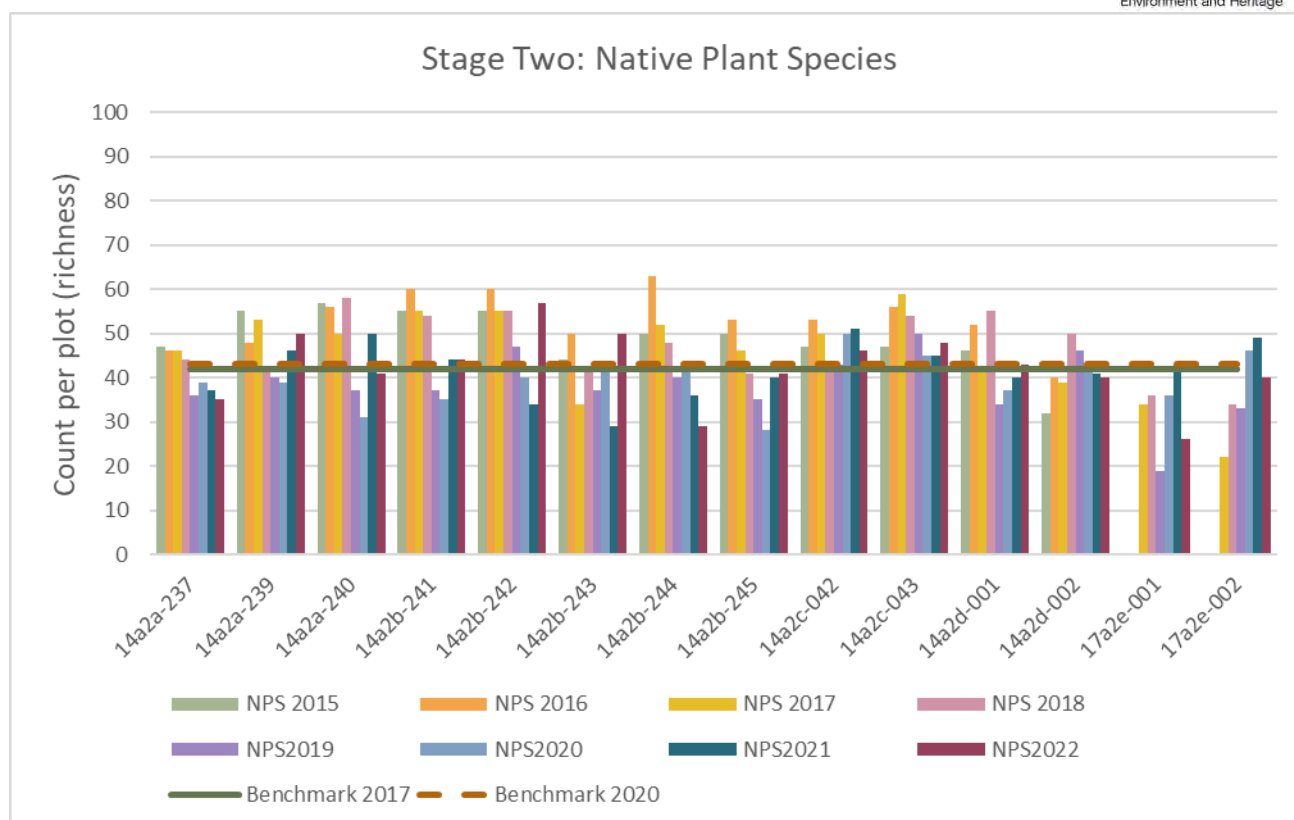
## RESULTS

### Native Plant Species (NPS) Richness



**Figure 1. Stage One NPS richness per plot from 2015 to 2022 and the Benchmark 2020  $\geq$  43 (previous Benchmark 2017  $\geq$  42).**

The plots in Stage One had a mean NPS richness of 20.3. This was slightly higher than the mean of 18.7 in 2021 and slightly lower than the mean of 21 in 2020. All plots remain below the Benchmark 2020.



**Figure 2. Stage Two NPS richness in Area 2a, 2b, 2c and 2d per plot from 2015 to 2022 and Area 2e per plot from 2017 to 2022, and the Benchmark 2020  $\geq$  43 (previous Benchmark 2017  $\geq$  42).**

The plots in Area 2a had a mean NPS richness of 42, meeting Benchmark 2020. However, this was slightly lower than the mean of 44 in 2021 and higher than the mean of 36 in 2020. Plots 14a2a-237 and 14a2a-240 are below the Benchmark 2020 while plot 14a2a-239 is above.

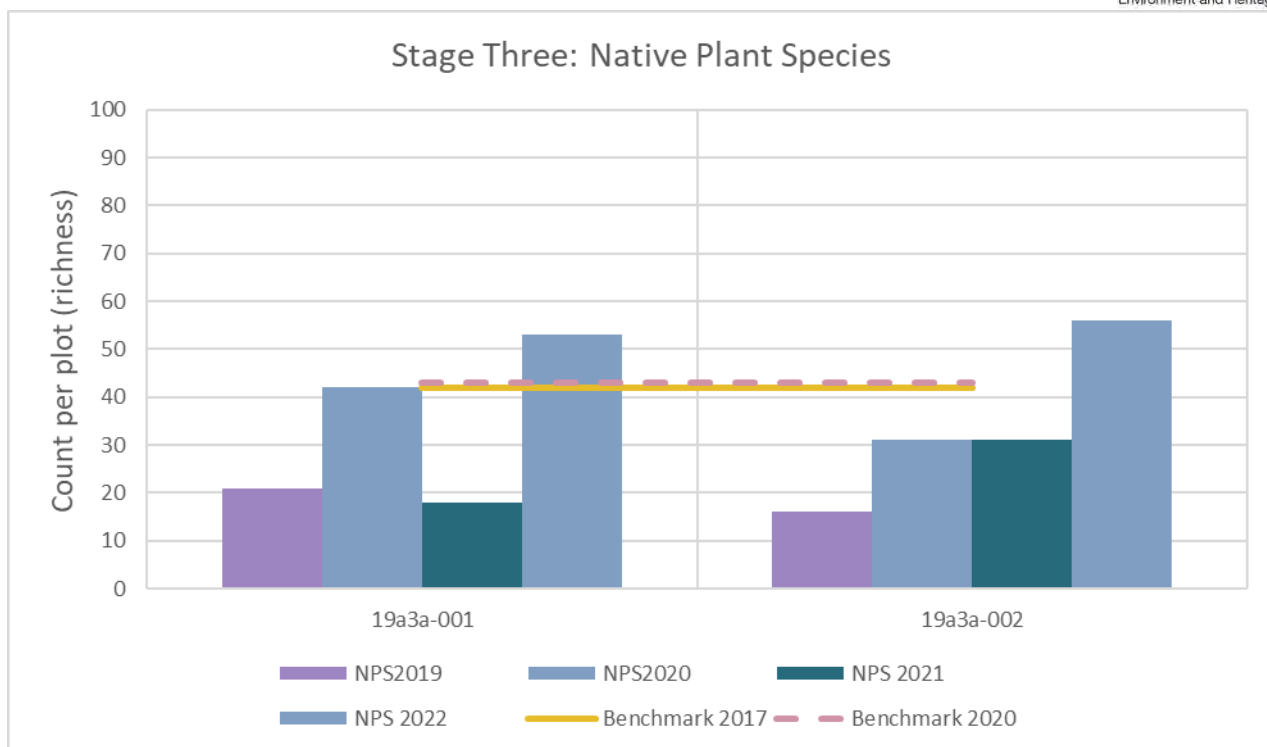
The plots in Area 2b had a mean NPS richness of 44.2, exceeding Benchmark 2020. This was higher than the mean of 36 and 37 observed in 2021 and 2020, respectively. Plots 14a2b-241, 14a2b-242 and 14a2b-243 were above the Benchmark 2020 while plots 14a2b-244 and 14a2b-245 were below.

The plots in Area 2c had a mean NPS richness of 47. This was slightly lower than the mean of 48 and 47.5 in 2021 and 2020, respectively. Both plots were higher than the Benchmark 2020.

The plots in Area 2d had a mean NPS richness of 41.5. This was slightly higher than the mean of 40.5 and 40 in 2021 and 2020, respectively. Plot 14a2d-001 was on the Benchmark 2020 while plot 14a2d-002 was below.

The plots in Area 2e had a mean NPS richness of 33. This was markedly lower than the mean of 46 and 41 in 2021 and 2020, respectively. Both plots were below the Benchmark 2020.



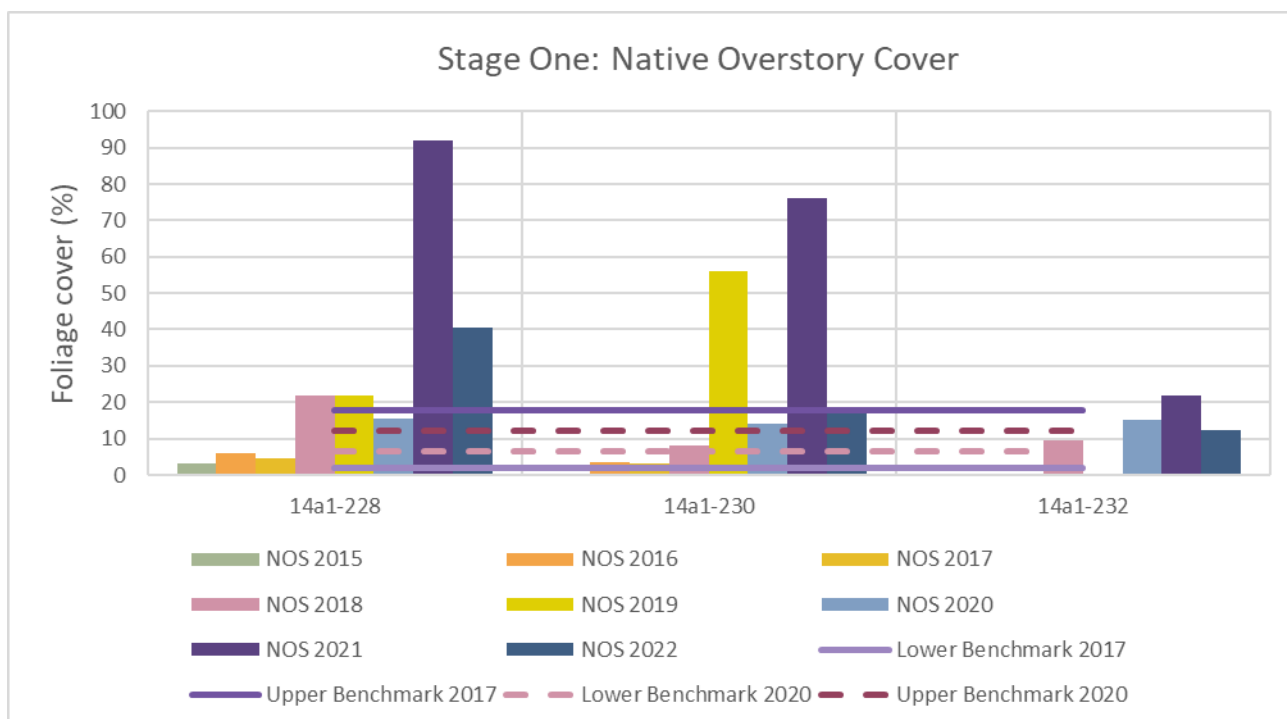


**Figure 3. Stage Three NPS richness per plot from 2019 to 2022 and the Benchmark 2020  $\geq$  43 (previous Benchmark 2017  $\geq$  42).**

The plots in Stage Three had a mean NPS richness of 54.5. This was markedly higher than the mean of 24.5 and 33.5 observed in 2021 and 2020, respectively. Both plots were above the Benchmark 2020.

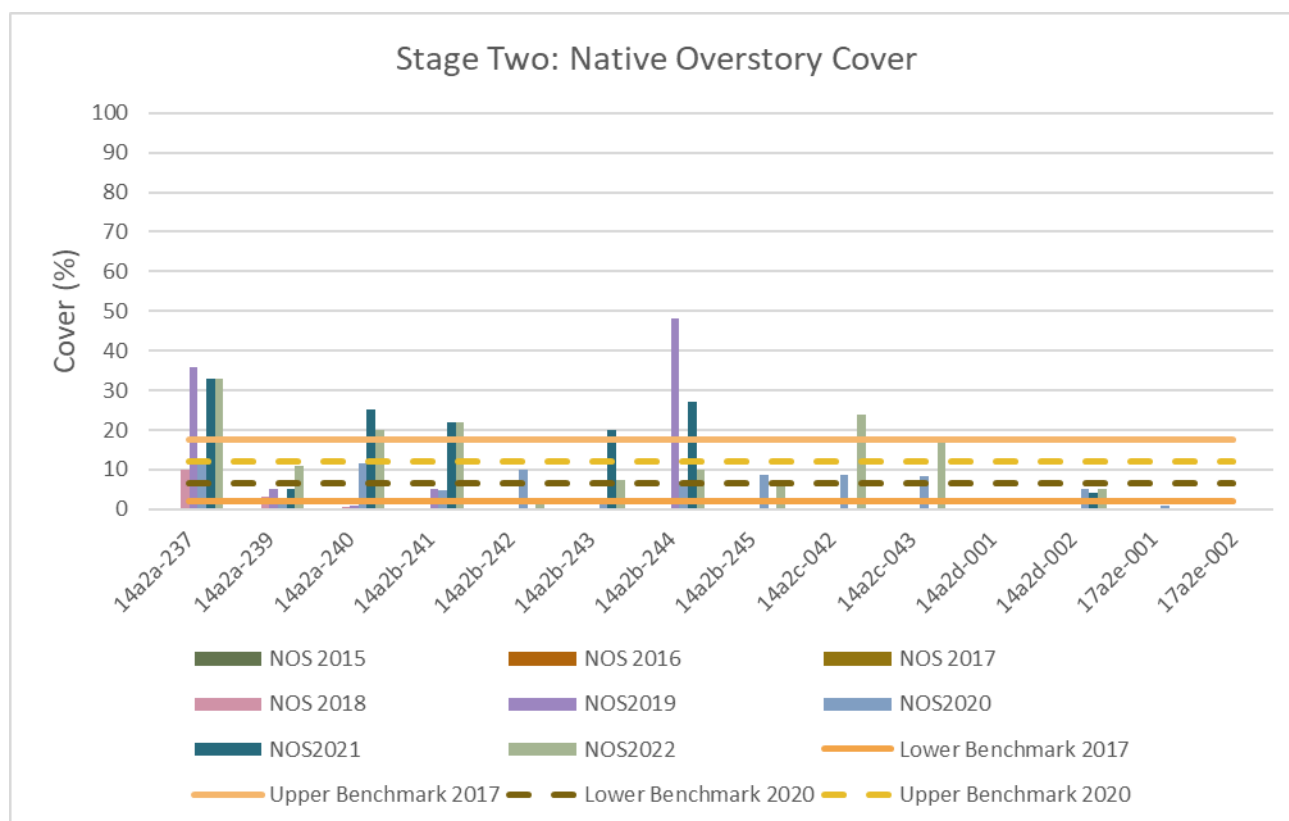
### Native Overstorey (NOS) Cover

The NOS cover was recorded in all plots in Stage One and Stage Two. Due to treatment immaturity and lack of NOS cover, the attribute was not assessed in Stage Three.



**Figure 4. Stage One NOS cover per plot from 2015 to 2022 and the lower and upper Benchmark 2020 6.6 – 12.0% (previous Benchmark 2017 1.9 – 17.7%).**

The plots in Stage One had a mean NOS cover of 23.3%. This was markedly lower than the mean of 63.3% in 2021 and higher than the mean of 14.9% in 2020. All plots were above the upper Benchmark 2020.



**Figure 5. Stage Two NOS cover in Area 2a, 2b, 2c and 2d per plot from 2015 to 2022 and Area 2e per plot from 2017 to 2022, and the lower and upper Benchmark 2020 6.6 – 12.0% (previous Benchmark 2017 1.9 – 17.7%).**

The plots in Area 2a had a mean NOS cover of 21.3%. This was higher than the mean of 21% and 8.8% in 2021 and 2020, respectively. Plots 14a2a-237 and 14a2a-240 were higher than the upper Benchmark 2020, while plot 14a2a-239 fell within the range of Benchmark 2020.

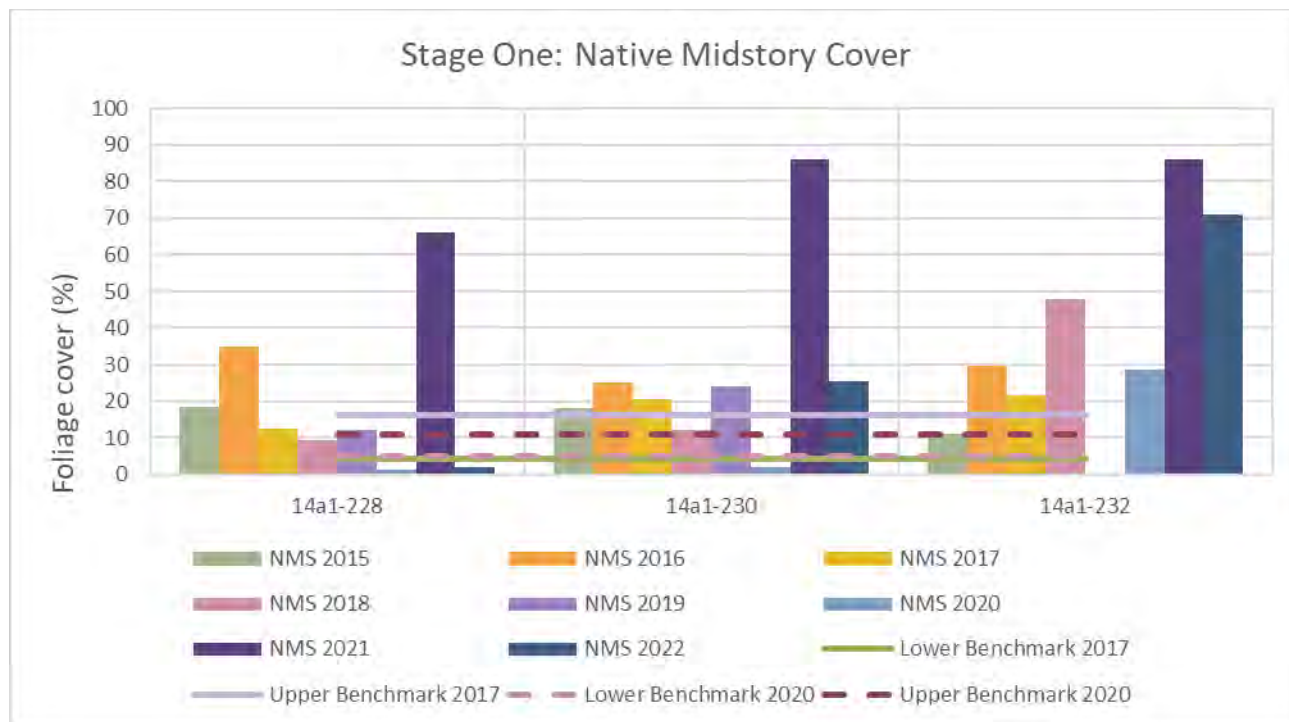
The plots in Area 2b had a mean NOS cover of 9.6%. This was slightly lower than the mean of 13.8% in 2021 and slightly higher than the mean of 6.5% in 2020. Plot 14a2b-241 was higher than upper Benchmark 2020, plot 14a2b-242 was below the lower Benchmark 2020, and the remaining plots fell within the range of the Benchmark 2020.

The plots in Area 2c had a mean NOS cover of 21%. This was markedly higher than the mean of 0% in 2021 and 8.4% in 2020. Both plots were higher than the upper Benchmark 2020.

The plots in Area 2d had a mean NOS cover of 2.5%. This was slightly higher than the mean of 2% in 2021 and slightly lower than the mean of 2.6% in 2020. Plot 14a2d-001 fell below the lower Benchmark 2020 while plot 14a2d-002 fell within the range of Benchmark 2020.

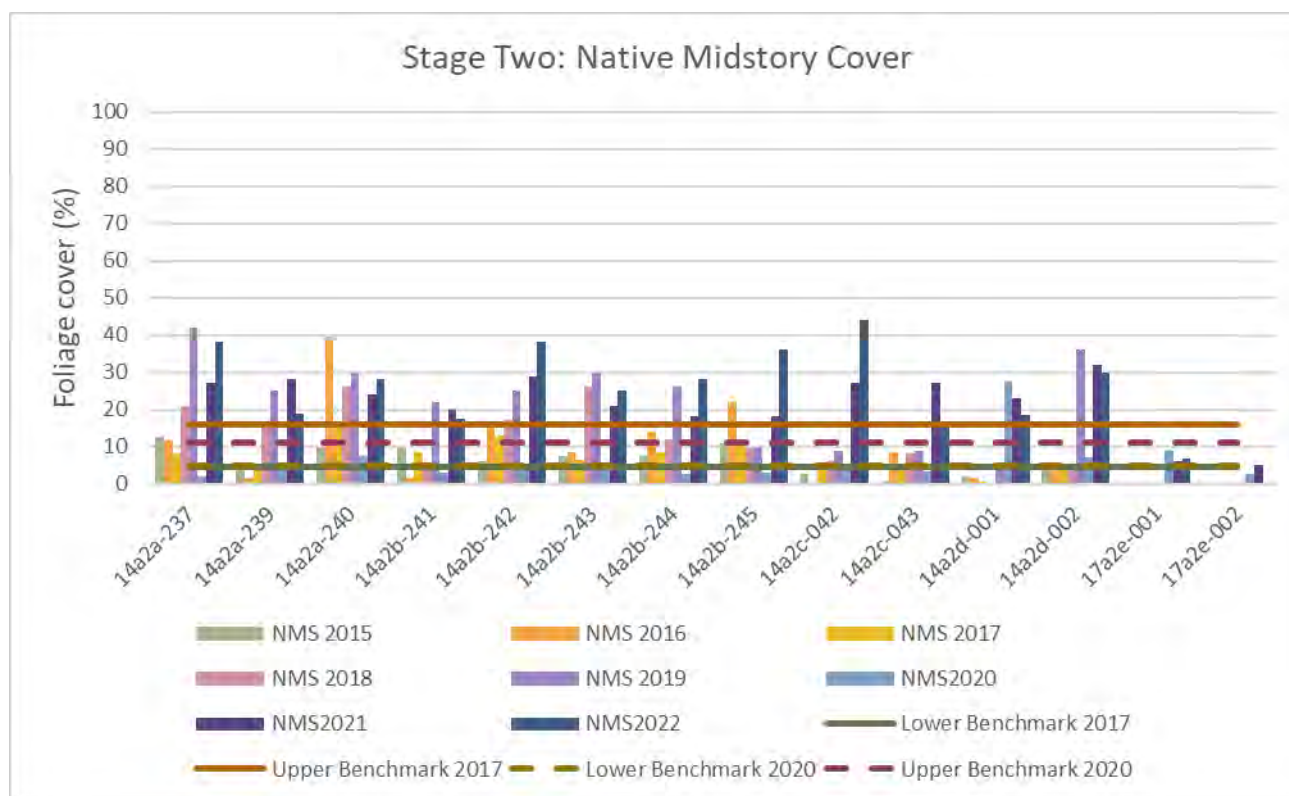
The plots in Area 2e had a mean NOS cover of 0%. This was the same at the mean of 0% in 2021 and slightly lower than the mean of 0.5% in 2020. Both plots fell below the lower Benchmark 2020.

### Native Midstory (NMS) Cover



**Figure 4. Stage One NMS cover per plot and the upper and lower Benchmark 2020 4.9 – 11.0% (previous Benchmark 2017 4.4 – 16.0%).**

The plots in Stage One had a mean NMS cover of 32.9%. This was markedly lower than the mean of 79.3% in 2021 and markedly higher than the mean of 10.7% in 2020. Plot 14a1-228 was below the lower Benchmark 2020, while the remaining plots were above the upper Benchmark 2020.



**Figure 5. Stage Two NMS cover in Area 2a, 2b, 2c and 2d per plot and the mean NMS cover of the upper and lower Benchmark 2017 (4.4 – 16.0%) and Benchmark 2020 (4.9 – 11.0%).**

The plots in Area 2a had a mean NMS cover of 28.3%. This was slightly lower than the mean of 29.3% in 2021 and markedly higher than the mean of 5.1% in 2020. All plots were above the upper Benchmark 2020.

The plots in Area 2b had a mean NMS cover of 28.9%. This was higher than the mean of 21.2% in 2021 and markedly higher than the mean of 3.3% in 2020. All plots were above the upper Benchmark 2020.

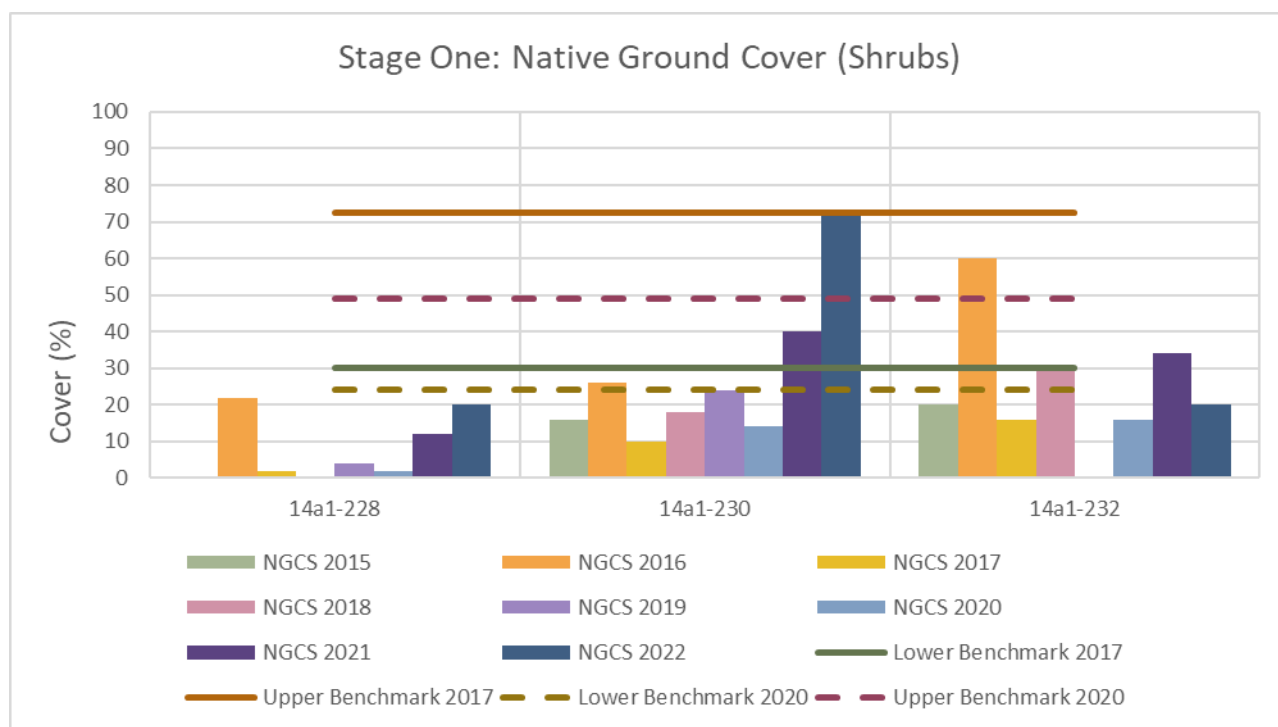
The plots in Area 2c had a mean NMS cover of 29.5%. This was slightly higher than the mean of 27% in 2021 and markedly higher than the mean of 4.1% in 2020. Plot 14a2c-042 was above the upper Benchmark 2020 while plot 14a2c-043 fell within the range of the Benchmark 2020.

The plots in Area 2d had a mean NMS cover of 24.3%. This was slightly lower than the mean of 27.5% in 2021 and higher than the mean of 17.4% in 2020. Both plots were above the upper Benchmark 2020.

The plot in Area 2e had a mean NMS cover of 3.3%. This was slightly lower than the mean of 5.5% and 5.6% in 2021 and 2020, respectively. Plot 17a2e-001 fell within the range of the Benchmark 2020 while plot 17a2e-002 fell below the lower Benchmark 2020.

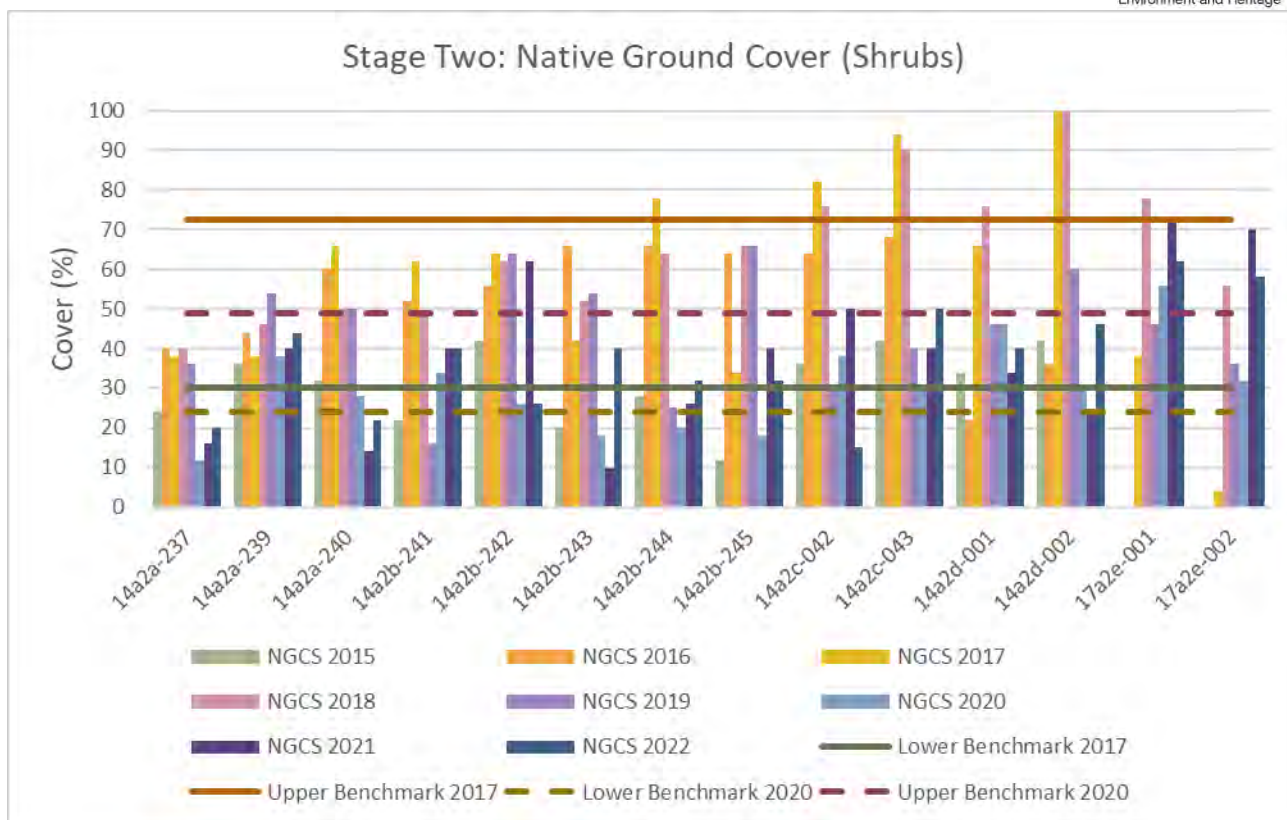
### Native Ground Cover (Shrubs) (NGCS)

The NGCS attribute refers to woody plants < 1 metre in height.



**Figure 6. Stage One NGCS per plot from 2015 to 2022 and the upper and lower Benchmark 2020 24.0 – 49.0% (previous Benchmark 2017 30.0 – 72.6%).**

The plots in Stage One had a mean NGCS of 37.3%. This was higher than the mean of 28.7% in 2021 and markedly higher than the mean of 10.7% in 2020. Plots 14a1-228 and 14a1-232 were below the lower Benchmark 2020, while plot 14a1-230 was above the upper Benchmark 2020.



**Figure 7. Stage Two NGCS per plot in Areas 2a, 2b, 2c, 2d from 2015 to 2022, Area 2e from 2017 to 2022 and the upper and lower and Benchmark 2020 24.0 – 49.0% (previous Benchmark 2017 30.0 – 72.6%).**

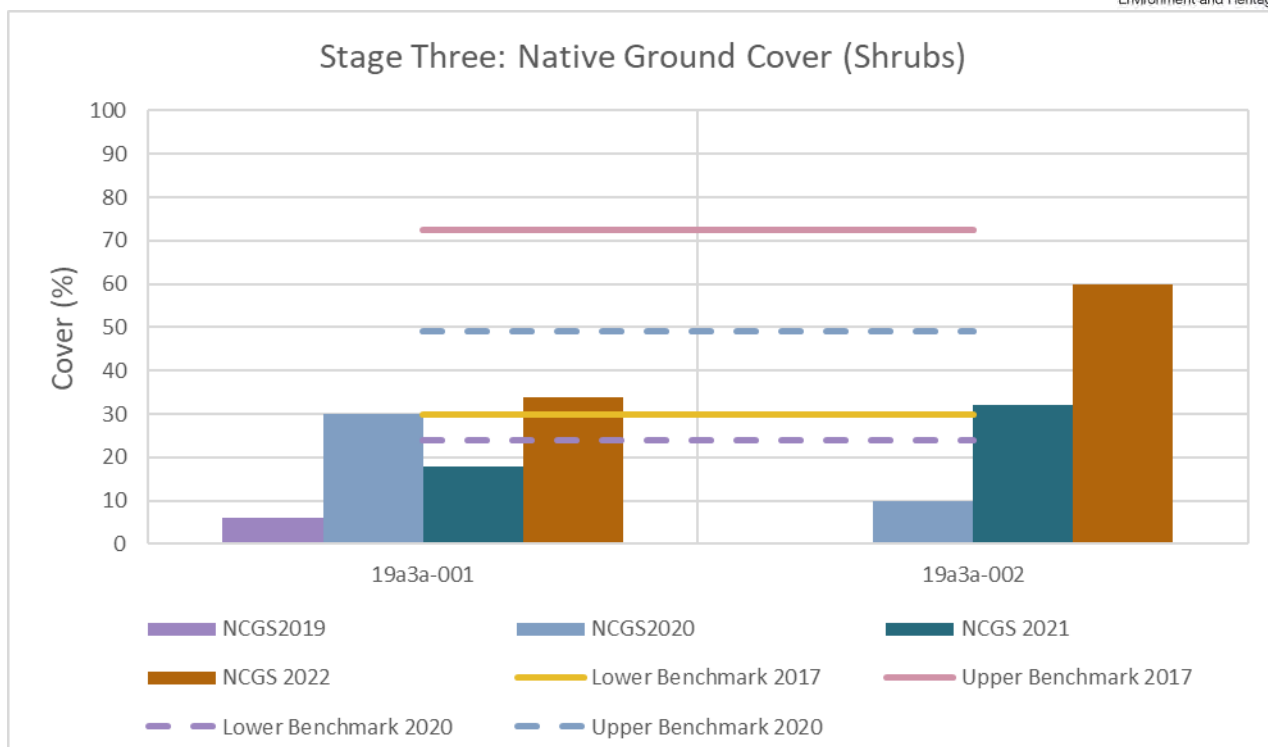
The plots in Area 2a had a mean NGCS of 28.7%. This was slightly higher than the mean of 23.3% and 26% in 2021 and 2020, respectively. Plots 14a2a-237 and 14a2a-240 fell below the lower Benchmark 2020, while plot 14a2a-239 fell within the range.

The plots in Area 2b had a mean NGCS of 34%. This was slightly lower than the mean of 35.6% in 2021 and higher than the mean of 23.2% in 2020. All plots were above the upper Benchmark 2020.

The plots in Area 2c had a mean NGCS of 32.5%. This was lower than the mean of 45% and 34% in 2021 and 2020, respectively. Plot 14a2c-042 was below the lower Benchmark 2020 while plot 14a2c-043 was above the upper Benchmark 2020.

The plots in Area 2d had a mean NGCS of 43%. This was higher than the mean of 29% and 38% in 2021 and 2020, respectively. Both plots fell within the range of the Benchmark 2020.

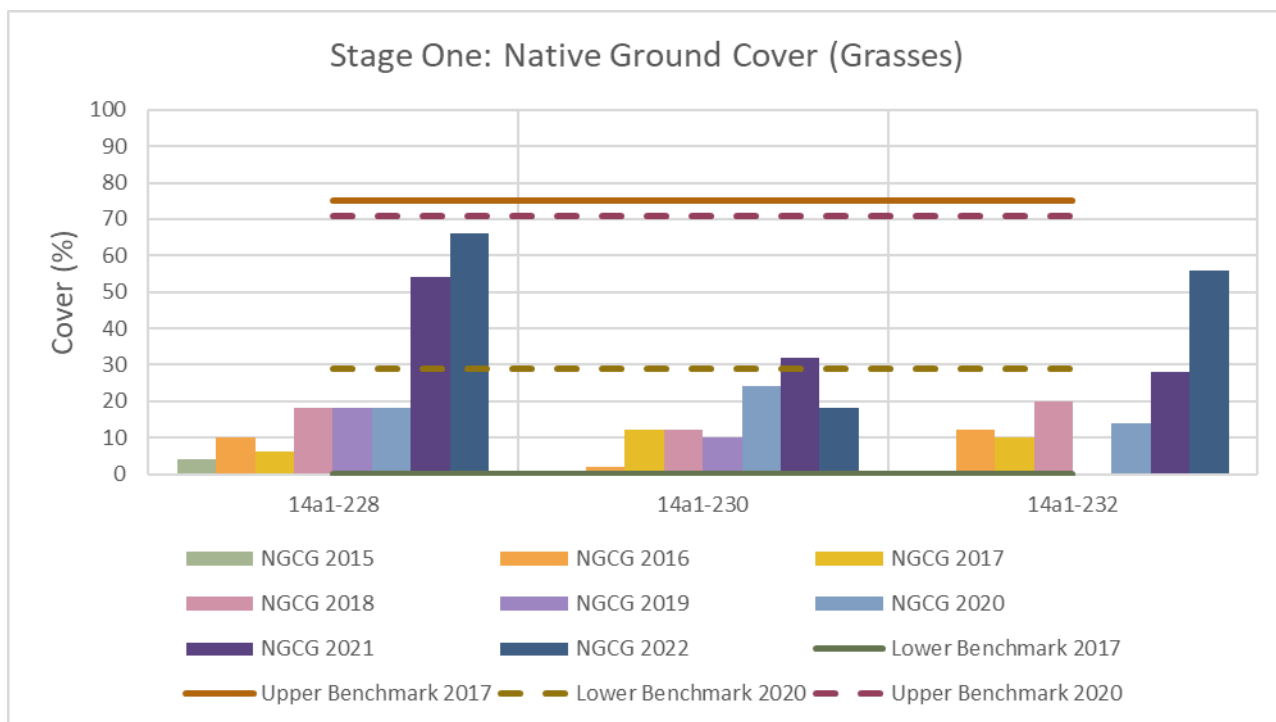
The plots in Area 2e had a mean NGCS of 60%. This was lower than the mean of 71% in 2021 and markedly higher than the mean of 44% in 2020. Both plots were above the upper Benchmark 2020.



**Figure 8: Stage Three NGCS per plot from 2019 to 2022 and the upper and lower Benchmark 2020 24.0 – 49.0% (previous Benchmark 2017 30.0 – 72.6%).**

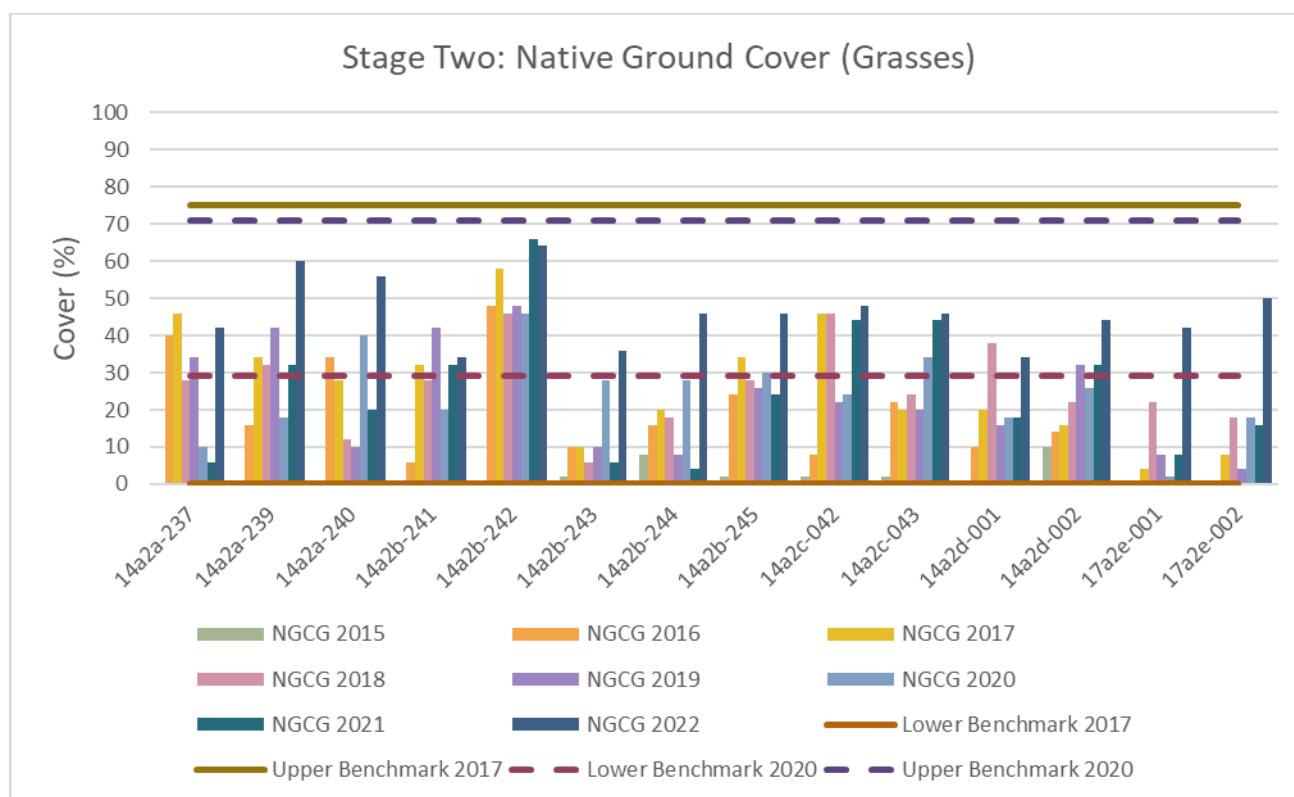
The plots in Stage Three had a mean NGCS of 47%. This was markedly higher than the mean of 25% and 20% in 2021 and 2020, respectively. Plot 19a3a-001 fell within the range of the Benchmark 2020, while plot 19a3a-002 was above.

**Native Ground Cover (Grasses) (NGCG)**



**Figure 9. Stage One NGCG per plot from 2015 to 2022 and the upper and lower Benchmark 2020 29.0 – 71.0% (previous Benchmark 2017 0.0 – 75%).**

The plots in Stage One had a mean NGCG of 46.7%. This was higher than the mean of 38% in 2021 and markedly higher than the mean of 18.7% in 2020. Plots 14a-228 and 14a1-232 fell within the range of the Benchmark 2020, while plot 14a1-230 fell below the lower Benchmark 2020.



**Figure 10. Stage Two NGCG per plot in Areas 2a, 2b, 2c, 2d from 2015 – 2022 and Area 2e from 2017 to 2022, and the upper and lower Benchmark 2020 29.0 – 71.0% (previous Benchmark 2017 0.0 – 75%).**

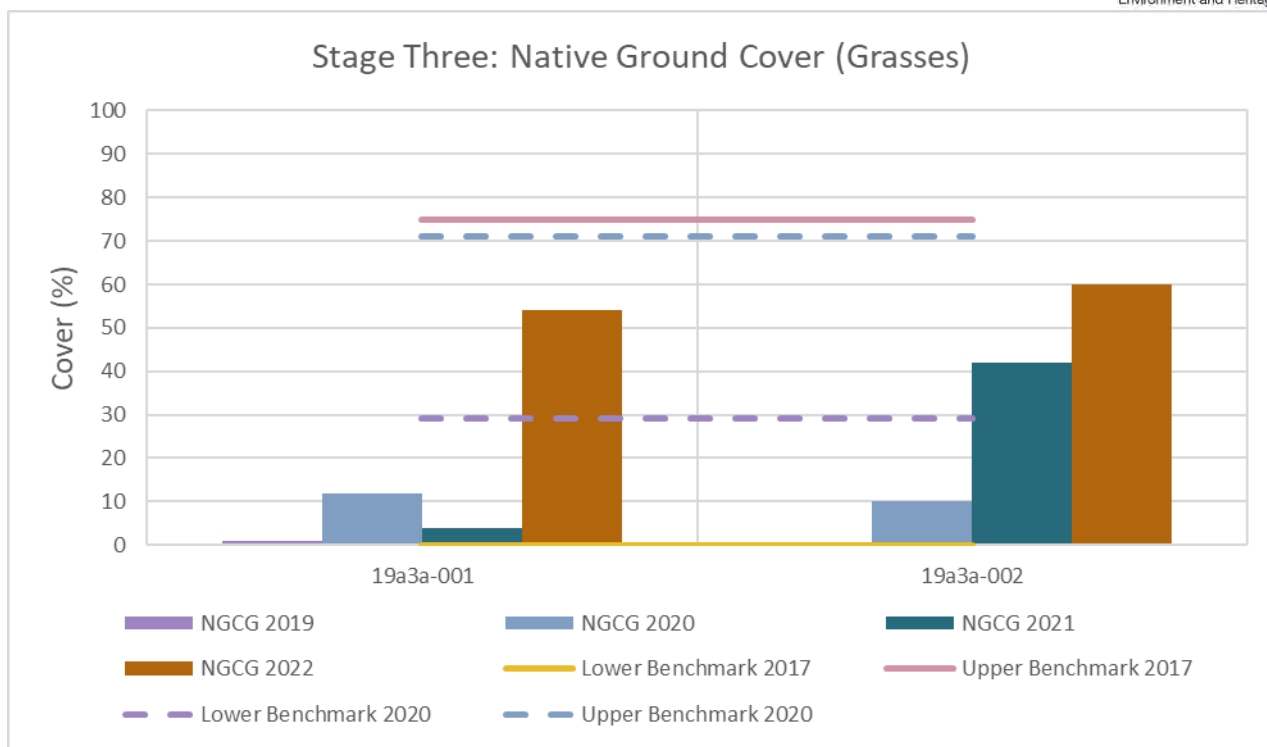
The plots in Area 2a had a mean NGCG of 52.7%. This was markedly higher than the mean of 19.3% and 22.7% in 2021 and 2020, respectively. All plots fell within the range of the Benchmark 2020.

The plots in Area 2b had a mean NGCG of 45.2%. This was markedly higher than the mean of 26.4% and 30.4% in 2021 and 2020, respectively. All plots fell within the range of the Benchmark 2020.

The plots in Area 2c had a mean NGCG of 47%. This was slightly higher than the mean of 44% in 2021 and markedly higher than the mean of 29% in 2020. Both plots fell within the range of the Benchmark 2020.

The plots in Area 2d had a mean NGCG of 39%. This was higher than the mean of 25% and 22% in 2021 and 2020, respectively. Both plots fell within the range of the Benchmark 2020.

The plots in Area 2e had a mean NGCG of 46%. This was markedly higher than the mean of 12% and 10% in 2021 and 2020. Both plots fell within the range of the Benchmark 2020.

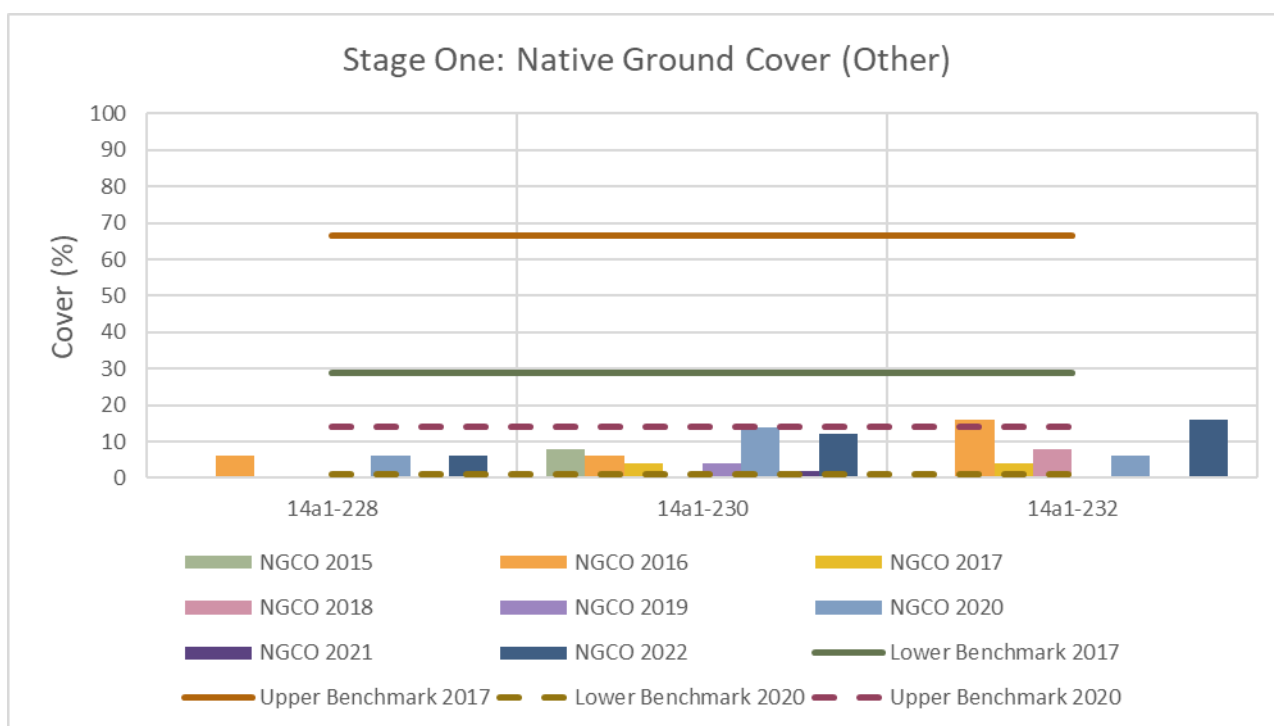


**Figure 11. Stage Three NGCG per plot from 2015 – 2022 and the upper and lower Benchmark 2020 29.0 – 71.0% (previous Benchmark 2017 0.0 – 75%).**

The plots in Stage Three had a mean NGCG of 57%. This was markedly higher than the mean of 23% and 11% in 2021 and 2020, respectively. Both plots fell within the range of the Benchmark 2020.

### Native Ground Cover (Other) (NGCO)

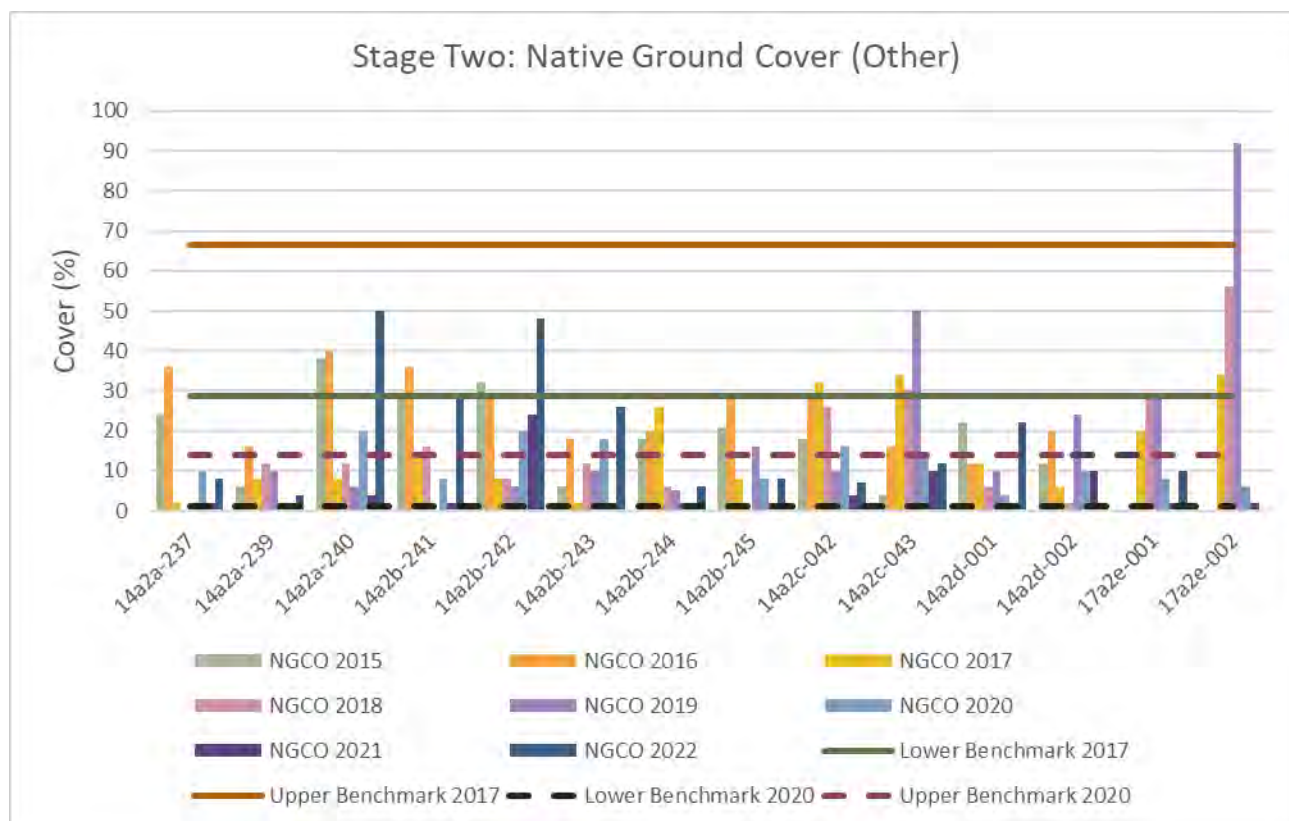
The NGCO attribute refers to herbs and forbs other than grasses.



**Figure 12. Stage One NGCO per plot from 2015 to 2022 and the upper and lower Benchmark 2020 1 – 14% (previous Benchmark 2017 28.8 – 66.6%).**



The plots in Stage One had a mean NGCO of 11.3%. This was markedly higher than the mean of 0.7% in 2021 and slightly higher than the mean of 8.7% in 2020. Plots 14a1-228 and 14a1-230 fell within the range of Benchmark 2020, while plot 14a1-232 was higher than the upper Benchmark 2020.



**Figure 13. Stage Two NGCO per plot in Areas 2a, 2b, 2c, 2d from 2015 to 2022 and Area 2e from 2017 to 2022 and the upper and lower Benchmark 2020 1 – 14% (previous Benchmark 2017 28.8 – 66.6%).**

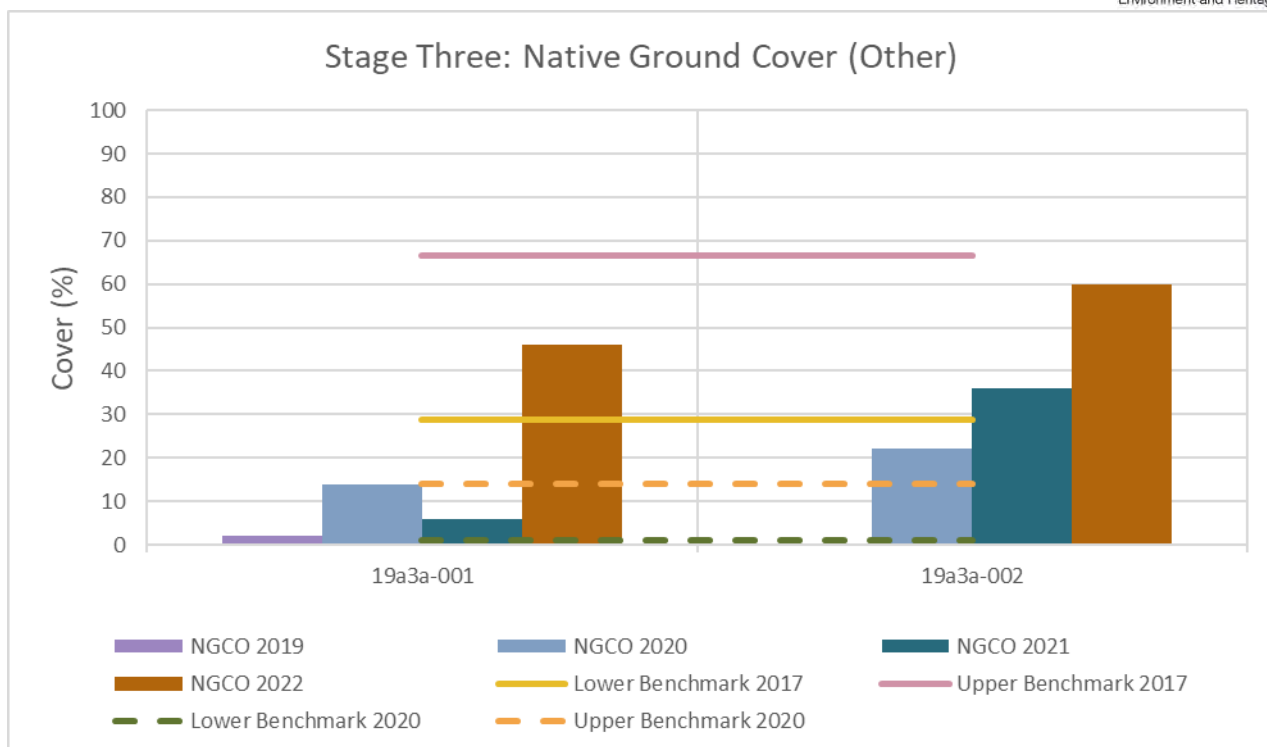
The plots in Area 2a had a mean NGCO of 20.7%. This was markedly higher than the mean of 2.7% and 10.7% in 2021 and 2020, respectively. Plots 14a2a-237 and 14a2a-239 fell within the range of Benchmark 2020, while plot 14a2a-240 was higher than the upper Benchmark 2020.

The plots in Area 2b had a mean NGCO of 23.2%. This was markedly higher than the mean of 6.4% and 11.2% in 2021 and 2020, respectively. Plots 14a2b-241, 14a2b-242 and 14a2b-243 were higher than the upper Benchmark 2020, while plots 14a2b-244 and 14a2b-245 were within the range of Benchmark 2020.

The plots in Area 2c had a mean NGCO of 9.5%. This was higher than the mean of 7% in 2021 and lower than the mean of 15 in 2020. Both plots fell within the range of Benchmark 2020.

The plots in Area 2d had a mean NGCO of 12%. This was higher than the mean of 5% and 7% in 2021 and 2020, respectively. Plot 14a2d-001 was higher than the upper Benchmark 2020 while plot 14a2d-002 fell within the range of Benchmark 2020.

The plots in Area 2e had a mean NGCO of 5%. This was higher than the mean of 2% in 2021 and lower than the mean of 7% in 2020. Plot 17a2e-001 fell within the range of Benchmark 2020 while plot 17a2e-002 fell below the lower Benchmark 2020.

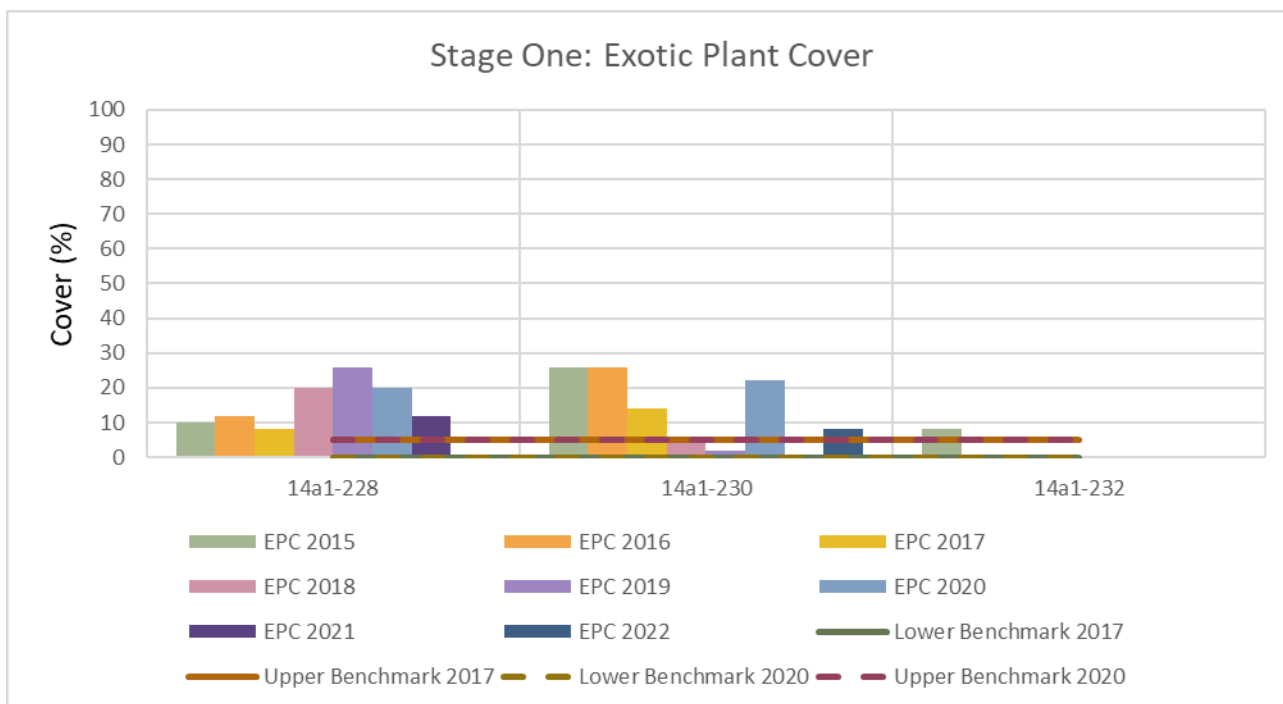


**Figure 14. Stage Three NGCO per plot from 2019 to 2022 and the upper and lower Benchmark 2020 1 – 14% (previous Benchmark 2017 28.8 – 66.6%).**

The plots in Stage Three had a mean NGCO of 53%. This was markedly higher than the mean of 21% and 18% in 2021 and 2020, respectively. Both plots were higher than the upper benchmark 2020.

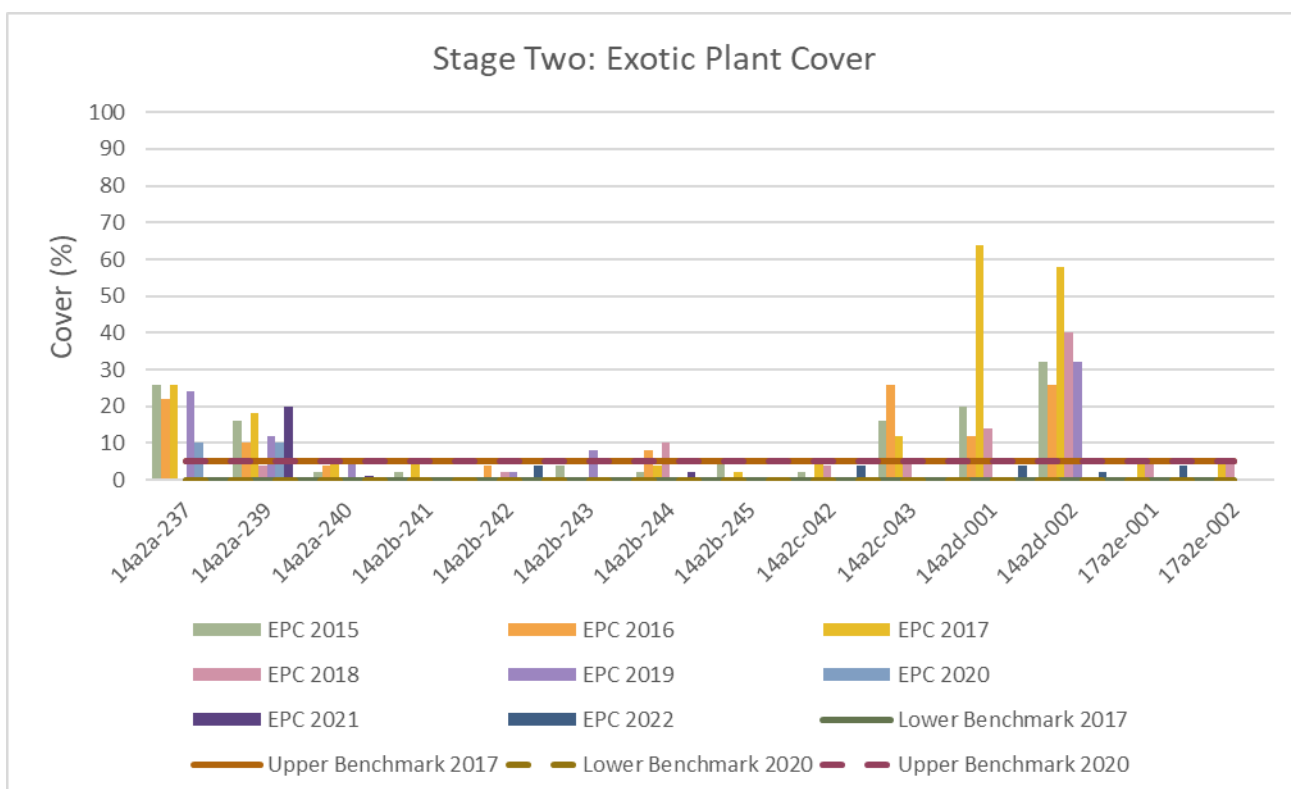
#### **Exotic Plant Cover (EPC)**

A lower Benchmark of 0% and an upper Benchmark of 5% EPC is assumed within the control plots. A target of <20% has been established in the KPIs for all rehabilitation areas.



**Figure 15. Stage One EPC per plot from 2015 to 2022 and the upper and lower Benchmark 2020 0 – 5% (previous Benchmark 2017 0 – 5%)**

The plots in Stage One had a mean EPC of 2.7%. This was lower than the mean of 4% and 14% in 2021 and 2020, respectively. Plot 14a1-230 was above the upper Benchmark 2020, while the remaining plots were below. All plots had an EPC of <20%.



**Figure 16. Stage two EPC per plot in Areas 2a, 2b, 2c, 2d from 2015 to 2022 and Area 2e from 2017 to 2022, and the upper and lower Benchmark 2020 0 – 5% (previous Benchmark 2017 0 – 5%)**

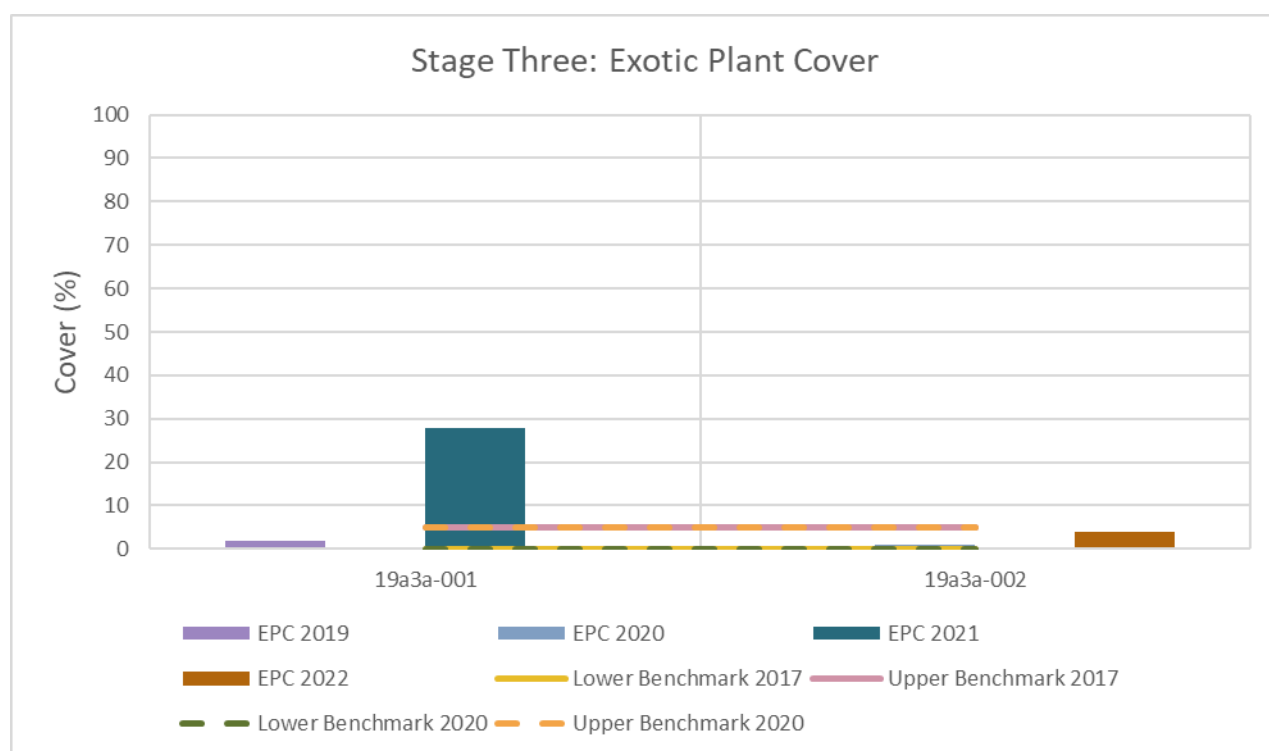
The plots in Area 2a had a mean EPC cover of 0%. This was less than the mean of 7% and 6.7% in 2021 and 2020, respectively. All plots were below the upper Benchmark of 5%.

The plots in Area 2b had a mean EPC cover of 0.8%. This was slightly higher than the mean of 0.4% and 0% in 2021 and 2020, respectively. All plots were below the upper Benchmark of 5%.

The plots in Area 2c had a mean EPC cover of 2%. This was slightly higher than the mean of 0% and 0% in 2021 and 2020, respectively. All plots were below the upper Benchmark of 5%.

The plots in Area 2d had a mean EPC cover of 3%. This was slightly higher than the mean of 0% and 0% in 2021 and 2020, respectively. All plots were below the upper Benchmark of 5%.

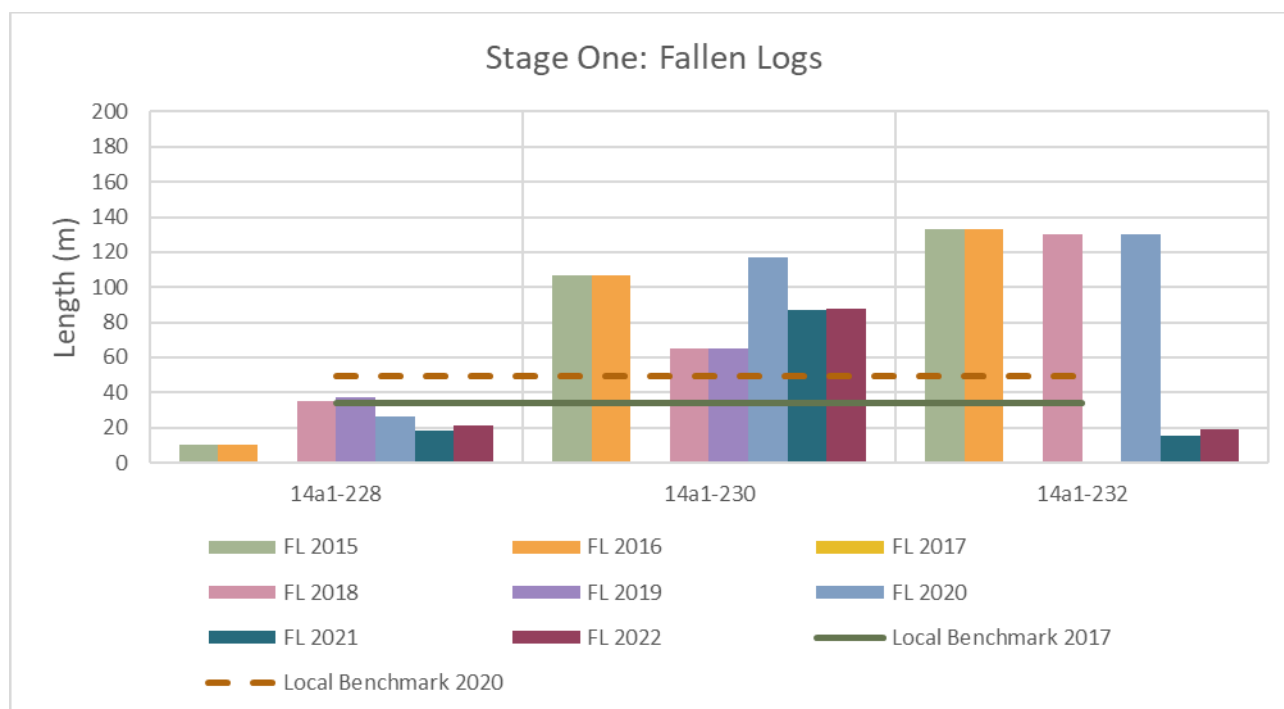
The plots in Area 2e had a mean EPC cover of 2%. This was slightly higher than the mean of 0% and 0% in 2021 and 2020, respectively. All plots were below the upper Benchmark of 5%.



**Figure 17. Stage Three EPC per plot from 2019 to 2022 and the upper and lower Benchmark 2020 0 – 5% (previous Benchmark 2017 0 – 5%)**

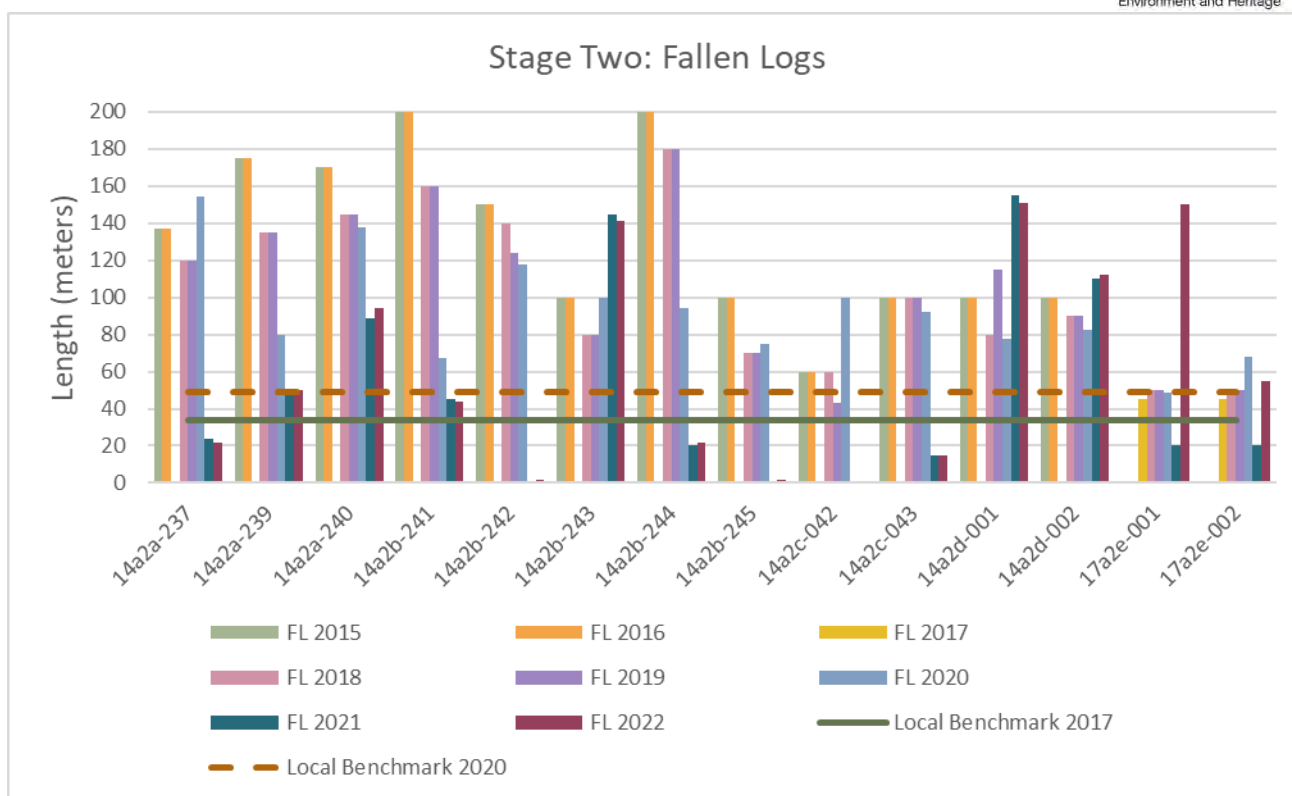
The plots in Stage Three had a mean EPC of 2%. This was markedly less than the mean of 14% in 2021 (28% in plot 19a3a-001 and 0% in plot 19a3a-002) and less than the mean of 0.5% in 2020. All plots were below the upper Benchmark of 5%.

## Length of Fallen Logs (FL)



**Figure 18. Stage One FL per plot from 2015 to 2022 and the mean FL of the Benchmark 2020  $\geq 49.3$  (previous Benchmark 2017  $\geq 34$ ).**

The plots in Stage One had a mean FL length of 42.7m. This was slightly higher than the mean of 40m in 2021 and markedly lower than the mean of 91m in 2020. Plots 14a1-228 and 14a1-232 failed to reach the Benchmark 2020.



**Figure 19. Stage Two FL per plot in Areas 2a, 2b, 2c, 2d and 2e, and the mean FL of the Benchmark 2020  $\geq 49.3$  (previous Benchmark 2017  $\geq 34$ ).**

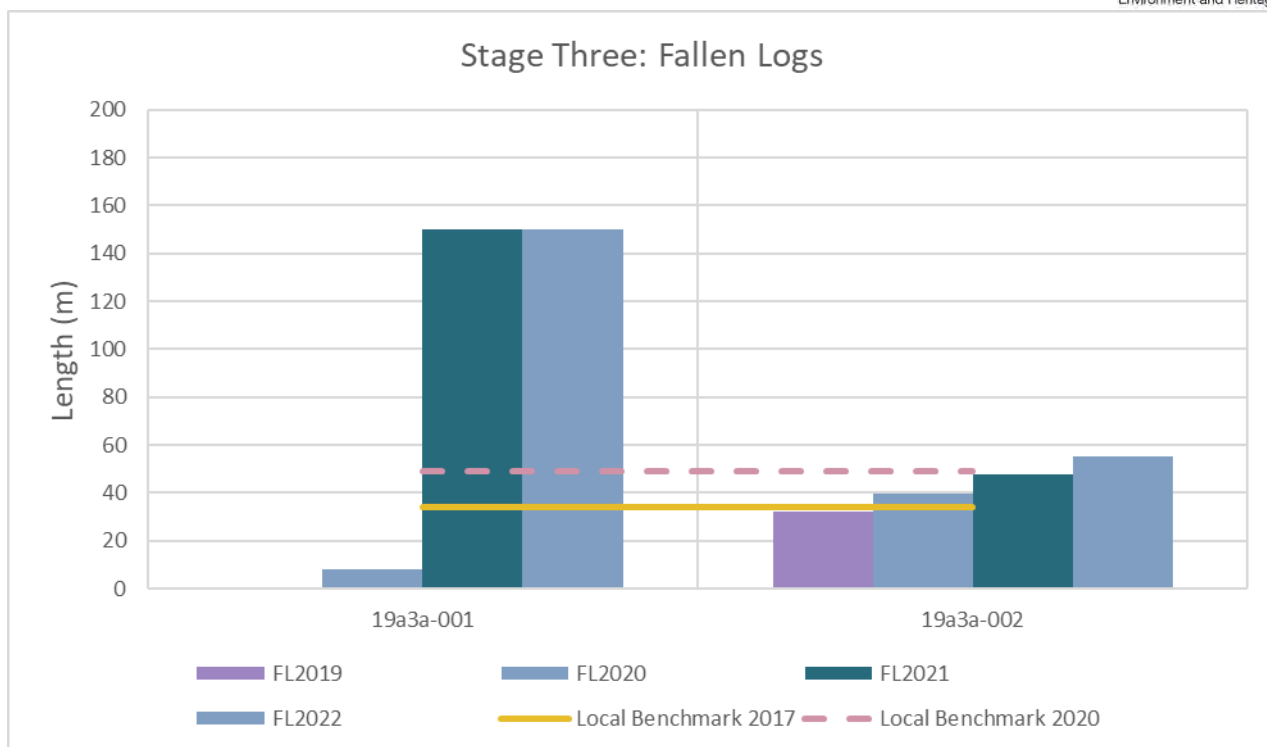
The plots in Area 2a had a mean FL length of 55.3m. This was slightly higher than the mean of 53.7m in 2021 and markedly lower than the mean of 123.7m in 2020. Plot 14a2a-237 was below the Benchmark 2020, while plots 14a2a-239 and 14a2a-240 were above.

The plots in Area 2b had a mean FL length of 42.2m. This was slightly higher than the mean of 42m in 2021 and markedly lower than the mean of 90.7m in 2020. All plots (excluding plot 14a2b-243) were below the Benchmark 2020.

The plots in Area 2c had a mean FL length of 8m. This was slightly higher than the mean of 7.5m in 2021 and markedly lower than the mean of 96.25m in 2020. Both plots in Area 2c were below the Benchmark 2020.

The plots in Area 2d had a mean FL length of 131.5m. This was slightly lower than the mean of 132.5 in 2021 and markedly higher than the mean of 80.25m in 2020. Both plots in Area 2d were above the Benchmark 2020.

The plots in Area 2e had a mean FL length of 102.5m. This was markedly higher than the mean of 20m and 58.3m in 2021 and 2020, respectively. Both plots in Area 2e were above the Benchmark 2020.



**Figure 20. Stage Three FL per plot from 2019 to 2022 and the mean FL of the Benchmark 2020  $\geq 49.3$  (previous Benchmark 2017  $\geq 34$ ).**

The plots in Stage Three had a mean FL length of 102.5m. This was slightly higher than the mean of 99m in 2021 and 23.8m in 2020. Both plots in Stage Three were above the Benchmark 2020.

## DISCUSSION

### Stage One

The NPS richness in all plots in Stage One failed to reach the Benchmark 2020. The mean NPS richness in 2022 was similar to that of previous years, with slight fluctuations observed in all plots (Figure 1). Compared to Stage Two Areas 2a – 2d, the NPS richness of Stage one remains low, even though both were established in 2014 (Figure 2). This may be due to the use of different translocation methods between the Stages. The translocation method used in Stage One resulted in shallower topsoil than Stage Two, which may have decreased the comparative native seed load and available nutrients. Stage One was also selectively planted with endemic tube stock, predominantly *Acacia* and *Eucalyptus* spp., which may have outcompeted species established from seed resulting in an artificially lowered NPS richness within the community.

The mean NOS cover of 23.3% in Stage One was above the upper Benchmark 2020. This mean was markedly lower than that observed in 2021, with plots 14a1-228 and 14a-230 showing a large reduction in the attribute (Figure 4). Given the longevity of Stage One establishment, these substantial differences are unlikely due to natural fluctuations in vegetation cover. They are likely due to changes in transect bearing and/or observer bias in 2021, as it was difficult to maintain a consistent bearing and observer between the years. Although utmost care was taken, a small change in bearing can dramatically influence the results and estimations of foliage cover are subject to observer bias. However, the overall trend in the NOS cover indicates that the attribute has developed into its expected value (above Benchmark 2020).

The mean NMS cover in Stage One was markedly lower than that of 2021, although it remained above the upper Benchmark 2020. However, the NMS cover in plot 14a1-228 fell below Benchmark 2020, while plots 14a1-230 and 14a1-232 were above the upper Benchmark 2020 (Figure 6). The low NMS cover observed in plot 14a1-228 may have been caused by the comparatively high NOS cover observed in this plot (Figure 4), resulting in the out-competition of NMS species.

The mean NGCS in Stage One was higher than that of 2021. However, this was due to a large increase in the NGCS in plot 14a1-230 which was above the upper Benchmark 2020, while plots 14a1-228 and 14a1-232 were below the lower Benchmark 2020 (Figure 8). The low values may have been due to the comparatively high NOS cover and NMS cover, respectively, observed in these plots (Figure 1, Figure 6), resulting in the out-competition of NGCS species.

The NGCG varied between the plots in Stage One. Plots 14a1-228 and 14a1-232 fell within the range of the Benchmark 2020, while plot 14a1-230 fell below (Figure 11). The low value in plot 14a1-230 may be due to the comparatively high NGCS in this plot (Figure 8), resulting in the out-competition of NGCG species.

The mean NGCO in Stage One has increased markedly since 2021 and all plots fall within the range or just above the Benchmark 2020 (Figure 14). This indicates that the attribute has successfully established since 2021.

The mean FL length in Stage One has remained consistent since 2021, and plots 14a1-228 and 14a1-232 fell below the lower Benchmark 2020 (Figure 20). Fauna habitat and soil stabilisation in this translocation area may be improved by artificially increasing the FL length.



## Stage Two

The NPS richness in Stage Two Areas 2a – 2d was within the expected benchmark for the attribute; Areas 2a, 2b and 2c had a mean NPS richness above the Benchmark 2020 and Area 2d slightly below (Figure 2). Results in Areas 2a – 2d fluctuated moderately from those observed in 2021 and are considered natural fluctuations within an establishing vegetation community. Area 2e had a mean NPS richness markedly below the Benchmark 2020 and the means observed in 2021 and 2020 (Figure 2). However, the low NPS richness in Area 2e is likely reflective of a shorter establishment period; Area 2e has been established for 5 years, while Areas 2a – 2d have been established for 8 years. Once the plant community is given more time to establish, the mean NPS richness in Area 2e is expected to reach the local Benchmark.

The NOS cover in Stage Two Areas 2a and 2c were above the upper Benchmark 2020, Area 2b fell within the range of the Benchmark 2020, and Areas 2d and 2e were below the lower Benchmark 2020 (Figure 5). Overall, the mean NOS cover in Areas 2a and 2c has markedly increased since 2020 and 2021, respectively, and has remained stable in Area 2b. However, in Areas 2d and 2e, plot 14a2d-001 and both plots in 2e have consistently remained below both Benchmarks, while plot 14a2d-002 was above Benchmark 2017 and is approaching Benchmark 2020 (Figure 5). However, all dominant canopy species were recorded in Areas 2d and 2e, and as these communities mature the NOS cover is expected to reach Benchmark values.

The mean NMS cover in Stage Two Areas 2a – 2c was higher than that of the previous years while that of Area 2d decreased marginally and fell below the lower Benchmark 2020 (Figure 7). As previously discussed in Stage One, the substantial increase in NMS cover observed in 2021 may be due to small changes in transect bearing and observer bias. Increases in NMS cover may have also been influenced by higher-than-average rainfall in the region since the beginning of Australia's La Niña event in spring 2020. In Area 2e, the NMS cover in plot 17a2e-002 fell below Benchmark value (Figure 7). The community in Area 2e is considerably younger than Areas 2a – 2d and has an NPS richness below Benchmark 2020 (Figure 2). Once the plant community is given more time to establish, the mean NMS cover in Area 2e is expected to reach the local Benchmark value.

The NGCS in Stage Two fluctuated throughout Areas 2a – 2d and from the years prior. Most plots were near, within or above the range of the Benchmark 2020 (Figure 9), and these fluctuations are considered natural within an establishing vegetation community. In Area 2e, both plots had a NGCS above the upper Benchmark 2020, which was likely due to the low values of NOS and NMS covers in these plots (Figure 5, Figure 7) and the comparative immaturity of the translocation area.

The NGCG of all plots in Stage Two fell within the range of the Benchmark 2020 (Figure 12). Similarly, the NGCO of most plots in Stage Two, excluding plot 17e2e-002, fell within or above the range of the Benchmark 2020 (Figure 16). These values were markedly higher than those observed in 2021, indicating the further establishment of the community.

The mean FL length of Stage Two was similar to 2021, with plots 14a2a-237, 14a2b-242, 14a2b-245 and 14a2c-043 falling below the Benchmark 2020 (Figure 21). Fauna habitat and soil stabilisation within these plots may be improved by artificially increasing the FL length.

## Stage Three

The NPS richness of both plots in Stage Three reached the Benchmark 2020 with a mean of 54.5, which was markedly higher than the mean observed in previous years (Figure 3). Stage Three has

been established for only 4 years, and the marked temporal fluctuations in the mean NPS richness are expected to moderate as the community matures.

As Stage Three is an immature community, a NOS cover of 0% was recorded in all plots and an NMS cover of 4% and 0% was recorded in plot 19a3a-001 and plot 19a3a-002, respectively, over the monitoring period (2019 – 2022). As only one value above zero was recorded for these attributes, comparative figures have not been provided. As Stage Three continues to mature, the NOS and NMS covers are expected to increase and approach the values of local Benchmark.

The mean NGCS, NGCG and NGCO in Stage Three was higher than the mean in the previous years and fell within and above the range of the Benchmark 2020 (Figure 10, Figure 13, Figure 16). An increase in these attributes since 2021 indicates that the translocation area is further establishing, and a high cover of these ground cover growth form groups is to be expected in a younger community while the NOS and NMS cover is establishing. As the NOS and NMS covers increase, increases in these attributes are expected to moderate and temporal fluctuations to stabilise.

The FL length of both plots in Stage Three remains above the Benchmark 2020 (Figure 22).

### **Exotic Plant Cover (All Stages)**

The dominant weeds recorded include *Eragrostis curvula* (African lovegrass), *Andropogon virginicus* (Whisky Grass), *Conyza bonariensis* (Fleabane) and *Hypochaeris radicata*. Exotic grasses including *Pennisetum clandestinum* (Kikuyu) and *Cynodon dactylon* (Common Couch) have also dominated localised patches within the CWEA.

In Stage One, the EPC in plot 14a1-230 was 8% and above the upper Benchmark 2020, while the remaining plots were below. However, the EPC in all plots in Stage One has been declining over time (Figure 17). In Stage Two and Three, all plots were below the upper Benchmark 2020 (Figure 18, Figure 19). Overall, these results suggest that weed management practices in the translocation areas have been successful in restricting EPC below 5%.

### **PHOTO-POINT MONITORING**

Photo-point monitoring, illustrating the changes in vegetation cover at each of the monitoring sites is provided in Appendix 1 (Plate 1 to 19). Overall, the native plant cover in all translocation areas is continuing to improve over time.

### **THREATENED PLANT RANDOM MEANDER**

Threatened plant meanders are undertaken every 3 years. The last meander was completed in Summer 2020 (10 December 2020). *Pultenaea aristata* (1 individual) was detected within the CWEA during the 2020 surveys. *Pultenaea aristata* is listed as vulnerable under the NSW *Biodiversity Conservation Act 2016* (BC Act) and EPBC Act. *Pultenaea aristata* has continued to successfully re-establish within the CWEA (refer to previous monitoring reports). The next threatened plant meander is scheduled for 2023.

*Persoonia hirsuta* was recorded in 2022 within Stage Two (plot 14aA2a-239). During 2021, six additional *P. hirsuta* were recorded just outside the Stage 4 emplacement area, along with four *Acacia bynoeana*. These have been reported in the 2021 *Persoonia hirsuta* burn survey report.

Threatened plant occurrences within the CWEA will be regularly monitored by an IMC environmental representative who is familiar with the flora species of the area.

## FAUNA

Camera traps were deployed across nine sites in 2022 across all of the rehabilitation areas from 25 November 2022 – 20 March 2023 (total of 115 days). Cameras were attached low to the ground on to a tree and were placed within general habitat in the rehabilitation areas (Table 7).

**Table 7: Camera Trap Locations**

Site Name	Latitude	Longitude
Site 1	-34.22369	150.816870
Site 2	-34.22946	150.824998
Site 3	-34.228400	150.818583
Site 4	-34.226168	150.821412
Site 5	-34.225992	150.819107
Site 6	-34.230294	150.825427
Site 7	-34.222261	150.816232
Site 8	-34.226954	150.822980
Site 10	-34.229780	150.825902

See Plan B for camera trap locations.

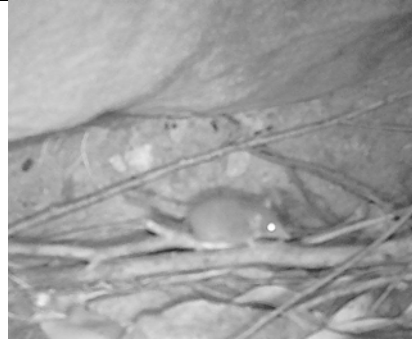
The survey detected 13 different native species; four of which were mammals, six birds and three reptiles. These results are summarised in Table 8. Rosenberg's Goanna (*Varanus rosenbergi*) listed as Vulnerable under the BC Act was recorded once at Site 4.

**Table 8: Fauna records from the camera trap survey**

Scientific Name	Common Name	Exotic	BC Status	EPBC status	Sites									Total
					1	2	3	4	5	6	7	8	10	
<i>Wallabia bicolor</i>	Swamp wallaby	-	-	-	2							4		6
<i>Antechinus stuartii</i>	Brown antechinus	-	-	-		8	1	4			1			14
<i>Rattus fuscipes</i>	Bush rat	-	-	-								2		2
<i>Trichosurus vulpecula</i>	Common brushtail possum	-	-	-									1	1
<i>Lepus europaeus</i>	European hare	Yes	-	-		1								1
<i>Cervus timorensis</i>	Rusa deer	Yes	-	-						1		1		2
<i>Vulpes vulpes</i>	European fox	Yes	-	-								2		2
<i>Sericornis frontalis</i>	White-browed scrub wren	-	-	-		8	7						1	16
<i>Malurus lamberti</i>	Variegated fairy wren	-	-	-		1		1						2
<i>Colluricincla harmonica</i>	Grey-shrike thrush	-	-	-		2								2
<i>Origma solitaria</i>	Rockwarbler	-	-	-							1			1
<i>Corvus coronoides</i>	Australian raven	-	-	-								1		1
<i>Phaps chalcoptera</i>	Common bronzewing	-	-	-								1		1
<i>Tiliqua scincoides</i>	Blue tongue	-	-	-		1		1						2
<i>Varanus rosenbergi</i>	Rosenberg's goanna	-	V	-		1								1
<i>Pseudonaja textilis</i>	Eastern brown snake	-	-	-		1								1
<b>Total</b>					2	23	8	6	0	1	2	11	2	55



Swamp wallaby



Brown antechinus



Bush rat



Common brushtail possum



European hare



Rusa deer



European fox



White-browed scrub wren



Variegated fairy wren



Grey-shrike thrush



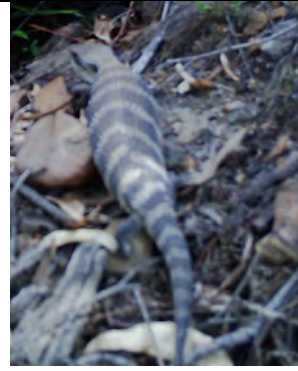
Rockwarbler



Australian raven



Common bronzewing



Blue tongue



Rosenberg's goanna



Eastern brown snake

## COMPLETION CRITERIA

Table 9 details the completion criteria for the for all three stages of the Coal Wash Emplacement Area (CWEA) at Appin North Colliery, provided by IMC personnel (South32 2020). The completion criteria relate to land stability and establishing plant growth mediums, by having no exposed coal wash and fauna habitat replaced over the site (logs and rocks).

**Table 9: Coal Wash Emplacement Area (CWEA) completion criteria as per the Mining Operations Plan (MOP) (South32 2020)**

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
Domain 11: CWEA	Landform Establishment	Landform established to be consistent with the surrounding environment or post-mining land use.	Final landform design.	Site reprofiled as per final landform design (where applicable). Note Stages One and Two emplacements were reprofiled to the standard of the day.	Section 5.1 – Landform construction - Mine Rehabilitation Leading Practice Sustainable Development Program for the Mining Industry (2016).	Emplacement Stage One and Two are completed. Stage Three is being rehabilitated progressively.	Landform established and stabilising with no active, gully or tunnel erosion across all Stages.
Domain 11: CWEA (Stage Two and Three emplacements only)			Compaction testing (for CWEA stages Two & Three only).	>95% compaction achieved as evidenced by compaction test reports. Note Stages One and Two emplacements were constructed to the standard of the day.	Coal Wash Emplacement Area Management Plan (CWEAMP) – Section 8.3. -Emplacement Compaction.		
Domain 11: CWEA (all emplacement stages)			Combustion testing (CWEA only).	Coal wash ignition testing results within acceptable range (using the Coal Washery Rejects Order 2014 as a guide unless otherwise determined by the regulatory authority).	Coal Washery Rejects Order 2014.		
Domain 11: CWEA	Growth Medium Development.	Establish plant growth medium.	CWEA Capping.	No coal wash is left exposed (Stage One emplacement).	Wollondilly Shire Council Development Consent (1975).	Emplacement Stage One and Two are completed. Stage Three is being rehabilitated progressively.	Plant growth in Stage Three displayed marked increases in native species richness and ground stratum species. Midstorey and

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
Domain 11: CWEA			Topsoil/capping depth.	Bare or stripped areas topsoiled/capped – Depth will be governed by factors such as desired vegetation, quantity and quality of the surface and subsoil available and the nature of underlying material. Generally, >50 mm depth required for seed germination. Combined topsoil and capping depth min requirement for the CWEA is 0.5 m (Stages Two and Three).	For CWEA, CWEAMP – Section 6 - Vegetation and Fauna Management.	Emplacement Stage One and Two are completed. Stage Three is being rehabilitated progressively.	overstorey cover is expected to increase as the community establishes.  Overall, Stage One and Two had established plant growth with increases in mean native overstorey and midstorey cover since 2021, and resulting leaf litter will return nutrients to the soil.  In all Stages, logs and rocks are creating habitat for native fauna.
Domain 11: CWEA (Stage Two and Three)	Ecosystem Establishment	Stable landform capable of supporting and sustaining vegetation growth (subject to post-closure land use considerations).	Translocated habitat (rocks and logs).	Rocks and logs spread across the surface of the rehabilitating emplacement in accordance with the CWEAMP. Broad-headed Snake habitat incorporated into Stage Three and Four rehabilitation areas.	CWEAMP – Section 6 - Vegetation and Fauna Management.	Landform established, and site preparation works are largely completed within Stages One and Two; however, some minor areas require further habitat placement, planting and weeding (for example, Stage Two lookout point).	Stage One, Two and Three have had habitat features installed, such as logs and rocks.
Domain 11: CWEA			Site preparation and seeding/planting with appropriate species.	Area ripped (if required) and seeded/planted using the appropriate method.	Section 5.3 (Establishment of a Plant Growth Medium) - Mine Rehabilitation Leading Practice Sustainable Development Program for the Mining Industry (2016).		All 3 Stages had seeded/ planted species consistent with the surrounding vegetation.



Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
			Plant establishment and growth.	50% combined vegetative cover achieved and sustained for a period of two years.	<p>Target was determined based on past experience and taking into consideration:</p> <ol style="list-style-type: none"> <li>1. Observational evidence from the CWEA rehabilitation program.</li> <li>2. Vegetation types and climate of the area.</li> <li>3. Local Benchmarks as determined in the CWEA rehabilitation monitoring program.</li> </ol>		<p>Stage One had a healthy vegetation cover; species diversity is low although consistent species with surrounding vegetation.</p> <p>Stage Two had good vegetation cover and high species diversity.</p> <p>Stage Three has markedly increased in diversity since 2021. The midstorey and overstorey cover remain below the lower benchmark, however the community structure will develop further overtime.</p>
			Weed cover.	Regular weed control undertaken.	<p>Project Approval Condition 17 (f).</p> <p>NSW Biosecurity Act 2015.</p>		<p>All Stages have had a variety of challenges with exotic species. More time is required for the community to establish and develop resilience against weed incursion, particularly in</p>

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
							Stages One and Three.  It is recommended that weed management is conducted across all Stages to keep exotic species under control.
Domain 11: CWEA	Ecosystem development.	Ecosystem is self-sustaining.	Succession.	Rehabilitation report indicates plants in rehabilitated areas show evidence of seed setting and seed germination.	CWEAMP Section 8.1.1.1 – Key Performance Criteria.  Also applies to other domains due to similar vegetation community.	Rehabilitation works in some sections of Emplacement Stage One and Two are complete. Stage One was rehabilitated to the standard of the day.	Many of the species from all strata are setting seed with natural species recruitment occurring in all Stages.
			Weed cover.	Weed cover is no greater than 20% (at the time of relinquishment) as determined by relevant survey method.	Target is defined in Table 5 of the CWEAMP and Section 8.1.1.1 – Key Performance Criteria.  Also applies to other domains due to similar vegetation community.		In all Stages weed cover averaged less than 20% across the plots, although there are patches dominated by weeds, which are being sprayed annually to control by a subcontractor, arranged by IMC directly.
Domain 11: CWEA			Bushfire resilience.	Rehabilitation can withstand a bushfire. Germination is observed and evidence of recovery after a test burn (subject to approval under the Rural Fires Act 1997).	Following a site inspection with the Resources Regulator, this area was determined as being an area prone to wildfire.		N/A
Domain 11: CWEA			Floristic structure,	Trajectory analysis indicates selected biometric indicators	CWEAMP – Section 6.3 -Emplacement		Comparisons between plot data

Domains	Rehabilitation Phase	Domain Objective	Indicator	Completion Criteria	Justification/Sources	Complete (IMC comments)	Complete (Niche comments)
(Stages One and Two)			species composition.	(species richness and vegetation cover) are on track to achieve like that of pre-determined reference benchmarks. For example, a statistical test indicates biometric indicators show a year on year improvement and on-track to achieve (or exceed) the reference benchmarks.	Rehabilitation which outlines the monitoring program and benchmarks.  Also applies to other domains due to similar vegetation community.		and benchmarks have been applied for a number of key biometric attributes and presented in a graph. This report combines the previous 2017 benchmark results with the 2020 newly calculated benchmarks to show changes over time with regards to the control sites and how this compares to plot data from the three Stages within the CWEA.
All domains	Relinquished lands.	Stakeholders satisfied.	Regulator and/or landholder satisfied.	Formal Regulator and/or landholder sign-off.		Nil.	N/A

## CONCLUSION AND RECOMMENDATIONS

This report provides a description of the methodologies used and outcomes achieved from the thirteenth season of monitoring the rehabilitation success in Stages One, Two and Three of the Appin North CWEA. Overall, the rehabilitation areas were within or above the local benchmarks for most of the biometric attributes.

Weed incursion remains the key threat to the rehabilitation of the CWEA. African Love grass was observed as one of the dominant weeds throughout the monitoring program and is likely to spread and out-complete native plants if not treated. Excluding plot 14a1-230 in Stage One, all plots indicate that weed incursion within the translocation areas has been effectively suppressed below the upper benchmark of 5% since 2021, with the EPC cover in plot 14a1-230 also declining over time. Weed management practices continue to be recommended, mainly within Stage One. Trained bush regenerators with chemical application tickets would be most appropriate to carefully apply chemicals to the African Love grass, or manually remove where closer to susceptible species.

Previously, two threatened plant species, *Pultenaea aristata* and *Persoonia hirsuta*, were detected in 2016, 2017 and 2018 with neither detected within the CWEA during the 2021 monitoring. This may be due to the drought conditions of 2019-2020, with flora slow to respond to changes in weather conditions (recent increase in rainfall).

*Persoonia hirsuta* was recorded in 2022 within Stage Two. Six additional *P. hirsuta* and four *A. bynoeana* were observed just outside the CWEA of Stage 4. The *Persoonia hirsuta* individuals are considered a significant observation, contributing to the understanding of the species' capacity for regeneration within the rehabilitation areas and will continue to be considered during future monitoring.

The habitat features within the rehabilitation are being occupied by native mammals, reptiles and birds. As the rehabilitation matures, it is expected that native fauna abundance will increase further.

# PLANS

Plans have been removed due to errors when consolidating document. Please contact IMC if the plans are required.



## APPENDIX 1: PHOTO POINT MONITORING



Plate 1: Site A1\_228 (left 2010, middle 2020, right 2022)



Plate 2: Site A1\_230 (left 2010, middle 2020, right 2022)



Plate 3: Site A1-232 (left 2010, middle 2020, right 2022)



Plate 4: A2a\_237 (left 2010, middle 2020 right 2022)



Plate 5: Site A2a\_239 (left 2010, middle 2020, right 2022)



Plate 6: Site A2a\_240 (left 2010, middle 2020, right 2022)





Plate 7: Site A2b\_244 (left 2010, middle 2020, right 2022)



Plate 8: Site A2b\_241 (left 2010, middle 2020, right 2022)



Plate 9: Site A2b\_242 (left 2010, middle 2020, right 2022)

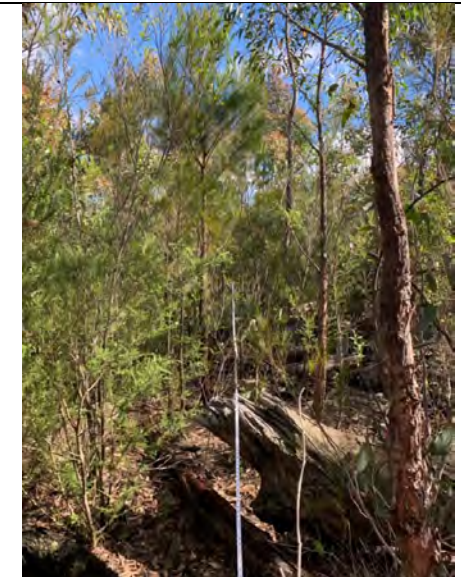


Plate 10: Site A2b\_243 (left 2010, middle 2020, right 2022)



Plate 11: Site A2b\_245 (left 2010, middle 2020, right 2022)



Plate 12: Site A2c-042 (left 2012, middle 2020, right 2022)



Plate 13: A2c-043 (left 2012, middle 2020, right 2022)



Plate 14: A2d-001 (left 2015, middle 2020, right 2022)



Plate 15: A2d-002 (left 2015, middle 2020, right 2022)



Plate 16: 17a2e-001 (left 2017, middle 2020, right 2022)



Plate 17: 17a2e-002 (left 2017, middle 2020, right 2022)

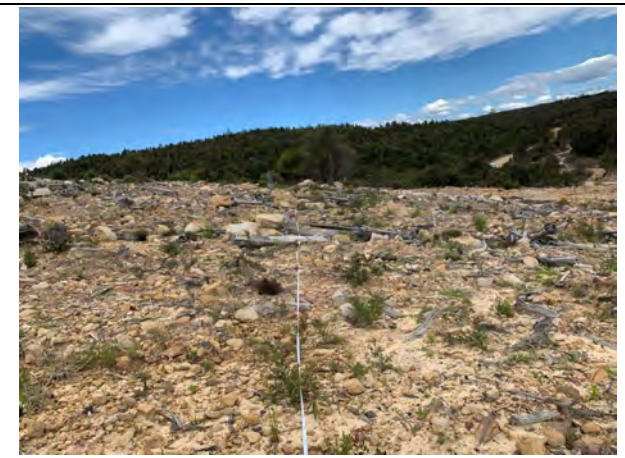


Plate 18: 19a3a-001 (left 2019, middle 2020, right 2022)



Plate 19:19a3a-002 (left 2019, middle 2020, right 2022)

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**Appendix 8: Annual *Persoonia hirsuta* Condition Monitoring Report**



# ANNUAL *PERSOONIA HIRSUTA* CONDITION MONITORING REPORT

Illawarra Metallurgical Coal, 2022 Survey



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## OVERVIEW

Illawarra Metallurgical Coal (IMC) conducted its tenth round of annual condition monitoring of the *Persoonia hirsuta* population at Appin North (formerly West Cliff). The monitoring was undertaken in accordance with the approved *P. hirsuta* Offset Management Plan, which complies with EPBC Approval 2010/5350 Condition 2. The monitoring was completed by one Niche Environment and Heritage (Niche) ecologist and one IMC representative over one day in December 2022, during the peak flowering period for the species.

## REVIEW OF PREVIOUS SURVEYS

### FloraSearch 2009

A study by FloraSearch (2009) was conducted to quantify the distribution of *P. hirsuta* prior to construction of the Stage 3 Coal Wash Emplacement and indicated a local high density of the species on the broad ridgetop to the north-east of Brennans Creek and low-density occurrences on the ridgetops to the north and south of the core population. Beyond these the concentrations were widely scattered isolated individual plants.

At least 88 plants of *P. hirsuta*, or approximately 66% of the total population, were identified by FloraSearch (2009) within the core population. Of the core patch, approximately 20 plants have been lost to the Stage 3 emplacement development and at least seven are within the footprint of Stage 4 emplacement.

### Niche 2012 (Baseline Study)

Niche undertook a field survey of the core *P. hirsuta* population in November 2012 to establish a baseline population estimate and distribution of *P. hirsuta* for the Offset Management Plan. Two representatives from IMC were also present and assisted with the surveys.

A total of 44 individuals were recorded within the core population area. A single individual was recorded approximately 14 metres to the north of the core population area and it was assumed that it would be impacted by the Stage 4 emplacement. Height and age class were also recorded.

A further nine individuals were recorded within the Appin North lease area in areas where the species had been previously recorded, seven along Brennans Creek Road to the north and three along the south-west boundary with the Appin Road easement.

The core population was in good condition. The core area had a good level of inherent resilience (capacity to regenerate), a high level of native plant species richness, a low level of exotic plant cover and all structural layers were intact (canopy, mid-storey, shrubs and ground-cover).

The previous southern extension of the core population had been impacted by the construction of an approved haul road, which resulted in an indirect impact through edge effects. However, whilst the increased light levels and altered drainage had locally altered the native vegetation in a narrow, localised strip along this edge, the condition of this vegetation was still good with a low level of exotic cover. Some exotic perennial grasses, such as *Eragrostis curvula* (African lovegrass) and *Chloris gayana* (Rhodes grass) occurred occasionally along the road and track edges within the mine site and exclusion of these exotics from the core *P. hirsuta* population was considered a high priority.

It was estimated that the core *Persoonia* area had not experienced a fire event for up to 24 years. This was evident in the senescing (dead or dying) *Banksia ericifolia*, the low cover of annual herbs, grasses and obligate seeding short-lived shrubs. The fire history map for the study area (Wollondilly Bush Fire Risk Management Plan 2007) supported this observation, with the last reported fire event mapped around 1989.

### Spring 2013

The 2013 survey was undertaken by IMC. The total Offset population (Core population) in 2013 was 38 plants:

- Discounting five new plants that were identified during this survey, the Offset area had experienced an overall population decline of 11 plants since baseline (2012). It was

concluded that the majority of the *P. hirsuta* plants in the Offset were reaching the end of their natural lifecycle; there appeared to be no recruitment occurring at the time which was likely a natural occurrence as no evidence suggested otherwise.

#### **Spring 2014**

The 2014 survey was undertaken by IMC. The total Offset population in 2014 was 36 plants:

- Discounting eight new plants that had been identified in the Offset since baseline (2012), the Offset area had experienced an overall population decline of 16 plants. Again, there were no visible impacts from dust or apparent disease, and it was concluded that the mortality was due to the plants reaching the end of their natural lifecycle.
- Three immature plants were identified (estimated age between 1 and 2.5 years). All were situated on a cleared easement. Recruitment within the population was limited to previously disturbed areas.
- One mature plant was discovered within the Stage Two Emplacement rehabilitation.

#### **Spring 2015**

The total count of live plants in the Offset in spring 2015 was 29:

- Discounting nine new plants that had been identified in the Offset since baseline (2012), the Offset area had experienced an overall population decline of 24 plants. Although the vegetation remained in good condition, the *P. hirsuta* population in the Offset continued to decline because of the plants reaching senescence and the absence of a germination cue.
- Any recent recruitment of *P. hirsuta* (three immature plants in 2014) had been limited to previously disturbed areas (in this case a powerline easement). Other known (healthier) populations at Couridjah and Yanderra, NSW, had a more recent fire history than Appin North (D. Gregory pers.obs.).

#### **Spring 2016**

The total count of live plants within the Offset in 2016 was 11:

- Discounting nine new plants that had been identified in the Offset since baseline (2012), the Offset area had experienced an overall population decline of 42 plants:
  - 16 of these were burned as part of the approved conservation burn trial in April 2016; and
  - 26 are likely due to age related causes.
- No new plants were identified in the Offset during 2016.
- There appeared to be no recruitment occurring during 2016.

#### **Spring 2017**

The total count of live plants within the Offset in 2017 was 10:

- One new plant was identified in the Offset during 2017.
- All 10 plants were identified post-baseline. Discounting the 10 plants that had been identified in the Offset since baseline (2012), the offset has declined by 44 plants.
  - 28 plants have died likely due to age related causes (since the baseline in 2012);
  - 16 plants were burned as part of the approved conservation burn trial in April 2016; and
  - A seedling was identified within the powerline corridor on Dam Road, indicating recruitment is occurring but limited to previously disturbed areas.

#### **Spring 2018**

The total count of live plants within the Offset in 2018 was 10:

- 28 plants have died likely due to age related causes (since the baseline in 2012);

- 16 plants were burned as part of the approved conservation burn trial in April 2016; and
- No new plants were identified in the Offset during 2018.

### **Spring 2019**

The total count of live plants within the Offset in 2019 was 138 (10 from previous years and 128 planted in 2019):

- One plant had died likely due to age related causes or lack of rainfall;
- One new plant (SH004) was identified in the Offset during 2019, within the demarcated fencing near CF001;
- 128 plants were translocated from the Mount Annan Botanic Gardens and placed adjacent to the offset area.
- Two plants had died in the translocated offset area in 2019, likely due to stresses when initially planted, leaving 126 living plants.

### **Spring 2020**

The total count of live plants within the Offset in 2020 was 38 (nine from previous years and 28 translocated plants):

- Two plants had died likely due to age related causes or lack of rainfall.
- One new plant (SH006) was identified in the Offset during the burn survey 2020.
- 98 of the translocated plants have died, many of which were juvenile plants in the translocated area that were more susceptible to harsh conditions likely due to extreme hot and dry weather in early 2020.

### **Spring 2021**

The total of live individuals combined with the offset and translocated population is 134:

- The total count of live plants within the Offset in 2021 (not including translocated) was ten (cm002, CF001, cm011, DG011, ns006, ns021, ns022, ns025, SH004, and SH006).
- The remaining 28 translocated plants recorded in 2020 were recorded again in the 2021 survey (PB002, PB005, PB007, PB008, PB022, PB025, PB030, PB038, PB039, PB045, PB046, PB047, PB052, PB053, PB054, PB060, PB062, PB064, PB070, PB075, PB076, PB077, PB088, PB090, PB093, PB103, PB113 and PB124).
- Seven new plants were recorded during the 2021 surveys (PB0001, PB0002, PB0003, PB0004, PB0005, PB0006 and PB0007). PB0007 was found in the Offset area.
- A total of 90 plants were translocated in 2021 (PB128-PB217) (Figure 1). One plant has died since translocation, likely due to stresses when initially planted, leaving 89 living plants.

## CURRENT SURVEY (SPRING 2022)

### Aim

To inspect all *P. hirsuta* plants to determine:

1. Survivorship and recruitment:
  - a. Condition;
  - b. Reproductive activity and age to maturity; and
  - c. Any imminent threat or risk to the plants health (e.g. apparent disease, excessive dust deposition).

### Methods

All *P. hirsuta* plants were inspected to record the following attributes:

- Height;
- Age class;
- Condition; and
- Comments on any imminent threat or risk to the plants health (e.g. apparent disease, excessive dust deposition).

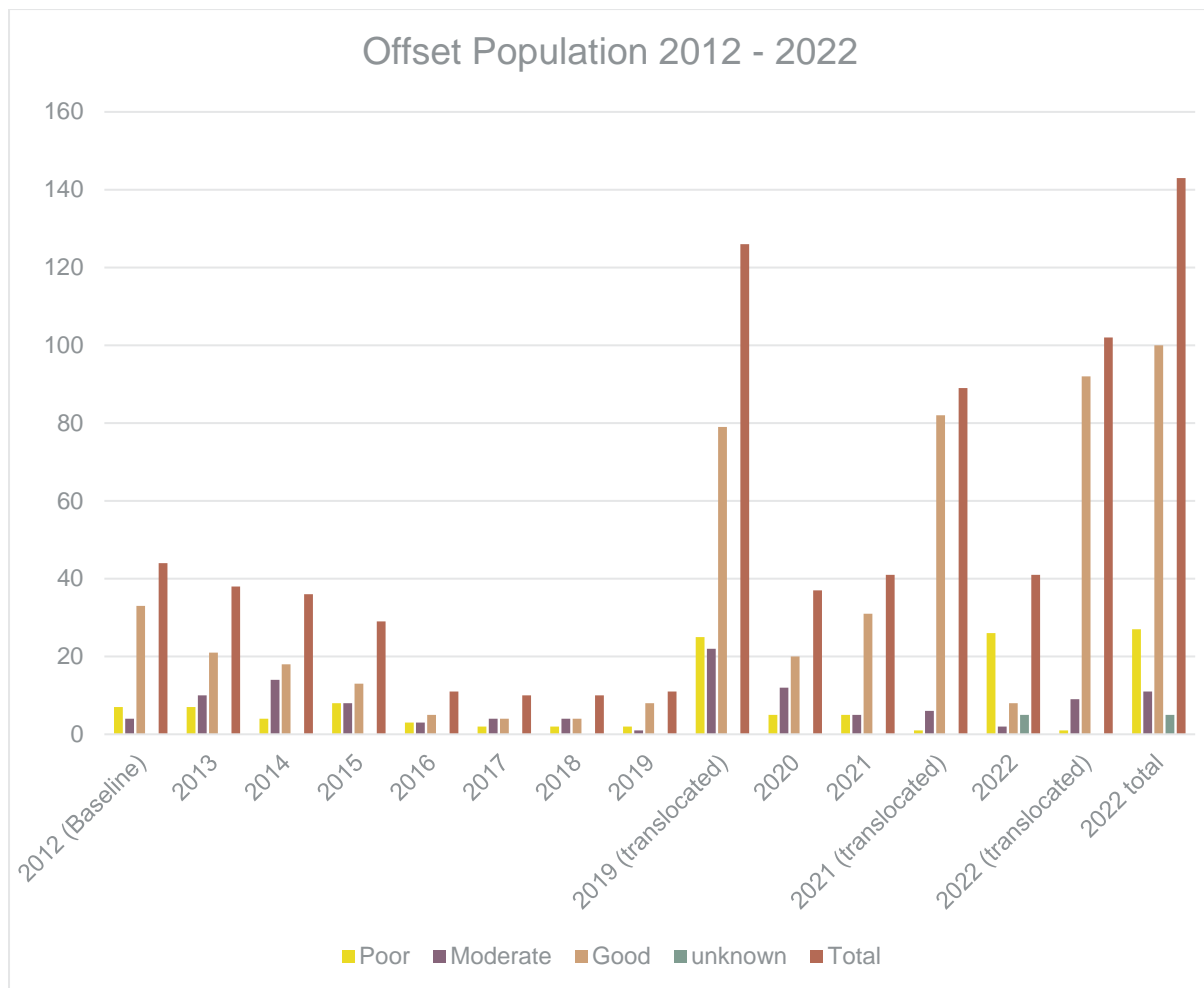
Height was measured using a tape measure, measuring from the ground surface to the highest point on the plant, without physically moving any part of the plant. Condition was defined using a combination of factors, including the percent cover of leaves, colour of leaves and the presence or absence of fruit or flowers, rating condition from 0 to 6, or from very poor condition to excellent condition (Appendix A).

Any new individuals were recorded with a Garmin GPS. The plants were also flagged with fluorescent, biodegradable flagging tape.

### Results

Offset and Translocation Population:

- The total count of live plants within the Offset in 2022 (not including translocated) was 15 (including five plants that are of unknown condition as they were not surveyed in 2022) (cm002, CF001, DG011, ns025, SH004, SH006, PB0001, PB0002, PB0003, PB0004, PB0005, PB0006, PB0007, IL001, IL002).
- The 26 of the 28 remaining translocated plants recorded in 2019 were recorded again in the 2022 survey (PB0002, PB0004, PB0007, PB0008, PB0022, PB0025, PB0030, PB0038, PB0039, PB0045, PB0046, PB0047, PB0052, PB0053, PB0054, PB0060, PB0064, PB0070, PB0075, PB0076, PB0077, PB0088, PB0090, PB0093, PB0103 and PB0124).
- Five new plants were recorded during the 2022 surveys (IL001, IL002, IL004, IL005 and IL006). IL001 and IL002 were found in the Offset area.
- A total of 102 plants were translocated in 2022 (OT0001-OT0102) (Figure 1). All except one individual were flowering during the 2022 survey.
- The total of live individuals within the offset area excluding the 2022 translocated population (including the 2019 translocated population) is 41.
- The total of live individuals combined with the offset and translocated population is 143.



**Figure 1: Comparison of *Persoonia hirsuta* condition and population within the Offset across years**

#### Appin North Other Areas

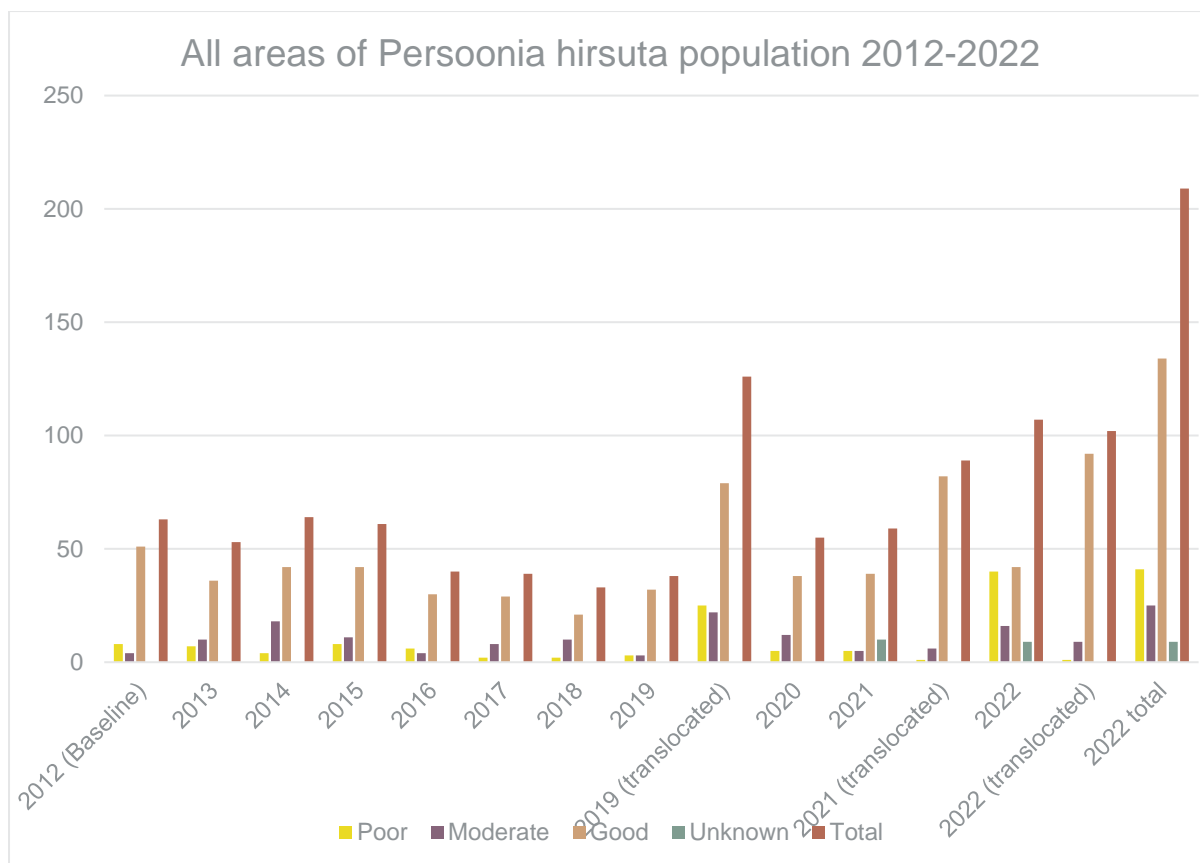
An additional 12 live individuals were recorded within the surrounding Appin North lease in 2022 (see Figure 3).

#### Total Site Count

- The total count for confirmed live *P. hirsuta* plants at Appin North in summer 2022 was 209, including plants that have been identified post-baseline (2012) and the additional translocated plants (2019, 2021 and 2022) that are still alive (Figure 2).
- A potential juvenile *P. hirsuta* (IL003) was recorded at the western end of the dam road near NS031. Due to the size of individual the species could not be confirmed, this individual should be checked during future monitoring rounds.

The results are tabulated in Appendix B.





**Figure 2: Comparison of condition and population of all *Persoonia hirsuta* plants across years**

### Discussion

The overall health of the core population of *P. hirsuta* is good as the plants are producing flowers and fruits in most cases. Flowering and fruiting is more prevalent in plants that are located within dense bush rather than those beneath powerlines or on the roadside.

The vegetation in the Offset and surrounding Appin North site remains in good condition. The conservation burn area is regenerating well. IMC is monitoring the site for emergent seedlings. Three new *P. hirsuta* within the burn trial area have been observed to date (IL001, SH006 and PB0007).

As per previous years, recruitment is limited to previously disturbed areas (beneath powerlines) or close to a skeleton of a previously known record.

It is recommended to continue to water the translocated plants within the offset area as they mature to enable growth and have a greater chance of survival.

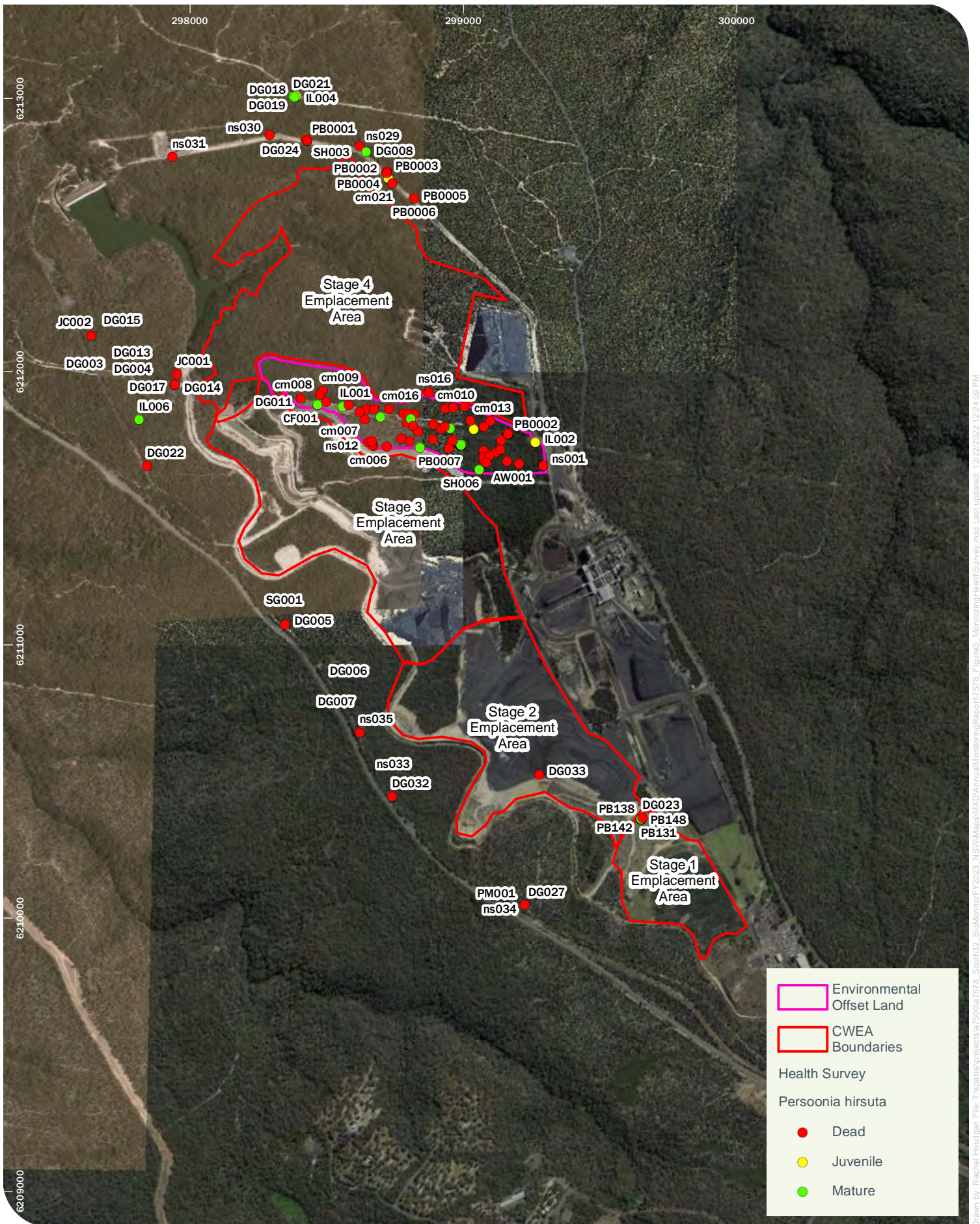
### Ongoing Research and Conservation Management

In accordance with EPBC 2010/5350 Condition 3, IMC is undertaking targeted research on *Persoonia hirsuta* including:

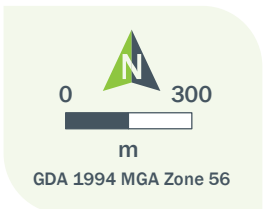
- Habitat and demography;
- Population genetics;
- Seed biology, germination and recruitment and propagation, and
- Pollination.

Refer to Appendix C – *Persoonia* Research Status and Strategy for more detail.

**Figure 3: *P. hirsuta* records**



Drawn by: Rachel Hourigan File: T:\spatial\projects\va7500\va7578\_South32\_BiolMonitor\FY2023\_NSW\MapSMXD\AnnualMonitoringReport\Figure3\_MonitoringHealthSurvey.mxd Last updated: 12/22/2022 12:24:09 PM



**MONITORING REPORT 2022 - Persoonia hirsuta health survey**  
Plot locations

Niche PM: Sian Griffiths  
Niche Proj. #: 7578  
Client: IMC

**Figure 3**

## REFERENCES

Alison Haynes Honours Thesis (2015). Conservation genetics of the rare and endangered plant, *Persoonia hirsuta* (Proteaceae). University of Wollongong, NSW.

BHPBIC *Persoonia hirsuta* Offset Management Plan

FloraSearch (2009). Illawarra Coal - Bulli Seam Operations Project - Terrestrial Flora Assessment. Illawarra Coal and BHP Billiton, eds. Bulli Seam Operations - Appendix E - Terrestrial Flora Assessment. EPBC Referral 2010/5350. Orange, NSW: FloraSearch.

Stephanie Wilmott Honours Thesis (2013). The Demography and Habitat Characteristics of *Persoonia hirsuta*. University of Wollongong, NSW.

**APPENDIX A: RATING SYSTEM USED TO DETERMINE THE CONDITION OF *P. HIRSUTA* INDIVIDUALS**

<b>Rating</b>	<b>Condition</b>	<b>Determinants</b>
0	Very Poor	0-15% cover of leaves 100% of leaves dull or browning No fruits or flowers
1	Poor	15-30% cover of leaves >75% of leaves dull or browning No fruits or flowers
2	Fairly Poor	30-45% cover of leaves >50% of leaves dull or browning No fruit or flowers
3	Moderate	45-60% cover of leaves 50% of leaves dull or browning Some fruits or flowers
4	Good	60-75% cover of leaves <50% leaves dull or browning Presence of fruits or flowers
5	Very good	75-90% cover of leaves <25% of leaves dull or browning Presences of fruits or flowers
6	Excellent	90-100% cover of leaves 0% leaves dull or browning Presence of fruits or flowers

## APPENDIX B: *PERSOONIA HIRSUTA* RECORDS FROM 2022

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Burn area	N/A	IL001	350	300	Moderate	Juvenile	298556.975	6211872.487
Burn area	N/A	PB0007	600	1000	Excellent	Mature	298841.12	6211720.9
Burn area	N/A	SH006	150	50	Very poor	Juvenile	299056.98	6211640.16
Emplacement Rehab	N/A	DG023	0	0	Dead	Dead	299655	6210366
Emplacement Rehab	N/A	DG033	0	0	Dead	Dead	299277	6210523
Non core non impacted	N/A	ER001	750	1630	Moderate	Mature	298717	6212727
Non core non impacted	N/A	IL004	310	90	Excellent	Juvenile	298388.129	6213007.14
Non core non impacted	N/A	IL005	200	135	Excellent	Juvenile	298724.94	6212707.965
Non core non impacted	N/A	IL006	400	2340	Excellent	Mature	297813.6508	6211823.661
Non core non impacted	N/A	ns033	630	1030	Very good	Mature	298682	6210531
Non core non impacted	N/A	ns034	640	1450	Poor	Mature	299213	6210048
Non core non impacted	N/A	PM001	410	860	Good	Mature	299196	6210059
Non core non impacted	N/A	SG001	495	723	Excellent	Mature	298278	6211131
Non core non impacted	N/A	SH001	345	280	Very good	Juvenile	298819	6212634
Non core non impacted	N/A	SH002	275	430	Moderate	Mature	298717	6212727
Non core non impacted	N/A	DG003	Unknown	Unknown	Unknown	Unknown	297701	6212019
Non core non impacted	N/A	DG004	Unknown	Unknown	Unknown	Unknown	297704	6212032
Non core non impacted	N/A	DG006	530	820	Excellent	Mature	298511	6210872
Non core non impacted	N/A	DG013	Unknown	Unknown	Unknown	Unknown	297712	6212037
Non core non impacted	N/A	DG015	Unknown	Unknown	Unknown	Unknown	297684	6212156
Non core non impacted	N/A	DG018	730	1550	Fairly poor	Mature	298381	6213005
Non core non impacted	N/A	DG024	0	0	Dead	Dead	298422	6212851
Non core non impacted	N/A	DG027	0	0	Dead	Dead	299223	6210048
Non core non impacted	N/A	DG028	0	0	Dead	Dead	298718	6212731
Non core non impacted	N/A	DG029	0	0	Dead	Dead	298721	6212729
Non core non impacted	N/A	DG031	0	0	Dead	Dead	298719	6212730
Non core non impacted	N/A	DG032	0	0	Dead	Dead	298738	6210444
Non core non impacted	N/A	JC001	0	0	Dead	Dead	297951	6211989
Non core non impacted	N/A	JC002	0	0	Dead	Dead	297637	6212132
Non core non impacted	N/A	ns027	0	0	Dead	Dead	298819	6212634
Non core non impacted	N/A	ns028	0	0	Dead	Dead	298718	6212726
Non core non impacted	N/A	ns029	0	0	Dead	Dead	298619	6212825

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Non core non impacted	N/A	ns030	0	0	Dead	Dead	298290	6212866
Non core non impacted	N/A	ns031	0	0	Dead	Dead	297935	6212786
Non core non impacted	N/A	ns035	0	0	Dead	Dead	298619	6210678
Non core non impacted	N/A	SH003	0	0	Dead	Dead	298427	6212845
Non core non impacted	N/A	YN001	0	0	Dead	Dead	298427	6212845
Non core non impacted	N/A	YN002	0	0	Dead	Dead	298427	6212845
Non core non impacted	N/A	cm021	0	0	Dead	Dead	298740	6212688
Non core non impacted	N/A	DG005	0	0	Dead	Dead	298346	6211073
Non core non impacted	N/A	DG007	0	0	#N/A	Dead	298568	6210760
Non core non impacted	N/A	DG008	0	0	#N/A	Dead	298644	6212804
Non core non impacted	N/A	DG014	0	0	Dead	Dead	297943	6211952
Non core non impacted	N/A	DG017	0	0	Dead	Dead	297944	6211953
Non core non impacted	N/A	DG019	0	0	#N/A	Dead	298379	6213004
Non core non impacted	N/A	DG020	0	0	#N/A	Dead	298377	6213006
Non core non impacted	N/A	DG021	0	0	#N/A	Dead	298382	6213005
Non core non impacted	N/A	DG022	0	0	Dead	Dead	297842	6211654
Offset	N/A	CF001	Unknown	Unknown	Unknown	Unknown	298466	6211878
Offset	N/A	cm002	Unknown	Unknown	Unknown	Unknown	299037	6211788
Offset	N/A	DG011	Unknown	Unknown	Unknown	Unknown	298406	6211903
Offset	N/A	IL002	250	250	Excellent	Mature	299262.321	6211740.913
Offset	N/A	NS025	Unknown	Unknown	Unknown	Unknown	298695	6211834
Offset	N/A	PB0001	375	220	Very good	Juvenile	298421.73	6212851.73
Offset	N/A	PB0002	80	50	Fairly poor	Juvenile	298717.6	6212728.32
Offset	N/A	PB0003	135	25	Very good	Juvenile	298718.66	6212726.8
Offset	N/A	PB0004	150	45	Very good	Juvenile	298717.9	6212726.78
Offset	N/A	PB0005	470	315	Very good	Mature	298818.73	6212634.01
Offset	N/A	PB0006	240	35	Very good	Juvenile	298818.5	6212632.77
Offset	N/A	SH004	Unknown	Unknown	Unknown	Unknown	298466	6211878
Offset	N/A	AH001	0	0	Dead	Dead	299074	6211709
Offset	N/A	AW001	0	0	Dead	Dead	299204	6211662
Offset	N/A	AW002	0	0	Dead	Dead	299159	6211671
Offset	N/A	CB004	0	0	Dead	Dead	299074	6211676
Offset	N/A	cm001	0	0	Dead	Dead	299119	6211704
Offset	N/A	cm003	0	0	Dead	Dead	298933	6211799
Offset	N/A	cm004	0	0	Dead	Dead	298889	6211807
Offset	N/A	cm005	0	0	Dead	Dead	298833	6211781
Offset	N/A	cm006	0	0	Dead	Dead	298669	6211727
Offset	N/A	cm007	0	0	Dead	Dead	298638	6211825
Offset	N/A	cm008	0	0	Dead	Dead	298405	6211903
Offset	N/A	cm009	0	0	Dead	Dead	298485	6211930
Offset	N/A	cm010	0	0	Dead	Dead	298933	6211865
Offset	N/A	cm011	0	0	Dead	Dead	298963	6211868
Offset	N/A	cm012	0	0	Dead	Dead	299003	6211871
Offset	N/A	cm013	0	0	Dead	Dead	299025	6211820

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Offset	N/A	cm014	0	0	Dead	Dead	299098	6211818
Offset	N/A	cm015	0	0	Dead	Dead	298781	6211844
Offset	N/A	cm016	0	0	Dead	Dead	298728	6211863
Offset	N/A	cm017	0	0	Dead	Dead	299138	6211748
Offset	N/A	cm018	0	0	Dead	Dead	298719	6211724
Offset	N/A	cm019	0	0	Dead	Dead	298792	6211812
Offset	N/A	cm020	0	0	Dead	Dead	298918	6211790
Offset	N/A	DG001	0	0	Dead	Dead	299089	6211685
Offset	N/A	DG002	0	0	Dead	Dead	298802	6211746
Offset	N/A	DG009	0	0	Dead	Dead	298646	6211861
Offset	N/A	DG010	0	0	Dead	Dead	298498	6211889
Offset	N/A	DG025	0	0	Dead	Dead	298475	6211914
Offset	N/A	ns001	0	0	Dead	Dead	299291	6211655
Offset	N/A	ns002	0	0	Dead	Dead	299134	6211714
Offset	N/A	ns003	0	0	Dead	Dead	299073	6211686
Offset	N/A	ns004	0	0	Dead	Dead	299095	6211692
Offset	N/A	ns005	0	0	Dead	Dead	299083	6211666
Offset	N/A	ns006	0	0	Dead	Dead	298950	6211791
Offset	N/A	ns007	0	0	Dead	Dead	298960	6211747
Offset	N/A	ns008	0	0	Dead	Dead	298946	6211718
Offset	N/A	ns009	0	0	Dead	Dead	298888	6211752
Offset	N/A	ns010	0	0	Dead	Dead	298772	6211754
Offset	N/A	ns011	0	0	Dead	Dead	298663	6211731
Offset	N/A	ns012	0	0	Dead	Dead	298651	6211741
Offset	N/A	ns013	0	0	Dead	Dead	298664	6211744
Offset	N/A	ns014	0	0	Dead	Dead	298619	6211853
Offset	N/A	ns015	0	0	Dead	Dead	298579	6211877
Offset	N/A	ns017	0	0	Dead	Dead	299074	6211798
Offset	N/A	ns018	0	0	Dead	Dead	298820	6211843
Offset	N/A	ns019	0	0	Dead	Dead	298798	6211844
Offset	N/A	ns020	0	0	Dead	Dead	298673	6211861
Offset	N/A	ns021	0	0	Dead	Dead	298806	6211827
Offset	N/A	ns022	0	0	Dead	Dead	298807	6211825
Offset	N/A	ns024	0	0	Dead	Dead	298815	6211801
Offset	N/A	ns026	0	0	Dead	Dead	298931	6211797
Stage 4	N/A	ns016	0	0	Dead	Dead	298873	6211924
Translocated	N/A	NOTAGE-78	0	0	Dead	Dead	299162	6211770
Translocated	N/A	P2017-1049/1-23	0	0	Dead	Dead	299162	6211770
Translocated	3	PB001	0	0	Dead	Dead	299162	6211770
Translocated	31	PB003	0	0	Dead	Dead	299162	6211770
Translocated	106	PB004	0	0	Dead	Dead	299162	6211770
Translocated	48	PB006	0	0	Dead	Dead	299162	6211770
Translocated	63	PB009	0	0	Dead	Dead	299162	6211770
Translocated	35	PB010	0	0	Dead	Dead	299162	6211770
Translocated	28	PB011	0	0	Dead	Dead	299162	6211770
Translocated	36	PB012	0	0	Dead	Dead	299162	6211770
Translocated	33	PB013	0	0	Dead	Dead	299162	6211770
Translocated	27	PB014	0	0	Dead	Dead	299162	6211770
Translocated	75	PB015	0	0	Dead	Dead	299162	6211770
Translocated	2	PB016	0	0	Dead	Dead	299162	6211770
Translocated	10	PB017	0	0	Dead	Dead	299162	6211770
Translocated	1	PB018	0	0	Dead	Dead	299162	6211770
Translocated	102	PB019	0	0	Dead	Dead	299162	6211770



Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated	23	PB020	0	0	Dead	Dead	299162	6211770
Translocated	50	PB021	0	0	Dead	Dead	299162	6211770
Translocated	64	PB023	0	0	Dead	Dead	299162	6211770
Translocated	62	PB024	0	0	Dead	Dead	299162	6211770
Translocated	61	PB026	0	0	Dead	Dead	299162	6211770
Translocated	14	PB027	0	0	Dead	Dead	299162	6211770
Translocated	45	PB028	0	0	Dead	Dead	299162	6211770
Translocated	32	PB029	0	0	Dead	Dead	299162	6211770
Translocated	63	PB031	0	0	Dead	Dead	299162	6211770
Translocated	74	PB032	0	0	Dead	Dead	299162	6211770
Translocated	4	PB033	0	0	Dead	Dead	299162	6211770
Translocated	76	PB034	0	0	Dead	Dead	299162	6211770
Translocated	30	PB035	0	0	Dead	Dead	299162	6211770
Translocated	29	PB036	0	0	Dead	Dead	299162	6211770
Translocated	35	PB037	0	0	Dead	Dead	299162	6211770
Translocated	26	PB040	0	0	Dead	Dead	299162	6211770
Translocated	58	PB041	0	0	Dead	Dead	299162	6211770
Translocated	30	PB042	0	0	Dead	Dead	299162	6211770
Translocated	40	PB043	0	0	Dead	Dead	299162	6211770
Translocated	44	PB044	0	0	Dead	Dead	299162	6211770
Translocated	5	PB048	0	0	Dead	Dead	299162	6211770
Translocated	65	PB049	0	0	Dead	Dead	299162	6211770
Translocated	7	PB050	0	0	Dead	Dead	299162	6211770
Translocated	24	PB051	0	0	Dead	Dead	299162	6211770
Translocated	56	PB055	0	0	Dead	Dead	299162	6211770
Translocated	57	PB056	0	0	Dead	Dead	299162	6211770
Translocated	3	PB057	0	0	Dead	Dead	299162	6211770
Translocated	60	PB058	0	0	Dead	Dead	299162	6211770
Translocated	39	PB059	0	0	Dead	Dead	299162	6211770
Translocated	22	PB061	0	0	Dead	Dead	299162	6211770
Translocated	6	PB063	0	0	Dead	Dead	299162	6211770
Translocated	9	PB065	0	0	Dead	Dead	299162	6211770
Translocated	11	PB066	0	0	Dead	Dead	299162	6211770
Translocated	115	PB067	0	0	Dead	Dead	299162	6211770
Translocated	121	PB068	0	0	Dead	Dead	299162	6211770
Translocated	48	PB069	0	0	Dead	Dead	299162	6211770
Translocated	51	PB071	0	0	Dead	Dead	299162	6211770
Translocated	59	PB072	0	0	Dead	Dead	299162	6211770
Translocated	24	PB073	0	0	Dead	Dead	299162	6211770
Translocated	38	PB074	0	0	Dead	Dead	299162	6211770
Translocated	71	PB079	0	0	Dead	Dead	299162	6211770
Translocated	20	PB080	0	0	Dead	Dead	299162	6211770
Translocated	14	PB081	0	0	Dead	Dead	299162	6211770
Translocated	85	PB082	0	0	Dead	Dead	299162	6211770
Translocated	25	PB083	0	0	Dead	Dead	299162	6211770
Translocated	118	PB084	0	0	Dead	Dead	299162	6211770
Translocated	38	PB085	0	0	Dead	Dead	299162	6211770
Translocated	43	PB086	0	0	Dead	Dead	299162	6211770
Translocated	102	PB087	0	0	Dead	Dead	299162	6211770
Translocated	52	PB089	0	0	Dead	Dead	299162	6211770
Translocated	29	PB091	0	0	Dead	Dead	299162	6211770
Translocated	49	PB092	0	0	Dead	Dead	299162	6211770
Translocated	26	PB094	0	0	Dead	Dead	299162	6211770
Translocated	111	PB095	0	0	Dead	Dead	299162	6211770
Translocated	103	PB096	0	0	Dead	Dead	299162	6211770

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated	15	PB097	0	0	Dead	Dead	299162	6211770
Translocated	114	PB098	0	0	Dead	Dead	299162	6211770
Translocated	112	PB099	0	0	Dead	Dead	299162	6211770
Translocated	18	PB100	0	0	Dead	Dead	299162	6211770
Translocated	41	PB101	0	0	Dead	Dead	299162	6211770
Translocated	31	PB102	0	0	Dead	Dead	299162	6211770
Translocated	33	PB104	0	0	Dead	Dead	299162	6211770
Translocated	7	PB105	0	0	Dead	Dead	299162	6211770
Translocated	54	PB106	0	0	Dead	Dead	299162	6211770
Translocated	36	PB107	0	0	Dead	Dead	299162	6211770
Translocated	27	PB108	0	0	Dead	Dead	299162	6211770
Translocated	119	PB109	0	0	Dead	Dead	299162	6211770
Translocated	117	PB110	0	0	Dead	Dead	299162	6211770
Translocated	64	PB111	0	0	Dead	Dead	299162	6211770
Translocated	16	PB112	0	0	Dead	Dead	299162	6211770
Translocated	13	PB114	0	0	Dead	Dead	299162	6211770
Translocated	21	PB115	0	0	Dead	Dead	299162	6211770
Translocated	8	PB116	0	0	Dead	Dead	299162	6211770
Translocated	37	PB117	0	0	Dead	Dead	299162	6211770
Translocated	46	PB118	0	0	Dead	Dead	299162	6211770
Translocated	53	PB119	0	0	Dead	Dead	299162	6211770
Translocated	42	PB120	0	0	Dead	Dead	299162	6211770
Translocated	47	PB121	0	0	Dead	Dead	299162	6211770
Translocated	9	PB122	0	0	Dead	Dead	299162	6211770
Translocated	6	PB123	0	0	Dead	Dead	299162	6211770
Translocated	19	PB125	0	0	Dead	Dead	299162	6211770
Translocated	107	PB126	0	0	Dead	Dead	299162	6211770
Translocated	12	PB127	0	0	Dead	Dead	299162	6211770
Translocated	N/A	PB141	0	0	Dead	Dead	299649	6210361
Translocated (2019)	91	PB0002	340	90	Poor	Juvenile	299162	6211770
Translocated (2019)	92	PB0004	240	120	Poor	Juvenile	299162	6211770
Translocated (2019)	93	PB0007	220	130	Fairly poor	Juvenile	299162	6211770
Translocated (2019)	94	PB0008	630	240	Poor	Juvenile	299162	6211770
Translocated (2019)	95	PB0025	460	180	Poor	Juvenile	299162	6211770
Translocated (2019)	null	PB0022	230	50	Poor	Juvenile	299162	6211770
Translocated (2019)	96	PB0030	170	160	Poor	Juvenile	299162	6211770
Translocated (2019)	97	PB0047	140	170	Poor	Juvenile	299162	6211770
Translocated (2019)	98	PB0046	330	90	Poor	Juvenile	299162	6211770
Translocated (2019)	99	PB0045	210	110	Poor	Juvenile	299162	6211770
Translocated (2019)	100	PB0052	160	70	Poor	Juvenile	299162	6211770
Translocated (2019)	7	PB0060	200	100	Poor	Juvenile	299162	6211770
Translocated (2019)	1	PB0053	500	150	Fairly poor	Juvenile	299162	6211770
Translocated (2019)	2	PB0054	70	100	Fairly poor	Juvenile	299162	6211770
Translocated (2019)	null	PB0038	150	140	Fairly poor	Juvenile	299162	6211770

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2019)	3	PB0039	300	180	Poor	Juvenile	299162	6211770
Translocated (2019)	4	PB0070	210	90	Poor	Juvenile	299162	6211770
Translocated (2019)	5	PB0075	150	70	Poor	Juvenile	299162	6211770
Translocated (2019)	6	PB0076	270	120	Poor	Juvenile	299162	6211770
Translocated (2019)	13	PB0088	290	30	Fairly poor	Juvenile	299162	6211770
Translocated (2019)	12	PB0064	340	140	Poor	Juvenile	299162	6211770
Translocated (2019)	14	PB0093	330	100	Moderate	Juvenile	299162	6211770
Translocated (2019)	11	PB0090	190	90	Fairly poor	Juvenile	299162	6211770
Translocated (2019)	9	PB0077	110	30	Poor	Juvenile	299162	6211770
Translocated (2019)	16	PB0103	220	190	Good	Juvenile	299162	6211770
Translocated (2019)	15	PB0124	490	150	Poor	Juvenile	299162	6211770
Translocated (2021)	N/A	PB131	1090	440	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB138	670	440	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB139	390	510	Very poor	Mature	299649	6210361
Translocated (2021)	N/A	PB142	630	380	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB148	880	450	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB152	940	530	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB153	760	690	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB154	460	520	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB155	700	610	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB156	770	420	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB157	310	450	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB158	1090	510	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB159	560	510	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB162	600	470	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB163	730	460	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB166	780	570	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB169	1200	480	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB170	710	400	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB172	780	690	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB173	850	390	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB174	810	430	Moderate	Mature	299649	6210361

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2021)	N/A	PB175	710	530	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB176	570	590	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB177	260	340	Very poor	Mature	299649	6210361
Translocated (2021)	N/A	PB178	1060	510	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB180	660	540	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB181	490	600	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB182	610	450	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB183	880	370	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB184	660	460	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB185	860	540	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB187	780	530	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB188	1050	450	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB189	260	540	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB190	900	540	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB191	310	510	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB192	650	730	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB194	300	410	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB198	180	120	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB199	230	220	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB200	880	470	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB201	790	500	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB202	530	460	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB205	710	530	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB207	630	470	Excellent	Mature	299649	6210361
Translocated (2021)	N/A	PB208	630	600	Poor	Mature	299649	6210361
Translocated (2021)	N/A	PB209	240	450	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB211	780	530	Moderate	Mature	299649	6210361
Translocated (2021)	N/A	PB213	650	470	Very good	Mature	299649	6210361
Translocated (2021)	N/A	PB215	1000	650	Very poor	Mature	299649	6210361
Translocated (2021)	N/A	PB128	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB129	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB130	0	0	Dead	Dead	299649	6210361

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2021)	N/A	PB132	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB133	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB134	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB135	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB136	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB137	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB140	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB143	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB144	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB145	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB146	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB147	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB149	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB150	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB151	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB160	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB161	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB164	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB165	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB167	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB168	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB171	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB179	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB186	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB193	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB195	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB196	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB197	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB203	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB204	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB206	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB210	0	0	Dead	Dead	299649	6210361

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2021)	N/A	PB212	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB214	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB216	0	0	Dead	Dead	299649	6210361
Translocated (2021)	N/A	PB217	0	0	Dead	Dead	299649	6210361
Translocated (2022)	1	OT0001	390	480	Excellent	Mature	TBC	TBC
Translocated (2022)	2	OT0002	560	400	Very good	Mature	TBC	TBC
Translocated (2022)	3	OT0003	520	670	Very good	Mature	TBC	TBC
Translocated (2022)	4	OT0004	450	530	Very good	Mature	TBC	TBC
Translocated (2022)	5	OT0005	510	500	Excellent	Mature	TBC	TBC
Translocated (2022)	6	OT0006	670	520	Very good	Mature	TBC	TBC
Translocated (2022)	7	OT0007	550	530	Very good	Mature	TBC	TBC
Translocated (2022)	8	OT0008	670	490	Excellent	Mature	TBC	TBC
Translocated (2022)	9	OT0009	710	380	Very good	Mature	TBC	TBC
Translocated (2022)	10	OT0010	320	490	Very good	Mature	TBC	TBC
Translocated (2022)	11	OT0011	630	410	Very good	Mature	TBC	TBC
Translocated (2022)	12	OT0012	550	450	Excellent	Mature	TBC	TBC
Translocated (2022)	13	OT0013	490	380	Excellent	Mature	TBC	TBC
Translocated (2022)	14	OT0014	430	430	Very good	Mature	TBC	TBC
Translocated (2022)	15	OT0015	350	310	Very good	Mature	TBC	TBC
Translocated (2022)	16	OT0016	490	530	Excellent	Mature	TBC	TBC
Translocated (2022)	17	OT0017	500	440	Excellent	Mature	TBC	TBC
Translocated (2022)	18	OT0018	590	390	Excellent	Mature	TBC	TBC
Translocated (2022)	19	OT0019	360	490	Excellent	Mature	TBC	TBC
Translocated (2022)	20	OT0020	500	580	Very good	Mature	TBC	TBC
Translocated (2022)	21	OT0021	590	540	Very good	Mature	TBC	TBC
Translocated (2022)	22	OT0022	290	480	Very good	Mature	TBC	TBC
Translocated (2022)	23	OT0023	640	300	Excellent	Mature	TBC	TBC
Translocated (2022)	24	OT0024	580	530	Very good	Mature	TBC	TBC
Translocated (2022)	25	OT0025	520	550	Very good	Mature	TBC	TBC
Translocated (2022)	26	OT0026	550	570	Very good	Mature	TBC	TBC
Translocated (2022)	27	OT0027	390	530	Excellent	Mature	TBC	TBC
Translocated (2022)	28	OT0028	390	410	Moderate	Mature	TBC	TBC

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2022)	29	OT0029	350	480	Very good	Mature	TBC	TBC
Translocated (2022)	30	OT0030	430	600	Excellent	Mature	TBC	TBC
Translocated (2022)	31	OT0031	450	330	Very good	Mature	TBC	TBC
Translocated (2022)	32	OT0032	580	390	Very good	Mature	TBC	TBC
Translocated (2022)	33	OT0033	610	530	Very good	Mature	TBC	TBC
Translocated (2022)	34	OT0034	590	460	Excellent	Mature	TBC	TBC
Translocated (2022)	35	OT0035	390	630	Excellent	Mature	TBC	TBC
Translocated (2022)	36	OT0036	410	550	Very good	Mature	TBC	TBC
Translocated (2022)	37	OT0037	500	560	Excellent	Mature	TBC	TBC
Translocated (2022)	38	OT0038	550	510	Very good	Mature	TBC	TBC
Translocated (2022)	39	OT0039	590	460	Excellent	Mature	TBC	TBC
Translocated (2022)	40	OT0040	760	470	Excellent	Mature	TBC	TBC
Translocated (2022)	41	OT0041	430	390	Very good	Mature	TBC	TBC
Translocated (2022)	42	OT0042	530	500	Excellent	Mature	TBC	TBC
Translocated (2022)	43	OT0043	490	360	Moderate	Mature	TBC	TBC
Translocated (2022)	44	OT0044	390	540	Moderate	Mature	TBC	TBC
Translocated (2022)	45	OT0045	680	470	Very good	Mature	TBC	TBC
Translocated (2022)	46	OT0046	390	370	Very good	Mature	TBC	TBC
Translocated (2022)	47	OT0047	330	490	Very good	Mature	TBC	TBC
Translocated (2022)	48	OT0048	590	340	Very good	Mature	TBC	TBC
Translocated (2022)	49	OT0049	500	370	Excellent	Mature	TBC	TBC
Translocated (2022)	50	OT0050	470	510	Excellent	Mature	TBC	TBC
Translocated (2022)	51	OT0051	550	460	Very good	Mature	TBC	TBC
Translocated (2022)	52	OT0052	400	450	Moderate	Mature	TBC	TBC
Translocated (2022)	53	OT0053	490	510	Very good	Mature	TBC	TBC
Translocated (2022)	54	OT0054	370	550	Excellent	Mature	TBC	TBC
Translocated (2022)	55	OT0055	670	390	Excellent	Mature	TBC	TBC
Translocated (2022)	56	OT0056	570	330	Excellent	Mature	TBC	TBC
Translocated (2022)	57	OT0057	660	650	Very good	Mature	TBC	TBC
Translocated (2022)	58	OT0058	450	470	Excellent	Mature	TBC	TBC
Translocated (2022)	59	OT0059	240	380	Excellent	Mature	TBC	TBC
Translocated (2022)	60	OT0060	390	470	Excellent	Mature	TBC	TBC

Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2022)	61	OT0061	230	480	Very good	Mature	TBC	TBC
Translocated (2022)	62	OT0062	310	510	Very good	Mature	TBC	TBC
Translocated (2022)	63	OT0063	330	510	Excellent	Mature	TBC	TBC
Translocated (2022)	64	OT0064	600	360	Very good	Mature	TBC	TBC
Translocated (2022)	65	OT0065	530	680	Very good	Mature	TBC	TBC
Translocated (2022)	66	OT0066	350	490	Moderate	Mature	TBC	TBC
Translocated (2022)	67	OT0067	470	490	Very good	Mature	TBC	TBC
Translocated (2022)	68	OT0068	550	610	Very good	Mature	TBC	TBC
Translocated (2022)	69	OT0069	330	380	Excellent	Mature	TBC	TBC
Translocated (2022)	70	OT0070	680	430	Very good	Mature	TBC	TBC
Translocated (2022)	71	OT0071	330	520	Excellent	Mature	TBC	TBC
Translocated (2022)	72	OT0072	630	530	Very good	Mature	TBC	TBC
Translocated (2022)	73	OT0073	620	450	Moderate	Mature	TBC	TBC
Translocated (2022)	74	OT0074	380	530	Moderate	Mature	TBC	TBC
Translocated (2022)	75	OT0075	630	480	Excellent	Mature	TBC	TBC
Translocated (2022)	76	OT0076	540	480	Excellent	Mature	TBC	TBC
Translocated (2022)	77	OT0077	390	570	Very good	Mature	TBC	TBC
Translocated (2022)	78	OT0078	560	440	Very good	Mature	TBC	TBC
Translocated (2022)	79	OT0079	390	510	Excellent	Mature	TBC	TBC
Translocated (2022)	80	OT0080	430	460	Moderate	Mature	TBC	TBC
Translocated (2022)	81	OT0081	300	450	Very good	Mature	TBC	TBC
Translocated (2022)	82	OT0082	280	640	Excellent	Mature	TBC	TBC
Translocated (2022)	83	OT0083	400	750	Poor	Mature	TBC	TBC
Translocated (2022)	84	OT0084	710	510	Very good	Mature	TBC	TBC
Translocated (2022)	85	OT0085	380	610	Moderate	Mature	TBC	TBC
Translocated (2022)	86	OT0086	490	640	Very good	Mature	TBC	TBC
Translocated (2022)	87	OT0087	570	560	Very good	Mature	TBC	TBC
Translocated (2022)	88	OT0088	310	460	Excellent	Mature	TBC	TBC
Translocated (2022)	89	OT0089	560	460	Very good	Mature	TBC	TBC
Translocated (2022)	90	OT0090	410	340	Excellent	Mature	TBC	TBC
Translocated (2022)	91	OT0091	580	490	Very good	Mature	TBC	TBC
Translocated (2022)	92	OT0092	440	430	Excellent	Mature	TBC	TBC



Area	MtAnnanTAG	Label_Tag	Height_mm	Width_mm	Condition_22	AgeClass_22	Easting	Northing
Translocated (2022)	93	OT0093	460	500	Very good	Mature	TBC	TBC
Translocated (2022)	94	OT0094	530	480	Excellent	Mature	TBC	TBC
Translocated (2022)	95	OT0095	650	550	Excellent	Mature	TBC	TBC
Translocated (2022)	96	OT0096	380	370	Excellent	Mature	TBC	TBC
Translocated (2022)	97	OT0097	370	420	Excellent	Mature	TBC	TBC
Translocated (2022)	98	OT0098	250	440	Very good	Mature	TBC	TBC
Translocated (2022)	99	OT0099	380	430	Excellent	Mature	TBC	TBC
Translocated (2022)	100	OT0100	630	500	Very good	Mature	TBC	TBC
Translocated (2022)	101	OT0101	620	420	Very good	Mature	TBC	TBC
Translocated (2022)	102	OT0102	360	470	Very good	Mature	TBC	TBC

## APPENDIX C: PERSOONIA HIRSUTA RESEARCH STRATEGY AND STATUS

### EPBC Approval (2010/5350) Condition 3 – South32 Illawarra Metallurgical Coal Persoonia Research Status Update and Strategy

Prepared by: David Gregory – IC Land and Biodiversity Specialist

Review Date: 22<sup>nd</sup> June 2018

Condition Requirement	Status
<p>3. The person taking action must engage a suitably qualified expert to undertake and make publicly available targeted research to inform conservation knowledge of <i>Persoonia hirsuta</i>. The research must:</p>	<p>The ‘targeted research’ is being undertaken by both the University of Wollongong (UOW) and Royal Botanic Gardens and Domain Trust. The following research has been completed by UOW to date:</p> <ol style="list-style-type: none"><li>1. Honours project #1 titled The Demography and Habitat Characteristics of the Endangered <i>Persoonia hirsuta</i> (submitted 2013)</li><li>2. Honours project #2 titled Conservation genetics of the rare and endangered plant, <i>Persoonia hirsuta</i> (Proteaceae) (submitted 2015)</li><li>3. Honours Project #3 (Continuation of #2) titled Can the seed bank act as a reservoir of genetic diversity? A Conservation genetic study of <i>Persoonia hirsuta</i></li></ol> <p>UOW will publish the outcomes from this work. We expect the final paper/s to be available mid-late 2018. The following research is underway with the Royal Botanic Gardens and Domain Trust:</p> <ol style="list-style-type: none"><li>1. Trial propagation using cuttings collected from the West Cliff and other populations. The aim is to develop a population of stock plants at the nursery which will be used to collect seed for germination trials and translocation. This project is ongoing, progress has been slow due to the overall success rate for this species being very low.</li><li>2. ACARP 24013 (2017). <i>Managing and conserving native plant species in the mining environment - seed germination biology and alternative ex situ storage of Persoonia germplasm for restoration</i>. This work is a collaborative project between IMC, Centennial Coal and Royal Botanic Gardens and Domain Trust and is funded by the Australian Coal Association Research Program (ACARP). The research had two main aims:<ol style="list-style-type: none"><li>a. To optimise propagation of <i>Persoonia</i>, through seed and vegetative material, with a focus on several species relevant to current mining leases in South-Eastern Australia. The objectives within this aim include:<ol style="list-style-type: none"><li>i. - Optimising the collection of seed and vegetative material</li><li>ii. - Understanding dormancy preventing high rates of seed germination for multiple species and optimising germination conditions to establish cultivation protocols</li><li>iii. - Trialling various approaches to vegetative propagation.</li></ol></li><li>b. To determine the most appropriate ex situ conservation options for successful reintroduction of these species as part of restoration programs. The following objectives were addressed:<ol style="list-style-type: none"><li>i. Determination of the long-term suitability of seedbanking for <i>Persoonia</i></li><li>ii. Identification of optimal conditions for the successful propagation and healthy growth and survival of <i>Persoonias</i> in the nursery</li><li>iii. Establishment of a protocol for storage of germplasm as seed (seedbanking) and plantlets (tissue culture) to maximise survivorship.</li></ol></li></ol></li></ol>

Condition Requirement	Status
	<p>The above project (Phase 1) commenced February 2015 and completed in March 2017. This project was granted further funding in 2016 and extended for two years (Phase 2) (to conclude late 2019) to include high interest native plants in mine site restoration programs and Propagation, translocation and re-introduction of plants for the establishment of offset populations. Mt Annan RBG are currently undergoing seed collections, germination and pollinator observations. To date, the project has resulted in successful germination of <i>P. hirsuta</i> seed in the nursery plants grown from seed in the nursery have been translocated back to the mine site. Phase 1 has resulted in several published research articles.</p> <p>3. PhD (Collaboration with Royal Botanic Gardens and Western Sydney University) titled <i>Addressing Drivers of Dieback in an Endangered Tree Species, Persoonia hirsuta (Hairy Geebung)</i>. The aim of this project is to assess environmental factors that may be linked to dieback, particularly those related to beneficial and detrimental microbes and to plant nutrition. These factors will be assessed in field and glasshouse experiments and using state-of-the-art laboratory techniques. This project will commence mid-2018 and run for the next 3 years.</p>
<p>a. Document current understanding of <i>Persoonia hirsuta</i> ecology and genetics;</p>	<p>UOW honours project #1 - Thesis titled <i>The demography and Habitat Characteristics of the Endangered Persoonia hirsuta</i> by Stephanie Wilmott. Project was completed in October 2013. The study investigated the following:</p> <ul style="list-style-type: none"> <li>• Current distribution and abundance</li> <li>• Soil stored seed bank – to determine if seed is dispersed or retained directly under the plant; and</li> <li>• Habitat requirements – Indicator species, soil particle size/composition and elevation</li> </ul> <p>Current understanding of genetics was summarised in the Conservation Genetics Projects (UOW project #2 &amp; #3) which is summarised in Condition (5) below. UOW will publish the outcomes of these works in a paper late 2018.</p>
<p>b. Outline previously documented management and conservation actions;</p>	<p>This will be outlined in the final report when published.</p>
<p>c. Investigate:</p> <p>i. Pollination biology</p>	<p>Royal Botanic Gardens have commenced pollinator observations on <i>P. hirsuta</i>. This work will form part of the ACARP research mentioned above.</p>
<p>ii. Requirements of its pollinators</p>	<p>As above.</p>
<p>iii. Soil seed bank dynamics and the role of various disturbances (including fire) in germination and recruitment;</p>	<p>Soil seed bank was investigated as part of project #1 as mentioned above. This study found that all of the sites where <i>P. hirsuta</i> populations were present were found to have high levels of disturbance. The type of disturbance and the level of disturbance <i>P. hirsuta</i> can tolerate, and perhaps benefit from, was not tested experimentally. The RBG ACARP project will attempt to develop a robust and informative experimental framework for examining germination cues for <i>Persoonia</i> species seed, including temperature, chemical, physical and temporal treatments. Soil stored seed was also a topic of investigation in the UOW project #3.</p> <p>UOW was engaged by IMC to investigate post-fire seedling emergence patterns at a site consisting of approximately 8000 m<sup>2</sup> of dry sclerophyll forest at Yanderra, on the edge of the Southern Highlands, NSW. The site was burned in a wildfire in late October 2013. This study was the first to record the spatial and</p>

Condition Requirement	Status
	<p>temporal pattern of post-fire seedling emergence in <i>P. hirsuta</i> and found that of 16 burned skeletons, the seed banks immediately below 10 of them produced a flush of seedlings mostly seven months after the fire (Alison Haynes Thesis 2015). The results were published in the UOW project #2 (Conservation Genetics).</p> <p>IMC conducted an ecological burn within the West Cliff <i>Persoonia</i> Offset in April 2016. The aim of the burn was to promote germination of <i>P. hirsuta</i> and increase the density of the species within the area. IMC prepared a Burn Plan and designed a post-fire monitoring program and is currently monitoring for seedlings.</p>
<p>iv. Phenology and seasonal growth of <i>Persoonia hirsuta</i></p>	<p>IMC is conducting annual population and condition surveys at West Cliff. These surveys examine the growth, health and survival of the plants growing within the Offset area at West Cliff. An annual report is provided to Department of Agriculture, Water and the Environment each year in accordance with EPBC 2010/5350 Condition (h).</p>
<p>v. Population genetic structure, levels of genetic diversity, minimum viable population size and management actions</p>	<p>UOW honours project #2 - titled <i>Conservation Genetics of the Rare and Endangered Persoonia hirsuta (Proteaceae)</i>. Project was completed July 2015 and investigated the following:</p> <ul style="list-style-type: none"> <li>• Developing and optimising a set of species-specific microsatellite primers suitable for fine scale population genetic analysis in this study, and in later studies of paternity analyses.</li> <li>• Using microsatellite data from adult plants to estimate patterns of allelic and genotypic diversity, fine and coarse scale genetic differentiation and mating systems; and</li> <li>• Investigating the species' demographic response to fire by taking advantage of a wildfire in October 2013 that burned one of the adult stands, providing the opportunity to document spatial and temporal patterns of seedling emergence and growth.</li> </ul> <p>Further research in this area continued under Honours project # 3 – Completed Nov 16.</p> <p>There were five major aims of this project:</p> <ul style="list-style-type: none"> <li>• Extract and amplify DNA of a reliable and workable quality from <i>Persoonia hirsuta</i> seed material using PCR.</li> <li>• Select and optimise markers based on quality, repeatability and variability.</li> <li>• Use material from each of two populations to genotype seed from canopy and soil stored seed bank to: <ul style="list-style-type: none"> <li>○ Verify that seed genotypes were reflective of the embryo, whilst not containing maternal DNA</li> <li>○ Compile a representative sample of the seed bank</li> </ul> </li> <li>• Infer patterns of mating using paternity analyses, estimation of pollen dispersal distances and variation in male reproductive success across time. Calculate single and multilocus outcrossing rates.</li> <li>• Compare levels and partitioning of genetic diversity within the adult and seed bank populations.</li> </ul>
<p>vi. Impact of dieback disease and control techniques on <i>Persoonia hirsuta</i> and its habitat; and</p>	<p>PhD (Collaboration with Royal Botanic Gardens and Western Sydney University) titled <i>Addressing Drivers of Dieback in an Endangered Tree Species, Persoonia hirsuta (Hairy Geebung)</i>.</p> <p>The aim of this project is to assess environmental factors that may be linked to dieback, particularly those related to beneficial and detrimental microbes and to plant nutrition. These factors will be assessed in field and glasshouse experiments and using state-of-the-art laboratory techniques. This project will commence mid-2018 and run for the next 3 years.</p>

Condition Requirement	Status
vii. Impact of fire on <i>Persoonia hirsuta</i> and its habitat	As mentioned above, <i>UOW Conservation Genetics...</i> (Project #2) thesis Investigated the species' demographic response to fire by taking advantage of a wildfire in October 2013 that burned one of the adult stands, providing the opportunity to document spatial and temporal patterns of seedling emergence and growth. IMC has conducted an ecological burn within the Offset in 2016 and is monitoring to measure the plants' response to fire at West Cliff.

Key Milestones	Target Completion Date	Status
1. Demography and Habitat Project Completed	Nov 2013	Completed Nov 2013
2. Conservation Genetics Project Completed	June 2015	Honours Thesis completed June 15, UOW currently publishing this work.
3. Mating Systems Project Complete	Oct 2016	Completed Oct 2016
4. Annual population monitoring Completed	Dec 13, 14, 15, 16 & 17	Dec 13, 14, 15, 16 & 17 completed
5. Mt Annan Propagation Trials using cuttings completed	Trial 1 WC cuttings collected by – June 2014 Trial 2 (Couridjah) cuttings collected by – Dec 2014 Trial 3 WC cuttings collected by – March 2015 Trial 4 – WC cuttings collected by end of 2016 Trial 5 – WC and Yanderra April 2018	Trial 1 completed with no success Trial 2 ongoing, no long-term success Trial 3 underway, 16 cuttings successful to begin with, but mortality high – No plants have since survived. Trial 4 Mortality high, few plants remaining in nursery and progress very slow. Trial 5 – Cuttings have been potted but no root establishment yet.
6. Conduct Ecological burn – West Cliff Offset	Autumn 2016 (depending on findings from ACARP and 2015 population census).	Burn completed in Apr 2016. Commenced post-fire monitoring program. One <i>P. hirsuta</i> seedling recorded in 2020 (confirmed to be still present and healthy in 2021) and one mature plant recorded in the burn area in 2021.
7. Royal Botanic Gardens ACARP Project Report Completed	May 2017 (Part 1). Oct 2019 (Part 2)	Project commenced February 2015 – Ongoing. Has been extended into a second project –further funding for another two years.
8. PhD Project (RBG & UWS)	March 2021	Not yet commenced
9. Submit Final Project Report	June 2021	Original deadline was May 2017 – Request submitted to extend by another two years - Granted. Additional request submitted to extend till 2021 to allow for PhD project and additional work being undertaken by RBG.

END OF REPORT



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**Appendix 9: Appin West BioBank Site Annual Report – 2022/2023**



**Landcare Australia**

**Annual Report for the  
NSW Biodiversity Conservation Trust  
2023**

**Appin West BioBanking Site (ID: 215)**

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## 1. BioBanking Annual Reporting Table

BioBank Site Annual Report					
Location Details					
BioBanking Agreement ID: 215		Name of landowner - Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
Reporting date: 18 August 2023		Property address: 140 Douglas Park Drive, Douglas Park, 2569			
Management actions	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including reference to management zones), any variations and the reasons for variation.	Visual observations and other comments (including reasons for non-completion)
1. Management of grazing for conservation	Ongoing	Yes	<p>Site visits for this reporting period, include:</p> <p>Site visit dates are as follows.                      18 Aug 2022                      28 Oct 2022                      09 Nov 2022                      03 Mar 2023                      22 Jun 2023                      27 Jun 2023</p>	<p>No stock observed in all management zones on each site visit.</p> <p>Grazing by stock animals has recommenced on the property adjoining the southern boundary. There has been no incursion into the site since during the reporting period.</p>	No other observed evidence of grazing, trampling or other traces of stock animals.
2. Weed control	Ongoing – (minimum 4 times per year)	Yes	<p>Site visits for this reporting period, include.</p> <p>Site visit dates are as follows.                      18 Aug 2022                      28 Oct 2022                      09 Nov 2022                      03 Mar 2023                      27 Jun 2023</p>	<p>Weed control at MZ1, MZ2, MZ3 and Transmission Line (TL) easement and edges of MZ6 and MZ7 adjoining easement on each site visit using herbicide spot spraying, with a quick spray™ unit (in the TL) and hand-pulling of weed species listed in BioBanking Agreement (BBA) 215.</p> <p><i>Pls note: Vehicle access to MZ3 has recently reopened (March 2023) since the area has had sufficient time to dry out. Up to March 2023, all weed control was done by walking to the site with 15-20kg knapsacks.</i></p>	<p>Ongoing herbicide treatment required in MZ1, MZ2, MZ3 and the transmission line easement for Blue Periwinkle, Paterson’s Curse, Bridal Creeper, African Lovegrass, Spear Thistle, Fleabane, Paddy’s Lucerne and other woody species such as Small Leaved Privet.</p> <p>As per the BBA - Areas previously disturbed require ongoing control for at least the following 10 years, after which time these zones are to be reassessed for the need for further control.</p>

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				<p>Maintenance sweeps for key weed threats through MZ6 and MZ7. No access permitted to MZ4 and MZ5 due to the high cliffs and gorges, however no weeds observed in adjoining management zones during maintenance sweeps.</p> <p>Herbicides were used on the BioBanking site during site visits to undertake management actions (i.e., weed control) in each respective management zone as listed in the BBA. A list of herbicides used at each visit is available (if required).</p> <p>Slashing in the TL is planned for Spring 2023 subject to favourable weather conditions and slasher availability.</p>	
3. Management of fire for conservation	Ongoing	Yes	Quarterly site visits	<p>No evidence of recent fire activity during the site visits (BBA suggests last burn/wildfire was in 2004).</p> <p>No ecological burns are planned in any zone until at least 2026, and then the site will be reconsidered for future ecological burns in a mosaic pattern across the site.</p>	<p>Heavy senescence of Acacia spp. (predominantly A. decurrens) in MZ1, MZ2 and MZ7.</p> <p>The current overall fuel hazard has been estimated in accordance with the Forest Fire Overall Fuel Hazard Assessment Guidelines as High to Extreme.</p> <p>As per the revised management plan periodic trittering along external fence lines will be</p>

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					conducted annually. It will not affect the mid-storey or over storey with negligible impact on native groundcover.
4. Management of human disturbance	Ongoing	Yes	Quarterly site visits	Signage and fencing as per the BBA are in good working order.  No waste was observed on the site during the site visits during this reporting period.	Access for management purposes includes South32 and Landcare Australia (land management contractor) staff.  There is no ability for stock or unauthorized motor vehicles to access the site with the current exclusion fencing in place.  Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts would be reported to South32 and then escalated to the BCT as per BBA.
5. Retention of native vegetation	Ongoing	Yes	Quarterly site visits	There was no evidence of vegetation being killed, destroyed or poisoned onsite during this reporting period.	No evidence or observation of ringbarking or tree felling onsite.
6. Planting or seeding - maintenance	Ongoing	Yes	Quarterly site visits	As per the Section 6.6 of the BBA, a planting program was implemented as a "local planting day" on 22/05/18 for the species listed in the planting schedule within MZ3.  Survivability is approx. 50-60% as of 22 June 2023 and this increase is likely attributed to the seedling becoming more visible as the	Soil moisture levels declined significantly during the drought (2018 – 2020). Supplementary watering was provided to the seedlings as per the scope of works for maintenance.  It is recommended (based on current survivability of seedlings) that MZ3 continue to be monitored

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				grasses in the site cure and brown off, making smaller seedlings easier to identify. The seedlings continue to be grazed by native and non-native herbivores on the site (see Section 10, below).	for grazing pressure in the next 12-month reporting period.
<b>7. Retention of dead timber</b>	Ongoing	Yes	Quarterly site visits	No timber has been introduced or removed from the site since the commencement of the BBA.	Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.
<b>8. Erosion control</b>	Ongoing	Yes	Quarterly site visits	No areas identified across the site that currently require any supplementary erosion control or stabilisation.	Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.
<b>9. Retention of rocks</b>	Ongoing	Yes	Quarterly site visits	No rock removal has occurred on the site since the commencement of the BBA.	Site monitored for rock removal at either quarterly or annual site visits to the respective management zones.
<b>10. Control of feral and overabundant native herbivores</b>	Ongoing	Yes	Quarterly site visits	Negligible feral or overabundant native herbivory in all areas except MZ3. Grazing in MZ3 is likely by wallabies, kangaroos and goats (no goat scats observed onsite to date).	In accordance with the BBA annual inspection required for species traces. Opportunistic observations made during weed control and maintenance sweeps for all zones during either the annual and/or quarterly site visits.
<b>11. Vertebrate pest management</b>	Ongoing	Yes	Quarterly site visits.  Canid pest ejectors containing	Fox scats were observed within in the TL and MZ6 in the reporting period.  No goat scats have been observed during any site visits. However, there is potential for goats to access the site (and graze in MZ3) as	Following liaison with Greater Sydney Region Local Land Services, the site is currently included in the regional fox-baiting program due to the presence of fox scats and observations at the site.

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			1080 capsules were activated from 4 August and will continue until 09 September 2023 under a program approved by Greater Sydney Local Land Services. The site visits are used to assess the lure condition and replace as needed.	goats have been sighted within the same gorge approx. 7 km to the Northwest at Douglas Park, NSW.	
12. Nutrient control	Ongoing	Yes	Quarterly site visits	Nil	No fertilizers have been used on the site since the commencement of the BBA.
13. Control of exotic fish species	N/A	N/A	N/A	N/A	No action required under the BBA.
14. Maintenance or reintroduction of natural flow regimes	Ongoing	Yes	Ongoing	No artificial structures installed to impede the natural flow regimes on the site.	Natural flow regimes are maintained on the site in accordance with the BBA.
Incident or event that has adverse effect on biodiversity values on biobank site					

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Incident or event including adverse impacts (e.g. natural events)			Action taken and proposed recommended actions		
Nil			N/A		
Nil			N/A		
Records submitted with this report					
<input checked="" type="checkbox"/> Photographs taken at the photo points set in the BioBanking agreement – see attached					
<input checked="" type="checkbox"/> Results of the inspections required to be conducted in item 1.3 of annexure D to the BioBanking agreement – see attached					
<input checked="" type="checkbox"/> Results of any monitoring, inspections, surveys required in Annexures C and D to the BioBanking agreement – see attached					













Signature and certification	
I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements under item 2 of the Annexure D to the BioBanking agreement Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report	
Signed: 	Signed: 
Date: 14 August 2023	Date: 15 August 2023

## 2. Photo Points

Location of Photopoints					
Projected Coordinate System: GDA 94, MGA – Zone 56					
Photopoint Ref.	Easting	Northing	Feature	Direction of Photo	Comment (Date)
PP1	289949	6210260	Planted and regenerating native pasture.	NSEW	1 Star Picket in clearing, flagged.
PP2	289844	6210546	Shale Sandstone Transition Forest (EEC).	NSEW	1 Star Picket in clearing, 20m from original site. Flagged.
PP3	290152	621692	Acacia thicket in subtle drainage line from adjoining property's dam outfall.	NSEW	1 Star Picket in clearing, flagged.
PP4	290223	6210758	Centre of old Bore site, in regeneration area, at end of access track.	NSEW	1 Star Picket in clearing, flagged.
PP5	290390	6210874	Centre of main access track to western block, in centre of powerline alignment.	NSEW	New Photopoint established ~15m from original GPS location, which will not interfere with slashing regime (see Feature column) (2/3/18).
PP6	290321	6211031	Powerpole (ID869210) marker, viewing weed management (and future revegetation) in slashed grass area.	NSEW	New Photopoint established approximately 15m from original GPS location, using Powerpole (ID 869210) in centre of easement/slashed area (2/3/18).
PP7	290420	6211172	Garden plant escapee/weed management, east of boundary fence maintenance track.	NSEW	New Photopoint established approximately 20m from original GPS location. New Site is next to patch of succulents (Removed 24-25/10/17), approximately 10m from property boundary with adjacent house block, due east from carport (25/10/17). 1 Star Picket in clearing, flagged (2/3/18).
PP8	290631	6211462	Regeneration of track. Marker within vegetation, south-east of track bend.	NSEW	Original photopoint not found. New Photopoint established and flagged (2/3/18).
PP9	290788	6211293	Regeneration of formerly cleared area.	NSEW	New photopoint established approximately 15m from original GPS location. Used forked Eucalypt in NW corner of clearing / turning circle (25/10/17). New photopoint established and flagged in clearing (2/3/18).


*Pls note: We were unable to take photo points for 2021 due to Covid 19 restrictions.*

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PP#	Direction	February 2019	July 2020	August 2022	June 2023
PP1	N				
PP1	E				
PP1	S				



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PP1	W				
PP2	N				
PP2	E				

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PP2	S				
PP2	W				
PP3	N				

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PP3	E	 <p>Image facing SE not E</p>			
PP3	S				
PP3	W				

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PP4	N				
PP4	E				
PP4	S				

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PP4	W				
PP5	N				
PP5	E				

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PP5	S				
PP5	W				
PP6	N				

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PP6	E				
PP6	S				
PP6	W				

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PP7	N				
PP7	E				
PP7	S				



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PP7	W				
PP8	N				
PP8	E				

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PP8	S				
PP8	W				
PP9	N				

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PP9	E				
PP9	S				
PP9	W				

### 3. Results of the inspections required - as per item 1.3 of Annexure D to the BioBanking Agreement

1. *Percentage of ground cover present on the biobank site for the purpose of item 1.1 of Section 1 of Annexure C (reporting - 12 monthly) – No stock incursion has allowed groundcover to be maintained and/or increase in density across the site over the previous 6 years due to the installation of the exclusion fencing (refer to photopoints for further detail). The La Nina weather pattern between 2021 and early 2023 has increased the density of weed species (due to the existing seed bank in the soils) within the disturbed areas of the site.*
2. *Number of stock and date/s when the stock have entered the management zones of the biobank site (reporting - 6 monthly) – No further evidence of stock on the site since the previous reporting period (inspected 09 November 2022 and 22 June 2023).*
3. *Physical condition of fencing and gates to ensure they are maintained to the standard listed in Annexure D section 1.3 of the BBA:*
  - a. *Currently maintained to the standard to exclude stock from the site and inspected annually:*
    - *As of 22 June 2023 the site fencing was maintained to prevent stock grazing.*
  - b. *Currently maintained to a standard to control human disturbance and inspected annually:*
    - *As of 22 June 2023 the site fencing was maintained to prevent human disturbance on the site with unauthorised vehicles.*
  - c. *Currently maintained at a standard to control feral or overabundant herbivores and/or vertebrate pests and inspected annually (inspected 22 June 2023) - feral and/or native herbivores have been observed onsite during quarterly site visits. Whilst the existing fencing is adequate to ensure stock exclusion, the fencing will not prevent non-native and native herbivores from accessing the site.*
4. *Records of any human disturbance on the biobank site – (reporting 6 monthly) – No human disturbance observed (inspected 09 November 2022 and 22 June 2023).*
5. *Evidence of erosion – (reporting 6 monthly) - There are no identified areas across all Management Zones as currently requiring any supplementary erosion control or stabilisation (inspected 09 November 2022 and 22 June 2023).*
6. *Evidence of Waste – (reporting 6 monthly) – No evidence of any new waste was observed during the site visits (inspected 09 November 2022 and 22 June 2023).*

#### 4. Site visits – August 2022, October 2022, November 2022, March 2023 and June 2023 (Annual Inspection by Landcare Australia)

##### 4.1. Weeds

<b>Template for reporting of monitoring activities</b>		
<b>Management Zone</b>	<b>Date</b>	<b>Observations and assessment of monitoring</b>
<b>MZ1</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 27 Jun 2023	Treatment of exotic weeds and grasses with herbicide spot spraying and hand pulling of weeds.
<b>MZ2</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 27 Jun 2023	Undertaken in conjunction with weed control works at MZ1. Treatment of exotic weeds and grasses with herbicide spot spraying and hand-pulling of weeds.
<b>Transmission line (TL) and associated cleared area</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Undertaken in conjunction with weed control works at MZ1 and MZ2. Treatment of exotic weeds (Particularly Paterson’s Curse and Stinking Roger) and grasses with herbicide (using quick spray™ unit), spot spraying and hand-pulling of weeds.
<b>MZ3</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Undertaken in conjunction with weed control works at MZ1 and MZ2. Treatment of exotic weeds (particularly Paterson’s curse) and exotic grasses with herbicide spot spraying. Limited vehicle access until March 2023, refer to management action two above for further details.
<b>MZ4</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Management zone not visited: no access due to high-risk cliffs. No weeds observed in adjacent management zones.
<b>MZ5</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Management zone not visited: no access due to high-risk cliffs. No weeds observed in adjacent management zones.
<b>MZ6</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Undertaken in conjunction with weed control works in MZ7. Maintenance sweep targeting key weed threats, concentrating along existing tracks.
<b>MZ7</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023	Undertaken in conjunction with weed control works at MZ6. Maintenance sweep targeting key weed threats, concentrating along existing tracks.

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
	22 Jun 2023 27 Jun 2023	

Diary template for weed control management			
Date	Management Zone	Description and type of activity undertaken or observation made	Minor variations (details and reasons)
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	<b>1,2,3 and TL easement</b>	Weed control, herbicide spot spraying, quick spray unit and hand pulling of: <ul style="list-style-type: none"> <li>- Blue Periwinkle (<i>Vinca major</i>);</li> <li>- Paterson's' Curse (<i>Echium plantagineum</i>);</li> <li>- African Lovegrass (<i>Eragrostis curvula</i>);</li> <li>- Spear Thistle (<i>Cirsium vulgare</i>);</li> <li>- Bridal Creeper (<i>Asparagus asparagoides</i>); and</li> <li>- Small-leaved Privet (<i>Ligustrum sinense</i>)</li> </ul>	Ongoing treatment in MZ1, MZ2 and transmission line (TL) to treat Paterson's curse, African Lovegrass, Spear Thistle, Bridal Creeper and Stinking Roger.  The TL is planned to be slashed in August or September 2023 to improve efficiency of weed treatment in this zone, subject to favourable weather conditions.
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	<b>MZ 6 and 7</b>	Quarterly maintenance weed sweeps ongoing. Occasional spot spraying of African Lovegrass in these zones.	Ongoing observation in these Zones.
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	<b>MZ 1, 2, 3, TL, 6, 7</b>	Site walk to observe any pests or evidence of presence via scats. Evidence of Foxes observed at the site (scats).	The site was assessed as suitable for inclusion in the Greater Sydney Local Land Services regional fox-baiting program. The site is currently being baited using Canid Pest Ejectors this program ends on 09 September 2023.

## 4.2. Fire

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
<b>MZ 1, 2, 3, TL, 6, 7</b>	18 Aug 2022 28 Oct 2022 09 Nov 2022	No evidence of recent fire activity during site visit (Management report suggests last burn was in 2004).

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	03 Mar 2023 22 Jun 2023 27 Jun 2023	<i>Acacia</i> spp. in MZ 2 and MZ 7 continue to exhibit senescence. Overall fuel hazard has been estimated to be high to extreme across the site.
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Diary template for fire management activities			
Date	Management Zone	Description and type of activity undertaken or observation made	Minor variations (details and reasons)
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	MZ 1, 2, 3, TL, 6, 7	No fire management activities undertaken except for opportunistic observation during weeding activities and annual inspection on 22 June 2023.	N/A

### 4.3. Pest Animals

1. Template for reporting of monitoring activities		
Management Zone	Date	Current level of impact on vegetation This column must record impacts as Negligible, Minimal, Moderate or High.
MZ 1, 2, 3, TL, 6, 7	18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	Minimal grazing by native herbivores in all zones except MZ3.  Heavy grazing of seedlings planted in MZ3 appears to be subsided in this reporting period as outlined in management action six, above.

Diary template for feral and overabundant herbivore management			
Date	Management Zone	Description and type of activity undertaken This column must include details of the feral and overabundant herbivores targeted, control techniques, and numbers controlled.	Minor variations (details and reasons)
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	MZ2 and TL	Greater Sydney Region Local Land Services regional fox baiting program conducted by Landcare Australia on site in Winter/Spring 2023.	N/A
18 Aug 2022 28 Oct 2022 09 Nov 2022 03 Mar 2023 22 Jun 2023 27 Jun 2023	All	Opportunistic observations were undertaken during weeding activities and the annual inspection.	N/A







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**Appendix 10: Nepean River BioBank Site Annual Report – 2022/2023**



**Landcare Australia**

**Annual Report for the  
Biodiversity Conservation Trust  
2021-2022**

**Nepean BioBanking Site (ID: 382)**

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## 1. BioBanking Annual Reporting Table

BioBank Site Annual Report					
Location Details					
BioBanking agreement ID: 382		Name of landowner – Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
Reporting date: 19 August 2022		Property address: 1025 and 1235 Menangle Rd, Douglas Park, NSW Australia.			
Management actions	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including reference to management zones), any variations and the reasons for variation.	Visual observations and other comments (including reasons for non-completion)
1. Management of grazing for conservation	Ongoing	Yes	Recorded at the following site visits including:  8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Reported on 27 June that domestic stock had entered the site via the adjoining property on the eastern boundary in late June 2022.  South32 and Landcare Australia staff inspected site on 29 June 2022 following the report but could not find any evidence of stock onsite. The advice from the neighbour was that stock had been retrieved from the site shortly after they noticed they were missing.  Except for the above incident no stock have been observed in all management zones during sites visits since the last reporting period.	Landcare Australia is currently seeking a quote for replacement of the existing eastern boundary fence line with a stock proof fence in collaboration with the adjoining landowner.
2. Weed control	Ongoing – (4 times per year)	Yes	Quarterly site visits, including  8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022	Weed control within MZ1 and MZ2 continues with spot spraying using herbicide and hand-pulling of species listed in BioBanking Agreement (BBA) 382. A list of herbicides used at each visit is available (if required).  Maintenance sweeps for key weed threats through MZ3 and the accessible parts of MZ4 are undertaken during site visits. No access	Additional herbicide treatment will still be required in MZ1 and MZ2. The above average rainfall in the previous 24 months continues to provide opportunities for increased densities of weed species in disturbed areas of the site including: African lovegrass, Stinking Roger, various Thistle, Fleabane, Blackberry, Prickly Pear and woody species such as African Boxthorn.

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BioBank Site Annual Report					
Location Details					
BioBanking agreement ID: 382		Name of landowner – Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
Reporting date: 19 August 2022		Property address: 1025 and 1235 Menangle Rd, Douglas Park, NSW Australia.			
Management actions	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including reference to management zones), any variations and the reasons for variation.	Visual observations and other comments (including reasons for non-completion)
			05 Aug 2022	<p>permitted to MZ5 due to the high cliffs and gorges. However, no significant weed issues observed within these undisturbed areas of the site.</p> <p>Previous slashing of the eastern planting area within MZ1 and MZ2 continues to provide good opportunities for native species such as Kangaroo Grass to outcompete non-natives species which previously dominated this area.</p> <p>Further slashing of the eastern plantings within MZ1 a MZ2 was planned for July 2022 however, this has been deferred until at least Sep/Oct 2022 subject to more favourable weather conditions and repairs to the crossing (see Section 8 below).</p>	<p>As per the BBA, areas previously disturbed require ongoing control for at least the following 10 years, after which time these zones are to be reassessed for the need for further weed control.</p> <p><i>Pls note: The current weather conditions continue to prevent Landcare Australia from undertaking regular quarterly site visits as reflected in the dates of the site visits in the previous 12 months (see quarterly site visits column).</i></p>
3. Management of fire for conservation	Ongoing	Yes	Quarterly site visits.	<p>No evidence of recent fire activity during site visits (BBA suggests no burn as far back as 1962).</p> <p>No ecological burns are planned in any zone until at least 2024 and then the site will be reconsidered for future ecological burns in a mosaic pattern across the site.</p>	<p>Fuel loads vary in all management zones but are at least 15-25 tonnes per hectare or greater (in areas) across the site.</p> <p>However, with the current high moisture levels within the vegetation and the soils the site does not pose a significant fire risk (as of 5 August 2022).</p>

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BioBank Site Annual Report					
Location Details					
BioBanking agreement ID: 382		Name of landowner – Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
Reporting date: 19 August 2022		Property address: 1025 and 1235 Menangle Rd, Douglas Park, NSW Australia.			
Management actions	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including reference to management zones), any variations and the reasons for variation.	Visual observations and other comments (including reasons for non-completion)
4. Management of human disturbance	Ongoing	Yes	Quarterly site visits.	<p>Signage and fencing as per the BBA are in good working order.</p> <p>There has been no observations or evidence of incursions onto the site from the neighbouring properties (excluding the stock incursion outlined Section 1 above)</p> <p>No waste has been observed on the site during site visits this year.</p>	<p>Access for management purposes includes South32 and Landcare Australia (land management contractor) staff.</p> <p>As outlined in Section 1 (above) the stock exclusion fencing on the eastern boundary is significantly aged and beyond economical repair. Landcare Australia is currently seeking a quote for replacement.</p> <p>Unauthorised motor vehicles have no capacity to access the site with the current exclusion fencing and gates in place.</p>
5. Retention of native vegetation	Ongoing	Yes	Quarterly site visits.	There was no evidence of vegetation being killed, destroyed or poisoned onsite during this reporting period.	No evidence or observation of recent ringbarking or tree felling onsite.
6. Planting or seeding	May/June 2020	Yes	N/A	<p>Success rate in survivability of the canopy and shrub layer species planted in June 2020 in MZ1 and MZ2 is approx. 90%. However, due to the heavy browsing by goats the seedlings are unable to grow beyond the height of the tree guards (450mm), refer to Section 10 below.</p> <p>Currently there is approx. 50% success rate in survivability in the western section of MZ1</p>	Observations made during maintenance sweeps for all accessible zones during quarterly sites visits.

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BioBank Site Annual Report					
Location Details					
BioBanking agreement ID: 382		Name of landowner – Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
Reporting date: 19 August 2022		Property address: 1025 and 1235 Menangle Rd, Douglas Park, NSW Australia.			
Management actions	Required completion time and frequency	Action completed (Yes/No)	Actual completion date/s	Description of actions undertaken (including reference to management zones), any variations and the reasons for variation.	Visual observations and other comments (including reasons for non-completion)
				(planted in Autumn 2019) following from the drought conditions in the summer of 2019. Landcare Australia have observed the feral goats also using this area for browsing and are impacting the ability of these plants to gain any substantial height.	
7. Retention of dead timber	Ongoing	Yes	Quarterly site visits.	There is no evidence that timber has been introduced or removed from the site in this reporting period	Observations made during maintenance sweeps for all accessible zones during quarterly sites visits.
8. Erosion control	Ongoing	Yes	Quarterly site visits.	The water crossing used to access the eastern planting zones in MZ1 and MZ2 has been damaged due to recent flooding (March 2022). Landcare Australia has advised South32 that there is no vehicle access as a result. South32 are currently arranging for additional inert ballast material to be reinstated to allow ongoing access to the planting area by vehicle.	Observations made during maintenance sweeps for all zones during quarterly sites visits.
9. Retention of rocks	Ongoing	Yes	Quarterly site visits.	No rock removal has occurred on the site since the commencement of the BBA.	Observations made during maintenance sweeps for all zones during quarterly sites visits.
10. Control of feral and overabundant native herbivores	Ongoing	Yes	Quarterly site visits.	In accordance with the BBA annual inspection required for species traces. Opportunistic observations made during weed control and maintenance sweeps for accessible zones during either the annual and/or quarterly site visits.	Feral goats continue to activate trail cameras on numerous occasions during the fox baiting programs.  These goats continue to have a significant impact on the seedlings planted in western and eastern sections of the site as observed by Landcare Australia staff.





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<b>BioBank Site Annual Report</b>					
<b>Location Details</b>					
<b>BioBanking agreement ID: 382</b>		Name of landowner – Endeavour Coal Pty Ltd. All conservation land management works undertaken by Landcare Australia on behalf of Endeavour Coal Pty Ltd.			
<b>Reporting date: 19 August 2022</b>		Property address: 1025 and 1235 Menangle Rd, Douglas Park, NSW Australia.			
<b>Management actions</b>	<b>Required completion time and frequency</b>	<b>Action completed (Yes/No)</b>	<b>Actual completion date/s</b>	<b>Description of actions undertaken</b> (including reference to management zones), any variations and the reasons for variation.	<b>Visual observations and other comments</b> (including reasons for non-completion)
			completed in Winter 2022.	record any movements around each bait station.	
<b>12. Nutrient control</b>	Ongoing	Yes	Quarterly site visits.	N/A	No fertilizers (except for diluted seasoil for the seedlings) have been used on the site since the commencement of the BBA.
<b>13. Control of exotic fish species</b>	N/A	N/A	N/A	N/A	No action required under the BBA.
<b>14. Maintenance or reintroduction of natural flow regimes</b>	Ongoing	Yes	Ongoing.	N/A	Natural flow regimes are maintained on the site in accordance with the BBA.
<b>Incident or event that has adverse effect on biodiversity values on biobank site</b>					
<b>Incident or event including adverse impacts (e.g. natural events)</b>			<b>Action taken and proposed recommended actions</b>		
Stock access to the site in June 2022			Site inspected by Landcare Australia and South32 on 29 June 2022. No evidence of stock onsite the neighbour advised that stock had removed from site. A quote for replacement of the eastern boundary fence line is currently being sought to prevent further stock incursions.		
Damage to existing water crossing in March 2022 floods.			South32 currently developing a proposal to upgrade the previous crossing for access to the planting site in the eastern section of MZ1 and MZ2.		
<b>Records submitted with this report</b>					
<input checked="" type="checkbox"/> Photographs taken at the photo points set in the BioBanking agreement – see attached					
<input checked="" type="checkbox"/> Results of the inspections required to be conducted in item 1.3 of annexure D to the BioBanking agreement – see attached					
<input checked="" type="checkbox"/> Results of any monitoring, inspections, surveys required in Annexures C and D to the BioBanking agreement – see attached					

BioBanking Agreement 382 - Annual Report (2021-2022), Photo Points, Inspections, Monitoring and Reporting







Signature and certification	
I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements under item 2 of the Annexure D to the BioBanking agreement Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report	
Signed: 	Signed: 
Date: 12 August 2022	Date: 19 August 2022

## 2. Photo Points

Location of Photopoints					
Projected Coordinate System: GDA 94, MGA – Zone 56					
Photopoint Ref.	Easting	Northing	Feature	Direction of Photo	Comment (Date)
PP1	285862	6215244	Weed control and boundary fence	NE/NW	1 Star Picket, flagged
PP2	284670	6214464	Weed control and boundary fence	SE/NW	1 Star Picket, flagged
PP3	284753	6214555	Revegetation CPW Zone 1	N/S	1 Star Picket, flagged
PP5	284810	6214720	Revegetation CPW Zone 1	E/W	1 Star Picket, flagged
PP6	284930	6214751	Cumberland Plain Woodland Zone 2	N/S	1 Star Picket, flagged
PP7	285161	6214854	Grey Myrtle Dry Rainforest edge	SE	New Photopoint established (setup in 2019) approximately 30m east of original GPS location to improve accessibility. 1 Star Picket, flagged
PP9	285412	6215024	Cumberland Plain Woodland Zone 2	NE/NW	1 Star Picket, flagged
PP10	286216	6215177	Riparian Scrub edge	E/W	New Photopoint established (setup in 2019) approximately 100m north of the original GPS location to improve accessibility. 1 Star Picket, flagged
PP11	286265	6215312	Shale Sandstone	E/W	1 Star Picket, flagged

*Note that Landcare Australia were unable to take photo points for 2021 due to Covid 19 restrictions and the BCT were notified of this at the time.*

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PP#	Direction	March 2019	August 2020	July 2022
PP1	NE			
PP1	NW			

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PP2	SE			
PP2	NW			
PP3	N			

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PP3	S			
PP5	E			
PP5	W			

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PP6	N			
PP6	S			
PP7	SE			

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PP9	NE			
PP9	NW			
PP10	SE			



BioBanking Agreement 382 - Annual Report (2021-2022), Photo Points, Inspections, Monitoring and Reporting

PP1 0	NW			
PP1 1	E			
PP1 1	W			

### 3. Results of the inspections required by the BioBanking Agreement

1. *Percentage of ground cover present on the biobank site for the purpose of item 1.1 of Section 1 of Annexure C* (reporting - 12 monthly). Minimal stock incursion (approx. 1-2 days in late June 2022) has allowed groundcover to be maintained and/or increase in density across the site over the previous 4 years due to the installation of the exclusion fencing (refer to photopoints for further detail). Heavy rainfall in the region in 2021 and 2022 has increased growth of existing groundcover (and weed species due to the weed seed bank within the disturbed areas of the site).
2. *Number of stock and date/s when the stock have entered the management zones of the biobank site* (reporting - 6 monthly) – Inspected 21 January and 29 June 2022. Minor stock incursion reported on 27 June 2022. However, no stock observed onsite by Landcare Australia or South32 staff following the site inspection on 29 June 2022.
3. *Physical condition of fencing and gates to ensure they are maintained to the standard listed in Annexure D section 1.3 of the BBA:*
  - a. *Currently maintained to the standard to exclude stock from the site on the eastern, western and northern boundaries* (inspected 29 June 2022). – No on eastern boundary
    - As of 27 June a report had been received that stock from the adjoining property on the eastern boundary had accessed the site. A site inspection on 29 June by both Landcare Australia and South32 revealed no stock incursion. Refer to the notes in Section 1 of the annual reporting table which indicates that the adjoining landowner retrieved the stock from the site. A quote for replacement of this stock exclusion fence line on the eastern boundary is currently being sought from Landcare Australia.
  - b. *Currently maintained to a standard to control human disturbance on the eastern, western and northern boundaries* (inspected 29 June 2022).
    - As of 29 June 2022 the site fencing was maintained to a standard to control human disturbance.
  - c. *Currently maintained to a standard to control feral or overabundant herbivores and/or vertebrate pests* (inspected 29 June 2022).
    - Feral and/or native herbivores have been observed onsite during all quarterly site visits. The boundary fences installed will not prevent native and non-native herbivores from accessing and grazing the planting areas in MZ1 and MZ2 on the site.
4. *Records of any human disturbance on the biobank site* – (reporting 6 monthly) – Nil human disturbance observed at the site (inspected 21 January and 15 July 2022).
5. *Evidence of erosion* – (reporting 6 monthly) – There are no areas identified across management zones as currently requiring any supplementary erosion control or stabilisation (inspected in 21 January and 29 June 2022)
  - As of 29 June 2022 Landcare Australia advised South32 of the damage to the existing water crossing in the eastern section of the site. South32 is currently exploring options to reinstate the crossing so that vehicle access can be provided to the eastern plantings in MZ1 and MZ2.
6. *Evidence of Waste* – (reporting 6 monthly) – No evidence of waste was observed during the site visits (inspected 21 January and 29 June 2022).

## 4. Landcare Australia Quarterly Site Visits September 2021, January, June, July and August 2022

### 4.1. Weeds

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
MZ1	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Treatment of exotic weeds and grasses spot spraying with herbicide or hand hand-pulling of weeds.
MZ2	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Treatment of exotic weeds and grasses spot spraying with herbicide, or hand-pulling of weeds.
MZ3	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Maintenance sweep targeting key weed threats.
MZ4	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Maintenance sweep targeting key weed threats in accessible sections of this zone.
MZ5	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	No activity conducted – no access to the gorge, visual observation made from safe locations within MZ4.

Diary template for weed control management			
Date	Management Zone	Description and type of activity undertaken or observation made	Minor variations (details and reasons)
8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	1, 2, 3, 4	Weed control, herbicide (spot spraying) and hand pulling of: <ul style="list-style-type: none"> <li>• <i>Opuntia stricta</i>, Prickly Pear</li> <li>• <i>Lycium ferocissimum</i>, African Boxthorn</li> <li>• <i>Rubus fruticosus</i>, Blackberry</li> <li>• <i>Verbena rigida</i>, Purpletop</li> <li>• <i>Conyza bonariensis</i>, Fleabane</li> </ul>	Will need to revisit MZ1 and MZ2 to continue treating the key threat weed species listed. Continue weed sweeps in MZ3 and MZ4.  The BBA does not list presence of Prickly Pear

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		<ul style="list-style-type: none"> <li>• <i>Tagetes minuta</i>, Stinking Roger</li> <li>• <i>Asparagus asparagoides</i>, Bridal creeper</li> <li>• <i>Cirsium vulgare</i>, Spear Thistle</li> <li>• <i>Eragrostis curvula</i>, African Lovegrass</li> </ul>	<p>onsite, it is assumed that these were not identified during the initial assessment. Along with African Boxthorn it is one of the more prevalent invasive weed species identifiable on the site and will require significant follow-up for emergents.</p>
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#### 4.2. Fire

Template for reporting of monitoring activities		
Management Zone	Date	Observations and assessment of monitoring
1, 2, 3, 4, 5	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	No evidence of recent fire activity during site visit (Management report suggests no burns reported on the property since 1962).

Diary template for fire management activities			
Date	Management Zone	Description and type of activity undertaken	Minor variations (details and reasons)
8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	All	No specific fire management activities undertaken except for opportunistic observation during weeding, watering, planting, fox baiting and goat control activities.	N/A

#### 4.3. Native herbivores

Template for reporting of monitoring activities			
Management Zone	Date	Current level of impact on vegetation This column must record impacts as Negligible, Minimal, Moderate or High	Observations and assessment of monitoring
All	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	No specific native herbivore management work undertaken except for opportunistic observation during weeding, watering, planting fox baiting and goat control activities.	Trail cameras set up for fox baiting revealed several common native mammal and bird species regularly traverse the site.

Diary template for overabundant herbivore management			
Date	Management Zone	Description and type of activity undertaken This column must include details of the	Minor variations (details and reasons)

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		overabundant herbivores targeted, control techniques, and numbers controlled.	
8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	All	No specific native herbivore management work undertaken except for opportunistic observation during weeding, watering, planting, fox baiting and goat control activities.	Native species observed include: Common Wombat and Eastern Grey Kangaroo.

4.4. Vertebrate (feral) pests

Template for reporting of monitoring activities			
Management Zone	Date	Current level of impact on vegetation or threatened fauna species This column must record impacts as Negligible, Minimal, Moderate or High	Observations and assessment of monitoring
<b>MZ1</b>	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	Feral Goats have been observed on all occasions during site visits in a herd of approx. 15-30 animals within MZ1, MZ2, MZ3 and MZ4. Currently undertaking a control program with the assistance of Greater Sydney Local Land Service.  Trail cameras installed in Winter 2022 during the Greater Sydney Local Land Services fox baiting program revealed foxes traversing the site and activating two ejectors.  No threatened native fauna has been observed within the site to date by Landcare Australia. Common native fauna species observed may be impacted by the presence of foxes.	Feral species observed onsite include feral goats and foxes.
<b>MZ2</b>	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	As above	As above
<b>MZ3</b>	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	As above	As above
<b>MZ4/MZ5</b>	8 Sep 2021 21 Jan 2022 29 Jun 2022 15 Jul 2022 29 Jul 2022 05 Aug 2022	As above	As above

BioBanking Agreement 382 - Annual Report (2021-2022), Photo Points, Inspections, Monitoring and Reporting

<b>Diary template for vertebrate pest management</b>			
<b>Date</b>	<b>Management Zone</b>	<b>Description and type of activity undertaken</b> This column must include details of the vertebrate pests targeted, control techniques applied and numbers controlled.	<b>Minor variations</b> (details and reasons)
Days visited for goat trapping: 25 Jan 2022 14 Jan 2022 06 May 2022 30 Jun 2022	MZ2	Due to the increase in the feral goat populations within the site, goat pens were setup in MZ2 and trapping has commenced. The pens were installed in Jan 2022 by Landcare Australia and Greater Sydney Local Land Services.	Three goats were caught in the pens in June 2022 and were taken off site for processing.
Days visited for fox baiting: 15 Jun 2022 23 Jun 2022 29 Jun 2022 12 July 2022 14 July 2022	MZ3	Greater Sydney Region Local Land Services regional fox baiting program conducted by Landcare Australia on site in Winter 2022.	Foxes have activated two Canid Pest Ejectors during the Winter 2022 fox baiting program.



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**Appendix 11: Cataract River BioBank Site Passive Management Annual Report - 2023**



**Landcare Australia**

**Biodiversity Stewardship Agreement ID number: BA 345  
for sites established under the NSW Threatened Species  
Conservation Act, 1995**

**Annual Report – March 2023 for Passive Management**

**Cataract River Biobanking Stewardship Site BA 345**

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## Annual report summary of passive management actions

BSA Site Reporting and Monitoring				
Audit details				
Reporting year of BSA site: 2023 Site visit: 23/2/2023 (Annual) BCT Contact: Pollyanna Barlow - Specialist Environment Phone: 0401 808 711    Email: <a href="mailto:pollyanna.barlow@south32.net">pollyanna.barlow@south32.net</a>  Prepared by Anna Charlton Shick from Landcare Australia on behalf of South32 Illawarra Metallurgical Coal.			Biodiversity Stewardship agreement ID: BA 345  Name of landowner/site contact: South32 Illawarra Metallurgical Coal. All conservation land management works undertaken by Landcare Australia behalf of South32 Illawarra Metallurgical Coal.  South32 Illawarra Metallurgical Coal Address: Port Kembla Coal Terminal, Port Kembla Road, Inner Harbour, Port Kembla, NSW 2505	
Management actions				
Annual reporting undertaken by landowner of the site (as per landowner's annual report)				
Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
1. Management of grazing for conservation	1.1 Stock must not be permitted to graze in any area of the BSA site.	Ongoing from commencement date	Yes	During the site visit on 23/2/2023 there was no evidence of stock incursion via grazing or manure.  Grazing by stock animals appears to have significantly reduced on the adjoining site to the north.
	1.2 If stock is observed, the landowner must take measures to remove the stock immediately.	Ongoing from commencement date	Yes	No further action required as per item 1.1 (above)

Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
<b>2. Weed control</b>	2.1 N/A until active management	NA	NA	Weed control will commence when the requirement for active management is initiated. Weeds are localised to the northern and western boundary of the site, whereas across the remainder of the site resilient native vegetation is dominant.
<b>3. Management of fire for conservation</b>	3.1 N/A until active management	NA	NA	Fire management of the site will be in accordance with the BSA and only commence once the requirement for active management is initiated.
	3.2 The landowner must light no additional fires on the property except that which has been outlined as part of the fire management plan.	Ongoing from commencement date	Yes	No fires have been ignited on the site in the previous 12 months.
<b>4. Management of human disturbance</b>	4.1 Human activities that adversely affect biodiversity values must not be carried out except as permitted under the agreement.	Ongoing from commencement date	Yes	The area previously disturbed due to the removal of asbestos containing material (ACM) has been revegetated in accordance with the requirements of the BCT.  Revegetation occurred in June 2020 and the area has a high rate of survivability as a result of the La Nina weather conditions in the region over the past two years.
	4.3 The landowner must not store or dispose of any waste on the BSA site.	Ongoing from commencement date	Yes	No waste has been stored, or disposed of, on the site in the previous 12 months.  There is some evidence of orphaned waste on the site, mainly consisting of Styrofoam packing that may have blown onto site. This was removed from site.
<b>5. Retention of regrowth and remnant native vegetation</b>	5.1 Native vegetation must not be cut down or removed.	Ongoing from commencement date	Yes	No native vegetation has been removed or poisoned onsite in the previous 12 months.
	5.2 Native vegetation must not be burnt except in accordance with fire management plan.	Ongoing from commencement date	Yes	No wildfire or hazard reduction burning has occurred on the site in the previous 12 months.
<b>6. Replanting or supplementary planting where</b>	6.1 N/A until active management	As required	Yes	Replanting on the disturbed site containing ACM was completed, in June 2020 and seedlings were observed to have a high success rate as at 23/2/2023.

Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
<b>natural regeneration will not be sufficient</b>	6.2 Seeds and plants used for planting must be from locally collected provenances unless there are reasons to do otherwise.	As required	<b>Yes</b>	As advised in previous annual report seeds were sourced locally in Western and South Western Sydney.
<b>7. Retention of dead timber</b>	7.1 Dead timber (whether standing or fallen and including branches and leaf litter) must not be removed from or within the BSA site.	Ongoing from commencement date	<b>Yes</b>	No dead timber (standing or fallen) has been removed and no additional timber has been introduced to the site in the previous 12 months.
<b>8. Erosion control</b>	8.1 N/A until active management	<b>NA</b>	<b>NA</b>	No areas identified across the site which currently require any supplementary erosion control or stabilisation.
<b>9. Retention of rocks</b>	9.1 The landowner must not remove, or cause or permit to be removed, rocks from or within the BSA site.	Ongoing from commencement date	<b>Yes</b>	No rock removal has occurred on the site in the previous 12 months.
<b>10. Control of feral and overabundant native herbivores</b>	10.1 N/A until active management	<b>NA</b>	<b>NA</b>	No feral species or overabundance of native herbivores observed and minimal native herbivory could be identified during the site visit.
<b>11. Vertebrate pest management – foxes</b>	11.1 N/A until active management	<b>NA</b>	<b>NA</b>	Annual baiting of foxes and wild dogs using buried 1080 baits to be laid in conjunction with local programs once active management commences.
<b>12. Nutrient control</b>	N/A until active management	<b>NA</b>	<b>NA</b>	No fertilizers will be used on the site when active management commences.

Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
<b>14. Maintenance or reintroduction of natural flow regimes</b>	14.3 Artificial structures such as dams or levee banks that impede the natural flow regimes on the BSA site must not be constructed unless approved in writing for the purpose of restoring natural flows.	Ongoing from commencement date	<b>Yes</b>	Natural flow regimes are maintained on the site in accordance with the BSA.
<b>Any other comments or observations regarding the biobank site</b>				
<p><b>Please include photos of the site visit along with comments/observations.</b></p> <p>Landcare Australia identified and installed 6 photo point locations during a site visit on 13 Aug 2019. Each photo point from 13 August 2019 is shown with the UTMs. The six photo points were revisited on 23/2/2023 as shown below.</p>			<p>The images taken on 23/2/2023 show a noticeable increase in the native vegetation understory, in particular at sites 4 and 6.</p> <p>Increased weed growth is located along the boundary (adjoining the exclusion fencing) and is mostly likely attributed to the ongoing La Nina weather conditions experienced in the region.</p>	



**Photo point 1**





Photo point 2



Photo point 3





Photo point 4







**Photo point 5**

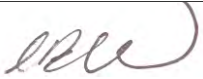




**Signature and declaration**

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements under clause 2 of the Annexure D to the biodiversity stewardship agreement.  
 Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report.

Signed  

Date 3/3/2023

Date 6/03/2023

<b>Details of incidents or events that have had an adverse effect on biodiversity values on biobank site</b>	
<b>Description of incident or event (e.g. natural events)</b>	<b>Action taken and/or proposed recommended actions</b>
Nil	Nil



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## **Appendix 12: Ventilation Shaft 6 Offset Annual Monitoring Report - 2022/2023**

## Appin Ventilation Shaft Site No. 6 Offset Area

Offset Site Monitoring Report 2022

Prepared for South32 Illawarra Metallurgical Coal | 22 December 2022



## Document control

Project number	Client	Project manager	LGA
7578	South32 Illawarra Metallurgical Coal	Sian Griffiths	Wollondilly Shire Council

Version	Author	Review	Status	Date
D1	Isabel Lyons	Sian Griffiths	Draft	9 December 2021
R0	Isabel Lyons		Draft	19 December 2022
R1	Sian Griffiths		Final	22 December 2022

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## Executive summary

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As part of the project approval (MP 10\_0079) and Commonwealth *Environmental Protection Biodiversity Conservation Act 1999* approval (2010/5722) for the Appin Ventilation Shaft Site No.6, South32 Illawarra Metallurgical Coal (IMC) is required to implement a formal monitoring program of the management actions that were approved for the associated offset area at the Mountbatten Stud property at Douglas Park, NSW. This report is the eleventh annual report for the monitoring program, conducted by Niche Environment and Heritage (Niche) in November 2022.

The aim of the monitoring program is to demonstrate the success of management actions through the collection of empirical data, mapping and photographic records for the offset site. The monitoring methodology employs fixed floristic plots to collect vegetation condition data, population estimates of the threatened plant species *Pimelea spicata* (conducted every five years), strategic photo-point monitoring and vegetation distribution mapping.

The 2022 monitoring results in relation to the floristic composition, structure and function, indicate that, on average, the bushland on the offset area is outside of benchmark attribute values for the Cumberland Plain Woodland but is slowly showing trends towards benchmark values. An increase in exotic species may be due to the wetter conditions within 2020, 2021 and 2022 or the bush regeneration works occurring in areas not within plots.

An assessment of the change in size and distribution of the threatened plant population of *Pimelea spicata* (Spiked rice-flower) was undertaken during the 2021/22 surveys, as it has been five years since the last monitoring census in 2016/17. The *Pimelea spicata* census is next required to be undertaken in 2026.

Recommendations in relation to the on-going management of the site include continued treatment of African Olive and African Boxthorn, seasonal spraying of Blackberry, continued treatment of exotic vines and exotic perennial grasses.

## Glossary and list of abbreviations

Term or abbreviation	Definition
BAM	Biodiversity Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
CEEC	Critically Endangered Ecological Community
DPIE	NSW Department of Planning, Industry and Environment, formerly NSW Department of Planning and Environment (DPE)
EEC	Endangered Ecological Community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
Ha	Hectare/s
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environmental Plan
Locality	The Work Zone and surrounds, nominally a 10 km radius from the Work Zone.
MNES	Matters of National Environmental Significance (from the Commonwealth Environment Protection and Biodiversity Conservation Act 1999).
m	Metre/s
m <sup>2</sup>	Metres square
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
OEH	Office of Environment and Heritage (formerly DECCW, DECC, DEC)
Study area	Means the Work Zone and surrounding land where surveys were conducted.
PCT	Plant Community Type
TEC	Threatened Ecological Community



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# 1. Introduction

## 1.1 Background

The Appin Ventilation Shaft Site No. 6 project approval requires South32 Illawarra Metallurgical Coal (IMC) to secure, manage and monitor an 8.7 hectare offset (offset area) of Cumberland Plain Woodland (CPW) such that an improve or maintain outcome would be achieved for threatened biodiversity.

The offset area is known as MZ5 and is located to the north of the Appin Ventilation Shaft Site No. 6 on the property known as Mountbatten Stud at Douglas Park NSW (Figure 1). An initial assessment of the proposed offset area was conducted by Niche in December 2010 to assess the suitability of the site to be used as an offset for the unavoidable impacts associated with Appin Ventilation Shaft Site No. 6. Niche determined that the site was indeed CPW and, under management, would improve to benchmark condition over time. The initial inspection of MZ5 also resulted in the discovery of a population of the threatened plant, *Pimelea spicata*, adding significant conservation value to the offset area.

In accepting the offset proposal, the Department of Planning and Environment (DPE) and Department of Environment and Energy (DoEE) provided a number of approval conditions relating to the reservation, management and monitoring of management actions within MZ5. One of the conditions required IMC to implement a formal monitoring program for both the management of the native vegetation on the offset area and the extent and health of the *Pimelea spicata* population.

Conditions 2(c) (v – vii) of the NSW project approval (MP10\_0079) and condition 3(d) of the EPBC Act Approval (2010/5722) are the conditions that require a monitoring and performance evaluation program to be implemented (Table 1).

**Table 1: Conditions of approval requiring a monitoring program**

Approval	Condition of Approval
NSW approval	2(c)(v) – A program to monitor the effectiveness of these measures, and progress against the performance and completion criteria.
	2(c)(vi) – A description of the potential risks to re-vegetation, and a description of the contingency measures that would be implemented to mitigate these risks.
	2(c)(viii) – Details of who would be responsible for monitoring, reviewing and implementing the plan.
Commonwealth approval	3(d) The plan must include key milestones, performance indicators, corrective actions and timeframes for the completion of all actions outlined in the plan for the life of the project.

## 1.2 Purpose and objectives

The aim of the monitoring program is to demonstrate the success of the management actions through the collection of empirical data, mapping and establishment of a photographic record for the offset area. The specific objectives of this report are:

1. To describe and evaluate the re-vegetation and bush regeneration works undertaken to date against the key performance criteria as detailed in the Biodiversity Management Plan (BMP) for the offset area (South32 IMC 2021)
2. To outline any problems encountered during works and how these were managed
3. To recommend alterations or additions to management actions as required
4. To provide an analysis of vegetation monitoring results, including
  - Comparison of data from monitoring plots to benchmark condition levels for CPW

- Visual comparative analysis of photo point monitoring locations
- Vegetation and condition mapping at a scale deemed appropriate to inform management decisions.

Mapping will include:

1. Location of vegetation monitoring plots
2. Photo point monitoring locations
3. Baseline mapping of native vegetation and condition within MZ5.

The 2021 monitoring report includes the details regarding the latest results of the *Pimelea spicata* population census. Given the census is not required again until 2026, results detailed in this year's report are limited to presence within BAM monitoring plots.

## 2. Management Actions

### 2.1 Management actions undertaken

Since 2011, management actions have been conducted at both the offset area (MZ5) and the voluntary management area (MZ6) to enhance and maintain native biodiversity. Stock has been excluded from MZ5 and MZ6 by the installation of a fence around the site boundary, which was installed in 2011.

Toolijooa Bushland Restoration Pty Ltd (Toolijooa) conducted the bushland restoration works at both MZ5 and MZ6 between 2011 and 2018. Bush regeneration works have been undertaken by Landcare Australia since 2019. In 2022, nine site visits were undertaken between January and November to undertake primary and maintenance weed control of both woody and herbaceous weeds (Landcare Australia 2022).

Weeds treated across the site in 2022 include (Landcare Australia 2022):

- Herbaceous species: *Brassica sp.*, *Cirsium vulgare* Spear Thistle, *Conyza sp.* Fleabane, *Echium plantagineum* Paterson's Curse, *Gomphocarpus fruticosus* Cotton Bush, *Onopordum acanthium* Scotch Thistle, *Setaria sphacelata* (Pidgeon Grass), *Sida rhombifolia* Paddy's Lucerne, *Verbena bonariensis* Purpletop;
- Woody weeds: *Lycium ferocissimum* African Boxthorn, *Olea europaea* subsp. *cuspidata* African Olive.
- Vines *Rubus sp.* Blackberry.

### 2.2 Management actions compared to BMP

The current management actions have addressed the recommended actions proposed in the BMP (South32 IMC 2021) for MZ5 and MZ6. These have been compared in Table 2. It should be noted that the management actions are on-going.

**Table 2: Proposed and current management actions in the BMP**

Action	Description	Performance Target (Milestones)	Completion Status
<i>Pimelea spicata</i> Monitoring program	<ul style="list-style-type: none"> <li>Design a program to determine the success of management or the need for intervention.</li> <li>Annual population counts within permanent plots.</li> <li>5 yearly population census.</li> <li>Condition of individual plants from mixed cohorts.</li> <li>Condition of habitat.</li> <li>Annual inspections of fencing to ensure maintenance and up-keep.</li> <li>Regular site visits the potential presence of stock and/or feral herbivores that have breached fencing to ensure that such impact is eliminated by fencing and that trapped stock or feral herbivores are freed.</li> <li>Monitoring against stochastic events.</li> </ul>	Sustainable <i>Pimelea spicata</i> population with population numbers staying level with or exceeding current numbers.	Census proposed to occur every five years. Previous census undertaken in early 2021 and reported on in the 2022 monitoring report. Details regarding the <i>Pimelea spicata</i> population are provided in the 2021 monitoring report. This report provides general observations for the species and presence within plots.
MZ5 Fencing	<ul style="list-style-type: none"> <li>The first action within the offset area will be to exclude stock. Existing four-strand post-and-wire fence will be utilised and additional fencing installed where required. No barbed-wire will be used and the bottom strand will have a clearance of 400mm above the ground to allow the movement of native fauna. Stock will be herded out of the area prior to fencing taking place.</li> </ul>	Four-strand post-and-wire fence installed, no strands barbed and 400 mm separation from ground to lowest strand.	Fence installed, barbed wire as top wire. On-going monitoring.

Action	Description	Performance Target (Milestones)	Completion Status
Bush Regeneration in MZ5	<ul style="list-style-type: none"> <li>Primary, secondary and maintenance weed management within MZ5 will target the treatment of Blackberry, African Olive, Lantana, African boxthorn, privet, Cape ivy and a variety of exotic perennial grasses such as African Lovegrass, Rhodes Grass, Kikuyu and Couch.</li> <li>All weed management works will be supervised by a suitably qualified bush regenerator. A team of four bush regenerators will be engaged for five days for the primary weeding and then a team of two for one day every four months thereafter for secondary and maintenance weed management as required.</li> </ul>	Engagement of suitably qualified bush regeneration contractor to implement primary, secondary and maintenance weed management program. Annual vegetation condition assessment Improvement in condition of offset bushland to within, or as near as possible to, benchmark condition levels.	Currently being conducted. On-going. Section 4 of this report compared current vegetation condition to benchmarks.
MZ6 Fencing	<ul style="list-style-type: none"> <li>The first action within the native vegetation area will be to exclude stock. Existing four-strand post-and-wire fence will be utilised and additional fencing installed where required. No barbed-wire will be used and the bottom strand will have a clearance of 400mm above the ground to allow the movement of native fauna. Stock will be herded out of the area prior to fencing taking place.</li> </ul>	Four-strand post-and-wire fence installed, no strands barbed and 400 mm separation from ground to lowest strand.	Fence erected. On-going monitoring.
Bush Regeneration in MZ6	<ul style="list-style-type: none"> <li>Weed management within MZ6 will target the treatment of Blackberry, African Olive, lantana, African Boxthorn, privet, Cape ivy and a variety of exotic perennial grasses such as African lovegrass, Rhodes grass, Kikuyu and couch.</li> <li>All weed management works will be supervised by a suitably qualified bush regenerator.</li> </ul>	Engagement of suitably qualified bush regeneration contractor to implement weed management program. Improvement in condition of offset bushland to within, or as near as possible to, benchmark condition levels.	Currently being conducted. On-going. Section 4 of this report compares current vegetation condition to benchmarks.

## 3. Methodology

---

### 3.1 Key performance criteria

The priority management actions, performance criteria and timeframes for the works in MZ5, as described in the BMP, are provided in Appendix A. The key elements include:

- Engagement of suitably qualified bush regeneration contractor to implement a primary, secondary and maintenance weed management program.
- Annual vegetation condition assessment.
- Improvement in condition of offset bushland to within, or as near as possible to, benchmark condition levels.
- Sustainable *Pimelea spicata* population with population numbers staying level with or exceeding current numbers.

Utilising these elements, Niche developed the monitoring methodology described in Section 3.2.

### 3.2 Monitoring methodology

The monitoring methodology will follow that outlined in the BMP.

Fixed plot vegetation monitoring for 2022 was conducted on 21-22 November 2022 by Isabel Lyons (Niche Ecologist) and Polly Barlow (South32 IMC).

#### 3.2.1 Fixed plot vegetation monitoring

The plot monitoring incorporated the following (Figure 2):

1. Five fixed BAM (Biodiversity Assessment Method) plots within MZ5, monitored annually.
2. Five fixed BAM plots within MZ6, monitored annually.
3. Comparison of site collected attribute data with the benchmarks for the PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain (CPW) from the PCTs Benchmarks Database. The BAM site attributes and their methods of measurement are provided in Appendix D.

Historically, the fixed plot vegetation monitoring has used the BioBanking Plot methodology. However, in 2017 a new industry standard was developed in association with the *Biodiversity Conservation Act 2016* (BC Act). Biodiversity Assessment Method (BAM) Plots have replaced BioBanking Plots as the standard method of collecting attribute data. As such, BAM plots have been utilised since 2017 instead of BioBanking Plots in order to collect data consistent with updated methodologies, PCTs and benchmarks.

#### 3.2.2 *Pimelea spicata* population census

Monitoring of the *Pimelea spicata* population takes place annually as part of the fixed plot vegetation monitoring, with counts of *P. spicata* stems occurring within the BAM Plots. *P. spicata* occurs within BAM plots MZ5\_001, MZ5\_003, MZ5\_004. These plots coincide to some extent with the monitoring plots used to count *P. spicata* during the population census, as detailed below. Annual observations within the BAM plots can monitor the extent of the population throughout zone MZ5 within areas monitored by Niche. General observations of the population outside of the plots are also undertaken annually to observe any obvious declines in population health.

A population census of the *P. spicata* population in the study area occurs once every five years to estimate the population size and determine the health of the population. With monitoring of the presence of the



species undertaken annually, it is determined that a full population census undertaken every five years is adequate. If the species was determined not to be present in plots where it is known to previously occur during the annual monitoring, this would trigger a full population census regardless of its scheduled timeframe.

The original census of the *P. spicata* population was undertaken in October 2012 and a second census was undertaken in February 2017. The most recent *P. spicata* census occurred in 2021/2022. The next round of monitoring is scheduled for 2026.

The monitoring of the *Pimelea spicata* population within MZ5 follows the methods used in the original surveys in 2012., involving counting every *Pimelea spicata* plant within five permanent 10 x 10 metre plots (Figure 2) and then extrapolating an average across the known extent of the population. The plots were set up as permanent sites in 2012, the first year of monitoring.

### 3.2.3 Photo-point monitoring

The photo-point monitoring was planned as follows:

1. Five fixed photo-points were sited within MZ5, coincident with the BAM plots.
2. Five fixed photo-points were sited within MZ6, coincident with the BAM plots.
3. An additional five photo-points were located within 200 metres of the external boundary of MZ5 to enable a visual assessment of the health of the vegetation in that area. Opportunistically favourable locations for photo-points were also recorded.

The photo-point locations are those shown in Figure 2.

### 3.2.4 Vegetation distribution monitoring

1. The boundary of the native vegetation within MZ5 and MZ6 will be mapped annually using a hand held GPS and interpretation of the available aerial imagery.
2. The mapped vegetation boundary will be compared each year, with the expectation that the extent of native vegetation within the offset area will increase with management.

## 3.3 Survey stratification

Stratification of the monitoring sites within the offset area was determined on-site whilst conducting the first round of monitoring surveys in spring 2012. Stratification was based on condition such that an accurate comparison of the improvement in that condition could be gained over time. Three broad condition categories existed on the site:

1. Woodland (Section 4.2.1)
2. Native Blackthorn (*Bursaria spinosa*) thicket (Section 4.2.2)
3. Pasture (Section 4.2.3).

Five BAM plots were conducted in each of MZ5 and MZ6 (ten in total) and distributed over the three condition types as shown in Table 3 and Figure 2.

**Table 3: Location of monitoring sites**

Management Zone	Area (ha)	Monitoring Site	Easting	Northing	Condition Class
MZ5	8.7	MZ5-001	290285	6216759	Woodland
		MZ5-002	290360	6216591	Woodland
		MZ5-003	290365	6216665	Woodland
		MZ5-004	290195	6216725	Native Blackthorn thicket
		MZ5-005	290017	6216883	Pasture
MZ6	12.43	MZ6-006	289842	6216418	Woodland
		MZ6-007	289990	6216474	Woodland
		MZ6-008	289852	6216665	Woodland
		MZ6-009	289925	6216342	Pasture
		MZ6-010	289974	6216678	Native Blackthorn thicket

\* Easting and Northing provided in GDA94, MGA Zone 56.

### 3.4 Data analysis and interpretation

A series of key attributes were identified for assessing the current condition of the vegetation and habitats in MZ5 and MZ6, the restoration pathways and progress towards attaining the conservation objectives. These attributes relate to species richness and percent cover of native plants in vegetation layers, as well as fauna habitat features and canopy regeneration. This monitoring report presents the 2022 monitoring data according to these key attributes.

Basic statistical analyses have been conducted incorporating temporal variation (i.e., changes over time) in vegetation condition to assess the magnitude and direction of change in vegetation communities. Statistical analysis conducted involved temporal comparisons of means and standard errors (variability in data between quadrats) between the average survey data from 2012 to 2022. Key attributes which would be most informative for management input were selected for comparison, such as native species diversity, percent cover of exotics and native canopy cover. Calculations of mean and standard error were not conducted where less than three plots were undertaken within a plant community type as this is not enough data to provide meaningful or statistically robust analysis. Therefore, analysis was limited to the woodland plots in MZ5 and MZ6.

Benchmark values based on the Plant Community Type (PCT) accessed from the Vegetation Information System (VIS) database were used to provide an indication of the condition of the vegetation in a broader context. It should be noted that these benchmark values are not site specific and therefore are not intended to represent a target for measuring restoration success. Comparison of site values with benchmark values is intended to provide a broader context for interpreting the restoration pathway and the trajectory of change (direction of change) as management measures are implemented.

### 3.5 Limitations

Some plant species are cryptic and can only be detected when flowering at certain times of the year. For example some orchids flower within certain seasons and cannot be detected at other times of the year.

The density of Native Blackthorn at plots MZ5-004 and MZ6-010 prevented the placement of the 50 metre transect tape. An estimate of the BAM composition, structure and function attributes were therefore used for the plot. Different staff to previous monitoring events were used and this may introduce observer bias in the results. Analysis of results should be undertaken with these limitations in mind.

## 4. Results

### 4.1 Flora recorded

A total of 85 species were recorded across ten floristic plots within the study area during the 2022 monitoring event (Appendix B). The number of species recorded varies slightly with each monitoring event, the observed differences are likely attributed to seasonal variation. The species diversity in 2022 is slightly lower than 2021, this may be linked to the increase of general weed cover across the study area, suppressing species diversity. During the current monitoring, 37 species were exotic which accounts for 43.5 percent of species recorded, a steady increase since 2019 (Table 4).

**Table 4: Flora recorded over monitoring years**

Year of survey	Total number species recorded	Number of exotic species recorded	Percentage exotic species recorded
2022	85	37	43.5%
2021	103	41	39.8%
2020	44	15	20%
2019	74	14	19%
2018	82	30	37%
2017	81	23	28%
2016	83	38	46%
2015	96	43	45%
2014	96	53	55%
2013	85		
2012	90		

## 4.2 Assessment of site attribute data

### 4.2.1 Woodland

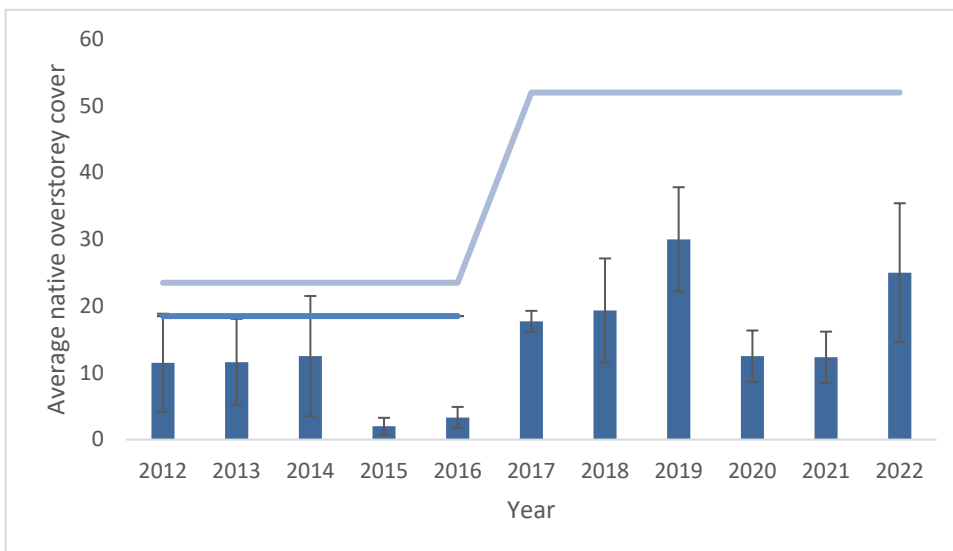
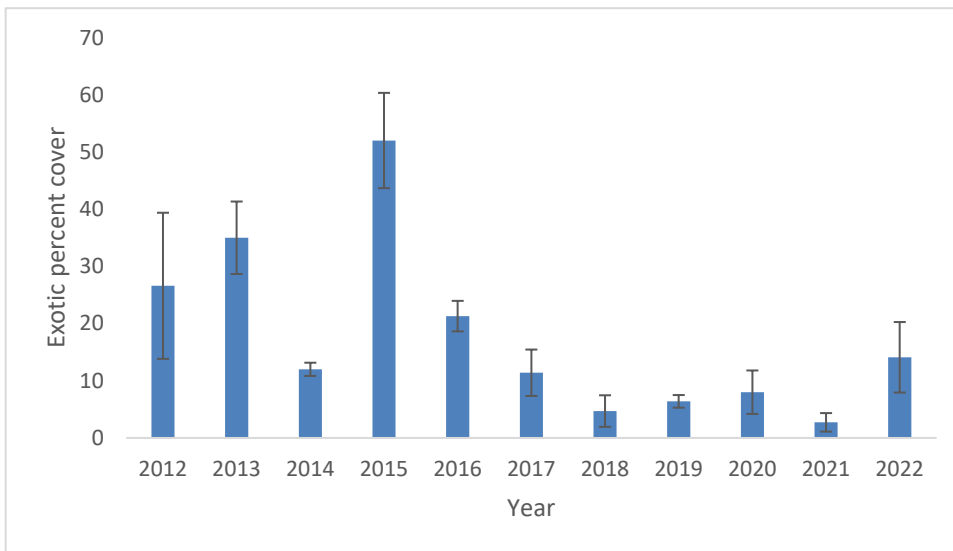
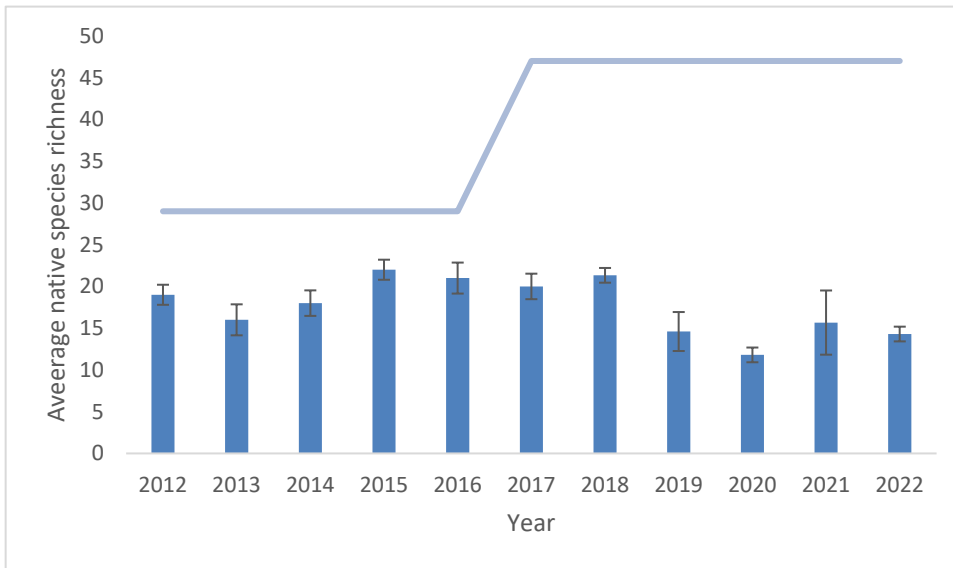


Plate 1. Woodland during 2022 at monitoring plot MZ5-003

#### 4.2.1.1 Plot data

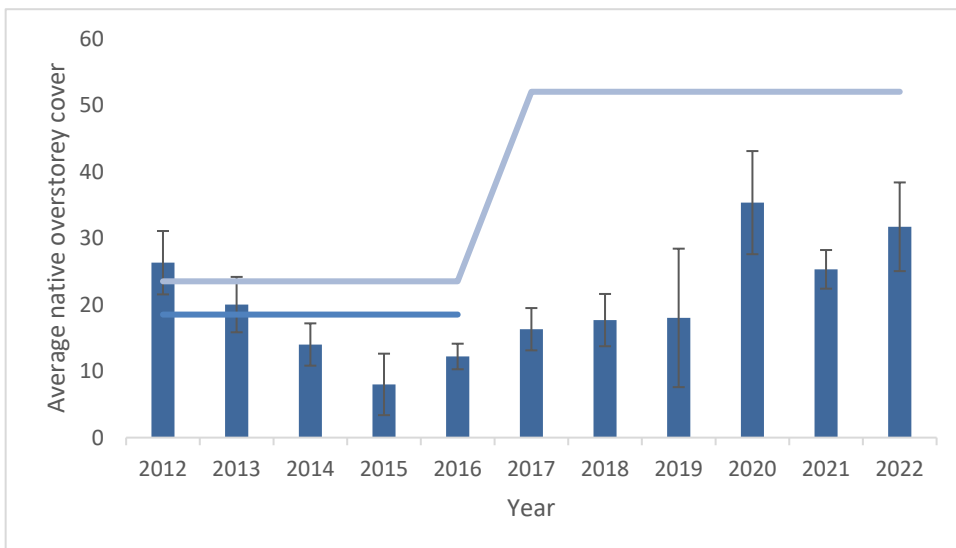
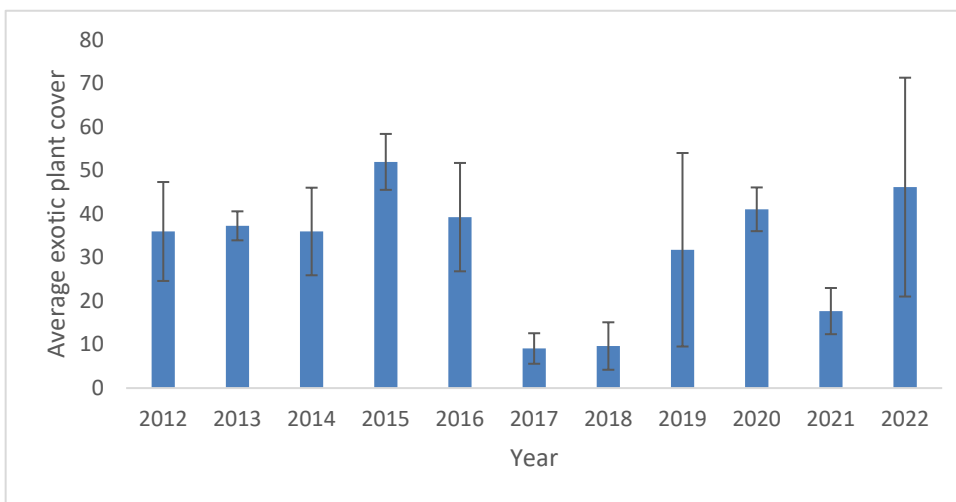
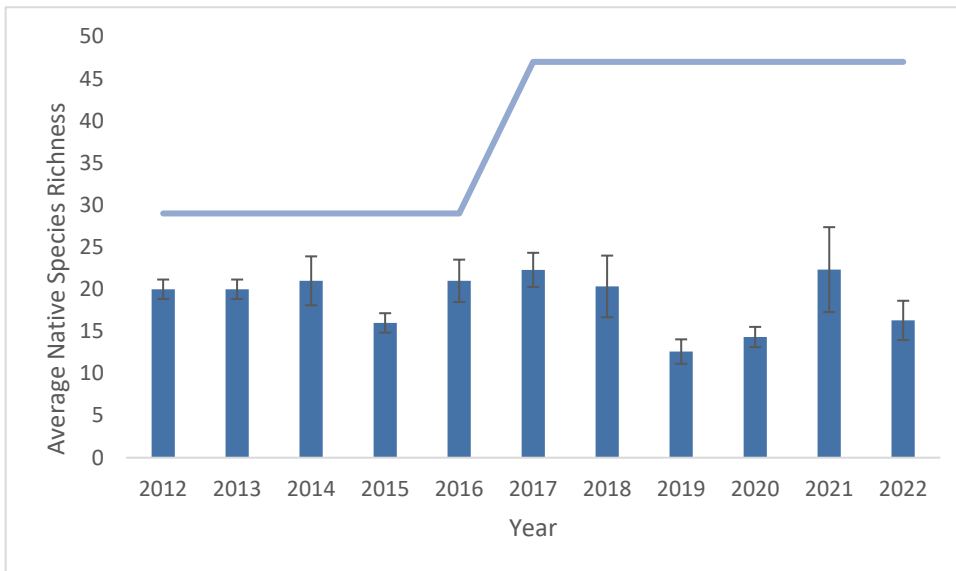
BAM site attribute data was collected at six sites that corresponded to a woodland structure. Three of the sites were collected from MZ5 (MZ5\_001, MZ5\_002 & MZ5\_003) and three were collected from MZ6 (MZ6\_006, MZ6\_007 & MZ6\_008). The data collected is contained in Table 8 (2017-2021 data) and Table 9 (2012-2016 data) (Appendix C). The tables also include the benchmarks for each of the site attributes for the relevant PCT (PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain). Benchmarks for 2012-2016 data are for Biometric Vegetation Type (BVT) HN529.

Graph 1 and Graph 2 show the temporal change for key attributes for woodland plots in MZ5 and MZ6 respectively and compare the average values to benchmarks (shown as line graphs).



**Graph 1: Comparison of key attributes for woodland plots in MZ5 (HN529/PCT850) (Note only High Threat Weeds (HTW) measured in 2017-2022, as per BAM methodology)**

Mean ( $\pm$ SE) 2012-2020 quadrat data ( $n = 3$ ). Benchmark values/ranges shown as line graphs.



**Graph 2: Comparison of key attributes for woodland plots in MZ6 (HN529/PCT850)**

Mean ( $\pm$ SE) 2012-2022 quadrat data ( $n = 3$ ). Benchmark values/ranges shown as line graphs

#### 4.2.1.2 Discussion

Compositionally, the 2022 data shows the woodland plots remaining below benchmark values for all growth forms in both MZ5 and MZ6, as was the case since 2014. In 2017 when the data updated to the BAM methodology the benchmarks are much higher on a state level and may not comprehensively represent the local vegetation quality but the ultimate objective for good quality remnant vegetation. The average native species richness for MZ5 in 2022 was 14, this is a slight decrease from the previous year. The average native species richness for MZ6 was 16 which is a decrease from the previous year (Table 5).

**Table 5: Native flora recorded from 2012-2022**

Year of survey	Average number of native species recorded	
	MZ5	MZ6
2022	14	16
2021	15	22
2020	12	14
2019	15	12
2018	21	20
2017	20	22
2016	21	21
2015	22	16
2014	18	21
2013	16	20
2012	19	20

Values of native species richness remains below benchmark in both MZ5 and MZ6 (Graph 1 and 2). It is likely over time with the continual management of the study area that the vegetation is likely to reach benchmark condition or show a trend towards it.

Structurally, the percent cover of all growth forms remained below benchmark in 2022 for the woodland plots, with the exception of shrub cover in MZ5 which was above the benchmark (average percentage cover MZ5=45.2). The shrub cover in MZ5 has been above benchmark for all years, except 2021.

The average native overstorey cover (tree cover) for 2022 was below benchmark with an increase in MZ6 and MZ5 compared with the previous year (see Graph 1 and 2). Regeneration of canopy species was observed in all plots, except for plot MZ6\_008. Given the current management of MZ5 and MZ6 and the fact that five of the six plots had regenerating overstorey species (stem size class <5 cm and 5-9cm DBH present), it is considered that MZ5 and MZ6 are likely to maintain a healthy overstorey canopy in future years.

Native ground-cover grasses (grass cover/NGCG) averaged below benchmark. However, over the past few years, there appears to be an upward trend in cover. In 2022 the average cover recorded was 25.4% compared with the previous year which was 7.5% and in 2020 it was 1.2%. This increase is likely the result of wetter site conditions influencing growth of ground-cover grasses. Similarly, the average grass cover has notably increased in MZ5 during the 2022 monitoring year (MZ5=58.4).

The 2022-2017 monitoring data shows a decrease in native ground-cover grasses compared with 2016, however it should be noted that the method for collecting cover data has changed with BAM (from BBAM).

Native shrub cover in MZ5 remained above benchmark in all years from 2022-2016. As stated in the previous monitoring reports, this was attributed to the regeneration of Native Blackthorn, which has steadily increased over the monitoring period. With management it is anticipated that the shrub cover would stabilise in the offset area, however the high level of rainfall between 2020-2022 has made the completion of management actions difficult, the increase in shrub cover in MZ5 may be attributed to this. Comparatively, the shrub cover in MZ6 has slightly decreased since 2019 and a below benchmark cover of 13.3% was recorded in 2022. However, this may be attributed to the increase of weed species since 2019 (with the exception of a decrease in weed cover in 2021).

Native ground-cover other (NGCO) remained below benchmark at less than 1% (benchmark 5%) in 2022 and has been since 2017, which was a decrease from 2016 where this attribute was within benchmark for the first time since monitoring commenced, and an increase from 2015 average. Again, the change in methodology could be attributed to this change.

Functionally, average litter cover was above benchmark value (35) in MZ6 (81) but below benchmark in MZ5 (25.4). Trees with hollows (NTH) were present in four of the six plots in 2022, which is two more NTHs compared to the 2021 data. The length of fallen logs (FL) remained well below the benchmark of 40 metres in all of the woodland plots except for M5\_001 which recorded 45 metres of fallen logs.

Exotic plant cover (EPC) during 2022 was higher in MZ5 (14.7%) compared with 2021 data at 2.7% (8% in 2020, 6% in 2019, 5% in 2018). However, this result is comparable with the 11% EPC recorded in 2017. EPC was also higher in MZ6 (46.2%) during the 2022 monitoring, compared with 2021 data at 17.7. However, the 2022 result is comparable with the 2020 data (41.1%) and the 2019 data (31.8) (Graph 1 and Graph 2). The increase in EPC across both management zones could be attributed to the large amount of rainfall the study area has received during 2022, encouraging weed growth despite weed management being undertaken.

Woody weeds such as African Olive, Lantana and African Boxthorn are persisting in the woodland area throughout MZ5 and MZ6 and it is recommended that woody weed control continue to be undertaken in this area in 2023. In many areas of both MZs the African Olive is dominating the ground cover with juvenile individuals sprouting rapidly underneath the canopy.



## 4.2.2 Native Blackthorn thicket



**Plate 2. Native Blackthorn thicket in plot MZ5-004 in 2022**

### 4.2.2.1 Plot data

BAM site attribute data was collected at two sites within patches of Native Blackthorn thicket. One site was located within the M5 offset area (MZ5\_004), and the other in the MZ6 (MZ6\_010) voluntary management site. The data collected is presented in Table 10 (2017-2021 data) and Table 11 (2012-2016 data)(Appendix C), which also includes the benchmarks for each of the site attributes for the relevant PCT (PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain). Benchmarks for 2012-2016 data are for BVT HN529.

### 4.2.2.2 Discussion

The 2022 results for the Native Blackthorn thicket were relatively consistent with previous monitoring years (except for 2021 where shrub cover decreased across both MZ5 and MZ6). Results for the plots within the Native Blackthorn thicket should be interpreted with caution, as the thicket in both MZ5 and MZ6 were so dense that it prevented access to much of the plot and it was not possible to run the 50 m transect out. As such, estimates have been used to gather the data since 2015. In the 2022 monitoring round the vegetation was so thick that accessing MZ6\_010 was not possible and representative data had to be collected within proximity to the plot.

Compositionally, Native Blackthorn thickets plots scored below benchmark for all growth form groups in 2022, consistent with previous years. Native plant species richness (NPS) has scored below benchmark in all monitoring years, including 2022. However, this was to be expected given the dominance of Native Blackthorn.

Structurally, the percent cover of all growth forms has remained below benchmark for the Native Blackthorn thicket plots since 2017, with the exception of shrub cover, which was above benchmark in all years (except 2021 where shrub cover notably decreased in MZ5). No canopy species were recorded within the Native Blackthorn thicket plots, therefore native overstorey cover (tree cover/NOS) and overstorey regeneration (presence of stem size class <5 cm DBH/OR) were zero. This report and previous monitoring reports have recommended thinning the Native Blackthorn to diversify the habitat structure and allow for natural regeneration. One such ecological benefit may be in controlling the Bell Bird population, as discussed below. As previously stated, the density of Native Blackthorn in these areas is considered unnaturally high.

Native ground-cover grass (NGCG) was below benchmark in 2022 and has been since 2017. Native ground-cover other (NGCO) in 2022 was comparative to 2020-2017 data, and above 2021 data.

The 2022 data for EPC scored 40.9% in MZ5 and 40.1% in MZ6. This is a notable increase from 2021 (MZ5=5.2% and MZ6=20.3%), however, the MZ6 score is comparable to 2020 which was 40%. This notable increase may be due to the higher level of rainfall encouraging weed growth. African Olive seedlings were observed across both management zones in a high density under mature specimens. Lantana and Blackberry were recorded and observed during the 2022 monitoring across both management zones. Weed maintenance should be undertaken in this area to prevent African Olive, Blackberry and Lantana dominating.

In the Native Blackthorn thicket plots, trees with hollows (NTH) and the length of fallen logs (FL) were zero in 2022 and have been since 2017, as would be expected in the absence of native overstorey cover.

As recommended in previous monitoring reports, bush regeneration works should continue and focus on the removal of African Olive and Blackberry within the vicinity of plot MZ5\_004 and MZ6\_010, due to the presence of the threatened plant, *Pimelea spicata*, at MZ5\_004. Any management in this area should be conducted with care so as to minimise any impact to *Pimelea spicata* individuals. In this area the population of *Pimelea spicata* is largely associated with the Native Blackthorn thicket.

### 4.2.3 Pasture



Plate 3. Plot (MZ5-005) within pasture land during 2022

#### 4.2.3.1 Plot data

BAM site attribute data was collected at two sites dominated by pasture. One site was located within the MZ5 offset area (MZ5\_005) and the other in the MZ6 voluntary management area (MZ6\_009). The data collected are contained in Table 12 (2021-2017 data) and Table 13 (2012-2016 data) (Appendix C), which also includes the benchmarks for each of the site attributes for the relevant PCT (PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain). Benchmarks for 2012-2016 data are for BVT HN529.

#### 4.2.3.2 Discussion

Compositionally, pasture plots scored below benchmark in 2022 for all growth form groups and was consistent with previous years. Total native plant species richness (NPS) was overall lower than each of the woodland and Native Blackthorn thicket condition classes for both MZ5 and MZ6. As stated in the previous monitoring reports, this is an indication of the poor condition in these areas, the high percentage cover of exotic pasture grasses and few key native grasses (NGCG) such as Weeping Grass (*Microlaena stipoides*), Kangaroo Grass (*Themeda australis*) and Wallaby Grass (*Rytidosperma racemosum*).

As discussed in previous monitoring reports (Niche 2012, 2013, 2015, 2016, 2017, 2018, 2019, 2020 and 2021), effective regeneration of these areas would be difficult without some re-vegetation of overstorey species, though in time Native Blackthorn is likely to establish. As discussed in Niche (2014) better patches of pasture that are dominated by native grasses should be prioritised if any weed management work is conducted in these pastures. Chilean Needle Grass (*Nassella neesiana*) has been recorded in the pasture

plot in MZ6 since 2017 and is observed to be dominant in parts of pasture surrounding the woodland areas. This exotic grass is very invasive and should be appropriately controlled as part of the bush regeneration program. In 2022 Chilean Needle Grass was also observed in the grassy areas of MZ5.

### 4.3 Bell Minors

During the monitoring surveys in 2017-2019, it was noted that Bell Miners were abundant in the MZ5 area. Management actions to reduce the Bell Miner colony should be considered as the birds seem to be having an impact on mature overstorey in woodland areas in MZ5. Eucalypt dieback in association with Bell Miners is listed as a Key Threatening Process on the NSW *Biodiversity Conservation Act 2016* (Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners). However, during the 2020, 2021 and 2022 monitoring surveys the Bell Miners were not in large numbers, and this may be due to the now lack of habitat.

An independent review of bell Miner associated dieback was commissioned by Office of Environment and Heritage, which details management recommendations for bell Miner associated dieback (Silver and Carnegie 2017):

- Prevention:
  - Disturbance of the canopy should be minimised where possible.
  - Where the canopy is disturbed, rehabilitation should focus on re-establishment of a canopy as soon as possible to limit unnatural understorey density.
  - Site rehabilitation should include ongoing management of invasive weeds, particularly those that minimise natural regeneration and can act as superior nesting sites for Bell Miners.
  - Exclusion of fire is an artificial disturbance activity that can lead to woody weed invasion. Appropriate fire regimes should be designed and implemented.
- Treatment
  - A site assessment should be undertaken to ensure that Bell Miners are present and psyllid attack is the primary cause of dieback.
  - If the prevailing vegetation community is naturally dense in the understorey or midstorey then consideration should be given to not intervening in the site as Bell Miner associated dieback (BMAD) may be a natural process there.
  - At sites with an unnatural level of understorey and/or midstorey density the viability of the seed bank for rehabilitation without planting should be assessed.
  - In sites with high value assets being impacted by BMAD (e.g. threatened flora or fauna) consideration should be given to culling of Bell Miners followed by site rehabilitation. This has been shown to have an immediate reduction on exclusion of other bird species for example.
  - The primary aim of site treatment should be to reduce the occurrence of superior nesting sites for the Bell Miner. The method best to use to achieve this will depend on site-specific characteristics.

Management at the offset site would involve undertaking primary weed management works surrounding areas of woodland. Weed management would involve removing all woody weeds, including African Olive, Lantana and African Boxthorn and potentially plantings of native overstorey species, primarily Eucalyptus. Given the potential decrease of Bell Miners in MZ5 over the last three survey periods, an additional recommendation is to monitor the presence of Bell Miners and canopy dieback in MZ5 over the coming years and alter the management plan if required.

### 4.4 *Pimelea spicata* annual count

Annual counts of *Pimelea spicata* where they occur within the fixed monitoring BAM plots are required. *Pimelea spicata* is historically known to occur in plots MZ5\_001, MZ5\_003, and MZ5\_004. In 2021 and

2022, the species was also possibly recorded in MZ5\_002 (see details below Table 6). The annual count trigger for intervention is significant loss of population (>20% decline from one year to the next in population across plots), which would trigger full scale census.

At the time of the 2022 surveys, there were no flowers present, therefore the results are likely an underestimate of the *Pimelea spicata* stem count within the plots. Note, previously only percent cover was estimated for *Pimelea spicata* within plots (not stem count), so stem count data is restricted to the years that the annual census was undertaken, 2019, 2020, 2021 and the current survey (2022).

**Table 6. Stem count of *Pimelea spicata* within fixed monitoring plots**

Plot code	2012	2013	2014	2016	2019	2020	2021	2022
MZ5_001	12	0	20	47	14	0	0	0
MZ5_002	0	0	0	0	0	0	1 (possible record, to confirm when in flower at next census)	10 (possible record, to confirm when in flower at next census)
MZ5_003	5	0	4	4	0 (2 plants at 30 m mark of transect)	0	0	0
MZ5_004	52	218	61	7	47	50	50	50
Total count within BAM plots	69	218	85	58	61	50	51 (including possible record)	60 (including possible record)
							50 (excluding possible record)	50 (excluding possible record)
% change from previous year	-	+216%	-61%	-31.7%	+5.17%	-18%	+2% (included possible record)	+17.60% (including possible records)
							No change (excluding possible record)	No change (excluding possible record)

In 2021 and 2022, a possible new recording of *Pimelea spicata* was made at plot MZ5\_002, which needs to be confirmed at the next population census when the species is in flower (location of new *Pimelea spicata* record: E290361.016, N6216582.182). The species has not historically (prior to 2021) been recorded at this location and occurs outside of the previously mapped extent of the species on site. If confirmed, this would indicate the species is expanding on site to new areas. The confirmation of *Pimelea spicata* at this location would occur at the next census, or the next monitoring survey which coincides with an on-site flowering event for the species.

Overall, there has been an increase in stem counts within the plots from 2019 to 2022 from 50 to 60. These numbers include the possible new records to be confirmed at plot MZ5\_002). Across all BAM plots, there

has been an increase in *Pimelea spicata* population (including the possible new records), or the population has remained steady (excluding the possible new records). Either way, a full-scale census is not triggered (Table 6).

Differences in population counts between years are likely due to varying conditions around the time of monitoring (wet season/dry season). During a dry season, the species may not occur above the ground. This is supported by Recovery Plan for *Pimelea spicata* (DEC 2005) which states:

*‘It is difficult to accurately estimate population size and extent of occurrence for P. spicata given that the species is cryptic and difficult to detect, particularly when not in flower, and may not be apparent aboveground during drought conditions’.*

Every 5 years a full scale population census for *Pimelea spicata* is to be undertaken in the known areas and extensively across the two management zones, the last census was conducted in 2021. The next census is scheduled to occur with the next monitoring report (Spring 2026 – FY26/27) .

The key on-going management actions include excluding stock permanently from MZ5, feral animal control (evidence of rabbit occupation during previous surveys), weed management targeting Blackberry and African Olive within the extent of the population (these exotic species were observed in abundance within known habitat) and monitoring the health of the population as native herbs and grasses compete more vigorously upon the exclusion of grazing. Any weed management in these areas should exclude spraying of Blackberry as many *Pimelea spicata* individuals were present within and around blackberry patches. Any blackberry patches throughout the site should be visually inspected for *Pimelea spicata* individuals prior to spraying.

It should be noted that the long-term absence of any disturbance mechanism may itself be detrimental to the longevity a population as it appears that at least some disturbance may be an important germination cue for the species (NPWS 2004).

#### **4.5 Photo-points**

Photo-point monitoring was conducted at each of the locations shown in Figure 2. A selection of the photo points has been provided in Appendix E (Table 14- Table 20). Changes evident include increased cover of ground and shrub layer over the monitoring period (2012 to present). Continued woody weed control is required in 2023, evidenced by the increase in woody weeds in the photo point monitoring.

## 4.6 Vegetation distribution monitoring

The extent of the wooded native vegetation of MZ5 and MZ6 was mapped using aerial photography from NearMap (latest imagery 16 July 2022) and data from the field surveys. The results were then compared with previous monitoring years.

An increase in woody native vegetation cover has been detected since the 2021 monitoring event. The vegetation extent is illustrated in Figure 3 and Table 7.

**Table 7. Woody native vegetation changes per monitoring year**

Management zone	2011 (NPWS 2003)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
M5 Woody vegetation	5.28 ha	6.58 ha (1.3 ha increase)	6.73 ha (0.15 ha increase)	7.19 ha (0.46 ha increase)	7.19 ha (no detectable increase since 2014)	7.19 ha (no detectable increase since 2014)	7.27 ha (0.08 ha increase)	7.27 ha (no detectable increase since 2017)	7.27 ha (no detectable increase since 2017)	7.27 ha (no detectable increase since 2017)	7.62 ha (0.35 ha increase)	7.63 ha (0.01 ha increase)
M6 Woody vegetation	4.49 ha	7.99 ha (3.5 ha increase)	8.34 ha (0.35 ha increase)	8.79 ha (0.45 ha increase)	8.79 ha (no detectable increase since 2014)	8.79 ha (no detectable increase since 2014)	8.91 ha (0.12 ha increase)	8.91 ha no detectable increase since 2017)	8.91 ha no detectable increase since 2017)	8.91 ha no detectable increase since 2017)	9.30 ha (0.39 ha increase)	9.42 ha (0.12 ha increase)
<b>Total native woody vegetation</b>	<b>9.77 ha</b>	<b>14.57 ha</b>	<b>15.07 ha</b>	<b>15.98 ha</b>	<b>15.98 ha</b>	<b>15.98 ha</b>	<b>16.18 ha</b>	<b>16.18 ha</b>	<b>16.18 ha</b>	<b>16.18 ha</b>	<b>16.92 ha</b>	<b>17.05 ha</b>

## 5. Recommendations

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The management actions recommended in the BMP are provided in Appendix A. A summary of the management actions implemented throughout 2022-2023, and a qualitative assessment of the outcomes and recommendations for 2023-24 are each described below.

### 5.1 Fencing and stock management

**Description/Requirement** – Stock exclusion through the upgrading of existing fences and installation of new fences where required. Stock excluded from offset area (MZ5).

**Enacted management** – New four-strand post and wire fencing was installed in 2011 and stock removed from the offset area. The top strand is barbed wire.

**Outcome (Spring 2022)** – Fencing was intact. No recent evidence of stock in offset areas during field survey.

#### Recommendations for 2023

1. Continue to ensure integrity of fencing through regular inspections of the site
2. Continue to exclude stock from MZ5.

### 5.2 Bush regeneration

**Description/Requirement** – Primary, secondary and maintenance weed management by Toolijooa was conducted between 2011 and 2018 in the MZ5 offset area, and the MZ6 voluntary management area. Since 2019 Landcare Australia (2019) has undertaken primary, secondary and maintenance weed management. In 2022 Landcare Australia undertook primary and maintenance weed management over nine site visits between January and November (Landcare Australia 2022).

Previous weed species targeted include: Blackberry (*Rubus fruticosus*), African Olive (*Olea europaea* subsp. *cuspidata*), Lantana (*Lantana camara*), African Boxthorn (*Lycium ferocissimum*), Privet (*Ligustrum* sp.), Cape Ivy (*Delairea odorata*) and a variety of exotic perennial grasses such as African lovegrass (*Eragrostis curvula*), Rhodes grass (*Chloris gayana*), Chilean needle grass (*Nassella neesiana*) and Kikuyu (*Pennisetum clandestinum*).

The weed species identified and targeted in 2022 included: *Olea europaea* subsp. *cuspidata* (African olive), *Lycium ferocissimum* (African boxthorn), *Rubus* sp. (Blackberry), *Brassica* sp. (Brassica), *Cirsium vulgare* (Spear thistle), *Onopordum acanthium* (Scotch thistle), *Conyza* sp. (Fleabane), *Echium plantagineum* (Paterson's curse), *Setaria sphacelata* (Pidgeon grass), *Gomphocarpus fruticosus* (Cotton bush), *Sida rhombifolia* (Paddy's Lucerne) and *Verbena bonariensis* (Purpletop).

**Enacted management** – Landcare Australia was engaged to undertake bush regeneration in 2019, 2020, 2021 and 2022. Landcare Australia has completed 15 site visits on the following dates: 2 July 2020, 10 November 2020, 8 December 2020, 15 January 2021, 25 March 2021, 29 April 2021, 25 January 2022, 24 March 2022, 20 April 2022, 26 May 2022, 22 June 2022, 4 August 2022, 2 September 2022, 19 October 2022 and 10 November 2022.

**Outcome (Spring 2022)** – Weed density has increased in the previous 15 months as a result of the above average rainfall in the region. Both management zones are largely impacted by the presence of African olive and to a lesser extent, African boxthorn, Blackberry and a range of herbaceous species from previous land uses (Landcare Australia 2022).



## Recommendations for 2023

1. Continue bush regeneration works, to target woody and vine weeds within better condition areas, beneath driplines of large trees and adjacent to regenerating overstorey plants.
2. Ensure that herbaceous weeds and introduced grasses are targeted within woodland areas.
3. Areas which have had large woody weed removal should be followed up to promote native regeneration and ensure herbaceous weeds do not dominate.
4. Targeted spraying of Blackberry (or otherwise recommended treatment) throughout MZ5 and MZ6. Ensure that those areas previously treated are re-inspected and follow up conducted where required.
5. Targeted removal of Chilean Needle Grass, which is beginning to dominate in parts of the pasture areas surrounding the woodland.
6. Ensure staff of the bush regeneration company are familiar with *Pimelea spicata* so as to identify and avoid individuals during bush regeneration activities, especially weed spraying.
7. Selectively remove/trim areas of Native Blackthorn thicket surrounding eucalypts. This will help reduce Bell Birds population.

### 5.3 Monitoring of native vegetation and *Pimelea spicata*

**Description/Requirement** – Design a program to determine the success of management or the need for intervention including assessment of improvement in the condition of native vegetation, annual *Pimelea spicata* population counts, assessment of species and habitat condition and monitoring against stochastic environmental events.

**Enacted management** – Niche was engaged to develop and implement a monitoring strategy. The methodology is based on the BioBanking Assessment Methodology (DECCW 2014) (now modified to be consistent with the Biodiversity Assessment Method (DPIE 2020), photographic records and formalised *Pimelea spicata* population counts.

**Outcome (Spring 2022)** – Monitoring of native vegetation was undertaken in November 2022, using five fixed BAM plots in MZ5, five fixed BAM plot in MZ6 and a number of photo points. Weed control is required in 2023 to reduce exotic species cover.

Monitoring of *Pimelea spicata* was conducted in October for the 2021/2022 monitoring year, using five fixed monitoring plots established in 2012. There has been a significant increase in the estimated population of *Pimelea spicata*, however individual monitoring plots have historically showed a fluctuation in counts.

#### Recommendation for future monitoring

1. Conduct the next monitoring of native vegetation in Spring 2023.
2. Conduct the population census during next monitoring of *Pimelea spicata* during its correct flowering period (October-November) in 2026.
3. Maintain annual presence/absence and stem count monitoring for *Pimelea spicata* within BAM plots, and continue opportunistic observations of the presence and spread of the species throughout the offset area.
4. Ensure staff of the bush regeneration company are familiar with *Pimelea spicata* so as to identify and avoid individuals during bush regeneration activities, especially weed spraying.

## 6. Conclusion

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The aim of this report was to demonstrate the results of the on-going management actions at the offset area (MZ5) and voluntary management area (MZ6) associated with the Appin Ventilation Shaft Site No.6 Site.

The offset area requires an on-going commitment to weed management and ecological restoration in order to reach a benchmark state and successfully achieve and improve or maintain outcome for biodiversity.

Recommendations for future adaptive management and monitoring of the management zones include:

1. Continue to ensure integrity of fencing through regular inspections.
2. Continue to ensure stock remains excluded from MZ5 in order to ensure the recovery and conservation of the *Pimelea spicata* population.
3. Continue to target woody and vine weeds within better condition areas, beneath driplines of large trees and adjacent to regenerating overstorey plants.
4. Conduct herbaceous weed management and introduced grass management within areas of woodland and immediate surrounds.
5. Continue targeted spraying of Blackberry (or otherwise recommended treatment) throughout site. This includes re-visiting areas that have been previously treated to ensure treatment has been effective.
6. Consider management actions to reduce the Bell Miner colony which seems to be having an impact on mature overstorey. This would involve initially undertaking primary weed control works surrounding areas of woodland, or where emergent canopy species occur within Native Blackthorn thicket. First removing all woody weeds, including African Olive and African Boxthorn; then thinning areas of Native Blackthorn (*Bursaria spinosa*).
7. Consider feral herbivore control (rabbits), as evidence of rabbit occupation within *Pimelea spicata* habitat was observed.
8. Ensure bush regeneration staff are familiar with the identification of *Pimelea spicata*.
9. Maintain the timing of annual vegetation monitoring surveys to late October - early December such that the data collected for the species richness and native ground-cover attributes are optimised.

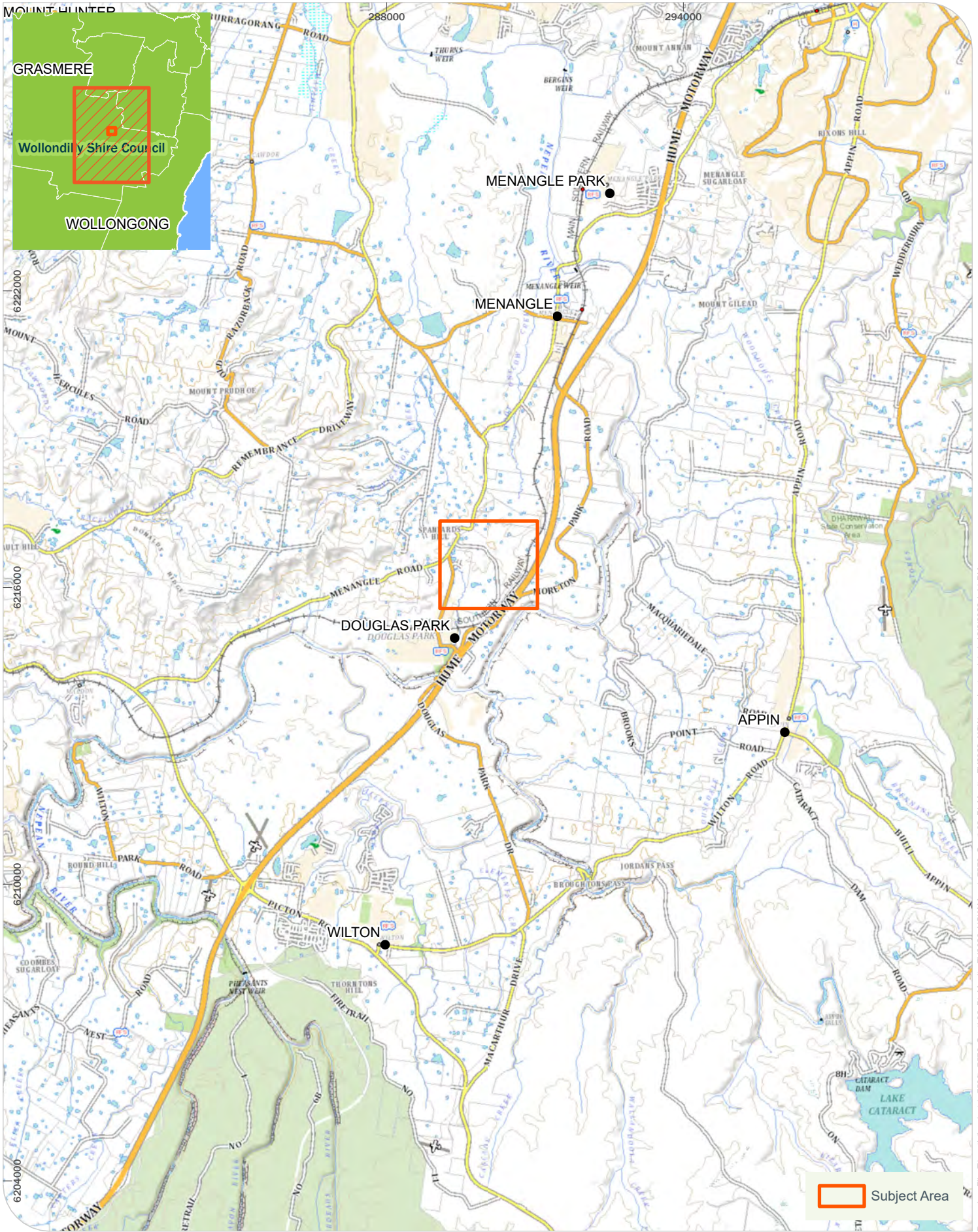
## References


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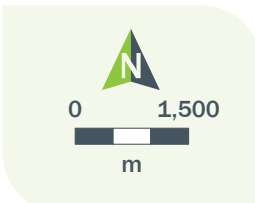
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## Figures

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 Subject Area

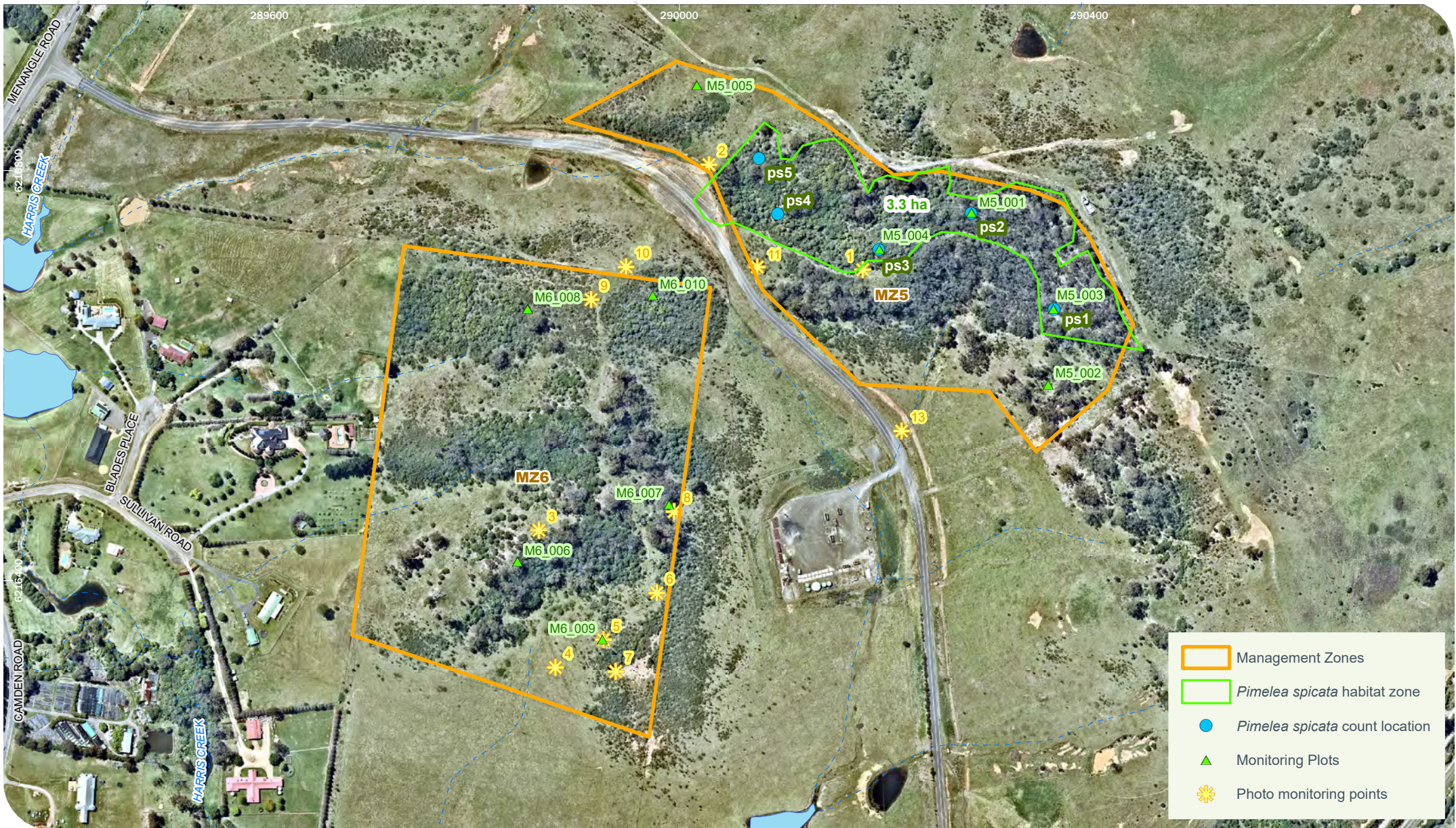


**Location Map**  
**VentShaft 6 - Annual Biodiversity Monitoring FY2023**

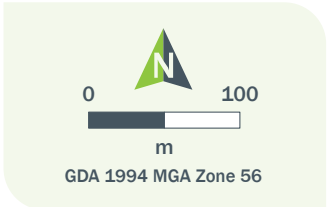
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 Niche Proj. #: 7578  
 Client: South32 - IMC

**Figure 1**

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- Management Zones
- Pimelea spicata* habitat zone
- *Pimelea spicata* count location
- ▲ Monitoring Plots
- ✦ Photo monitoring points



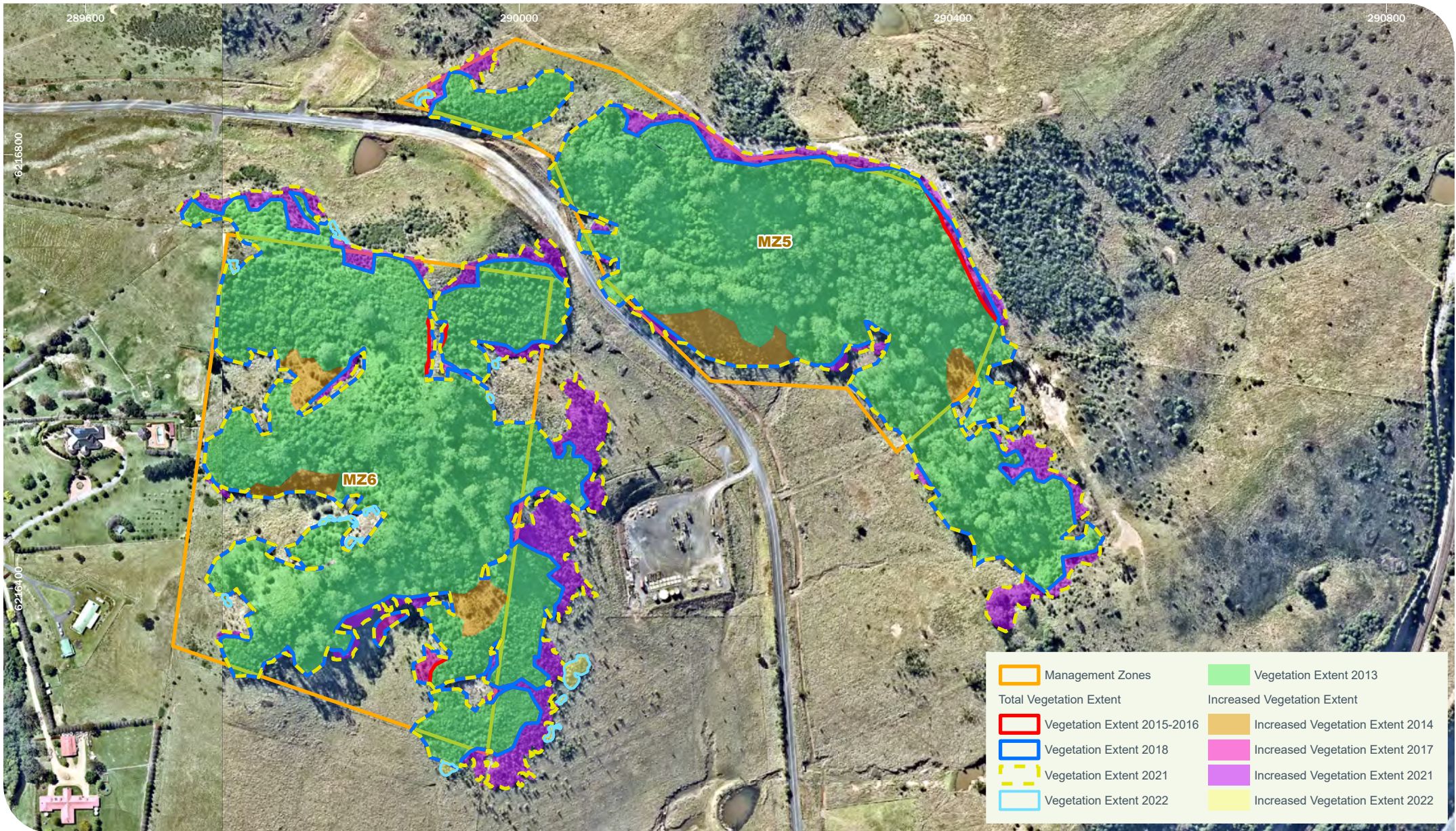
Niche PM: Sian Griffiths  
 Niche Proj. #: 7578  
 Client: South32 - IMC

## Monitoring Locations VentShaft 6 - Annual Biodiversity Monitoring FY2023

Figure 2

Imagery: Nearmap (October 2021)

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## Appendix A– Management actions, performance criteria, corrective actions and timeframes

Action	Description	Performance target (milestones)	Corrective actions	Timeframe
MZ5 and MZ6 Fencing	The first action within the offset area will be to exclude stock. Existing four-strand post-and-wire fence will be utilised and additional fencing installed where required. No barbed-wire will be used and the bottom strand will have a clearance of 400mm above the ground to allow the movement of native fauna. Stock will be herded out of the area prior to fencing taking place.	Four-strand post-and-wire fence has been installed, no strands barbed and 400 mm separation from ground to lowest strand.	Maintenance of fencing – fencing to be inspected at regular intervals and repairs made as required.	Every 3 months
Bush Regeneration in MZ5	Primary, secondary and maintenance weed management within MZ5 will target the treatment of Blackberry, African Olive, Lantana, African Boxthorn, Privet, Cape Ivy and a variety of exotic perennial grasses such as African lovegrass, Rhodes Grass, Kikuyu and Couch. All weed management works will be supervised by a suitably qualified bush regenerator. A team of four bush regenerators will be engaged for five days for the primary weeding and then a team of two for one day every four months thereafter for secondary and maintenance weed management as required.	Engagement of a suitably qualified bush regeneration contractor to implement primary, secondary and maintenance weed management program has occurred. Annual vegetation condition assessment has commenced. Improvement in condition of offset bushland to within, or as near as possible to, benchmark condition levels – on-going.	On-ground weed management regime to be adaptable and able to respond to changing conditions and weed problems. Given that the offset area has an intact soil profile and moderate resilience, sound bush regeneration methods and observance of integrated pest management should minimise the need for corrective actions. Weed management program in offset area to be annually reviewed and altered actions documented and implemented. Revegetation with locally collected native vegetation of local genetic stock as recommended by an appropriately qualified expert.	Annually
<i>Pimelea spicata</i> Monitoring program	Design a program to determine the success of management or the need for intervention. Annual population counts within permanent plots. 5 yearly population census. Condition of individual plants from mixed cohorts. Condition of habitat.	Sustainable <i>Pimelea spicata</i> population with population numbers staying level with or exceeding current numbers.	Annual count trigger for intervention is significant loss of population (>20% of monitored population within BioBanking Plots). Response: undertake full scale census. Stochastic events (such as one off fire events) will reset the baseline population size which will be determined	Annually as part of the fixed plot vegetation monitoring



Action	Description	Performance target (milestones)	Corrective actions	Timeframe
	<p>Annual inspections of fencing to ensure maintenance and up-keep.</p> <p>Regular site visits the potential presence of stock and/or feral herbivores that have breached fencing to ensure that such impact is eliminated by fencing and that trapped stock or feral herbivores are freed.</p> <p>Monitoring against stochastic events.</p>		<p>after a population census immediately after the event and then again at six, twelve, eighteen and twenty four months post disturbance.</p> <p>5 yearly population census trigger for intervention is:</p> <ul style="list-style-type: none"> <li>• &gt;35% decline in population from preceding census; or</li> <li>• Two consecutive (over two census') declines of &gt;20%; or</li> <li>• Area of occupancy is mapped to decrease to 50% or lower than originally mapped.</li> </ul> <p>Intervention Actions:            Stop regeneration works;            Consult with experts (RBG Mt Annan);            Implement actions as recommended by experts; additional actions may include slashing of competing native grasses, thinning of competing native shrubs or trees (e.g., <i>Bursaria spinosa</i>), ecological burning or resting of weed management until the population stabilises.. Crash grazing should only be utilised as a last resort. In emergency situations, plant rescue and re-introduction may be required.</p>	<p>and population census undertaken every five years</p>
<p>Bush Regeneration in MZ6</p>	<p>Weed management within MZ6 will target the treatment of Blackberry, African Olive, Lantana, African Boxthorn, Privet, Cape Ivy and a variety of exotic perennial grasses such as African Lovegrass, Rhodes Grass, Kikuyu and Couch.</p> <p>All weed management works will be supervised by a suitably qualified bush regenerator.</p>	<p>Engagement of a suitably qualified bush regeneration contractor to implement weed management program has occurred</p> <p>Improvement in condition of offset bushland to within, or as near as possible to,</p>	<p>On-ground weed management regime to be adaptable and able to respond to changing conditions and weed problems. Given that the native vegetation areas have an intact soil profile and moderate resilience, sound bush regeneration methods and observance of integrated pest management should minimise the need for corrective actions.</p>	<p>Annually</p>

Action	Description	Performance target (milestones)	Corrective actions	Timeframe
		benchmark condition levels – on-going.	Weed management program in native vegetation area to be annually reviewed and altered actions documented and implemented.	

## Appendix B. Plant species list (2022)

Scientific name	M5_001		M5_002		M5_003		M5_004		M5_005		M6_006		M6_007		M6_008		M6_009		M6_010	
	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A
<i>Acacia implexa</i>															5	10				
<i>Acacia</i> sp.	0.5	1																		
<i>Anagallis arvensis</i>			0.2	200	0.1	13	0.2	500	0.1	20	0.1	50	0.1	5	0.1	10	0.1	5	0.1	100
<i>Angophora floribunda</i>											10	1								
<i>Araujia sericifera</i>	0.1	5			0.1	1	0.1	2							0.5	10				
<i>Asparagus asparagoides</i>	0.2	50			0.1	1	0.1	5			0.1	1	0.1	5					0.1	5
<i>Asperula conferta</i>									0.1	100					0.1	50				
<i>Austrostipa</i> sp.			0.1	5																
<i>Bidens pilosa</i>																	0.1	5		
<i>Bothriochloa macra</i>									0.5	100	0.1	10	0.1	10			0.5	100		
<i>Bromus catharticus</i>									0.1	10										
<i>Bromus diandrus</i>							0.5	50	20	500	5	500	0.2	50			1	100		
<i>Bromus hordeaceus</i>			0.1	1													15	500		
<i>Brunonia australis</i>					0.5	200														
<i>Brunoniella australis</i>	0.1	50					0.2	500			0.1	50	0.1	10	0.1	10			0.1	100
<i>Bursaria spinosa</i>	55	500	50	500	30	100			0.5	2	20	500	5	50	10	50	45	500	60	500
<i>Bursaria spinosa</i> subsp. <i>spinosa</i>							70	500												
<i>Centaurium erythraea</i>	0.1	10			0.1	100	0.5	200			0.1	10					0.1	20	0.1	50
<i>Chloris ventricosa</i>											0.1	5	0.1	5	0.5	50				
<i>Cirsium vulgare</i>	0.1	5	0.5	15	0.1	5	0.5	10	0.1	5			0.1	1			0.3	10	0.5	10
<i>Clematis aristata</i>	1	200					0.1	10							0.2	10				
<i>Convolvulus erubescens</i>													0.1	1						
<i>Conyza bonariensis</i>	0.1	5	0.1	5	0.1	10	0.1	5	0.1	5	0.1	15							0.1	1
<i>Cynodon dactylon</i> var. <i>dactylon</i>									1	100										

Scientific name	M5_001		M5_002		M5_003		M5_004		M5_005		M6_006		M6_007		M6_008		M6_009		M6_010	
	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A
<i>Cyperus gracilis</i>			0.2	50	0.1	50	0.5	500	5	500	0.3	100	0.5	100	0.1	5	0.2	50		
<i>Delairea odorata</i>	5	500			5	100														
<i>Dichelachne micrantha</i>			1	100					0.1	10	1	100					1	100		
<i>Dichelachne rara</i>	0.5	50			0.1	5	3	500												
<i>Dichondra repens</i>	0.2	100	0.1	50	0.3	200	0.1	100	0.1	50	5	5000	0.1	50	1	500	0.1	100	0.1	400
<i>Echinopogon ovatus</i>							0.5	50												
<i>Ehrharta erecta</i>	0.1	50									1	100								
<i>Einadia nutans</i>											0.1	5			0.1	1				
<i>Elymus scaber</i>																	0.2	50		
<i>Eragrostis sp.</i>					0.3	50	0.5	50	0.1	5										
<i>Eucalyptus crebra</i>												20	1			25	1			
<i>Eucalyptus moluccana</i>					5	4						15	10	25	10					
<i>Eucalyptus tereticornis</i>	30	15	5	2	35	12														
<i>Galium sp.</i>	0.1	100																		
<i>Geranium solanderi</i>									0.3	20										
<i>Glycine clandestina</i>							0.1	50												
<i>Glycine tabacina</i>	0.5	500	0.1	5	0.1	50	0.1	50			0.1	10	0.1	10	0.1	10	0.3	500	0.1	50
<i>Gomphocarpus fruticosus</i>							0.1	1												
<i>Hypericum gramineum</i>			0.1	5			0.1	10									0.1	50		
<i>Hypochaeris radicata</i>			0.5	50			0.1	5	0.2	20	0.2	10	0.1	10	0.1	5	0.2	20	0.5	100
<i>Lantana camara</i>							0.2	10			0.1	5	25	100	15	50				
<i>Linum monogynum</i>											0.1	1								
<i>Lolium perenne</i>													0.1	10			0.1	10		
<i>Lycium ferocissimum</i>												0.2	1	0.5	3					
<i>Microlaena stipoides</i>	1	500	80	5000	70	5000	10	500	35	500	30	500	5	500	10	500	35	5000	15	500
<i>Modiola caroliniana</i>											0.1	5			0.1	5				
<i>Nassella neesiana</i>											0.5	50	0.5	50			3	100		

Scientific name	M5_001		M5_002		M5_003		M5_004		M5_005		M6_006		M6_007		M6_008		M6_009		M6_010	
	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A
<i>Olea europaea</i>					15	50														
<i>Olea europaea</i> subsp. <i>cuspidata</i>	15	200	0.8	50			40	500	0.1	1	10	50	70	500	10	100	10	50	40	500
<i>Oplismenus aemulus</i>							10	500												
<i>Oplismenus imbecillis</i>	10	5000			1	200					0.5	100			1	100				
<i>Opuntia stricta</i>					0.1	1														
<i>Oxalis perennans</i>	0.1	50	0.1	10			0.1	5	0.1	50	0.1	503	0.1	5	0.1	10	0.1	50	0.1	5
<i>Paspalum dilatatum</i>									1	100										
<i>Pennisetum clandestinum</i>									15	500										
<i>Petrorhagia nanteuillii</i>																			0.1	100
<i>Pimelea spicata</i>							0.1	50												
<i>Pimelea spicata</i> (possible record to confirm)			0.1	10																
<i>Plantago lanceolata</i>	0.1	5	5	100	0.1	10	0.2	50	35	500	0.5	50	0.5	50	0.5	100	25	5000	35	500
<i>Poa labillardierei</i> var. <i>labillardierei</i>											6	100								
<i>Rubus fruticosus</i> sp. agg.			1	10																
<i>Rubus</i> sp.							0.1	2												
<i>Rumex brownii</i>					0.1	2														
<i>Rytidosperma</i> sp.			0.5	50					30	500	20	500	0.1	5	0.1	5				
<i>Scaevola aemula</i>			0.5	15																
<i>Senecio madagascariensis</i>	0.1	1									0.1	3			0.1	1	0.1	2	0.1	5
<i>Sida corrugata</i>																	0.1	5		
<i>Sida rhombifolia</i>	0.1	5	0.1	10	1	200	0.1	50	1	300	3	500	0.1	50	5	500	0.2	100		
<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>	0.1	1			0.5	30														
<i>Solanum nigrum</i>					0.1	1														
<i>Solanum prinophyllum</i>	0.1	1					0.1	5												
<i>Sonchus asper</i>							0.1	2	0.1	1							0.1	3		
<i>Sonchus oleraceus</i>			0.1	5									0.1	1						

Scientific name	M5_001		M5_002		M5_003		M5_004		M5_005		M6_006		M6_007		M6_008		M6_009		M6_010	
	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A
<i>Sporobolus creber</i>																	0.1	5		
<i>Themeda triandra</i>	0.5	50	10	500			1	50	0.8	100	0.1	2			0.5	50			5	100
<i>Trifolium campestre</i>							0.1	10									0.1	5		
<i>Trifolium repens</i>			0.1	10																
<i>Verbena bonariensis</i>			0.2	10	0.2	50	0.1	10	6	200	0.1	5	0.1	5			3	200	1	50
<i>Veronica plebeia</i>	0.1	10																		
<i>Vulpia myuros</i>	0.1	50											0.1	10			0.2	100		
<i>Wahlenbergia multicaulis</i>											0.1	1			0.1	5	0.1	5		

## Appendix C. BAM and BBAM plot (raw data)

### Woodland

#### MZ5 offset area and MZ6 voluntary management area woodland plot comparison

Table 8. Comparison of woodland plots to PCT benchmarks (2017-2022)

Plot	Composition (Richness)						Structure (Cover)						Function				
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	HBT	NLT	LC	FL	HTW
<b>PCT 850 Benchmark</b>	5	8	12	15	2	5	52	18	61	10	1	5	-	3	35	40	0
<b>MZ5</b>																	
M5_001 (2022)	1	2	4	7	0	2	30	55.5	12	0.8	0	1.5	1	1	60	45	20.4
M5_002 (2022)	1	2	6	4	0	1	5	50.1	91.8	0.8	0	0.1	1	2	8.2	10	1.8
M5_003 (2022)	2	1	5	4	0	1	40	30	71.5	1.4	0	0.1	1	2	8	3	20.2
<b>2022 Average</b>	<b>1.3</b>	<b>1.7</b>	<b>5.0</b>	<b>5.0</b>	<b>0.0</b>	<b>1.3</b>	<b>25.0</b>	<b>45.2</b>	<b>58.4</b>	<b>1.0</b>	<b>0.0</b>	<b>0.6</b>	<b>1</b>	<b>1.7</b>	<b>25.4</b>	<b>19.3</b>	<b>14.1</b>
M5_001 (2021)	1	1	0	4	0	2	5	0.1	0	0.4	0	0.2	0	0	88	5	2.1
M5_002 (2021)	3	2	4	9	0	2	14	15.1	30.4	9	0	0.2	1	0	5.4	15	0.3
M5_003 (2021)	2	2	4	9	0	2	18	35.3	12.3	17.4	0	0.3	0	1	14	4	5.8
<b>2021 Average</b>	<b>2</b>	<b>1.7</b>	<b>2.7</b>	<b>7.3</b>	<b>0</b>	<b>2</b>	<b>12.3</b>	<b>16.8</b>	<b>14.2</b>	<b>8.9</b>	<b>0</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>35.8</b>	<b>8</b>	<b>2.7</b>
M5_001 (2020)	2	1	2	5	1	3	17	55	5.5	3.3	0.1	1.3	-	1	32	12	10.2
M5_002 (2020)	1	1	4	3	0	2	0.5	5	31.5	0.3	0	0.2	-	1	15	3	0.6
M5_003 (2020)	2	2	1	4	0	3	20	12	7	2.1	0	0.3	-	2	19	6	13.2
<b>2020 Average</b>	<b>1.6</b>	<b>1.3</b>	<b>2.3</b>	<b>4</b>	<b>0.3</b>	<b>2.6</b>	<b>12.5</b>	<b>24</b>	<b>14.7</b>	<b>1.9</b>	<b>0.03</b>	<b>0.6</b>	<b>-</b>	<b>1.3</b>	<b>22</b>	<b>7</b>	<b>8</b>
M5_001 (2019)	2	2	4	8	0	3	37	45.1	7.1	2.8	0	1.2	-	1	52	8	8.6
M5_002 (2019)	1	1	5	3	0	1	10	15	21	0.4	0	0.1	-	0	43	0	5
M5_003	2	1	3	6	0	2	25	20	20	5.7	0	0.2	-	2	36	3	5.7

Plot	Composition (Richness)						Structure (Cover)						Function				
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	HBT	NLT	LC	FL	HTW
<b>PCT 850 Benchmark</b>	<b>5</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>2</b>	<b>5</b>	<b>52</b>	<b>18</b>	<b>61</b>	<b>10</b>	<b>1</b>	<b>5</b>	-	<b>3</b>	<b>35</b>	<b>40</b>	<b>0</b>
(2019)																	
<b>2019 Average</b>	<b>1.6</b>	<b>1.3</b>	<b>4</b>	<b>5.6</b>	<b>0</b>	<b>2</b>	<b>24</b>	<b>26.7</b>	<b>16</b>	<b>2.9</b>	<b>0</b>	<b>0.5</b>	-	<b>1</b>	<b>43.6</b>	<b>3.6</b>	<b>6.4</b>
M5_001 (2018)	1	2	4	12	0	4	20	45.1	10.6	4.1	0	1.3	-	1	87	36	10.1
M5_002 (2018)	2	1	5	8	0	4	15	15	46.5	1.4	0	0.4	-	0	37	2	1
M5_003 (2018)	2	2	2	10	0	5	23	15.1	15	6.1	0	0.9	-	1	38	0	3
<b>2018 Average</b>	<b>1.7</b>	<b>1.7</b>	<b>3.7</b>	<b>10.0</b>	<b>0.0</b>	<b>4.3</b>	<b>19.3</b>	<b>25.1</b>	<b>24.0</b>	<b>3.9</b>	<b>0.0</b>	<b>0.9</b>	-	<b>0.7</b>	<b>54.0</b>	<b>12.7</b>	<b>4.7</b>
M5_001 (2017)	2	2	6	9	0	4	20	40.1	25.6	4.1	0	0.5	-	1	56	8	5.2
M5_002 (2017)	2	1	5	8	0	3	16	10	27.1	1.2	0	0.3	-	0	22	1	17
M5_003 (2017)	2	2	2	8	0	4	17	9.1	20.5	7.3	0	0.8	-	1	64	3	4.5
<b>2017 Average</b>	<b>2.0</b>	<b>1.7</b>	<b>4.3</b>	<b>8.3</b>	<b>0.0</b>	<b>3.7</b>	<b>17.7</b>	<b>19.7</b>	<b>24.4</b>	<b>4.2</b>	<b>0.0</b>	<b>0.5</b>	-	<b>0.7</b>	<b>47.3</b>	<b>4.0</b>	<b>8.9</b>
<b>MZ6</b>																	
M6_006 (2022)	3	1	10	5	0	1	3	20	58.1	5.4	0	0.1	1	4	43	11	16.9
M6_007 (2022)	1	1	5	3	0	2	1	5	5.8	0.3	0	0.2	1	6	100	5	96.3
M6_008 (2022)	1	2	6	6	0	2	1	15	12.2	1.5	0	0.3	0	1	100	2	25.5
<b>2022 Average</b>	<b>1.7</b>	<b>1.3</b>	<b>7.0</b>	<b>4.7</b>	<b>0.0</b>	<b>1.7</b>	<b>1.7</b>	<b>13.3</b>	<b>25.4</b>	<b>2.4</b>	<b>0.0</b>	<b>0.2</b>	<b>0.7</b>	<b>3.7</b>	<b>81.0</b>	<b>6.0</b>	<b>46.2</b>
M6_006 (2021)	4	1	1	6	0	3	26	10	0.1	0.7	0	0.5	0	1	4.6	0	20.4
M6_007 (2021)	1	1	8	8	0	2	30	8	19.6	11.4	0	2.1	1	1	2.6	35	7.5
M6_008 (2021)	1	3	7	15	1	5	20	36	2.8	3.4	0.2	0.6	0	1	45.4	0	25.3
<b>2021</b>	<b>2</b>	<b>1.7</b>	<b>5.3</b>	<b>9.7</b>	<b>0.3</b>	<b>3.3</b>	<b>25.3</b>	<b>18</b>	<b>7.5</b>	<b>5.2</b>	<b>0.1</b>	<b>1.1</b>	<b>1</b>	<b>1</b>	<b>17.5</b>	<b>11.7</b>	<b>17.7</b>



Plot	Composition (Richness)						Structure (Cover)						Function				
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	HBT	NLT	LC	FL	HTW
<b>PCT 850 Benchmark</b>	<b>5</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>2</b>	<b>5</b>	<b>52</b>	<b>18</b>	<b>61</b>	<b>10</b>	<b>1</b>	<b>5</b>	<b>-</b>	<b>3</b>	<b>35</b>	<b>40</b>	<b>0</b>
<b>Average</b>																	
M6_006 (2020)	1	2	3	4	1	4	41	5.1	0.9	0.5	0.1	0.5	-	2	18	20	37
M6_007 (2020)	1	1	5	3	0	2	45	5	1.9	0.4	0	0.3	-	8	35	17	51.1
M6_008 (2020)	1	2	4	6	1	2	20	75	0.9	0.9	0.1	0.2	-	1	10	0	35.2
<b>2020 Average</b>	<b>1.0</b>	<b>1.7</b>	<b>4.0</b>	<b>4.3</b>	<b>0.7</b>	<b>2.7</b>	<b>35.3</b>	<b>28.4</b>	<b>1.2</b>	<b>0.6</b>	<b>0.1</b>	<b>0.3</b>	<b>-</b>	<b>3.7</b>	<b>21.0</b>	<b>12.3</b>	<b>41.1</b>
M6_006 (2019)	2	1	4	8	0	0	25	50	55.1	4.1	0	0	-	2	39	7	1
M6_007 (2019)	1	1	4	4	0	0	50	10	12.5	6.2	0	0	-	2	97.4	0	75
M6_008 (2019)	1	2	6	3	0	1	15	30	45.8	5.6	0	0.1	-	1	62	0	19.4
<b>2019 Average</b>	<b>1.3</b>	<b>1.3</b>	<b>4.6</b>	<b>5</b>	<b>0</b>	<b>0.3</b>	<b>30</b>	<b>30</b>	<b>37.8</b>	<b>5.3</b>	<b>0</b>	<b>0.1</b>	<b>-</b>	<b>1.6</b>	<b>66.1</b>	<b>2.3</b>	<b>31.8</b>
M6_006 (2018)	4	1	5	11	0	3	23	20	12.6	5.7	0	0.3	-	2	71	24	6
M6_007 (2018)	1	1	2	7	0	2	20	12	9	2.8	0	0.2	-	3	77	50	20.4
M6_008 (2018)	1	2	5	11	0	5	10	53	18.6	4.7	0	0.9	-	1	75	8	2.6
<b>2018 Average</b>	<b>2.0</b>	<b>1.3</b>	<b>4.0</b>	<b>9.7</b>	<b>0.0</b>	<b>3.3</b>	<b>17.7</b>	<b>28.3</b>	<b>13.4</b>	<b>4.4</b>	<b>0.0</b>	<b>0.5</b>	<b>-</b>	<b>2.0</b>	<b>74.3</b>	<b>27.3</b>	<b>9.7</b>
M6_006 (2017)	3	1	6	10	0	2	19	15	24.1	4.2	0	0.3	-	2	52	18	7.2
M6_007 (2017)	1	1	7	6	0	4	20	25	18.3	7.4	0	0.4	-	6	48	51	15.9
M6_008 (2017)	1	2	8	11	0	4	10	50	21.4	4.2	0	0.5	-	1	61	4	4.2
<b>2017 Average</b>	<b>1.7</b>	<b>1.3</b>	<b>7.0</b>	<b>9.0</b>	<b>0.0</b>	<b>3.3</b>	<b>16.3</b>	<b>30.0</b>	<b>21.3</b>	<b>5.3</b>	<b>0.0</b>	<b>0.4</b>	<b>-</b>	<b>3.0</b>	<b>53.7</b>	<b>24.3</b>	<b>9.1</b>

Note: T – Tree, S – Shrub, G – Grass and Grass-like, F – Forb, Fe – Fern, O – Other, HBT – Hollow Bearing Trees, NLT – Number of Large Trees, LC – Litter Cover, FL – Fallen Logs, HTW – High Threat Weed

**Table 9. Comparison of woodland plots to BVT benchmarks (2012-2016)**

Plot	NPS	NOS		NMS		NGCG		NGCS		NGCO		EPC	NTH	OR	FL
		L	U	L	U	L	U	L	U	L	U				
<b>Benchmark</b>	<b>29</b>	<b>18.5</b>	<b>23.5</b>	<b>20</b>	<b>30</b>	<b>23</b>	<b>31</b>	<b>0</b>	<b>5</b>	<b>11.75</b>	<b>19.75</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>MZ5</b>															
M5_001 (2016)	22		3.5		26		44		28		22	24	1	1	37
M5_002 (2016)	17		6		1.2		94		8		8	24	1	1	2
M5_003 (2016)	23		0.5		17.5		76		4		8	16	1	1	10
<b>Average 2016</b>	<b>21</b>		<b>3.3</b>		<b>14.9</b>		<b>71.3</b>		<b>13.3</b>		<b>12.7</b>	<b>21.3</b>	<b>1</b>	<b>1</b>	<b>16.3</b>
M5_001 (2015)	24		1		41.5		92		10		4	56	1	1	15
M5_002 (2015)	20		4.5		1.5		86		2		18	36	1	1	0
M5_003 (2015)	23		0.5		22.5		68		16		6	64	1	1	8
<b>Average 2015</b>	<b>22</b>		<b>2.0</b>		<b>21.8</b>		<b>82.0</b>		<b>9.3</b>		<b>9.3</b>	<b>52.0</b>	<b>1.</b>	<b>1</b>	<b>7.7</b>
M5_001 (2014)	21		0		62.5		26		26		6	10	1	1	12
M5_002 (2014)	17		7.5		0		78		2		0	12	1	1	3
M5_003 (2014)	16		30		53		22		28		9	14	2	1	0
<b>Average 2014</b>	<b>18</b>		<b>12.5</b>		<b>38.5</b>		<b>42</b>		<b>18.5</b>		<b>5</b>	<b>12</b>	<b>1</b>	<b>1</b>	<b>5</b>
M5_001 (2013)	12		9		20.5		58		10		42	39	1	1	12
M5_002 (2013)	18		2		1.5		82		0		30	44	1	1	6
M5_003 (2013)	17		24		3		6		2		16	23	2	1	0
<b>Average 2013</b>	<b>16</b>		<b>11.6</b>		<b>8.3</b>		<b>48</b>		<b>4</b>		<b>29</b>	<b>35</b>	<b>1</b>	<b>1</b>	<b>6</b>
M5_001 (2012)	17		5.5		24		66		8		50	24	1	1	8
M5_002 (2012)	18		6.5		3		92		2		18	50	1	1	6
M5_003 (2012)	21		22.5		1		3.8		3.4		12	6	2	1	0
<b>Average 2012</b>	<b>19</b>		<b>11.5</b>		<b>9.3</b>		<b>53.9</b>		<b>4.5</b>		<b>26.6</b>	<b>26.6</b>	<b>1</b>	<b>4.6</b>	<b>4.6</b>
<b>MZ6</b>															
M6_006 (2016)	23		10		15		88		16		20	24	6	1	32
M6_007 (2016)	16		16		10		36		20		4	64	8	1	70
M6_008 (2016)	24		10.5		30		70		14		16	30	1	1	10
<b>Average (2016)</b>	<b>21</b>		<b>12.2</b>		<b>18.3</b>		<b>64.7</b>		<b>16.7</b>		<b>13.3</b>	<b>39.3</b>	<b>5</b>	<b>1</b>	<b>37.3</b>
M6_006 (2015)	16		0		60		85		0		6	50	1	0	0
M6_007 (2015)	18		16		7.5		26		16		10	42	4	1	40

Plot	NPS	NOS		NMS		NGCG		NGCS		NGCO		EPC	NTH	OR	FL
		L	U	L	U	L	U	L	U	L	U				
<b>Benchmark</b>	<b>29</b>	<b>18.5</b>	<b>23.5</b>	<b>20</b>	<b>30</b>	<b>23</b>	<b>31</b>	<b>0</b>	<b>5</b>	<b>11.75</b>	<b>19.75</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
M6_008 (2015)	14		8.5		13.5		76		12		6	64	1	1	8
<b>Average (2015)</b>	<b>16</b>		<b>8</b>		<b>27</b>		<b>62</b>		<b>9</b>		<b>7</b>	<b>52</b>	<b>2</b>	<b>1</b>	<b>16</b>
M6_006 (2014)	27		18		8		60		6		30	48	2	1	16
M6_007 (2014)	21		17		0		26		16		24	16	4	1	10
M6_008 (2014)	17		8		16		50		0		16	44	1	1	8
<b>Average 2014</b>	<b>21</b>		<b>14</b>		<b>8</b>		<b>45</b>		<b>7</b>		<b>23</b>	<b>36</b>	<b>2</b>	<b>1</b>	<b>11</b>
M6_006 (2013)	22		26		16		90		2		30	34	2	1	22
M6_007 (2013)	20		22		0		22		12		16	44	4	1	20
M6_008 (2013)	18		12		12		60		12		18	34	1	1	10
<b>Average (2012)</b>	<b>20</b>		<b>20</b>		<b>9.3</b>		<b>57.3</b>		<b>8.6</b>		<b>21.3</b>	<b>37.3</b>	<b>2.3</b>	<b>1</b>	<b>17.3</b>
M6_006 (2012)	20		26.5		10.5		82		4		44	42	2	1	22
M6_007 (2012)	18		34.5		0		8		18		6	14	4	1	14
M6_008 (2012)	22		18		10		72		0		22	52	1	1	8
<b>Average (2012)</b>	<b>20</b>		<b>26.3</b>		<b>6.8</b>		<b>54.0</b>		<b>7.3</b>		<b>24</b>	<b>36</b>	<b>2.3</b>	<b>1</b>	<b>14.6</b>

Note: NPS – Native Plant Species richness, NOS – Native Over-storey cover, NMS – Native Mid-storey cover, NGCG – Native Ground-cover (grasses), Native Ground-cover (shrubs), Native Ground-cover (other), EPC – Exotic Plant Cover, NTH – Number of Trees with Hollows, OR – Over-storey regeneration, FL – Length of Fallen Logs. L – Lower Benchmark, U – Upper Benchmark

## Native Blackthorn thicket

### MZ5 offset area and MZ6 voluntary management area Native Blackthorn thicket plot comparison

Table 10. Comparison of Native Blackthorn thicket plots to PCT benchmarks (2017-2022)

Plot	Composition (Richness)						Structure (Cover)						Function			
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	NLT	LC	FL	HTW
<b>Benchmark</b>	<b>5</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>2</b>	<b>5</b>	<b>52</b>	<b>18</b>	<b>61</b>	<b>10</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>35</b>	<b>40</b>	<b>0</b>
M5_004 (2022)	0	3	7	5	0	3	0.0	70.2	25.5	0.6	0.0	0.3	0	23.6	0	40.9
M5_004 (2021)	0	1	3	6	0	2	0	0.2	25.1	0.7	0	0.4	0	4.4	0	5.2
M5_004 (2020)	0	3	4	4	0	3	0	55.2	20.6	0.5	0	0.3	0	10	0	16
M5_004 (2019)	0	3	4	5	0	3	0	70.2	20.3	1	0	0.3	0	45	0	30.1
M5_004 (2018)	0	2	6	7	0	5	0	66	31	0.9	0	0.5	0	52	0	26.1
M5_004 (2017)	0	2	6	7	0	4	0	42	29.1	2.7	0	0.4	0	40	0	10.1

Plot	Composition (Richness)						Structure (Cover)						Function			
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	NLT	LC	FL	HTW
<b>Benchmark</b>	<b>5</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>2</b>	<b>5</b>	<b>52</b>	<b>18</b>	<b>61</b>	<b>10</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>35</b>	<b>40</b>	<b>0</b>
M6_010 (2022)	0	1	2	3	0	1	0.0	60.0	20.0	0.3	0.0	0.1	0	40	0	40.1
M6_010 (2021)	0	1	5	6	1	5	0	68	0.6	0.7	0.1	0.5	0	12	0	20.3
M6_010 (2020)	0	1	4	3	0	4	0	65	5.4	1.3	0	0.4	0	6	0	40.1
M6_010 (2019)	0	1	7	3	0	3	0	60	65.2	0.6	0	0.3	0	68	0	30.2
M6_010 (2018)	0	1	4	6	0	4	0	60	11.2	1.9	0	0.4	0	50	0	15.2
M6_010 (2017)	0	1	3	5	0	5	0	45	19.1	7.3	0	0.6	0	39	0	10.1

T – Tree, S – Shrub, G – Grass, F – Forb, Fe – Fern, O – Other; NLT – Number of Large Trees, LC – Litter cover, FL – Length of Fallen Logs. HTW – High Threat Weeds

**Table 11. Comparison of Native Blackthorn thicket plots to BVT benchmarks (2012-2016)**

	NPS	NOS		NMS		NGCG		NGCS		NGCO		EPC	NTH	OR	FL
		L	U	L	U	L	U	L	U	L	U				
<b>Benchmark</b>	<b>29</b>	<b>18.5</b>	<b>23.5</b>	<b>20</b>	<b>30</b>	<b>23</b>	<b>31</b>	<b>0</b>	<b>5</b>	<b>11.75</b>	<b>19.75</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
M5_004 (2016)	16		0		37.5		80		4		24	18	0	0	0
M5_004 (2015)	16		0		45		75		5		20	25	0	0	0
M5_004 (2014)	18		0		20		70		28		22	55	0	0	0
M5_004 (2013)	15		0		18		84		22		24	55	0	0	0
M5_004 (2012)	18		0		11		82		26		32	67	0	0	0
M6_010 (2016)	18		0		60		65		10		8	60	0	1	0
M6_010 (2015)	10		12		10.5		74		20		2	38	3	1	15
M6_010 (2014)	18		0		50		54		2		32	28	0	0	0
M6_010 (2013)	20		0		60		62		12		20	10	0	0	0
M6_010 (2012)	20		0		53		56		14		18	10	0	0	0

NPS – Native Plant Species richness, NOS – Native Over-storey cover, NMS – Native Mid-storey cover, NGCG – Native Ground-cover (grasses), Native Ground-cover (shrubs), Native Ground-cover (other), EPC – Exotic Plant Cover, NTH – Number of Trees with Hollows, OR – Over-storey regeneration, FL – Length of Fallen Logs. L – Lower Benchmark, U – Upper Benchmark

## Pasture

**Table 12. Comparison of pasture plots to PCT benchmarks (2017-2022)**

Plot	Composition (Richness)						Structure (Cover)						Function			
	T	S	G	F	Fe	O	T	S	G	F	Fe	O	NLT	LC	FL	HTW
<b>Benchmarks</b>	<b>5</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>2</b>	<b>5</b>	<b>52</b>	<b>18</b>	<b>61</b>	<b>10</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>35</b>	<b>40</b>	<b>0</b>
M5_005 (2022)	0	1	8	4	0	0	0.0	0.5	72.5	0.6	0.0	0.0	0	1	0	21.1
M5_005 (2021)	0	1	4	0	0	0	0	0.2	31.3	0	0	0	0	0	0	30.4
M5_005 (2020)	0	1	3	2	0	2	0	2	9.5	0	0.6	0.2	0	0	0	0.7
M5_005 (2019)	0	1	4	1	0	2	0	2	17	0.5	0	0.2	0	20	0	2.2
M5_005 (2018)	0	2	4	4	0	3	0	2.1	28	20.7	0	0.3	0	24	0	6.5
M5_005 (2017)	0	1	6	3	0	1	0	1	22.1	2.1	0	0.1	0	28	0	11.1
MZ6_009 (2022)	0	1	6	5	0	1	0.0	45.0	37.0	0.5	0.0	0.3	0	13	0	14.1
MZ6_009 (2021)	0	1	5	3	0	2	0	4	23.3	0.5	0	5.1	0	0.8	0	10
MZ6_009 (2020)	0	1	3	2	0	1	0	20	15.4	0.3	0	0.1	0	5	0	0.5
MZ6_009 (2019)	0	1	6	3	0	1	0	5	83	0.3	0	0.1	0	33	0	3.5
MZ6_009 (2018)	0	1	4	8	0	2	0	5	13.2	0.8	0	1.1	0	24	0	5
MZ6_009 (2017)	0	1	5	5	0	2	0	4	18.1	0.5	0	0.2	0	14	0	23.5

T – Tree, S – Shrub, G – Grass, F – Forb, Fe – Fern, O – Other; NLT – Number of Large Trees, LC – Litter cover, FL – Length of Fallen Logs. HTW – High Threat Weeds

**Table 13. Comparison of the pasture plots to BVT benchmarks (2012-2016)**

	NPS	NOS		NMS		NGCG		NGCS		NGCO		EPC	NTH	OR	FL
		L	U	L	U	L	U	L	U	L	U				
<b>Benchmark values</b>	<b>29</b>	<b>18.5</b>	<b>23.5</b>	<b>20</b>	<b>30</b>	<b>23</b>	<b>31</b>	<b>0</b>	<b>5</b>	<b>11.75</b>	<b>19.75</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
M5_005 (2016)	10		0		0		90		0		8	56	0	0	0
M5_005 (2015)	12		0		0		94		0		4	72	0	0	0
M5_005 (2014)	14		0		0		76		0		2	50	0	0	0
M5_005 (2013)	10		0		0		86		0		0	64	0	0	0
M5_005 (2012)	12		0		0		78		0		0	74	0	0	0
M6_009 (2016)	13		0		1.2		88		0		10	52	0	1	0
M6_009 (2015)	18		0		44		2		0		0	99	0	1	0
M6_009 (2014)	13		0		0		38		6		12	76	0	0	0
M6_009 (2013)	14		0		0		50		0		0	68	0	0	0
M6_009 (2012)	16		0		0		58		0		0	70	0	0	0

*NPS – Native Plant Species richness, NOS – Native Over-storey cover, NMS – Native Mid-storey cover, NGCG – Native Ground-cover (grasses), Native Ground-cover (shrubs), Native Ground-cover (other), EPC – Exotic Plant Cover, NTH – Number of Trees with Hollows, OR – Over-storey regeneration, FL – Length of Fallen Logs. L – Lower Benchmark, U – Upper Benchmark*

## Appendix D. Biodiversity Assessment Method: measuring vegetation integrity attributes (DPIE 2020)

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### Composition

- Assessment of composition is based on the number of native plant species (richness) observed and recorded by the assessor within a plot for each growth form group shown in Table 2 of the BAM (DPIE 2020).
- The assessor must assign a native plant species to a growth form group according to the definitions set out in Appendix F of the BAM. An assessor must allocate a species to one growth form group based on the adult/mature growth form of the species.
- The minimum vegetation survey data required to be recorded by the assessor for composition at each 20m x 20m condition plot are:
  - (a) full species name (*Genus species*) for the three dominant native species within each growth form group. Dominant native species means those native species that contribute most to the total cover of the growth form group, and
  - (b) genus name or the full species name where practicable for all other species. Practicable means that sufficient plant material is present to make a species level identification and the assessor has sufficient skills and knowledge to make the identification in the field
  - (c) whether each species is native, exotic, or high threat exotic
  - (d) the growth form group to which each native species has been allocated.
- The composition of each growth form group is assessed by counting the number of different native plant species recorded within each growth form group within each 20m × 20m condition plot.

### Structure

- Structure is the assessment of foliage cover for each growth form group within the 20m x 20m plot boundary. Foliage cover for a growth form group is the percentage of cover of all living plant material of all individuals of the species present for that group. This includes leaves, twigs, branchlets and branches as well as canopy overhanging the plot even if the stem is outside the plot.
- The assessor must record an estimate of the foliage cover for each native and exotic species present within the 20m x 20m plot. Foliage cover estimates for each species must draw from the following number series: 0.1, 0.2, 0.3,.....1, 2, 3,.....10, 15, 20, 25,.....100%.
- The assessor must not use methods such as Braun-Blanquet (or other) classes, or a transect point intercept method to record the foliage cover score for a growth form group.
- The structure of each growth form group for the 20m x 20m plot is recorded by the assessor as the sum of all the individual foliage cover estimates of all native plant species recorded within each growth form group within each plot.
- The assessor must assign each non-native (exotic) plant species a foliage cover estimate and either E (exotic) or HTW (high threat weed).

### Function

- The number of large trees, tree stem size class, tree regeneration and length of fallen logs is recorded within a 1000m<sup>2</sup> plot.
- Tree stem size classes should be measured at 1.3m above ground height, referred to as 'diameter at breast height over bark' or DBH.
- Tree stem size classes are: <5, 5–9, 10–19, 20–29, 30–49, 50–79, and 80+ cm DBH and include all species in the tree growth form group.
- Only living trees contribute to counts for determination of presence and for a multi-stemmed tree, only the largest living stem is included in the count.

- The number of large trees is a count of all living stems with a DBH equal to or greater than the large tree benchmark DBH size for that PCT or vegetation class.
- For a multi-stemmed tree, at least one living stem must be equal to or greater than the large tree benchmark DBH size to count as a large tree.
- Stem size class is based on the presence or absence of living tree stems within size classes that fall between regenerating stems (<5cm DBH) and the large tree benchmark DBH size(s).
- For a multi-stemmed tree, only the largest living stem is counted for determining the presence or absence of stems within each size class.
- Regeneration is based on the presence or absence of living trees with stems <5cm DBH.
- The length of fallen logs is the total length in metres of all woody material greater than 10cm in diameter that is dead and entirely or in part on the ground within the 20m x 50m plot. Where logs extend outside of the plot, the assessor must only record the length of fallen log that is contained within the plot.
- Litter cover is assessed as the average percentage ground cover of litter recorded from five 1m x 1m plots evenly located along the central transect. Litter cover includes leaves, seeds, twigs, branchlets and branches (<10cm in diameter). The assessment of litter cover must include all plant material that is detached from a living plant. Dead material still attached to a living plant (such as a grass) is assessed as litter cover where it is in contact with the ground. Dead material still attached to a living plant that is not in contact with the ground, or litter suspended in the canopies of other plants is not assessed as litter cover. Litter cover should be considered as the two-dimensional litter layer and includes litter under the canopies of erect plants.
- The number of trees with hollows is determined by counting the number of trees with hollows that are visible from the ground in the 20m x 50m plot. The number of trees with hollows can include native species allocated to the shrub growth form group. It must include both living and dead trees.
- The number of trees with hollows does not contribute to the vegetation integrity score. The presence of hollow bearing trees is used as part of the habitat suitability assessment for some threatened species in Chapter 6 and for identifying the credit class for biodiversity credits in Chapter 10.2 of the BAM.



Appendix E. Photo point monitoring

Table 14: Derived grassland and area of woodland from MZ6\_009 (photo point 5)



2012



2013



2014



2015



2016



2017



2018



2019



2020



2021



2022

Table 15: Derived grassland from photo point 4



2012



2013



2014



2015



2016



2017



2018



2019



2020



2021



2022

Table 16: Area of erosion, Photo point 7



2012



2013



2014



2015

No Data



2016



2017



2018



2019



2020



2021



2022

Table 17: MZ6\_006. Note the obvious cover differences between the years. Woody weed control required in 2023.



2012



2013



2014



2015



2016



2017



2018



2019



2020



2021



2022

Table 18: MZ6\_007. Note the ground cover since 2012. Woody weed control required in 2022.



2012



2013



2014



2015



2016



2017



2018



2019



2020



2021



2022

Table 19: Regenerating woodland from MZ5\_002. Note the increase in the regeneration of *Bursaria spinosa* within the woodland understorey



2012



2013



2014



2015



2016



2017



2018



2019



2020



2021



2022

Table 20: Derived grassland from M5\_005.



2012



2013



2014



2015



2016



2017



2018



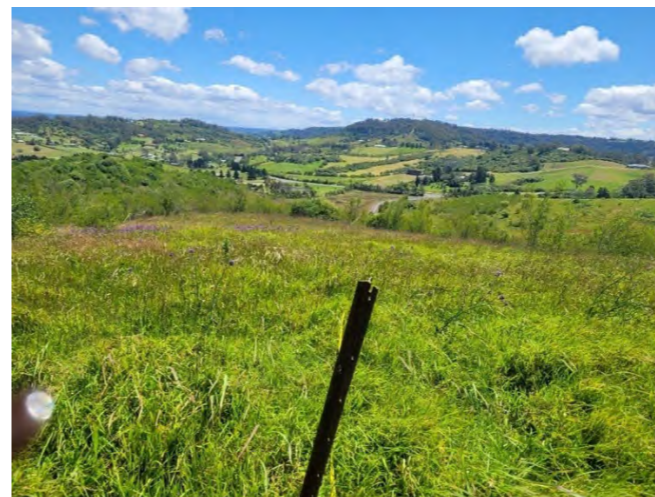
2019



2020



2021



2022

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## Our services

### Ecology and biodiversity

Terrestrial  
Freshwater  
Marine and coastal  
Research and monitoring  
Wildlife Schools and training

### Heritage management

Aboriginal heritage  
Historical heritage  
Conservation management  
Community consultation  
Archaeological, built and landscape values

### Environmental management and approvals

Impact assessments  
Development and activity approvals  
Rehabilitation  
Stakeholder consultation and facilitation  
Project management

### Environmental offsetting

Offset strategy and assessment (NSW, QLD, Commonwealth)  
Accredited BAM assessors (NSW)  
Biodiversity Stewardship Site Agreements (NSW)  
Offset site establishment and management  
Offset brokerage  
Advanced Offset establishment (QLD)





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**Appendix 13: Ventilation Shaft 6 Bush Regeneration Report - 2022/2023**



**Landcare Australia**

**Appin Vent Shaft 6 Bush Regeneration  
Report for South32**

**Sept 2021- Dec 2022**

## Document Control

### Project Name

APPIN VENT SHAFT 6 BUSH REGENERATION REPORT FOR SOUTH32

		<b>Date</b>
<b>Prepared by</b>	Anna Charlton Shick	15/12/22
<b>Approved by</b>	Rob Porter	16/12/22

## Disclaimer

This document may only be used in accordance with the contract between Landcare Australia Ltd and South32. The scope of services was defined in agreement with South32, and preparation has relied upon the data collected at the time and the availability of information and other data on the subject property. Legislation, regulations, and relevant information changes on an on-going basis. Readers are advised to obtain up to date Information.

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## Landcare Australia – Appin Vent Shaft 6 Bush Regeneration Report

### 1. Introduction

Vent Shaft 6 is located to the northeast of the township of Douglas Park and Landcare Australia was engaged to undertake bush regeneration works (including weed control and reporting) at the site between September 2021 and December 2022.

The bush regeneration works associated with this project relate to:

- Management Zone 5 (MZ 5) the offsets area, and;
- Management Zone 6 (MZ 6) the native vegetation area.

Refer to the map in Section 5 for location details.

Shale Hills Woodland (a community of the Cumberland Plain Woodland) and exotic pastures form the bulk of the site as mapped in the Appin Vent Shaft 6 Biodiversity Management Plan. Both management zones are heavily affected by invasive woody and herbaceous weed species.

### 2. Description of Work

Management Zones	Type of Work	Weed Type	Work Description
MZ5	Primary	Woody	Cut and paint or drill stem injection of woody weeds. Target weeds include, African olive, African boxthorn, and Blackberry. All vegetative material was cut into piles and left onsite.
	Maintenance	Woody and Herbaceous	Follow-up spot spraying and hand weeding the areas previously treated within native vegetation. Target weeds include Blackberry, African olive and African boxthorn regrowth and Scotch thistle, Paterson's curse, Purpletop, Fleabane, and Brassica.
MZ6	Primary	Woody	Cut and paint or drill stem injection of woody weeds. Target weeds include, African olive, African boxthorn, and Blackberry. All vegetative material was cut into piles and left onsite.

Table 1: Description of work

Refer to the attached map for location of areas treated for both primary and maintenance weed control.

### 3. Comments

#### 3.1. Management Issues:

Weed density has increased in the previous 15 months as a result of the above average rainfall in the region.

Erosion is evident on the site however, appears not to have deteriorated significantly in the past 15 months.

Both management zones are largely impacted by the presence of African olive and to a lesser extent, African boxthorn, Blackberry and a range of herbaceous species from previous land uses.

### 3.2. Site Progress

Landcare Australia has completed nine site visits on the following dates, including:

- 25<sup>th</sup> January 2022
- 24<sup>th</sup> March 2022
- 20<sup>th</sup> April 2022
- 26<sup>th</sup> May 2022
- 22<sup>nd</sup> June 2022
- 4<sup>th</sup> August 2022
- 2<sup>nd</sup> September 2022
- 19<sup>th</sup> October 2022
- 10<sup>th</sup> November 2022

No further site visits are planned for the rest of this year. A full list of all weed species observed and treated in both management zones during these site visits is listed in table 2.

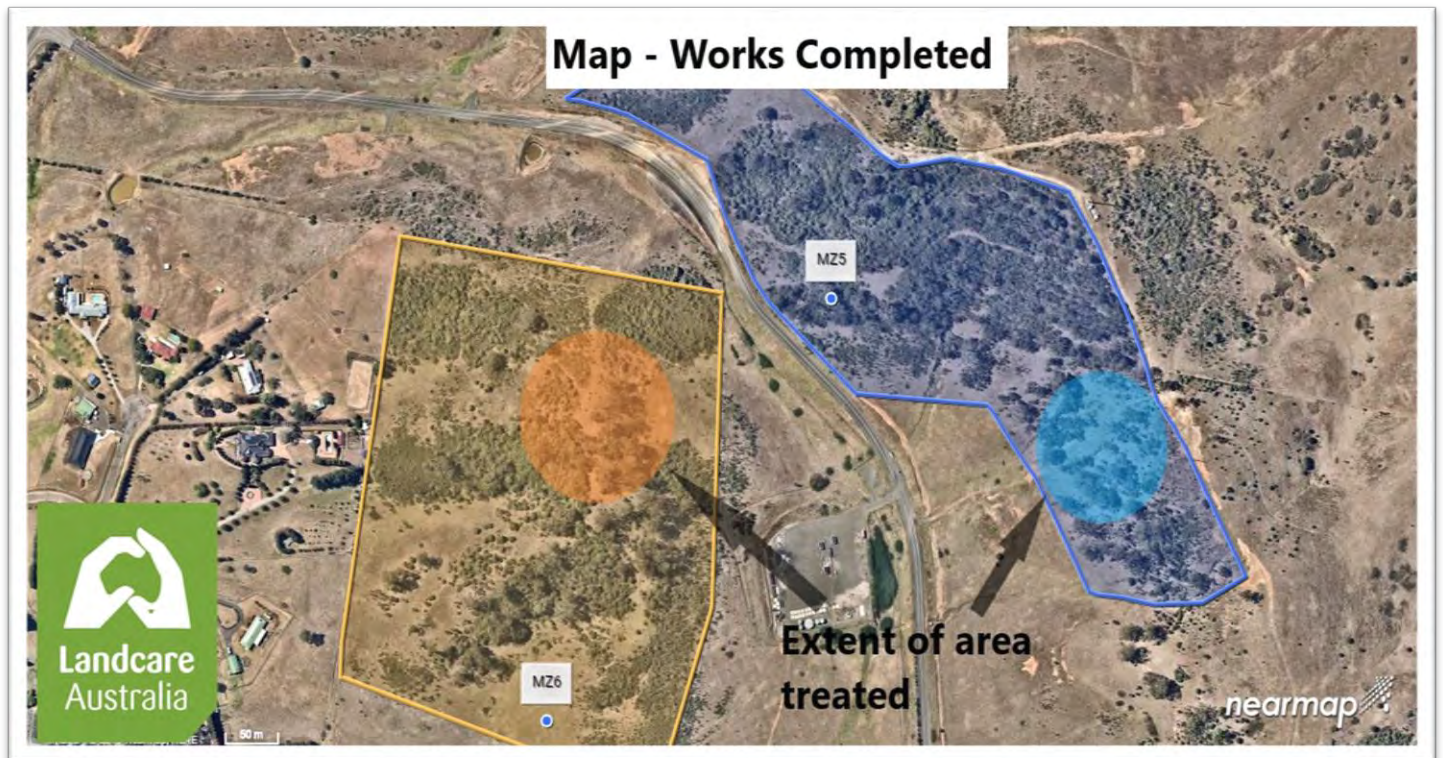
No observations of *Pimelea spicata* occurred during these site visits. The completion of primary and maintenance weed treatment during this period ensures compliance with Management Actions 13 and 16 of the Appin Vent Shaft 6 Biodiversity Management Plan, Bulli Seam Operations.

### 4. Weed Species Identified and Treated within MZ 5 and MZ 6

Scientific Name	Common Name
<b>Herbaceous</b>	
<i>Brassica spp.</i>	Brassica
<i>Cirsium vulgare</i>	Spear thistle
<i>Onopordum acanthium</i>	Scotch thistle
<i>Conyza spp.</i>	Fleabane
<i>Echium plantagineum</i>	Paterson's curse
<i>Setaria sphacelata</i>	Pidgeon grass
<i>Gomphocarpus fruticosus</i>	Cotton bush
<i>Sida rhombifolia</i>	Paddy's Lucerne
<i>Verbena bonariensis</i>	Purpletop
<b>Woody</b>	
<i>Olea europaea subsp. cuspidata</i>	African olive
<i>Lycium ferocissimum</i>	African boxthorn
<i>Rubus sp.</i>	Blackberry

Table 2: Weed species onsite

## 5. Map of Management Zones and Areas Treated



Map 1: Location of areas treated within MZ 5 and MZ 6

## 6. Images of Works Onsite



Image 1: African olive removal MZ5



Image 2: Manual Weed Control on site.



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**Appendix 14: EPBC Approval 2010/5350 Compliance Report - FY23**



Broad-headed Snake and Southern Brown Bandicoot Management Plan

APNMP0111

Management Plan Version 1.1

			Outcome	Comment	Proposed Action
<b>AUDIT REVIEW</b>					
Section	MP Ref.	Requirement / Obligation			
Management Strategies	6.1	Clearing practices will incorporate appropriate controls to minimise mortality and injury to Broad-headed Snakes and Southern Brown Bandicoots occupying the site.	In Control	Clearing practices involve a two-staged process as required by the MP.	
Pre clearance surveys	6.1.1	Prior to the first stage of clearing, the area to be cleared will be marked using flagging and surveyed by an ecologist or suitably trained site environmental representative to locate, record and mark specific habitat features that are proposed for preservation and redistribution to the emplacement (e.g. rocks and boulders, stags and large hollows).	In Control	Pre-clearing assessment undertaken as required which contains instructions for redistributing habitat	
Two stage Clearing	6.1.2	Where possible, (i.e. where access to trees by the excavator is safe and practical), clearing of hollow bearing trees will be performed in a two stage process where surrounding vegetation is cleared separately, before the removal of habitat trees to allow fauna an opportunity to move.	In Control	Clearing practices involve a two-staged process as required by the MP.  Pre-clearing assessment undertaken as required which contains instructions for redistributing habitat.	
Management of Captured Animals	6.1.3.1	If a Broad-headed Snake is found during the two-stage clearing process, the animal will be relocated to pre-determined suitable habitat within the Appin North surface mining lease area	In Control	In April 2016, one individual Broad-headed Snake was found in the Stage 3 area during a pre-clearing survey. The individual was captured and released to another location in accordance with this Plan. No other individuals have been located since.	

Broad-headed Snake and Southern Brown Bandicoot Management Plan

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Management of Captured Animals	6.1.3.1	Pre-determined sites for relocation will take into account the species home ranges and be evenly spaced to avoid social conflict. Ideally, predetermined relocation sites should not be inhabited by another Broad-headed Snake at the time of relocation.	In Control	In April 2016, one individual Broad-headed Snake was found in the Stage 3 area during a pre-clearing survey. The individual was captured and released to another location in accordance with this Plan. No other individuals have been located since.	
Management of Captured Animals	6.1.3.1	Pre-determined relocation sites will necessarily consist of the following: <ul style="list-style-type: none"> <li>• occur on Hawkesbury Sandstone within the current known range of the species and provide rocky outcrops with a westerly or north-westerly aspect, and horizontal crevices (Webb and Shine 1998c); and/or</li> <li>• have large adjacent areas of woodland that support large stags or trees bearing numerous hollows (Webb and Shine 1997b). The adjacent woodland will ideally be larger than the area supporting rocky outcrops (Webb and Shine 1997a) and contain preferred species of 'habitat trees' (trees most often selected by Broad-headed Snakes) such as <i>Eucalyptus gummifera</i>, <i>E. punctata</i>, <i>E. agglomerata</i> and <i>E. piperita</i> (Webb and Shine 1997b).</li> </ul>	In Control	The snake found in April 2016 was relocated to pre-determined habitat in accordance with Figure 3 of the MP.	
Management of Captured Animals	6.1.3.1	Any other fauna located within the CWEA during the pre-clearing survey will also be relocated. In particular, any Velvet Geckos (and other lizards) encountered will be relocated to the same pre-determined sites for Broad-headed Snakes to provide prey for the relocated snakes.	In Control	Not triggered	

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Management of Captured Animals	6.1.3.1	Where possible, snakes will be translocated from the initial capture point to the nearest site considered suitable for the long-term habitation by the species, but not more than 1 km from that point (where possible) to reduce the possibility for unfavourable genetic mixing.  Snakes will be released at sites as soon as practicable after capture.	In Control	The snake found in April 2016 was relocated to pre-determined habitat in accordance with Figure 3 of the MP.	
Management of Captured Animals	6.1.3.1	BCD will be notified within one month of any Broad-headed Snakes identified during pre-clearing surveys and relocated.	In Control	Not triggered	
Management of Captured Animals	6.1.3.2	Sites for relocation will take into account the species home ranges and be evenly spaced to avoid social conflict. Where possible, captured bandicoots will be translocated from the initial capture point to the nearest site considered suitable for the long-term habitation by the species, but not more than 1 km from that point (where possible) to reduce the possibility for unfavourable genetic mixing.	In Control	Not triggered	
Management of Captured SBBs	6.1.3.2	Bandicoots will be released at sites as soon as practicable after capture.	In Control	Not triggered	
Habitat Translocation - Broad-headed Snake	6.1.4	Suitable winter habitat occurring within the Stages 3 and 4 of the Emplacement Area will be identified during the pre-clearing survey.	In Control	Pre-clearing assessment undertaken as required which contains instructions for redistributing habitat.	

Broad-headed Snake and Southern Brown Bandicoot Management Plan

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Habitat Translocation - Broad-headed Snake	6.1.4	<p>Rehabilitation of the CWEA behind the line of clearing for the Broad-headed Snake, in terms of winter habitat, will include the following:</p> <ul style="list-style-type: none"><li>• Translocated rocky outcrops and boulders will ideally be positioned with a westerly or north-westerly aspect and crevices should remain horizontal (Webb and Shine 1998c; Goldingay and Newell 2017).</li><li>• The Velvet Gecko should also be translocated (Webb and Shine 2000). Suitable habitat for this prey species is the same as for the Broad-headed Snake's winter habitat and includes loose rock on rock substrate (Shine et al. 1998, Webb and Shine 1998c, Croak et al. 2013).</li><li>• The above shelter sites will ideally be evenly spaced and not clumped together to encourage a greater number of Broad-headed Snakes to the area (Webb and Shine 1997a). If shelter sites are too close together, they are likely to remain uninhabited due to home range overlap. Shelter sites will ideally be placed at least 300 m apart and close/adjacent to suitable summer habitat (translocated hollow-bearing trees or limbs within rehabilitating sections of the old CWEAs (Webb and Shine 1997a)).</li></ul>	In Control	<p>Artificial pavers were installed in the emplacement area in FY22.</p> <p>Camera trap monitoring of one Broad-Headed Snake habitat was included in the FY23 monitoring period. More in depth monitoring to be included in FY24 CWEA rehabilitation monitoring.</p>	
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Broad-headed Snake and Southern Brown Bandicoot Management Plan

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		<ul style="list-style-type: none"> <li>• Artificial rocks/concrete pavers will be added to the CWEA behind the line of clearing to increase habitat opportunities for prey items and the Broad-headed Snake if insufficient natural rock cannot be sourced from the CWEA for this purpose. Webb and Shine (2000) recommend the use of large pavers (30 – 45 cm wide and 5 – 10 cm thick), as well as a range of smaller pavers (e.g. 19 cm wide) and thicker pavers (e.g. &gt; 30 cm thick) placed with a variety of crevice sizes (up to 10 mm). The artificial rocks will be placed in both shaded and exposed areas to provide a range of suitable micro-climates for the snake and its prey depending on the time of year (Croak et al. 2013, Croak et al. 2008, Croak, et al. 2010).</li> <li>• Hollow logs and hollow-bearing stags will also be translocated to provide additional retreat-sites for the Broad-headed Snake and its prey (Webb and Shine 1997b).</li> </ul>			
Habitat Protection during construction	6.1.5	Sediment control measures will be adopted during clearing, as outlined in the CWEAMP.	In Control	Incorporated into emplacement design requirements	
Habitat Protection during construction	6.1.5	The CWEA will be clearly demarcated and regularly surveyed to prevent unnecessary clearing or access by construction vehicles and plant to surrounding potential habitat.	In Control	Emplacement boundaries are defined on digital plans and bounded by haul roads and diversion drains.	

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Habitat Protection during construction	6.1.5	Construction materials and spoil must not be stored, dumped or stockpiled within surrounding habitat.	In Control	Stockpiling of freshly stripped topsoil is avoided through progressive rehabilitation. There are some stockpiles onsite containing topsoil material from the original stage 3 emplacement development construction; however this is strategically set aside for future capping material as the emplacement progresses down the valley. These stockpiles are stable and non-polluting and situated within the approved disturbance footprints.	
Habitat Protection during construction	6.1.5	Induction of the CWEA Supervisory personnel will include information about the Southern Brown Bandicoot and its habitat within Stage 4 of the CWEA, along with protection measures that will be in place and enforced during the construction period.	In Control	Construction in Stage 4 has not yet commenced.	

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Habitat Protection during construction	6.1.5	General information on threatened species (including key site contacts for threatened species) will be provided to all CWEA personnel.	In Control	Threatened species identification included in all supervisory personnel during onboarding. CWEA pre-clearing process re-iterates threatened flora and fauna prior to any clearing works being undertaken.	Refresher planned in FY24.
Summary of Impact Minimisation Strategies	6.2/ Table 3	Vegetation clearing to be within approved boundaries	In Control	Boundaries set out in Emplacement MP.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Future development requiring land clearing to consider Broad-headed Snake and Southern Brown Bandicoot individuals.	In Control	Any additional clearing (outside the emplacement area) onsite will consider internal and external approval requirements.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Conduct pre-clearance surveys in the Stage 3 and 4 CWEAs and subsequent two-stage clearing, to give animals the opportunity to move away.  Individuals found will be relocated to pre-determined suitable habitat within the Appin North surface mining lease area.	In Control	Two-stage clearing processes are being followed as required. No SBB individuals have been found to date.  The BHS found in April 2016 was relocated to pre-determined habitat in accordance with Figure 3 of the MP.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Document by preparation of pre-clearing survey reports for every emplacement phase cleared including use of GIS coordinates for survey results.	In Control	Pre-clearance survey reports completed as required and issued to the emplacement contractors undertaking the clearing.	

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Summary of Impact Minimisation strategies	6.2/ Table 3	Document by preparation of pre-clearing survey reports for every emplacement phase cleared including use of GIS coordinates for survey results.	In Control	Pre-clearance survey reports completed as required and issued to the emplacement contractors undertaking the clearing. Last report completed April 2023.	
Summary of Impact Minimisation strategies	6.2/ Table 3	Document numbers of individuals trapped and released. Observation of animal condition. Record release location.	In Control	S32 engaged a snake expert from Niche Environment & Heritage in 2016 to capture and relocate the individual. A brief report was prepared documenting the process.	
Summary of Impact Minimisation strategies	6.2/ Table 3	Placement of hollow logs and rock outcrop elements of habitat for the Broad-headed Snake in rehabilitated areas.	In Control	Rehabilitation includes placement of rocks and hollows as required. Pre-clearance inspections also identify flat rock to be retained and translocated to the rehab areas. Artificial pavers were installed in the emplacement area in FY22. No translocation of Velvet Geckos has been undertaken or required.	
Summary of Impact Minimisation strategies	6.2/ Table 3	Installation of artificial habitat (e.g. concrete paving slabs) if necessary as per Webb and Shine (2000).	In Control	Rehabilitation includes placement of rocks and hollows as required. Pre-clearance inspections also identify flat rock to be retained and translocated to the rehab areas. Artificial pavers were installed in the emplacement area in FY22. No translocation of Velvet Geckos has been undertaken or required. Camera trap monitoring of one Broad-Headed Snake artificial habitat undertaken in FY23. Additional monitoring planned for FY24.	



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Summary of Impact Minimisation Strategies	6.2/ Table 3	Placement of topsoil, hollow logs and other structural elements of habitat for the Southern Brown Bandicoot in rehabilitated areas.	In Control	Undertaken as part of the progressive rehabilitation program - See Annual Emplacement Rehabilitation Monitoring Report.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Annual Emplacement Rehabilitation Inspection program undertaken	In Control	As above	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Reports from the annual rehabilitation monitoring program to be attached to the Appin Mine Annual Review.	In Control	Report is included each year as an appendix to the Annual Review.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Dust impacts from emplacement operations will be mitigated by the coal wash material being wet from coal washing processes and being compacted once emplaced.	In Control	In addition to coal wash moisture content, a watercart is in use for the active emplacement areas as additional dust control.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Active emplacement areas will be capped and vegetated as soon as practicable.	In Control	Rehabilitation is progressive as required. ~1.4 ha of stage 3 active emplacement capped and seeded over FY23.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Annual environmental reporting of air quality results and performance of mitigation measures in the Appin Mine Annual Review.	In Control	Dust results are provided in the Annual Review each year as required.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Participation in regional vertebrate pest programs with National Parks & Wildlife Service and Sydney Catchment Authority.	In Control	Not aware of any such program existing. No population of SBBs has been confirmed or defined.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Note: The regional research program established under the EPBC Act project approval (condition 7b) will focus on population monitoring. A regional pest problem will be designed once a population of Southern Brown Bandicoots has been confirmed and defined.	In Control	No population of SBBs has been confirmed or defined.	

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Summary of Impact Minimisation Strategies	6.2/ Table 3	Reporting of project to DAWE and other stakeholders.	In Control	DCCEEW (previously DAWE) is provided with a copy of the Annual Review each year.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Adjustments made to systems and methods as required	In Control	Not Triggered	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Monitoring including pre-clearing surveys, capture and transfer of animals, implementation of two-stage clearing, success of translocation efforts, progress in rehabilitation of emplacement sites, success of captive breeding programs if applicable.	In Control	Pre-clearance surveys undertaken as required, no SBB have been captured and no BHS since 2016. Success of rehabilitation reported in the Annual Review.	
Summary of Impact Minimisation Strategies	6.2/ Table 3	Annual compliance report to DAWE.	In Control	Annual compliance report submitted as required.	
Provision of Regional Funding	7.1	Illawarra Coal (IC) has funded \$250,000 towards the regional management of the Southern Brown Bandicoot and Broad-headed Snake programs as outlined in this Plan and as detailed in the Offset Strategy (Appendix 5). The project took place over three years commencing July 2014 and finishing June 2017 with payments issued as follows: • Year 1 \$85,000 July 2014. • Year 2 \$85,000 July 2015. • Year 3 \$80,000 July 2016.	In Control	Program completed as required	
Actions to be funded	7.2	OEH developed a Project Proposal to be funded by IC, which addressed points (c) to (f) of the EPBC Approval Condition 7. The Project Proposal, OEH Letter of endorsement and BHPBilliton letter of endorsement are provided in Appendix 5, Appendix 6 and Appendix 7 respectively.	In Control	The (then) NSW Office of Environment and Heritage (OEH) developed a Project Proposal to be funded by IC, which addresses points (c) to (f) of the EPBC Act Approval Condition 7.	

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Impacts to other EPBC Act Listed Species	7.3	Condition 7(d) of the EPBC Approval for works conducted by OEH as follows: (d) a demonstration that management actions to be undertaken will not adversely impact EPBC Act listed species; The OEH Proposal addressed the above requirement (see section titled Consideration of Impacts of the Project).	In Control	The OEH Proposal addressed the above requirement.	
Funding Arrangements	7.4	OEH provided a Project Proposal for the Broad headed snake and Southern Brown bandicoot Recovery Actions (see Appendix 5). IC provided the funding through a Non-order Invoice (NOI). OEH issued three separate invoices, prior to the start of each financial year i.e. Year 1, Year 2 and Year 3.	In Control	IMC provided the funding through a Non-order Invoice (NOI). OEH issued three separate invoices, prior to the start of each financial year i.e. Year 1, Year 2 and Year 3.	
Documentary Evidence of Funding	7.5	IC provided documentary evidence to the DoTE&E in September 2016 to satisfy this condition. The relevant results were included in the FY17 BSO Annual Review.	In Control	IMC provided documentary evidence to the DoTE&E in September 2016 to satisfy this condition.  <a href="https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/annual-review/bulli-seam-operations-project-annual-review-fy2017.pdf?sfvrsn=2ace739a_4">https://www.south32.net/docs/default-source/illawarra-coal-bulli-seam-operations/annual-review/bulli-seam-operations-project-annual-review-fy2017.pdf?sfvrsn=2ace739a_4</a> .	
Reporting	8.1.1	Annual reporting is undertaken as per Condition 14 of the EPBC Approval.  The Compliance Report is required to be submitted to DAWE by 15 August of each year via EPBCMonitoring@environment.gov.au and is attached as an appendix in the Annual Review.	In Control	The Compliance Report has been submitted as required and attached as an Appendix in the relevant Annual Review.	

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Reporting	8.1.2	<p>IMC will report on the performance of the SBMP in the Annual Review.</p> <p>The Annual Review is prepared in accordance with Condition 4 of Schedule 6 of the Project Approval and is submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the South32 website.</p>	In Control	<p>The Annual Reviews have been completed as required and published to the South32 website.</p> <p>Actions taken to support the SBMP will be detailed in the Annual Review.</p>	
Review of SBMP	8.2	<p>In accordance with Condition 5 of Schedule 6 of the Project Approval, the SBMP will be reviewed, and if necessary revised, within three months, of:</p> <ul style="list-style-type: none"> <li>• the submission of an annual review;</li> <li>• the submission of an incident report;</li> <li>• the submission of an Independent Environmental Audit report; or</li> <li>• any modification to the conditions of the Project Approval (unless the conditions require otherwise).</li> </ul> <p>Outcomes from each review will be documented in the Management Plan Review Log. The SBMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the SBMP.</p> <p>Administrative or descriptive changes do not constitute a material change.</p> <p>Where a review triggers a revision of the SBMP, the SBMP will be revised and submitted to the Secretary and/or Minister for approval.</p>	In Control	<p>The SBB and BHS Management Plans were reviewed in FY21 and combined. The revised document was approved by DPIE on 18/12/2020 and by DAWE on 28/01/2021.</p> <p>The Management Plan Review log is being maintained.</p>	

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Publication	12.3	<p>Condition 13 of the EPBC Approval requires the proponent to:  <i>...publish all management plans, reports, strategies or agreements required by these conditions of approval on their website. Each management plan, report strategy or agreement must be published on the website within 30 days of being approved.</i>          Approved versions of the SBMP will be displayed on the South32 regulatory page at:  <a href="https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents</a>.</p>	In Control	<p>The approved SBMP is available on the South32 website.</p> <p>Note that the link has changed:  <a href="https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal">https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal</a>.</p>	
Independent Environmental Audit	12.4.1	<p>In accordance with Condition 9 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval, an Independent Environmental Audit (IEA) shall be commissioned every three years, that will include a review of the SBMP. The report is required to be submitted to the Secretary within six weeks of completion of the audit, in accordance with Condition 10 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval. IEAs have been conducted in 2013, 2016/17 and 2019, with the next IEA to be conducted in 2022. Recommendations from the IEA will be incorporated into the SBMP where appropriate.</p>	In Control	<p>The last IEA was conducted in 2022. A copy of the IEA Report was provided to DCCEE as required.</p> <p>The next IEA will be completed in 2025.</p>	

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ISO 14001	12.4.2	<p>As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard. External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.</p> <p>Internal Governance Reviews of the SBMP are nominally undertaken on a three yearly basis.</p>	In Control	The last Governance Review was undertaken in March 2023.	
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AUDIT REVIEW			Outcome	Comment & Evidence	Proposed Action
Section	MP Ref.	Requirement / Obligation			
Protection Mechanism	3.2.2	The Persoonia hirsuta Offset Area is protected by incorporating a condition into Consolidated Coal Lease No. 724 (CCL 724)	In Control	Refer to lease conditions. In 2022 a variation to CCL 724 was issued that did not include this condition. An application was made and accepted for the condition to be included.	
Protection Mechanism	3.2.2	The leaseholder must comply with the <i>Persoonia hirsuta</i> Offset Management Plan approved (and modified if applicable) in accordance with the requirements of the Bulli Seam Operations Expansion, Bulli, NSW (EPBC 2010/5350) Approval dated 15 May 2012, made under sections 130(1) and 133 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act Approval).	In Control	Last IEA was completed in 2022.  Next IEA scheduled for 2025.	
Protection Mechanism	3.2.2	The leaseholder must provide the Department of Trade and Investment NSW - Mineral Resources Unit with a copy of the Compliance Report required by condition 14 of the EPBC Act Approval at the same time that the report is published in accordance with the requirements of Condition 14.	In Control	The FY22 Compliance Report was submitted at the same time as it was submitted to DCCEEW.	

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Protection Mechanism	3.2.2	The leaseholder must also provide Department of Trade and Investment NSW - Mineral Resources Unit with a copy of the Audit Report required by Condition 18 of the EPBC Act Approval as soon as practicable following confirmation that the Audit Report addresses the audit criteria to the satisfaction of the Minister responsible for the administration of the EPBC Act (or their delegate).	In Control	The triennial audit reports are provided to the Resources Regulator as required. The last IEA was undertaken in 2022. The next IEA is scheduled for 2025.	
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Protection Mechanism	3.2.2	<p>In the event that the Persoonia Offset cannot achieve the objectives of Conditions 1 and 2 of the EPBC Approval, ICHPL will provide an offsite offset or alternative offset if:</p> <ul style="list-style-type: none"> <li>- Annual surveys over the period 2037 – 2039 (both inclusive) demonstrate that the P. hirsuta core population has not been maintained or enhanced to the satisfaction of the Department. An offsite offset to be agreed by the department must be provided. The offsite offset must be secured by a legal mechanism acceptable to the Department six months prior to the expiry date of the EPBC approval (by 18 December 2041). In the event it can be demonstrated that a suitable offsite offset could not be found, ICHPL will provide an alternative compensatory measure commensurate with the requirements of Condition 1 of the EPBC Approval to the satisfaction of the Department, or</li> <li>- CCL 724 is not renewed or is revoked at any time prior to the expiry date of the EPBC approval (15 May 2042). An alternative offset to be agreed by the Department must be secured by a legal mechanism acceptable to the Department within two years of the relinquishment or revocation of CCL 724.</li> </ul> <p>In the event it can be demonstrated that a</p>	In Control	Not triggered.	
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		suitable alternative offset could not be found, ICHPL will provide an alternative compensatory measure commensurate with the requirements of Condition 1 of the EPBC Approval to the satisfaction of the Department.		
Persoonia Monitoring	5.2.1	All extant plants will be inspected annually to record the following attributes: * height and width to measure growth rates; * age class and condition to assess reproductive activity, age to maturity overall health of the population etc; * visual observations for any seedlings; and * comments on any imminent threat or risk to the plants health (e.g. apparent disease, excessive dust deposition) to assess the effectiveness of management actions contained within the OMP.	In Control	See Annual Persoonia health monitoring report that is submitted each year to DCCEEW.

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Persoonia Monitoring	5.2.1	<p>Height will be measured using a tape measure, measuring from the ground surface to the highest point on the plant, without physically moving any part of the plant. Condition will be defined using a combination of factors, including the percent cover of leaves, colour of leaves and the presence or absence of fruit or flowers, rating condition from 0 to 6, or from very poor condition to excellent condition.</p> <p>All plants have been recorded with a Garmin GPS and flagged with fluorescent, biodegradable flagging tape and given a unique ID.</p>	In Control	Monitoring methods as per the above.	
Survey Timing	5.2.1	<p>The survey will be conducted from late spring into early summer which is the peak flowering period for the species.</p>	In Control	Monitoring is undertaken during the peak flowering season. This does change slightly depending on season but generally falls late Spring into early summer.	
Reporting	5.2.3	<p>In accordance with Condition 2 (h) of the EPBC Approval, the results of the monitoring will be provided to the Department within 30 days of every 12 month anniversary of the implementation date of the OMP.</p>	In Control	2022 report was submitted on 22 December 2022 as required.	

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Research	6	ICHPL has engaged the University of Wollongong (UoW) and Royal Botanic Gardens Trust to conduct research on <i>P. hirsuta</i> . The aim of the research is to gain a better understanding of the ecology and genetics to satisfy Condition 3 of the EPBC Act Approval. A summary of the research undertaken to-date as well as the research planned is provided in Table 3.	In Control	<p>Research is now underway at the Mt Annan Royal Botanic Gardens as per strategy.</p> <p>The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.</p> <p>Research in FY23 included the support of an honours thesis through the University of Technology Sydney looking into pollinator-plant interactions and pollinator network recovery in the CWEA rehabilitation areas. This included checking flowering <i>Persoonia hirsuta</i> and associated pollinator interactions.</p>	
Research	6	As new information becomes available regarding the local population of <i>P. hirsuta</i> , this will be incorporated into the OMP revisions as required.	In Control	<p>The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.</p> <p>The Offset Management Plan will be reviewed to incorporate the outcomes of the research.</p>	
Research	6	In accordance with Condition 3 of the EPBC Approval, ICHPL prepared a research report that was submitted to DAWE by 30 June 2021. The research report is available on the IMC website in accordance with Condition 3 (f) of the EPBC Act Approval.	In Control	<p>The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.</p> <p>The research report has been published on the IMC website.</p>	

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Performance Objectives and Management Actions	7.1	1a. Secure Offset by the required timeframe i.e. 15 May 2014.	In Control	Offset secured as per timing requirements.	
Performance Objectives and Management Actions	7.1	1b. Offset must include a minimum area of suitable habitat to support at least 150 <i>P. hirsuta</i> plants.	In Control	As per the Offset Management Plan.	
Performance Objectives and Management Actions	7.1	1c. Maintain or increase the number of individual plants in the Offset Area relative to the 2012 baseline population (~44 plants).	In Control	Three translocations have been undertaken to Appin North (Autumn 2019, Autumn 2021 and Autumn 2022).	
Performance Objectives and Management Actions	7.1	2a. Develop a <i>P. hirsuta</i> research strategy	In Control	Research strategy is included in the MP.	
Performance Objectives and Management Actions	7.1	2b. Targeted research commenced by July 2013	In Control	Targeted research has been underway since 2013.	
Performance Objectives and Management Actions	7.1	2c. Research findings published by 30 June 2021 as per the EPBC Approval.	In Control	The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.	
Performance Objectives and Management Actions	7.1	2d. Undertake Phase 3 translocation in FY22.	In Control	The Phase 3 translocation was undertaken in May 2022.	

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Performance Objectives and Management Actions	7.1	2e. Continue to monitor outcomes of translocation trials.	In Control	Annual monitoring of the trials will continue to be undertaken.	
Performance Objectives and Management Actions	7.1	2f. Investigate opportunities with suitable organisations and research institutions for undertaking targeted research to progress recommendations as outlined in the Research Report.	In Control	<p>In FY23 an honours thesis around pollinator-plant interactions and pollinator network recovery was supported through the Mount Annan Botanic Gardens and the University of Technology Sydney.</p> <p>Discussions with the Mt Annan Botanic Gardens around potential research continued throughout FY23; with suggestions for additional research being taken on board for the FY24 period. Progress will be reported in the Annual Review.</p>	
Performance Objectives and Management Actions	7.1	3a. No loss of <i>P. hirsuta</i> in the Offset Area due to land clearing or operational activities	In Control	<p>Plants in an exposed position are clearly demarcated. There has been no loss due to land clearing or operational activities.</p> <p>Permit to Disturb process is in place (IMCF0209).</p>	
Performance Objectives and Management Actions	7.1	3b. No loss of <i>P. hirsuta</i> in other areas of site (outside the approved emplacement and development footprints) due to land clearing or operational activities.	In Control	Plants in an exposed position are clearly demarcated. There has been no loss due to land clearing or operational activities.	

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Performance Objectives and Management Actions	7.1	3c. Restrict access to Offset Area.	In Control	<p>Signage in place. Access to Appin North is restricted. Permit to Disturb process in place.</p> <p>The area is not fenced to allow unimpeded access for wildlife and pollination vectors across the site.</p>	
Performance Objectives and Management Actions	7.1	3d. Avoidance of surface runoff from emplacement areas entering the <i>Persoonia hirsuta</i> Offset Area	In Control	<p>Routine inspections of the Offset have not identified any issues regarding surface runoff from emplacement areas. Stage 4 emplacement construction has not yet commenced. Stage 3 is buffered by a haul road separating the Offset from the active disturbance areas. Drainage from disturbance areas is directed to dedicated catchment ponds.</p> <p>Drainage will be incorporated into the design of Stage 4 emplacement. Not yet required.</p>	
Performance Objectives and Management Actions	7.1	3e. Minimise weed infestation within the Offset Area	In Control	<p>Minor weed control is undertaken by experienced personnel for perennial grasses on the powerline easement.</p>	Weed control is ongoing.

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Performance Objectives and Management Actions	7.1	3f. Minimise dust impacts to <i>P hirsuta</i> from operational activities.	In Control	Dust from emplacement areas is mitigated by the wet coal washing process and the compaction of emplaced coal wash. Areas are rehabilitated as soon as practicable. Water carts are in use on the active emplacement area.  Routine inspections of the Offset have not identified any issues regarding dust impacts.	
Performance Objectives and Management Actions	7.1	4. Adequate regeneration of emplacement as per the approved CWEA Management Plan.	In Control	As per annual Emplacement Rehabilitation Report.	
Performance Objectives and Management Actions	7.1	Soil translocation protocols and re-vegetation protocols are implemented as per the CWEA Management Plan e.g. Topsoil from the donor site will be stripped from the surface in layers. The most valuable layer is the top 50 mm of soil which contains the majority of soil stored seed and propagules, plant nutrients and beneficial soil microbes.	In Control	As per CWEAMP.	
Performance Objectives and Management Actions	7.1	<i>P. hirsuta</i> individuals within the approved emplacement and development footprints may be translocated to the rehabilitating emplacement.	N/A	Not required at this stage.	



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Performance Objectives and Management Actions	7.1	Successfully propagated plants (or seed from propagated plants) are introduced from the nursery at Mt Annan Botanic Gardens to the rehabilitating emplacement (or other suitable areas outside the emplacement and disturbance footprints).	In Control	Translocation of Persoonia Plants into the Offset Area (Stage 3) was undertaken in Autumn 2022.	
Performance Objectives and Management Actions	7.1	Annual rehabilitation survey will be conducted and a report attached to the Appin Mine Annual Review.	In Control	Annual report is attached as an appendix each year to the Annual Review. The most recent rehabilitation report was submitted to DCCEEW via email 20/07/2023.	

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<p>Management Actions and Commitments from Research</p>	<p>7.2</p>	<p>1. Promoting outcrossing conditions.</p> <ul style="list-style-type: none"> <li>• This has been achieved through sourcing propagative material over three years (2017-2019) from several wild populations throughout the Sydney region to supply the P. hirsuta translocation trials occurring at Appin North. This strategy ensures the translocated population will contain a level of genetic diversity that reflects the natural species' distribution.</li> <li>• Genetic studies conducted by Mount Annan Botanic Gardens have confirmed there is a significant amount of genetic diversity in the Sydney region which has been enhanced in the Appin North translocations.</li> <li>• The following sourced material (location, year, propagative material) was utilised in the translocations stages 1 and 2 and will also be utilised in the stage 3 translocation:           <ul style="list-style-type: none"> <li>- Appin North, 2017, vegetative cuttings and seeds (stages 1 &amp; 2)</li> <li>- Glenorie, 2017-19, seeds (stages 1 &amp; 2)</li> <li>- Yanderra, 2018, vegetative cuttings (stages 1 &amp; 2)</li> <li>- Parr SCA, 2019, seeds (stage 2)</li> <li>- Yango NP, 2017-2019. Seeds and cuttings (stage 2)</li> </ul> </li> </ul>	<p>In Control</p>	<p>Sourcing of vegetative material from a diverse set of locations for the P. hirsuta translocations has achieved this action.</p>	
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<p>Management Actions and Commitments from Research</p>	<p>7.2</p>	<p>2. Encouraging the presence of natural pollinators.</p> <ul style="list-style-type: none"> <li>• This will be achieved by constructing artificial Bee Habitats on site, promoting the presence of native bee species. This will be primarily focused around the introduction of bees that have been known to successfully pollinate <i>P. hirsuta</i>, namely <i>Megachile</i> and <i>Leioproctus</i> species.</li> <li>• The presence of natural pollinators is also being encouraged in the Appin North Rehabilitation areas through promoting the growth of native flowering plants that attract natural pollinators. This is achieved through using fresh soil with a naturally occurring seed bank of flowering native plant species as capping material for the rehabilitation areas as well as directly seeding native flowering plants onto the freshly capped areas. This will encourage native Australian bees to naturally inhabit areas within the Appin North site. Some native flowering species present on the Emplacement Rehabilitation Areas that are known to attract Native Australian Bees include:             <ul style="list-style-type: none"> <li>o <i>Angophora</i> spp.</li> <li>o <i>Callistemon</i> spp.</li> <li>o <i>Eucalyptus</i> spp.</li> <li>o <i>Grevillea</i> spp.</li> <li>o <i>Leptospermum</i> spp.</li> </ul> </li> </ul>	<p>In Control</p>	<p>Native bee habitats were installed in FY23.</p> <p>The translocation of soil from areas stripped in advance of the CWEA onto the active rehabilitation area will continue to be implemented. Seeding of the translocated soil to initiate the growth of various native flowering plants will also be continued.</p>	<p>Monitor success of bee habitat installation.</p>
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<p>Management Actions and Commitments from Research</p>	<p>7.2</p>	<p>3. Discouraging damage of plants from herbivory.</p> <ul style="list-style-type: none"> <li>• Translocated plants will be protected with plant guards to assist in preventing potential herbivory, particularly in early translocation stages where introduced plants are adapting to an in-situ environment.</li> <li>• IMC will place mesh plant guards around the remaining <i>P. hirsuta</i> individuals in the Stage 1 translocation area as well as placing plant guards on all future translocations to protect them from herbivory.</li> </ul>	<p>In Control</p>	<p>Stage 1 translocation trial adopted mesh guards for a portion of the individuals to allow for observation of herbivory.</p> <p>Stages 2 and 3 translocations included the use of mesh guards on all plants.</p>	
<p>Management Actions and Commitments from Research</p>	<p>7.2</p>	<p>4. Managing bushfire risk.</p> <ul style="list-style-type: none"> <li>• Research has identified the importance of extended fire intervals in <i>Persoonia</i> populations.</li> <li>• The Appin Mine Bushfire Management Plan will be updated to show the location of adult plants at Appin North. The plan can be referred to in the event of a bushfire to avoid backburning in these areas.</li> </ul>	<p>In Control</p>	<p>The Appin Mine Bushfire Management Plan has been updated to include the location of these plants.</p>	

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Management Actions and Commitments from Research	7.2	<p>5. Maintaining Persoonia stocks through propagation.</p> <ul style="list-style-type: none"> <li>• Translocations of Persoonia plants have been effective in maintaining populations.</li> <li>• South32 will support the Mt Annan Botanic Gardens to maintain a stock of Persoonia plants in their nursery for future translocations and collection of seed (to be reviewed annually).</li> </ul>	In Control	<p>Two Persoonia hirsuta translocations have occurred within the offset area within Appin North to maintain populations. One Persoonia hirsuta translocation has also occurred within the rehabilitation area.</p> <p>Mount Annan have been approached to maintain Persoonia hirsuta stocks to supplement populations as required.</p>	
Review of the OMP	7.3	<p>In accordance with Condition 5 of Schedule 6 of the Project Approval, the OMP will be reviewed, and if necessary revised, within three months, of:</p> <ul style="list-style-type: none"> <li>• the submission of an Annual Review;</li> <li>• the submission of an incident report;</li> <li>• the submission of an Independent Environmental Audit (IEA) report; or</li> <li>• any modification to the conditions of the Project Approval (unless the conditions require otherwise).</li> </ul>	In Control	<p>The research report was submitted to DAWE on 29 June 2021 in accordance with Condition 3e of EPBC Approval 2010/5350.</p> <p>The Offset Management Plan was reviewed by IMC in discussions with DAWE. The Offset Management Plan was approved by DAWE on 18 May 2022.</p>	
Review of the OMP	7.3	<p>Outcomes from each review will be documented in the Management Plan Review Log. The OMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the OMP. Administrative or descriptive changes do not constitute a material change.</p>	In Control	<p>No material changes required since the last review of the OMP in FY22.</p>	

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Review of the OMP	7.3	Where a review triggers a revision of the OMP, the OMP will be revised and submitted to the Secretary for approval.	N/A	No material changes required since the last review of the OMP in FY22.	
Review of the OMP	7.3	The OMP will be reviewed in accordance with Condition 2(i) of the EPBC Approval. The findings from the research programs required by Condition 3 will be incorporated into the approved Persoonia hirsuta OMP and the revised plan will be re-submitted to the Minister for approval within 6 months of the research being finalised, i.e. within 6 months of 30 June 2021.	In Control	This was completed in FY22.  The OMP was approved on 18 May 2022.	

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AUDIT REVIEW			Outcome	Comment & Evidence	Proposed Action
Section	MP Ref	Requirement / Obligation			
Monitoring and Adaptive Management Framework	3	Potential impacts from mining induced subsidence is monitored and managed via an Extraction Plan which is to be approved by the Secretary of DPIE prior to longwall mining commencing in any area.	In Control	Extraction plans in place for Area 9. SMP and Extraction Plan for Area 7.	
Ecological Outcomes and Performance Measures	5	The "Trigger-Action-Response Plans (TARPs)" relate to identifying, assessing and responding to the range of conditions related to potential subsidence impacts on the Rivers which form the potential habitat for Macquarie Perch which is the primary species of management concern in this Plan. Detailed performance indicators are outlined in the Extraction Plan TARPs for each mining area.	In Control	Refer to each Extraction Plan/SMP.	

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Ecological Outcomes and Performance Measures	5	If any impact is recorded, consideration would be given to implementing appropriate management, remediation and/or mitigation measures in consultation with Biodiversity and Conservation Division, DAWE and other relevant stakeholders (refer Section 9). If the performance measures are exceeded, IMC will notify relevant stakeholders and implement the Contingency Plan (Section 10).	In Control	Recorded impacts are reported to relevant agencies in line with the Trigger Action Response Plan (TARP). This includes initiating discussion around remediation measures. The Georges River Rehabilitation Plan has been developed, incorporating detailed feedback from agencies, prior to being approved by DPIE and the Resources Regulator. Additional approvals will be sought to undertake the remediation, as per the plan. The findings from remediation at WC21 will be applied to the Georges River remediation. The remediation trial works were completed in FY23, following delays due to catchment closures as a result of excessive rainfall. A contractor has been onboarded to commence the Georges River Remediation works in Q1 FY24. There are continuing issues associated with land access to access the pools requiring remediation.	Commencement of execution of the Georges River Rehabilitation Plan is planned for Q1 FY24, pending land access approvals being in place.
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Water Requirements for Fish	6.1	Macquarie Perch could be impacted by subsidence through reduced habitat availability through pool diminution and possible discontinuity in smaller tributaries. These impacts are largely mitigated through the Mine Plan or longwall layout that does not longwall mine below rivers and aims to avoid impacts to critical ecological assets such as the Macquarie Perch.	In Control	<p>No Macquarie Perch have been identified within mining areas. Longwall mining does not occur below named streams where Macquarie Perch are found. Macquarie Perch are not expected to occur in the current and future Area 7 mining area due to the limited aquatic habitat provided by ephemeral first, second and third order drainage lines present.</p> <p>eDNA analysis of sediment samples was undertaken in FY22. No DNA for Macquarie Perch was identified.</p>	
Water Requirements for Fish	6.1	Any impacts to potential habitat for Macquarie Perch would be rehabilitated as part of the BSO Project.	N/A	There have been no impacts to known Macquarie Perch habitat.	
Water Requirements for Fish	6.1	Through the implementation of programs to reduce pollutants and compliance with license requirements, impacts from mine water discharges such as the BCD discharge are mitigated.	In Control	EPL 2504 is in place at Appin North.	

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Water Requirements for Fish	6.1	A water treatment plant (WTP) is planned for Appin North to provide an improvement in water quality released from site. It is planned for the WTP to release 1.5 ML/day averaged over the month.	In Control After Action Close-out	A temporary water treatment plant (WTP) was operational until December 2022. The long-term WTP was commissioned in February 2023. High quality permeate is being discharged from the water treatment plant. Discharge from BCD will be modified once consistent flow from the WTP is achieved.	Continue discussions with the EPA regarding discharge from BCD.
Water Requirements for Fish	6.1	Monitoring of mine water discharge and upstream and downstream water quality is an EPL requirement and is part of the ongoing management of mine water releases e.g. Brennans Creek.	In Control	As per EPL requirements.	
Water Requirements for Fish	6.1	Hydrological and water quality monitoring of streams within the Project mining areas is conducted to determine any surface water and surface/ground water impacts. This monitoring will fall under the Extraction Plan process.	In Control	Localised impacts to fish habitat has occurred as predicted in the EIS. No listed species of fish have been impacted.  Macquarie Perch are not expected to occur in the current and future Area 7 mining area due to the limited aquatic habitat provided by ephemeral first, second and third order drainage lines present.	

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Water Requirements for Amphibians	6.2	<p>No EPBC listed threatened amphibian species have been recorded in the BSO project area therefore it is highly unlikely that project discharges will affect any populations.</p> <p>Subsidence related impacts may affect small permanent, semi-permanent pools which they require to complete their life cycle. These impacts are largely mitigated through the mine planning that aims to avoid critical ecological areas.</p>	In Control	No EPBC listed threatened amphibian species have been recorded in the BSO project area.	Continue monitoring impacts in the mining areas.
Monitoring Overview	8.1	There are no records for Macquarie Perch within the Project Area. Potential habitat occurs in the project area but the species is highly unlikely to be present due to numerous fish barriers in the subject watercourses. A precautionary approach has been taken and routine aquatic monitoring (including fish sampling) is being undertaken in the relevant watercourses.	In Control	<p>No Macquarie Perch have been identified within mining areas. Longwall mining does not occur below named streams where Macquarie Perch are found.</p> <p>Macquarie Perch are not expected to occur in the current and future Area 7 mining area due to the limited aquatic habitat provided by ephemeral first, second and third order drainage lines present.</p>	

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Monitoring Overview	8.1	There are no records for either the Giant Burrowing Frog or Littlejohns Tree Frog within the Project Area despite targeted surveys for these species. Marginal potential habitat exists within the Project Area but the species are unlikely to be present due to lack of preferred habitat. Accordingly, no targeted monitoring is proposed for these species unless unpredicted impacts occur or these species are detected.	In Control	No EPBC listed threatened amphibian species have been recorded in the BSO Project Area.	Continue monitoring impacts in the mining areas.
Monitoring Overview	8.1	Potential habitat for the Woronora Beard-heath ( <i>Leucopogon exolasius</i> ) occurs within the Georges River but there are no records for this species within the Project Area despite survey completed for this species. Accordingly, no targeted monitoring is proposed for these species unless this species is detected in the project area.	In Control	Potential habitat for the Woronora Bearded Heath ( <i>Leucopogon exolasius</i> ) occurs within the Georges River but there are no records for this species within the Project Area despite survey completed for this species.	
Table 4 Monitoring Summary for Macquarie Perch	8.1	Aquatic monitoring (including fish sampling) via the Appin Area 7 Longwalls 701 – 710 Extraction Plans (Biodiversity Management Plan). Refer Section 8.2, Figure 10 and Appendix 3.	In Control	Monitoring plan in place.	
Table 4 Monitoring Summary for Macquarie Perch	8.1	Aquatic monitoring (including fish sampling) via the West Cliff Area 5 Longwall 34 - 36 Extraction Plans (Biodiversity Management Plan). Refer Section 8.2, Figure 11, Appendix 4 and Appendix 5.	In Control	Monitoring plan in place.	Continue monitoring impacts in the mining areas, noting that rehabilitation of pools in the Georges River as a result of previous mining has not yet been completed.

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Table 4 Monitoring Summary for Macquarie Perch	8.1	Aquatic monitoring (including fish sampling) via the Appin Area 9 Longwall 901-904 Extraction Plans (Biodiversity Management Plan). Refer Section 8.2, Figure 10 and Appendix 6.	In Control	Monitoring plan in place.	
Table 4 Monitoring Summary for Macquarie Perch	8.1	EPL 2504 Water quality monitoring (EPA Licence) for West Cliff, Appin East and Appin West Pit Top sites. Refer Section 8.2, Section 8.5 and Appendix 7.	In Control	As per EPL requirements	Continue monitoring in line with plans.
Table 4 Monitoring Summary for Macquarie Perch	8.1	General water quality monitoring of subsidence impacts under the Extraction Plans referred to above.	In Control	Water quality monitoring is being undertaken in the BSO project area in line with the SMP, EP or EMP for each area or specific feature e.g. Georges River.	Continue monitoring in line with plans.
Table 4 Monitoring Summary for Macquarie Perch	8.1	EPL Georges River Aquatic Health Monitoring Program (including program to improve water quality and minimum flow requirements) - Appendix 8.	In Control	Aquatic Health Monitoring Program in place.	Continue monitoring in line with plans.
Table 4 Monitoring Summary for Macquarie Perch	8.1	Surface water (hydrological) monitoring via Extraction Plans referred to above. Refer Section 8.	In Control	Surface water monitoring plan in place.	Continue monitoring impacts in the mining areas.
Table 4 Monitoring Summary for Macquarie Perch	8.1	Monitoring of subsidence impacts via Extraction Plans referred to above.	In Control	Subsidence monitoring plan in place.	As above
Table 4 Monitoring Summary for Giant Burrowing Frog	8.1	Targeted monitoring may be initiated if relevant subsidence management TARPs reach level 3, triggering corrective management actions for terrestrial biodiversity. Refer to the relevant Extraction Plan.	In Control	TARPs are in place and reported, corrective actions as required.  No triggers have been reported.	

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Table 4 Monitoring Summary for Giant Burrowing Frog	8.1	Any individuals of this species discovered in the Project Area will be addressed by targeted monitoring that will be included in subsequent revisions of this Plan.	In Control	No individuals identified.	Continue monitoring impacts in the mining areas.
Table 4 Monitoring Summary for Littlejohns Tree Frog	8.1	Targeted monitoring may be initiated if relevant subsidence management TARPs reach level 3, triggering corrective management actions for terrestrial biodiversity. Refer to the relevant Extraction Plan.	In Control	No individuals identified.	Continue monitoring impacts in the mining areas.
Table 4 Monitoring Summary for Littlejohns Tree Frog	8.1	Any individuals of this species discovered in the Project Area will be addressed by targeted monitoring that will be included in subsequent revisions of this Plan.	In Control	No individuals identified.	Continue monitoring impacts in the mining areas.
Table 4 Monitoring Summary for <i>Leucopogon exolasius</i>	8.1	Any individuals of this species discovered in the Project Area will be addressed in subsequent revisions of this Plan.	In Control	No individuals identified.	Continue monitoring impacts in the mining areas.

<p>Aquatic Monitoring Programs</p>	<p>8.2.2</p>	<p>Currently aquatic monitoring is conducted across four programs relating to the current longwall mining areas (Appin Area 7, Area 9 and West Cliff Area 5) and monitoring under the Georges River Aquatic Health Monitoring Program required by EPL 2504. These programs are itemized below with references to further specific information attached to this document.</p> <ul style="list-style-type: none"> <li>• Aquatic monitoring (including fish sampling) via the Appin Area 7 Longwalls 701 – 710 Extraction Plans (Biodiversity Management Plan). Refer Appendix 3.</li> <li>• Aquatic monitoring (including fish sampling) via the West Cliff Area 5 Longwall 37 - 38 Extraction Plan (Biodiversity Management Plan). Refer Appendix 5.</li> <li>• Aquatic monitoring (including fish sampling) via the Appin Area 9 Longwall 901 - 904 Extraction Plans (Biodiversity Management Plan). Refer Appendix 6.</li> <li>• Georges River Aquatic Health Monitoring Program. The Aquatic Health Monitoring Program incorporates (refer to Appendix 8):             <ul style="list-style-type: none"> <li>• quantitative sampling of macroinvertebrates;</li> <li>• ecological assessment processes using DNA extracted from sediment;</li> <li>• in-stream water quality; and</li> <li>• laboratory water testing.</li> </ul> </li> </ul>	<p>In Control</p>	<p>Georges River Aquatic Health Monitoring Program is in place.</p>	<p>Continue monitoring impacts in the mining areas.</p>
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Aquatic Monitoring Methods	8.2.3	<p>The following habitat features are recorded:</p> <ul style="list-style-type: none"> <li>* in-stream features such as sequence of pools, runs and riffles;</li> <li>* stream substratum;</li> <li>* presence, type and extent of aquatic vegetation;</li> <li>* presence of barriers to fish passage into and beyond the study area; and</li> <li>* a photographic record of the habitat.</li> </ul>	In Control	Refer Georges River Aquatic Health Monitoring Program methods.	
Aquatic Monitoring Methods	8.2.3	<p>Water quality will be measured at each site using a water quality probe. Variables to be measured include; pH, dissolved oxygen, oxidation-reduction potential, temperature, turbidity and conductivity. Where applicable, the results will be compared to ANZECC (2000) water quality guidelines for the protection of aquatic ecosystems.</p>	In Control	Georges River Aquatic Health Monitoring Program is in place.	Continue monitoring in line with plans.
Aquatic Monitoring Methods	8.2.3	<p>Fish will be sampled using a back-pack electro fisher and baited traps. At each site, six baited traps are to be deployed in a variety of habitats such as amongst aquatic plants and snags, in deep holes and over bare substratum. The back-pack electro fisher is to be operated around the edge of pools and in riffles. At each site, four, two minute shots are to be performed. Fish are to be collected in a scoop net, identified and measured. Native species are to be released unharmed whilst exotics are not to be returned to the water.</p>	In Control	Georges River Aquatic Health Monitoring Program has no requirement to monitor fish. This is only relevant to extraction plan monitoring.	Continue monitoring impacts in the mining areas.



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Aquatic Monitoring Methods	8.2.3	At each site macroinvertebrates will be sampled using the AusRivAS protocol developed under the National River Health Program. Where available, riffle and edge habitats will be sampled using a dip net along a 10m stretch of habitat. Samples will be sorted in the field, preserved in alcohol and transported to a laboratory for identification. Taxa will be identified to levels required for calculating SIGNAL2 values according to the AusRivAS protocol.	In Control	Monitoring plan in place.	Continue monitoring impacts in the mining areas.
Aquatic Monitoring Methods	8.2.3	Reports will be produced at the conclusion of each aquatic monitoring survey that provide sufficient information to describe the habitats and biota that may be affected by subsidence or Appin Mine water releases.	In Control	Refer to last AHMP report on the IMC website: <a href="https://www.south32.net/docs/default-source/operations/illawarra/illawarra-metallurgical-coal-mine/documents/bulli-seam-operations-project/licenses/georges-river-aquatic-health-monitoring-report-(2023).pdf?sfvrsn=454bf6ca_1">https://www.south32.net/docs/default-source/operations/illawarra/illawarra-metallurgical-coal-mine/documents/bulli-seam-operations-project/licenses/georges-river-aquatic-health-monitoring-report-(2023).pdf?sfvrsn=454bf6ca_1</a> .	Continue monitoring impacts in the mining areas.
Management Responses Monitoring Methods	8.2.4	If level 3 TARPs are triggered within potential Macquarie Perch habitat, Corrective Management Actions (CMAs) such as additional monitoring, habitat rehabilitation or other adaptive management measures will be considered.	In Control	No Macquarie Perch identified.	Continue monitoring impacts in the mining areas. Annual reports to be uploaded to the IMC website.
Management Responses Monitoring Methods	8.2.4	Monitoring results will be reviewed by the IMC Subsidence Management Committee and determine whether performance indicators have been exceeded; and whether CMAs are required.	In Control	Monthly meetings are conducted.	Continue with meetings and documentation.

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Management Responses Monitoring Methods	8.2.4	If the findings of monitoring are deemed to warrant an immediate response, the Manager Approvals will initiate the requirements of the TARP.	In Control	Actions are implemented as required and reported in the Monthly Subsidence Meeting Minutes.	Continue with meetings and documentation.
Terrestrial Biodiversity Monitoring Methods	8.3.2	Terrestrial monitoring occurs over longwall mining areas (i.e. Appin Area 7, Appin Area 9 and West Cliff Area 5) and focuses on detecting significant changes to vegetation communities and fauna habitat present within the mining area and aims to ensure complete coverage across the Study Area. Specific targeted monitoring sites will be determined if justified (e.g. if threatened species populations, EECs or habitats are known and have more than a negligible potential to be impacted).	In Control	Monitoring plan in place.	Continue monitoring impacts in the mining areas. Annual reports to be uploaded to the IMC website. Negligible impact to EECs, habitats or populations to date.
Terrestrial Biodiversity Monitoring Methods	8.3.2	Inspections of vegetation communities within the mining areas is undertaken as a part of routine landscape and water monitoring programs. Targeted inspection by a qualified ecologist will follow should vegetation health changes be observed.	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.

<p>Terrestrial Biodiversity Monitoring Methods</p>	<p>8.3.2</p>	<p>Monitoring will focus on detecting significant changes to vegetation communities and fauna habitat present within the Study Area and will aim to ensure complete coverage across the Study Area.</p> <p>Inspections of vegetation condition will assess the following:</p> <ul style="list-style-type: none"> <li>* Does the vegetation appear healthy?</li> <li>* Are there any detectable visual impacts (e.g. canopy thinning, thinning of shrub layer, loss of ground cover, dead branches present)?</li> <li>* Are there any significant detectable visual impacts (e.g. canopy loss with areas of dieback present, loss of whole shrubs, loss of ground cover)?</li> </ul> <p>Areas of impact or any subsidence effects will be mapped and documented using digital photography.</p> <p>Where a significant visual impact is detected a qualified ecologist will be engaged to document the following:</p> <ul style="list-style-type: none"> <li>* the total area of impact. This will be mapped using a GPS and aerial photo interpretation;</li> <li>* the Foliage Percentage Cover (FPC); and</li> <li>* Modified Braun-Blanquet cover abundance scores for each species.</li> </ul>	<p>In Control</p>	<p>No vegetation health changes detected to date.</p>	<p>Continue monitoring impacts in the mining areas.</p>
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Terrestrial Biodiversity Monitoring Methods	8.3.2	This information will be used to objectively assess extent and degree of impact. Assessment of similar vegetation communities or fauna habitat within the broader locality will be undertaken to determine if the detected changes are within normal variation or represent a possible impact of mining. Additional studies (e.g. gas release measurements) will be commissioned in response to an observed mining impact to understand the mechanism involved and consider any CMAs that may be required.	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.
Terrestrial Biodiversity Monitoring Methods	8.3.2	Impacts are to be monitored as a part of ongoing observations to determine any change in extent or degree.	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.
Terrestrial Biodiversity Monitoring Methods	8.3.2	The typical frequency of terrestrial biodiversity monitoring is: * two baseline monitoring campaigns 1 year prior to mining; * monthly visual inspections (as part of Landscape Features Monitoring), increased to weekly inspections during critical periods during mining; * six monthly monitoring for two years (as part of Landscape Features Monitoring) post mining; * general observation of active mining areas during all other monitoring.	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.

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Terrestrial Biodiversity Monitoring Methods	8.3.2	IMC will implement remediation measures where impacts to vegetation communities or fauna habitat are deemed to be caused by subsidence effects.	In Control	<p>Georges River Rehabilitation Plan has been approved by DPIE and the Resources Regulator. Additional approvals will be sought to undertake the remediation, as per the plan.</p> <p>WC21 trial work has been undertaken however the results of monitoring have not yet been received.</p>	Execution of the Georges River Rehabilitation Plan is anticipated in Q1 FY24, noting that some access approvals have not yet been received.
Monitoring methods for <i>Leucopogon exolasius</i>	8.4.2	<p>Standard monitoring will be conducted as per Section 8.3.2. Any future targeted monitoring for this species may include (but not be limited to):</p> <ul style="list-style-type: none"> <li>* Fixed photo points.</li> <li>* Fixed vegetation quadrats. Data collected from each quadrat may include species richness, community structure and composition, vegetation condition, mortality and recruitment, the presence of soil profile development (leaf litter, presence/absence of invertebrates).</li> <li>* Random meander transects in targeted monitoring areas in order to identify recruitment.</li> </ul>	In Control	<i>Leucopogon exolasius</i> not identified in monitoring program.	Continue monitoring impacts in the mining areas.
Water Monitoring Overview and Context for EPBC Listed Species	8.5.1	Water releases from surface operations are monitored and managed via the relevant management plans as shown in Diagram 1.	In Control	Refer to Appin Mine Water MP, Coal Wash Emplacement Area MP and Georges River Aquatic Health Monitoring Program on the IMC website.	

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Water Monitoring Overview and Context for EPBC Listed Species	8.5.1	Impacts associated with longwall mining areas are addressed through specific Extraction Plans (and their associated Water Management Plans).	In Control	Extraction plans/SMPs for Area 7 and 9 are on South32 website. <a href="https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents</a>	
Water Monitoring for Potential Impacts from Mining Induced Subsidence	8.5.2	Extractions Plans with detailed monitoring programs are submitted on a progressive basis as mining commences in each mining domain.	In Control	Approved monitoring plans in place.	Continue monitoring impacts in the mining areas.
Water Monitoring for Potential Impacts from surface Operations	8.5.3	Potential impacts from Appin Mine surface operations are monitored and managed via the Water Management Plan and EPL 2504 (Appendix 7).	In Control	Refer to Appin Mine Water MP, Coal Wash Emplacement Area MP and Georges River Aquatic Health Monitoring Program on the IMC website.	
Monitoring Parameters and Performance Indicators	8.5.4	EPL 2504 regulates, among other things, the discharge of water from the surface operations into receiving waters. Quantified limits are currently stated in EPL 2504 for a range of parameters. These limits are effectively the surface water quality performance indicators for the AMP as they are aimed at maintaining suitable water quality to support downstream aquatic habitat for species such as Macquarie Perch.	In Control	EPL 2504 is in place.	
Monitoring Parameters and Performance Indicators	8.5.4	Monitoring is conducted monthly.	In Control	Monthly samples are collected as required by EPL 2504	

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Summary of Performance Measures	9.1	The implementation of remedial or adaptive management measures would be assessed through the results of the Extraction Plan monitoring programs, EPL (surface water discharge) monitoring and additional detailed assessments as required.	In Control	Georges River Remediation Plan and Georges River Aquatic Health Monitoring Program are in place.	
Summary of Performance Measures	9.1	In the event the Performance Measures detailed in Table 7 of the AMP are considered to have been exceeded, or are likely to be exceeded, IMC will implement a Contingency Plan (refer Section 10) to manage any unpredicted impacts and their consequences. Such an exceedance would normally represent a Level 3 TARP for surface water quality, flow or aquatic habitat being triggered.	In Control	No Macquarie Perch identified to date.	
Adaptive Management Options - Mine Planning	9.2.1	If impacts exceed performance measures, adaptive management techniques will be considered, such as seeking variations to adjustment the length of planned longwalls. This has been implemented in the past for Longwall 34 in West Cliff Area 5 where Level 2 impacts were identified from Longwall 33.	In Control	No performance measures exceeded. Georges River Rehabilitation Plan has been approved by DPIE and the Resources Regulator.	Execution of the Georges River Rehabilitation Plan is anticipated in Q1 FY24, noting that some access approvals have not yet been received.

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Active Flow Management	9.2.2	During no or low rainfall periods the flow in the Georges River is largely determined by the volume of water discharged via licence discharge point 10 from BCD and from Appin East. If the Level 2 trigger for minor cracking leading to a reduction in pool water level is observed, then additional flow can be released from BCD and/or Appin East to ensure pool water levels are maintained.	In Control	Supplementary flows are and have been provided via BCD and from the temporary and long-term WTPs at Appin North. The EPA and Georges River Stakeholder Group is regularly advised and where required, consulted on the discharge from BCD. Discussions are underway with the EPA regarding BCD discharges post commissioning of the long-term WTP. (Note: Georges River Stakeholder Group was wound up in April 2023).	Continue discussions with the EPA regarding discharge from BCD.
Water Quality and Discharge Management	9.2.3	Where low water quality is identified to be resulting from mining induced subsidence or surface discharges this exceeds relevant TARPs , consideration of appropriate CMAs will be undertaken with relevant stakeholders. Any CMA will be highly dependent on the parameter being exceeded and technical feasibility of interventions.	In Control	No performance measures exceeded. Georges River Rehabilitation Plan has been approved by DPIE and the Resources Regulator.	Execution of the Georges River Rehabilitation Plan is anticipated in Q1 FY24, noting that some access approvals have not yet been received.
Natural Remediation	9.2.4	While sealing of surface fractures will occur naturally in some instances and over time, it is recognised that this may not provide sufficient mitigation in some situations and that active sealing of the streams may be required in some locations.	In Control	Active sealing of streams, with the exception of Georges River, not yet triggered	



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Hand Mortaring	9.2.5.1	Should large fractures occur in the base of the pools they may be sealed over with hand placed cement grout and natural oxides.	In Control	Georges River Rehabilitation Plan has been approved by DPIE and the Resources Regulator.	Execution of the Georges River Rehabilitation Plan is anticipated in Q1 FY24, noting that some access approvals have not yet been received.
Injection Grouting	9.2.5.2	These rehabilitation operations have the potential to cause adverse environmental impacts through the materials used and the disturbance associated with access and will be carefully planned to avoid contamination of watercourses. Bunds will be used to contain any spillage at mixing points. The materials used in these processes are non-toxic, environmentally inert and do not significantly impact upon the natural habitats of aquatic species.	In Control	Georges River Rehabilitation Plan approved by DPIE and the Resources Regulator incorporates these requirements.	Monitoring of the remediation program will be undertaken.

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Surface Treatment	9.2.5.6	Where cracking develops in significant areas and natural sealing is not progressing, the cracks may require forking over and compacting to prevent subsequent erosion. Larger cracks may require more work to repair them, for example, mulch or other protection to prevent the development of erosion channels. Surface protection will remain in place until revegetation covers the disturbed area. In some cases, e.g. if the cracks are wider they may require gravel or sand filling up to surface level and revegetation using local native plants. Such rehabilitation measures have the potential to cause impact through the materials used and the disturbance associated with access. Considerable care and relevant approvals will be obtained to ensure the protection of the environment as such works are implemented.	In Control	No significant cracks have been observed that require remediation to prevent erosion. Fracturing in Georges River is covered by above sections 7.2.5 and 7.2.6	
Gas Releases	9.2.6	Where vegetation is impacted by gas releases, the areas affected will be revegetated once monitoring determines the gas releases have ceased or reduced to an extent that vegetation is no longer affected.	In Control	No vegetation health changes detected to date.	Continue monitoring impacts in the mining areas.
Gas Releases	9.2.6	Where low dissolved oxygen is identified to be resulting from mining induced gas release and this exceeds relevant TARPS, consideration of appropriate CMAS will be undertaken with relevant stakeholders.	In Control	No CMAs have been required as a result of low DO from gas release zones. Consideration includes agencies and specialist consultants.	Continue monitoring impacts in the mining areas.

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Contingency and Response Plans	10.1	<p>In the event the Performance Measures pertaining to Macquarie Perch or other EPBC listed species detailed in Section 9 of the AMP are considered to have been exceeded, or are likely to be exceeded, IMC will implement a Contingency Plan to manage any unpredicted impacts and their consequences. This would involve:</p> <ul style="list-style-type: none"> <li>* capture photographic record if appropriate;</li> <li>* notify relevant stakeholder, agencies and specialists soon as practicable;</li> <li>* conduct site visits with stakeholders as required;</li> <li>* contract specialists to investigate and report on changes identified;</li> <li>* provide incident report to relevant agencies;</li> <li>* review monitoring and implement additional monitoring if required;</li> <li>* inform relevant agencies and stakeholders of results of investigation;</li> <li>* develop site CMA in consultation with key stakeholders if required and seek approvals;</li> <li>* implement CMA as agreed with stakeholders following approvals;</li> <li>* conduct initial follow up monitoring and reporting following CMA completion;</li> <li>* review relevant management plan(s); and</li> <li>* report in regular reporting and Annual Review.</li> </ul>	In Control	<p>No Macquarie Perch identified to date.</p> <p>Macquarie Perch are not expected to occur in the current and future Area 7 mining area due to the limited aquatic habitat provided by ephemeral first, second and third order drainage lines present.</p>	
Contingency and Response Plans	10.1	<p>IMC will consult with appropriate specialists and relevant agencies in order to devise an appropriate response in respect to any identified exceedance.</p>	In Control	No exceedance to date.	Continue monitoring impacts in the mining areas.

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Contingency and Response Plans	10.1	The development and implementation of contingency measures will be designed to address the specific circumstances of the exceedance and assessment of environmental consequences.	In Control	No exceedance to date.	Continue monitoring impacts in the mining areas.
Contingency and Response Plans	10.1	If the contingency measures implemented by IMC fail to remediate or mitigate the impact or the Secretary of DPIE determines that it is not reasonable or feasible to remediate the impact, IMC will provide a suitable offset to compensate for the impact to the satisfaction of the Secretary of DPIE (or DAWE as appropriate), in accordance with Condition 2 of Schedule 3 of the Project Approval.	In Control	No exceedance to date.	Continue monitoring impacts in the mining areas.
Non-compliance, Corrective Action and Preventative Action	10.2	Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and non-conformance/non-compliance classification and reporting, and identification of corrective and preventative actions.	In Control	No incidents to date.	Continue monitoring impacts in the mining areas.

Performance Improvement	9	<p>As part of the Statement of Commitments prepared for the BSO Project EA, IMC committed to implement “research, offset and compensatory measures for Project impacts on water quality and ecological aspects” with the aim of continual performance review and improvement.</p> <p>The annual review process will also formalise opportunities for improvement based on the monitoring data.</p>	In Control	As per Persoonia Offset and research, Georges River Aquatic Health Monitoring Program and construction of a long-term WTP at Appin North.	
Compliance Report	12.1.1	<p>Annual reporting is undertaken as per Condition 14 of the EPBC Approval which requires the proponent to:</p> <p><i>Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the department at the same time as the compliance report is published.</i></p> <p>The Compliance Report is required to be submitted to DAWE by 15 August of each year via EPBCMonitoring@environment.gov.au and is attached as an appendix in the Annual Review.</p>	In Control	This report	

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Annual Review	12.1.2	<p>IMC will report on the performance of the AMP in the Annual Review.</p> <p>The Annual Review is prepared in accordance with Condition 4 of Schedule 6 of the Project Approval and is submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the South32 website.</p>	In Control	<p>Annual Reviews are published on the IMC website as required.</p>	
EPL Reporting	12.1.3	<p>The specific requirements for the publication of EPL monitoring results are set out in section 66(6) of the POEO Act. In summary, this provision requires that licensees who undertake monitoring as a result of a licence condition must publish or make available monitoring data that relates to pollution within 14 days of obtaining the data and/or receiving a specific request for a copy of the data</p>	In Control	<p>Results are reporting online via the 14 day monitoring report <a href="https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents</a>.</p> <p>Monitoring data is stored in EQUiS.</p>	
EPL Reporting	12.1.4	<p>In addition to the above, an Annual Return is submitted to the NSW EPA as required by the EPL. The EPL also details requirements for the Aquatic Health Monitoring Program.</p>	In Control	<p>The 2022/23 Annual Return was submitted as required.</p>	
End of Panel Reports	12.1.5	<p>End of Panel (EoP) reports are prepared in accordance with the relevant Extraction Plan or Subsidence Management Plan. They are prepared following the completion of longwall extraction of each panel. The report outlines the measured and observed impacts relevant to the extraction of the longwall panel and summarises a comparison of observed impacts to predictions and performance criteria.</p>	In Control	<p>The most recent EoP reports completed are for Longwall 708 (April 2022), Longwall 904 (December 2022) and Longwall 905 (June 2023).</p>	

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Incident Reporting	12.1.5	<p>In accordance with Condition 7 of Schedule 6 of the Project Approval, IMC is to notify the Secretary of DPIE and relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. Within seven days of the date of the incident, IMC is to provide the Secretary and relevant agencies with a detailed report on the incident.</p>	In Control	Not triggered on the operational mine sites or mining area.	Continue monitoring impacts in the mining areas.
Review	12.2	<p>In accordance with Condition 5 of Schedule 6 of the Project Approval, the AMP will be reviewed, and if necessary revised, within three months, of:</p> <ul style="list-style-type: none"> <li>• the submission of an annual review;</li> <li>• the submission of an incident report;</li> <li>• the submission of an Independent Environmental Audit report; or</li> <li>• any modification to the conditions of the Project Approval (unless the conditions require otherwise).</li> </ul> <p>Outcomes from each review will be documented in the Management Plan Review Log. The AMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the AMP.</p> <p>Administrative or descriptive changes do not constitute a material change.</p> <p>Where a review triggers a revision of the AMP, the AMP will be revised and submitted to the Secretary and/or Minister for approval.</p>	In Control	AMP was reviewed in 2020. The AMP was approved by the Minister on 28 January 2021.	

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Publication	12.3	<p>Condition 13 of the EPBC Approval requires the proponent to:  <i>...publish all management plans, reports, strategies or agreements required by these conditions of approval on their website. Each management plan, report strategy or agreement must be published on the website within 30 days of being approved.</i></p> <p>Approved versions of the AMP will be displayed on the South32 regulatory page at:  <a href="https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents">https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents</a></p>	In Control	The approved AMP is available on the IMC website.	
Independent Environmental Audit	12.4.1	<p>In accordance with Condition 9 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval, an Independent Environmental Audit (IEA) shall be commissioned every three years, that will include a review of the AMP. The report is required to be submitted to the Secretary within six weeks of completion of the audit, in accordance with Condition 10 of Schedule 6 of the Project Approval and Condition 18 of the EPBC Approval.</p> <p>IEAs have been conducted in 2013, 2016/17 and 2019, with the next IEA to be conducted in 2022. Recommendations from the IEA will be incorporated into the AMP where appropriate.</p>	In Control	<p>The last IEA was conducted in 2022. The IEA report was submitted to DCCEEW as required.</p> <p>The next IEA is scheduled to be conducted in 2025.</p>	



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ISO 14001	12.4.2	As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard. External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years. Internal Governance Reviews of the AMP are nominally undertaken on a three yearly basis	In Control	The last Governance Review was undertaken in 2021, with the next review scheduled for 2024.	
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AUDIT REVIEW			Outcome	Comment & Evidence	Proposed Action
Section	MP Ref.	Requirement / Obligation			
Scope	1.2	Emplacement construction and operations will be conducted in accordance with the detailed design plans prepared for each emplacement phase. Due to the long life of the emplacement, detailed final design details are prepared progressively and are therefore not outlined in this plan for Stage 4. Emplacement of coal wash in Stage 3 is currently underway. The Stage 4 CWEA is scheduled to commence in approximately ten (10) years.	In Control	Detailed design plans are not yet available. Stage 4 construction is at least five years away.	
Emplacement Design and Staging	4.1	The maximum design parameters for Stage 3 are: * No more than 60.5 ha of native vegetation to be cleared	In Control	The area cleared to date for Stage 3 is ~40 Ha (37 Ha in desktop review). With an additional ~2.5 ha to be added once 2023 clearing is completed.	
Emplacement Design and Staging	4.1	The maximum design parameters for Stage 4 of the emplacement design are: * volume of 26Mt; * height of 331 m AHD; * footprint that retains the existing Brennans Creek Dam storage capacity and stockpile areas (refer to Plan 1); and * maximum of 60ha of native vegetation clearance.	In Control	Detailed design plans are not yet available. Stage 4 construction is at least five years away.	

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Emplacement Design and Staging	4.1	Measures to limit the clearing of native vegetation to no more than 60 ha will include: <ul style="list-style-type: none"> <li>• survey and demarcation of the Stage 4 boundary prior to clearing works by a qualified surveyor;</li> <li>• Stage 4 boundary will be clearly outlined on site plans and plans will be provided to clearance contractors;</li> <li>• pre-clearing survey will be undertaken by Specialist Environment who will be trained appropriately in survey methodology (training provided by external consultancy) or a specialist consultant. The area to be cleared will be clearly demarcated with flagging tape. Boundary markings will be placed in a way to ensure that each marker is within line of site.</li> </ul>	In Control	Detailed design plans are not yet available. Stage 4 construction is at least five years away.	
Emplacement Design and Staging	4.1	The Stage 3 valley will be filled in a north westerly direction and Stage 4 from the eastern (or upstream/upslope) boundary and progress in corridors from east to west down the valley, as required by EPBC Approval Condition 6 (d).	In Control	As verified on Arc GIS. Stage 3 is progressing in NW direction.	
Emplacement Design and Staging	4.1	Coal wash will be deposited in benches across the valley (in the case of Stage 4 which will be north-south) and progressively down the valley from east to west.	In Control	Stage 4 not yet commenced. Stage 3 is being deposited in benches across the valley.	
Emplacement Design and Staging	4.1	As each section of fill reaches the designed height, it is top soiled and revegetated. The final landform created by the CWEA will be sympathetic with the regional morphology and will be largely masked from public view by the visual screening of existing eucalypt forest.	In Control	Morphology is as per approved design plans. The completed emplacement is topsoiled and revegetated progressively.	Updated design for Stage 3 including landform is underway.

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Emplacement Design and Staging	4.1	CWEA construction and operations will be conducted in accordance with the final detailed engineering drawings prepared for each CWEA. The Stage 3 and 4 final landform concept designs are illustrated on Plan 2 and Plan 3.	In Control	Routine surveys and a desktop review on ArcGIS suggests the Stage 3 construction is consistent with the design plans.	
Emplacement Design and Staging	4.1	The engineering drawings for the Stage 4 CWEA will be prepared prior to implementation of the Stage 4 CWEA and these plans will show staging of the emplacement and will comply with Condition 17 (a) and (b) of the Project Approval and Condition 6(b) of the EPBC Approval.	In Control After Action Close-out	To be incorporated into the Stage 4 design plans when available	Design plans to comply with Condition 17 (a) and (b) and Condition 6 of the EPBC approval.
Emplacement Design and Staging	4.1	Plan 4 shows a preliminary concept staging plan that provides for the progressive staging of the Stage 4 CWEA to keep the minimum 100 m wide habitat corridor to link the <i>Persoonia hirsuta</i> core population with habitat north of the Stage 4 CWEA, as required by Condition 6(b) of the EPBC Act Approval.	In Control After Action Close-out	To be incorporated into the Stage 4 design plans when available	Design plans to comply with this condition.
Emplacement Design and Staging	4.1	The Stage 4 Design Plans will be implemented and remain in place for at least ten years, unless otherwise agreed to in writing by the Minister of DAWE, at which point a revised plan taking into account the monitoring referred to above must be submitted to and approved by the Minister.	In Control	Condition not triggered. Stage 4 design plans are not yet initiated	

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Haul Road Design	4.2.3.3	<p>Construction of coal wash haul roads associated with the emplacement are to be carried out in accordance with the CWEAMP.</p> <p>Minimum Road Width: Minimum road pavement widths for coal wash haul roads associated with the emplacement area are to be no less than 15 m along curved and straight sections.</p> <p>Maximum Grade: The grade of haul roads should generally not be greater than a 1:9 grade or 11%. If the grade of the haul road is greater than 11%, a risk assessment is to be conducted as detailed in Table 3.</p>	In control	<p>Minimum road widths are no less than 15 m along curved and straight sections. Where not possible risk assessment and traffic control undertaken. Risk assessments and procedures available as required on haul roads graded above 11%. In field inspections are undertaken as required.</p>	
Haul Road Design	Table 3	<p>A risk assessment is to be conducted to identify all the requirements that are to be put in place before operating on 11% to 20% grades.</p>	In control	<p>Risks assessments conducted as required on haul roads graded between 11% and 20%. In field inspections are undertaken as required. All vehicles are rated beyond the grade of all haul roads and access ramps.</p>	
Haul Road Design	Table 3	<p>Risk assessment is to be conducted and approval obtained from the Manager Surface and Infrastructure where haul road is planned to operate for more than 12 months) for grades greater than 20%.</p>	In control	<p>In field verifications are undertaken and any grade above 20% is reported to the Operations Manager. No haul roads have been constructed at a grade above 20%.</p>	

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Horizontal Curve Dimensions	4.2.3.3	Horizontal curves will be designed as required to suit site constraints taking into account safety and operational requirements. Where possible, the following guidelines will be applied to haul road design: <ul style="list-style-type: none"> <li>• sharp horizontal curves will be avoided at or near hill crests, at the bottom of hills, and after long sustained downgrades;</li> <li>• if passing will be required, sections of haul road will be designed with long tangents and constant grades intersections will be avoided at the crest of vertical and/or sharp horizontal curves; and</li> <li>• tight curves will be avoided.</li> </ul>	In control	Daily emplacement inspections undertaken to verify requirement. Any potential breach of guidelines is reported to the Operations Manager and rectified.	
Vertical Curve Dimensions	4.2.3.3	Coal wash haul roads associated with the emplacement are to be designed and constructed to a minimum vertical curve radius of 1500 m and a minimum vertical curve length of 150 m.	In Control After Action Close-out	Requires in field verification. Action taken to survey emplacement crest.	In-field verification required.
Construction of Brennans Creek Diversion Channel	4.2.4	Progressive rehabilitation of the Brennans Creek Diversion Channel will be undertaken in accordance with the approved Brennans Creek Bypass Channel Rehabilitation Plan.	In Control	Diversion channel (within channel) has been rehabilitated.	
Erosion and Sediment Control Measures for Clean Water Cut off Drains	4.2.5.2	The drains are positioned to capture clean water runoff from valley sides and divert it past the emplacement dirty water catch pond system and into BCD.	In Control		
Erosion and Sediment Control Measures for Clean Water Cut off Drains	4.2.5.2	The drains are to be sized as required for the catchment area. Excavated material will be placed beside the drains to form access tracks in the valley for construction of catch ponds and development of the emplacement.	In Control		

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Erosion and Sediment Control Measures for Clean Water Cut off Drains	4.2.5.2	The channels will be modified as necessary during the life of the CWEA to adapt to the changing runoff conditions created by the advancing emplacement.	In Control		
Construction of Emplacement Subsoil Drainage Network	4.2.6	Subsurface drains will be installed on the prepared active CWEA under engineering supervision before coal wash emplacement commences. Construction of the subsurface drains shall be installed in accordance with detailed engineering drawings. Subsurface drains will be progressively linked to subsoil drainage from previous sections of the CWEA.	In Control	In field verification is undertaken as required.	
Construction of Emplacement Catch Ponds	4.2.7.1	The CWEA to be supported by two sequential ponds sited down the Brennans Creek Valley. As each phase approaches completion, and filling of the first pond is imminent, a new pond will need to be constructed and so on.	In Control	Stage 3 emplacement is approaching Emplacement Pond 2. Emplacement Ponds 2 and 3 are still in place.	

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Construction of Emplacement Catch Ponds	4.2.7.1	Clean water cut-off drains will be established prior to construction of ponds and flows in Brennans Creek will be diverted around the construction area via a temporary dam and pump. This will prevent sediment contamination of clean water from surrounding clean water catchment and treated water from upstream emplacement ponds. Emplacement pond dam walls will be constructed using site won material excavated from an appropriate area onsite (most likely excavated material from the base of the dam storage area or areas being prepared for active emplacement) or coal wash. Where possible, dam wall fill material will be transported directly to construction areas however it may be necessary at times for this material to be temporarily stockpiled until required.	In Control	Clean water drains are in place. Planning for new emplacement ponds is in progress.	
Erosion and Sediment Control Measures for Emplacement Catch Ponds	4.2.7.3	Each phase of the CWEA is supported by two sequential ponds sited down Brennans Creek Valley. The first (upstream) pond allows passive settling of particles, while the second pond will have the capability to be chemically dosed to remove fine particulates from the water column.	In Control	The first (upstream) pond: Emplacement Pond 2 - is utilized for passive settling. The second (downstream) pond: Emplacement Pond 3 - is chemically dosed for assisted settling.	



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Erosion and Sediment Control Measures for Emplacement Catch Ponds	4.2.7.3	Each pond must be operational prior to commencement of coal wash emplacement in the catchment area for that pond. As each phase approaches completion and filling of the first pond is imminent, a new pond is to be constructed downstream, prior to the emplacement encroaching on the upstream pond. Emplacement pond dam walls will be constructed using coal wash or site won material excavated (sandstone, coal wash or other appropriate material) from prepared active emplacement areas or other suitable areas.	In Control	Stage 3 emplacement is approaching Emplacement Pond 2. No new ponds were created in FY23.	
Preparation of Active Emplacement Areas	4.2.8.1	Preparation of active emplacement areas will take place progressively as the emplacement advances down Brennans Creek Valley.	In Control	As per CWEAMP rehabilitation program.	
Preparation of Active Emplacement Areas	4.2.8.1	The area of land cleared and dedicated as the active emplacement area will be restricted to an operational size of 18 ha (where practical, with a maximum area of 21 ha) in order for the emplacement ponds to effectively treat surface flows.	In Control	Active emplacement area is within limits. Emplacement Area at 17.92 ha at time of desktop review (10/08/2023).  South eastern face of emplacement currently being covered by topsoil from clearing area taking place for the Stage 3 CWEA at the time of reporting. Total area to be cleared in early FY24 is ~1.5 ha that will be relocated as topsoil for current active emplacement.	

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Preparation of Active Emplacement Areas	4.2.8.1	In general, stripped topsoil will be placed on finished emplacement areas and stripped sandstone/bedrock will be used onsite for emplacement pond dam wall construction. This may require temporary stockpiling of stripped topsoil and sandstone material and appropriate mitigative measures will be undertaken to minimise the effects of erosion and sediment runoff. Stage 4 of the CWEA has a design footprint of 59.4 ha as shown in Plan 3.	In Control	As per CWEAMP rehabilitation program.  VENM was imported to Appin North in FY22 and FY23 for use as capping material for the CWEA.	
Vegetation and Topsoil Removal	4.2.8.3	All vegetation including shrubs, trees and roots shall be cleared from the active emplacement area using the two-stage clearing process before coal wash emplacement commences. Loose vegetation from site clearing, such as tree branches, shall be used as mulch or brush matting over areas of the CWEA being rehabilitated. Soil will be stripped from areas cleared for coal wash emplacement and where practicable, the seed rich surface layer of topsoil shall be separated from lower level soils. Stripped soil will be applied to a depth of typically 0.5 m (where appropriate) over completed areas of the emplacement as soon as practical. When seed rich topsoil stripped from cleared areas is available it will be spread as the surface layer on emplacement areas being rehabilitated. Seed rich topsoil is to be reused as quickly as possible to maintain viability of seeds.	In Control	As per CWEAMP rehabilitation program.	

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Vegetation and Topsoil Removal	4.2.8.3	When the emplacement is progressing to its final stages, particular attention must be paid to stockpiling the necessary volumes of soil to ensure adequate soil cover is achieved during rehabilitation of the final landform. Where required, suitable material may be sourced from off-site locations to supplement on-site material where deficiencies are identified.	In Control After Action Close-out	A Biodiversity Risk Assessment was completed in April 2023 which looked at "topsoil deficit" and identified actions to reduce the risk of a topsoil shortfall.  VENM was imported to Appin North in FY22 and FY23 for use as capping material for the CWEA.	Incorporate topsoil stockpiling into the design planning for Stage 4 (include a topsoil inventory for Stage 4).  Continue to investigate other options for sourcing alternative material and progress required approvals as appropriate.
Emplacement of Coal Wash in Active Emplacement	4.2.9.1	Active emplacement areas will be revegetated as soon as possible after the final emplacement design level has been reached.	In Control	Rehabilitation is undertaken progressively.	

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Coal Wash Transportation	4.2.9.3	<p>The following procedures must be adhered to with regard to transportation of coal wash associated with the emplacement operations:</p> <ul style="list-style-type: none"> <li>• coal wash shall be transported in trucks on the mine site;</li> <li>• coal wash trucks shall be restricted to designated haul roads on the mine site;</li> <li>• coal wash haul roads shall be designed in accordance with the haul road design guidelines in this management plan (see Section 4.2.3.3);</li> <li>• coal wash haul roads must drain to contaminated water catchments and have standard berms installed;</li> <li>• coal wash haul roads must be maintained to minimise airborne dust;</li> <li>• only dump trucks shall be permitted on the emplacement area (semi-trailers shall only be permitted on areas of the emplacement that have been specially prepared for their access);</li> <li>• dump trucks will be speed restricted to an appropriate speed to meet the site requirements; and</li> <li>• all haul trucks must adhere to site speed limits to maintain operational safety and minimise dust impacts.</li> </ul>	In Control	<p>The procedures governing the transportation of coal wash associated with the emplacement operations are consistent with the Management Plan. In field verification is undertaken as required.</p>	
Coal Wash Transportation	4.2.9.3	<p>Coal wash transport will comply with the safety and operational conditions of the West Cliff Surface Transport Management Plan (Document Number: WCPMP0012), Stockpile and Slope Stability Management Plan (Document Number: WCPMP0001), and the Road Maintenance Manual (Document Number: WCPM0004).</p>	In Control		

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Coal Wash Tipping	4.2.9.4	<p>A tipping area is provided on each active coal wash bench for haul trucks to tip their loads onto the bench. There are currently eight different materials which are required to be placed in a controlled manner into the emplacement.</p> <p>The tipping areas must be set up to handle all eight materials, each of which have different characteristics:</p> <ul style="list-style-type: none"> <li>• DCPD coal wash;</li> <li>• WCCPP coal wash;</li> <li>• belt press fines from the WCCPP;</li> <li>• oversize stone (Big Rock) from the WCCPP;</li> <li>• thickener sludge from the WCCPP;</li> <li>• drilling muds, waters and drill cuttings from IMC exploration and methane drainage programs;</li> <li>• inert waste (including concrete and soil) and virgin excavated natural material (VENM); and</li> <li>• sump/dam clean out materials.</li> </ul>	In Control	Tipping areas are set out on individual benches for approved materials as outlined in the Management Plan. In field verification is undertaken as required.	
Coal Wash Tipping	4.2.9.4	<p>The Material Acceptance Form must be completed and approved prior to the transport of any material not generated by the WCCPP or DCPD to the emplacement for use or disposal.</p>	In Control	Material Acceptance Forms have been completed for the transport of materials not generated by the WCCPP or DCPD.	
Coal Wash Tipping	4.2.9.4	<p>Each area is prepared in such a way that allows safe operation of mobile equipment while accessing the area for tipping. This includes:</p> <ul style="list-style-type: none"> <li>• adequate areas and lighting for night time operations;</li> <li>• berms in place;</li> <li>• signage marking tip areas;</li> <li>• allowance for drainage;</li> <li>• surfaces suitable for dump trucks and other approved surface mobile equipment; and</li> <li>• surfaces suitable for tankers around sludge ponds.</li> </ul>	In Control	Each area is prepared in such a way that allows safe operation of mobile equipment while accessing the area for tipping as outlined in the Management Plan. In field verification is undertaken as required.	

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Coal Wash Tipping	4.2.9.4	The Contract Supervisor for the CWEA operations is responsible for ensuring required inspections are undertaken. The adequacy of these inspection records will be checked by IMC personnel on a periodic basis (nominally annually).	In Control	Required inspections are undertaken and reviewed by IMC.	
Coal Wash Drying	4.2.9.5	If the moisture content of coal wash delivered to the emplacement area is too high for satisfactory compaction it will be left to dry naturally until suitable moisture content for compaction is reached.	In Control	Coal wash that is delivered to the emplacement area that has a high moisture content is left to dry naturally as outlined in the Management Plan.  In field verification is undertaken as required.	
Coal Wash Drying	4.2.9.5	Coal wash slimes/fines will be tipped into shallow temporary drying basins (i.e. sludge ponds) constructed with coarse coal wash. Temporary drying basins will be carefully located on the emplacement area well away from the embankment face and perimeter drains. No surface drainage will be permitted to enter a temporary drying basin.	In Control	Coal wash slimes/fines are handled as outlined in the Management Plan.  In field verification is undertaken as required.	
Compaction	4.2.9.6	Coal wash will be spread from tipped heaps and where necessary compacted with vibratory rollers. Fine coal wash will be combined with coarse coal wash in the spreading and compaction operation. Material from temporary drying basins will be placed and compacted into the emplacement in a similar manner to fine coal wash.	In Control	Tipping methods allow for the adequate mixing of coarse and fine coal wash materials. Fine coal wash management outlined in OMS and approved by RTFE/EoR. Compaction requirements outlined in OMS.	

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Compaction	4.2.9.6	The Emplacement Supervisor manages the deposition of coal wash and is required to balance available areas for deposition, volumes and material types and compaction results.	In Control	Emplacement Supervisor manages and balances coal wash deposition as outlined in the Management Plan.  In field verification undertaken as required.	
Compaction	4.2.9.6	The developing emplacement benches shall be graded back into the valley to prevent surface water flowing over the front batter of the bench.	In Control	Benches constructed as outlined in the Management Plan.  In field verification undertaken as required.	
Compaction	4.2.9.6	Compaction testing is nominally carried out ten times per year with each testing campaign comprised of at least five representative samples. The compaction testing tests for Standard Maximum Dry Density (SMDD) and the results are compared with a compaction criterion of 95% Standard Compaction. The tests are carried out by a Geotechnical consultant at test locations selected by the Contract Supervisor for the emplacement operations.	In Control	Compaction testing completed as per plan. Compaction method and trials underway under OMS.	
Compaction	4.2.9.6	A record of the test results and locations of where they have been taken shall be maintained in the document management system.	In Control	Records of compaction tests are maintained by the emplacement contractor.  Desktop verification undertaken as required.	

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Bench Heights	4.2.9.7	Coal wash emplacement will progress in a series of filled horizontal benches until each active emplacement area reaches its finished height. Coal wash benches will extend down the valley in a repetitive sequence of tipping, spreading, and compacting. Coal wash material that is too wet to be emplaced immediately will be placed in temporary drying ponds, which will be located within the emplacement footprint.	In Control	Emplacement operations undertaken as outlined in the Management Plan.  In field verification undertaken as required.	
Bench Heights	4.2.9.7	Coal wash emplacement in the valley shall commence at the lower end of the prepared active emplacement area and progress in a series of filled horizontal benches until the emplacement reaches the finished height. Coal wash shall be deposited on the benches and compacted in layers as shown in Figure 1 to achieve better than 95% dry density ratio.	In Control	Emplacement operations undertaken as outlined in the Management Plan.	
Bench Heights	4.2.9.7	The developing benches will be graded back into the valley to prevent surface water flowing over the front batter of the bench and operations will generally aim to maintain coal wash benches with a 30 m lift as outlined in Figure 1.	In Control	Emplacement operations undertaken as outlined in the Management Plan.	



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Bench Heights	4.2.9.7	<p>The vertical height of a bench is measured at its highest point or crest and at the bench toe. A bench is established in four distinct stages and must be built with the materials' natural angle of repose forming the maximum angle or slope. Any under-cut which increases this angle must be avoided and rectified before tipping can proceed on top of the bench. The procedure for constructing the benches is as follows:</p> <ul style="list-style-type: none"> <li>• each layer of coal wash is pushed off with the dozer;</li> <li>• depending on material type and compaction already achieved, a vibratory roller is used to further compact the coal wash; edges of the bench are further rolled providing increased compaction;</li> <li>• surface gradient of the bench top is provided to facilitate quick water run off for rain events; and</li> <li>• surface contour drains are provided at intervals and a new bench is started. The contour surface drains must have a gradient that allows surface water to be discharged quickly.</li> </ul>	In Control	<p>Emplacement benches established as outlined in the Management Plan.</p> <p>In field verification undertaken as required.</p>	
Bench Heights	4.2.9.7	<p>Best practice at the CWEA has limited bench heights to 30 m. This height can only be exceeded following a formal risk assessment which involves suitably qualified personnel other than the contractor or persons normally supervising the work.</p>	In Control	<p>Bench heights of 30 m are not exceeded in the CWEA.</p>	

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Bench Heights	4.2.9.7	The surface shape of the CWEA will be finished to blend with the surrounding landform (as per the approved final landform) and provide for non-eroding table drains to carry surface water runoff to the emplacement perimeter drains. Batter slopes on the finished emplacement will be constructed to non-eroding grades where practical in accordance with the approved finished profile design contours. This profile has been designed to a maximum grade of 1(V):3(H) to prevent erosion and sediment runoff. Suitable erosion control methods will be adapted as necessary.	In Control	The finished landform is as per approved design plans in the CWEA management plan.	
Redirect Coal Wash to Beneficial Uses	4.2.12	IMC has committed to pursuing alternative uses for coal wash as part of the Project Approval and the Dendrobium Mine Development Consent. This commitment is demonstrated from the continuing work in this area, including researching new technologies which would enable beneficial coal wash uses.	In Control	Beneficial uses of coal wash continue to be investigated.	
Cultural Heritage Management	5.1	Detailed design plans which include options for reducing, avoiding and/or managing impacts on Aboriginal heritage sites in and adjacent to the southwestern fringe of the proposed Stage 4 footprint (including sites 52-2-2228/3617, 52-2-1373, 52-2-3533/3613 and 52-2-3506);	In Control	Stage 4 not yet commenced	
Cultural Heritage Management	5.1	Management strategies to ensure no impacts to Aboriginal heritage site 52-2-3505 other than negligible impacts, including consideration of potential staged development of the emplacement and/or buffer areas.	In Control	Emplacement is at least five years away from this location. The site is also buffered by the Brennans Creek Diversion Channel.	
Management and Mitigation	5.7	There are 13 cultural heritage sites within the CWEA that will require some form of management. Refer to Appendix 3.	In Control	Cultural heritage is managed as per the approved CWEAMP.	

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Management and Mitigation	5.7	For sites located within the boundaries of the proposed Stage 4 CWEA, the proposed management approach is to conduct detailed recording and, where appropriate, archaeological salvage of a sample of occupation deposit. This strategy is consistent with that successfully employed for the Stage 3 CWEA.	In Control	Cultural heritage is managed as per the approved CWEAMP.	
Management and Mitigation	5.7	For sites avoided by the emplacement footprint, but located in close proximity, proposed management includes conducting detailed recording of the site prior to works in the vicinity, and demarcation of the site to minimize the potential for accidental impacts from mobile machinery working in the area.	In Control	Cultural heritage is managed as per the approved CWEAMP.  Consultation with Aboriginal Groups commenced in FY23 and will continue in FY24.	
Management and Mitigation	5.7	Detail and scheduling of these management strategies should be developed in consultation with the Aboriginal community through the AHP process.	In Control After Action Close-out	Cultural heritage is managed as per the approved CWEAMP.  Consultation with Aboriginal Groups commenced in FY23 and will continue in FY24.	Continue consultation with local Aboriginal groups.
Vegetation and Fauna Management	6.1.1	The unit of vegetation to be cleared will be surveyed by appropriately qualified personnel (suitably trained Environmental Representative or specialist consultant) and marked out using flagging tape.	In Control	Relevant site personnel have been trained	
Vegetation and Fauna Management	6.1.1	Surveys of each unit will involve traversing the study area to locate, record and mark specific habitat features that are proposed for preservation and redistribution to the emplacement (e.g. rocks and boulders, stags and large hollows).	In Control	Pre-clearance inspections are undertaken as required.	

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Vegetation and Fauna Management	6.1.1	Prior to any vegetation clearance occurring on site, specific details including the type and number of each habitat feature will be clearly recorded and identified on a pre-clearing checklist. Clearance will only occur following demarcation and survey by appropriately qualified personnel.	In Control	Pre-clearance inspections are undertaken as required.	
Vegetation and Fauna Management	6.1.1	The survey will identify appropriate candidate boulders and outcrop rock that could be translocated for habitat creation in revegetated areas. Boulders shall be placed on top of replaced soils (on top of the CWEA) to recreate habitat for species dependent on rocky outcrops, such as the Broad-headed Snake.	In Control	Pre-clearance inspections are undertaken as required and suitable boulders identified.	
Vegetation and Fauna Management	6.1.1	During the pre-clearance survey, habitat features within each unit will be inspected in order to identify the need for any relocation of resident fauna species. Relocation of fauna will also involve the identification of capture and release methods and release areas for the relocation of fauna species prior to clearing.	In Control	Pre-clearance inspections are undertaken as required. No relocations were required in FY22.	
Permit to Disturb	6.1.2	Prior to any vegetation clearance occurring on site, a Permit to Disturb (ICHF0209) is to be issued. Specific details including the type and number of each habitat feature will be clearly recorded and identified on Permits to Disturb prior to issue. Permits to Disturb will only be issued following demarcation and survey by the Environmental Representative.	In Control	Permits to Disturb are completed as required.	
Permit to Disturb	6.1.2	A post-clearing inspection will be undertaken by the site Environmental Representative to verify the clearing was done in accordance with the Permit to Disturb.	In Control	Permits to Disturb are completed as required.	

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Permit to Disturb	6.1.2	If unapproved clearing goes beyond the emplacement boundary: <ul style="list-style-type: none"> <li>• the incident will be reported in accordance with the Environmental Compliance/Conformance Assessment and Reporting Procedure (IMCP0186); and</li> <li>• the disturbed area will be rehabilitated as soon as practicable.</li> </ul>	N/A	Not triggered	
Clearing Process - Timing	6.2.1	Where possible, the timing of vegetation clearance of important habitat features will be between January and May to avoid the primary breeding and nesting periods of most hollow-dwelling species.	In Control	The last emplacement clearing permit was issued in April 2023 with two stage clearing implemented for this area. Habitat features checked through spotlighting before clearing approved. Some habitat features remain in the area as of 10/08/2023 and will be checked prior to clearing as part of two stage clearing process.	
Two-Stage Clearing	6.2.2	Where possible, (i.e. where access to trees by the excavator is safe and practical), clearing of hollow bearing trees will be performed in a two-stage process where surrounding vegetation is cleared separately, before the removal of habitat trees to allow fauna an opportunity to move.	In Control	Two stage clearing undertaken as required and as per requirements of the pre-clearing assessment report that is issued to the contractor before clearing can take place.	

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Injured Animals	6.2.2.3	The general practice of dealing with injured or captured fauna will be for the site operators to notify the site Environmental Representative who will arrange for fauna rescue or veterinary treatment. If the site Environmental Representative is not present when an injured or juvenile animal is found, the following steps will be implemented: <ul style="list-style-type: none"> <li>• cover animal with a towel or blanket to minimise stress and place in an appropriate hessian or cloth bag;</li> <li>• move animal to designated holding area; and</li> <li>• contact the local animal welfare group or veterinarian immediately.</li> </ul>	N/A	Not triggered	
Stockpiling	6.2.3	Vegetation shall be removed from the area in stages and stockpiled adjacent to the clearing.	In Control	Stockpiling is avoided where possible. Material is preferentially translocated directly to the areas being rehabilitated.	
Stockpiling	6.2.3	Rocks and logs are to be redistributed to the recipient sites (as per the Permit to Disturb). Large boulders and stags which require partial soil cover to be secured in place will be moved to the recipient sites prior to soil translocation.	In Control	Rocks and logs are collected. Large boulders and stags are relocated as required where identified.	
Stockpiling	6.2.3	Where practical, soil stockpiling will be avoided, and stripped soil layers will be immediately redistributed to the donor sites. Soils will not be stockpiled for long periods of time. Soil horizons will not be removed during or immediately following rain to minimise the composting process during stockpiling.	In Control	Stockpiling is avoided where possible. Material is preferentially translocated directly to the areas being rehabilitated.	

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Stripping of soil horizons	6.2.4	Topsoil from the donor site will be stripped from the surface in layers. The most valuable layer is the top 50 mm of soil which contains the majority of soil stored seed and propagules, plant nutrients and beneficial soil microbes. The top 50 mm of soil will be stripped and mixed with the cleared vegetation and stockpiled adjacent to or on the selected and pre-prepared recipient site ready for spreading.	In Control	Topsoil stripping and placement is undertaken as detailed. The success of this methodology is noted in the CWEA monitoring report.	
Stripping of soil horizons	6.2.4	Stripping and stockpiling of subsoil horizons will be undertaken depending on depth of bedrock. Where possible the depth of subsoil removal should exceed 500 mm. Subsoil layers will then be translocated to the recipient sites.	In Control	Subsoil stripping and placement is undertaken as detailed.	
Progressive Rehabilitation	6.3.1	Rehabilitation of the emplacement surface will take place progressively as each section of embankment fill reaches the finished level. Completed sections of the emplacement will be trimmed to even grades, and spread with approximately 0.5 m of soil (including subsoil and topsoil).	In Control	Progressive rehabilitation is undertaken.	
Progressive Rehabilitation	6.3.1	Habitat reinstatement techniques such as transplanting dead stags, addition of habitat logs and woody debris, nest box use and installation reconstruction of rock outcrops will be undertaken as described.	In Control	Progressive rehabilitation is undertaken.	
Landform Design	6.3.2	The surface of the emplacement will be reshaped in order to mimic micro-topographic features. Where possible, more natural concave slope profiles and slope angles will be used to limit the loss of sediment off the slope. The finished surface profile of the CWEA must be in accordance with the approved design contours (refer to Plan 2 and Plan 3).	In Control	Micro-topographic features are built in line with recommendations outlined in the Management Plan.  Verified in field on a quarterly basis.	

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Translocation of Habitat and Soil	6.3.3.1	To facilitate successful long term plant growth it will be necessary to avoid capillary rise of potential saline seepage from the coal wash. In order to avoid the potential for saline seepage (which can prevent seed germination and retard plant growth), the emplacement will be fully encapsulated by soil horizons to a depth of typically 0.5m where appropriate.	In Control	There is no evidence of capillary rise in the CWEA.	
Translocation of Habitat and Soil	6.3.3.1	Subsoil horizons will first be spread over the allocated recipient sites on the Emplacement surface. Finally, the remaining 50 mm (topsoil) will be spread over on top.	In Control	Soil horizons are spread as required.	
Translocation of Habitat and Soil	6.3.3.2	All remaining stockpiles of rocks, logs and vegetation will then to be redistributed over the recipient site. Avoiding excessive soil compaction is crucial to maximising plant establishment and all traffic should be excluded from the translocated soil horizons once all materials have been spread on the surface. Habitat logs and coarse woody debris from the cleared vegetation will provide microhabitat for fauna and protection for emerging seedlings.	In Control	Stockpiles of rocks, logs and vegetation are spread as detailed.	
Translocation of Habitat and Soil	6.3.3.3	Large hollow bearing trees are numerous within areas proposed for clearing. Selected large hollow bearing trees within each clearance compartment will be transplanted to areas within the rehabilitating emplacement to become standing dead trees (stags). Provision of these dead stags will provide fauna habitat which may otherwise take decades to form. The quantity of dead stags transplanted to the emplacement will aim to mimic the numbers originally present within the cleared compartments.	In Control	Large stags are being identified during the pre-clearance inspections and placed within the rehabilitation areas.	



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Translocation of Habitat and Soil	6.3.3.4	To provide suitable habitats for certain fauna species (especially reptiles), relocation of sandstone rock outcrops to the emplacement will be undertaken. The location of rock outcrops will account for the thermoregulatory requirements of reptile fauna by concentrating placement of boulders and exfoliating rocks on westerly aspects of the CWEA.	In Control	<p>Rock outcrops are being constructed as required. Soil capping and habitats are currently being built over the eastern side of the Stage 3 CWEA as of 10/08/2023.</p> <p>Pavers were installed in the rehabilitation areas to replicate habitat for the Broad-headed Snake and the Velvet Gecko in FY22. One Broad-Headed Snake habitat included in annual rehabilitation monitoring for FY23, with a more in depth monitoring regime to be implemented for FY24.</p>	
Translocation of Habitat and Soil	6.3.4	Seed mixes should resemble the local vegetation types (Exposed Sandstone Scribbly Gum Woodland (ESSW) and Sandstone Gully Peppermint Forest (SGPF)) to supplement rehabilitation of the emplacement and associated areas. Seed is harvested by contractors from areas of land within the regional locality, and will be spread over bare areas of the CWEA. Where required (i.e. in areas that remain without any, or poor, natural regeneration for a period longer than six months), supplementary planting of local provenance tubestock will be considered to ensure vegetation is progressively reinstated.	In Control	Seed is sourced from a contractor. It is not always possible to guarantee local seed due to availability in the local areas. Due to health and safety risks associated with seed collection on an active mine site, no seed is formally collected on the mine site and it hasn't been required due to seed being available elsewhere in the region. Supplementary planting has not been required to date.	
Translocation of Habitat and Soil	6.3.4	A list of suitable plant species for collection, propagation and installation has been derived from the Species Impact Study species list and is included in Table 5.	In Control	Seed list has been provided to the seeding contractor. Monitoring results suggests revegetation is consistent with the listing provided.	

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Weed and Pest Management	6.3.5.1	Weeds and vertebrate pests will be managed as detailed in Table 6.	In Control	Regular slashing has continued as required. Weed spraying occurred throughout the rehabilitation areas during FY23.  No pest management has been required in FY23.	
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<p>Bushfire Management</p>	<p>6.3.5.2</p>	<p>Bushfire management at the site will be reviewed once the current <i>Persoonia hirsuta</i> research project findings are completed (which includes ecological burning). The updated bushfire management for the site will also consider the fire ecology of all threatened species at the site. Bushfire trials are being considered on the CWEA, in particular Stage 1 and Stage 2.</p>	<p>In Control</p>	<p>A literature review of bushfire and rehabilitation was undertaken in FY21 and revised following the provision of results from coal wash sampling and provision of additional data as part of an ACARP Project. The Literature Review concluded that bushfire on the CWEA rehabilitation has a low (inconsequential) risk of ignition of the coal wash combustibles and the existing surrounding landscape would offer containment of a fire and prevent potential spread from the rehabilitation area. The subterranean coal wash material is unlikely to be exposed to a radiant heat intensity and duration that would have potential to ignite the coal wash reject material. There is a limited yet manageable risk associated with bushfire on the CWEA.</p> <p>The <i>Persoonia</i> Research report was submitted to DAWE in June 2021.</p> <p>The Appin Mine Bushfire Management Plan was reviewed in FY23.</p>	
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Rehab Phases, indicators and Completion Criteria	6.3.6	The Appin Mine Mining Operations Plan (that also meets the requirements of Condition 33 of Schedule 4 of the Project Approval for the Appin Mine Rehabilitation Management Plan) summarises the rehabilitation processes for all surface facilities and sites associated with Appin Mine. Table 7 outlines the rehabilitation phases, indicators, objectives and completion criteria for the CWEA.	In Control	Progressive rehabilitation is undertaken to achieve the Completion Criteria.  The CWEA Annual Monitoring Report details progress towards meeting these criteria.  The MOP was replaced with a Rehabilitation Management Plan on 2 July 2022.	
<i>Persoonia hirsuta</i> management strategies	6.4	The Stage 4 conceptual staging plan will facilitate pollination vectors for <i>Persoonia hirsuta</i> across remnant bushland for Corridors 1 through 3 as shown in Plan 4.	N/A	Not yet triggered	Design plans will be developed to comply with this Condition as required.
Water	7.1	Runoff from the active emplacement areas (or areas where the vegetation has not yet been spread) is directed to the emplacement water management system (i.e. Ponds P4, EP2, and EP3) for treatment prior to being gravity fed to BCD.	In Control	Inspections are undertaken to check effective operation of the water management system.	
Water	7.1	As the emplacement construction progresses, a subsurface drainage system is installed in the base of the cleared area. Emplacement under-drainage flows are generally clean. The emplacement under-drainage is pumped to the clean water diversion channel for release into BCD. If required (i.e. if the water is turbid), the underdrainage can be directed into the CWEA dirty water system. Overflow from the CWEA under-drainage system feeds directly to the CWEA water treatment system.	In Control	Underdrainage water quality is monitored monthly via grab samples.	

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Dust Control	7.2	<p>Dust impacts from emplacement operations will be mitigated by the coal wash material containing moisture from coal washing processes and being compacted once emplaced. Active emplacement areas will be vegetated as soon as is practical after emplacement and revegetated emplacement is typically stable. The following measures are in place to reduce dust emissions associated with emplacement operations:</p> <ul style="list-style-type: none"> <li>• regular inspections are undertaken to identify the presence of dry windy conditions and appropriate dust suppression is implemented as necessary</li> <li>• early warning weather alerts are received that predict adverse weather conditions and pre-emptive dust controls are implemented where required. A water cart is maintained on site and is used when the surface of the emplacement is dry and airborne dust can be created; and</li> <li>• vehicle speed limits are followed to reduce the risk of dust emissions from unsealed roads due to vehicle movements.</li> </ul> <p>Air quality around the CWEA will be monitored by:</p> <ul style="list-style-type: none"> <li>• collection and measurement of dust samples from strategically placed dust deposition gauges;</li> <li>• use of real-time air quality monitors; and</li> <li>• dust emission surveys and spot checks using hand-held photometers (as required).</li> </ul>	In Control	<p>Watercart is in use on the haul roads and stockpiles.</p> <p>Coal wash is compacted and covered as soon as practicable.</p> <p>Dust deposition gauges were decommissioned in FY21 following consultation with the EPA and DPIE.</p> <p>No specific dust impacts were identified in FY23.</p>	
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Noise Control	7.3	Noise generated on the CWEA is from coal wash haul trucks and earthmoving equipment. The noise impact from these operations is deemed to be minimal as noise is naturally mitigated by the emplacement being located in a valley and at a distance of 1.5 km to 2.5 km from the nearest residential development in Appin. This is confirmed by the quarterly noise monitoring program and the lack of complaints about noise from the site.	In Control	No noise complaints received.  No issues raised during quarterly noise monitoring.	
Noise Control	7.3	Noise complaints will continue to be recorded and if a notable increase is identified, IMC will undertake further investigations.	In Control	As per Noise MP.	
Visual Impact	7.4	The following measures will be undertaken to minimise impacts on visual amenity due to emplacement operations: <ul style="list-style-type: none"> <li>• the finished level of the CWEA will be in accordance with approval conditions;</li> <li>• the land area dedicated to active emplacement operations will be kept to a minimum (typically 18 ha, maximum 21 ha);</li> <li>• the finished surface of the emplacement will be of a shape which complements and blends, as much as possible, with the surrounding natural landform, as per the approved final landform plans; and</li> <li>• completed sections of the CWEA will be revegetated as soon as possible.</li> </ul>	In Control	The CWEA is constructed as per design.  Progressive rehabilitation is undertaken.	
Emplacement Rehabilitation Monitoring	8.1.1.5	Biometric assessments are required annually, starting at 1 year after translocation.	In Control	See last CWEA Monitoring Annual Report.	
Emplacement Rehabilitation Monitoring	8.1.1.5	Surveys at control sites only required once every three years and the benchmarks as presented in this report remain so for the ensuing three year period.	In Control	Control sites last monitored in Spring 2020. To be included in 2023 monitoring schedule.	

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Emplacement Rehabilitation Monitoring	8.1.1.5	Photo point monitoring is required annually and done in conjunction with the biometric assessment.	In Control	Photo points last monitored in 2022. See last CWEA Monitoring Annual Report.	
Emplacement Rehabilitation Monitoring	8.1.1.5	Meanders for threatened plants are undertaken every three years.	In Control	Threatened plant meander undertaken in Spring 2020. To be included in 2023 monitoring schedule.	
Emplacement Rehabilitation Monitoring	8.1.1.5	Fauna monitoring using camera traps is required annually, starting 5 years after translocation or as deemed appropriate depending on the maturity of the revegetation.	In Control	Fauna last monitored in Spring 2022. See last CWEA Monitoring Annual Report.  Next round of Fauna monitoring to be undertaken Spring 2023.	
Emplacement Monitoring	8.2	Permanent survey control benchmarks are established on stable ground outside the perimeter of the CWEA from which the monitoring stations can be surveyed. Survey heights are taken regularly to determine the appropriate design heights.	In Control	Emplacement contractor achieves finished levels as follows; 1. At regular intervals depending upon the coal wash volumes (up to 6 times per year), a Surveyor provides positive proof of the current levels against the IMC approved design. 2. Check of coal wash levels at 500 mm below the finished plan undertaken (allowing for soil placement). 3. Clarification of the emplacement heights and displacement is obtained using InSAR satellite monitoring.	

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Emplacement Monitoring	8.3	<p>Compaction testing is nominally carried out ten times per year. Each testing campaign must take at least five representative samples. Compaction testing will test for SMDD and the results will be compared with a compaction criterion of 95% Standard Compaction. If after testing the compaction results are less than 95% then the fail area must be reworked and re-tested. The fail area shall be isolated from normal emplacement operation until results of re-testing indicate 95% or better compaction.</p>	In Control	Compaction testing completed as per plan.	
Emplacement Monitoring	8.4	<p>Runoff from active emplacement areas or areas where vegetation is not established is directed to the CWEA water management system (i.e. Ponds P4A, EP2 and EP3) for treatment prior to being diverted to BCD. Emplacement under-drainage flows are generally clean but have the potential to be dirty during the first-flush period of a rainfall event, especially after a prolonged dry period. Any first flush flows that are dirty are directed to the CWEA water treatment system (i.e. Ponds P4A, EP2, and EP3). During clean subsurface flows, or once the dirty first flush flows have cleared, emplacement under-drainage is pumped to the clean water diversion channel for release into BCD. The water management system is explained in more detail in the Appin Mine Water Management Plan. Monthly water samples are taken to monitor the quality of the CWEA subsurface drainage.</p>	In Control	Monthly samples collected as required - refer to 14-day Report (Point 16) on IMC website.	



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Emplacement Monitoring	8.5	<p>Erosion and sediment control structures will be regularly inspected to check they are operating satisfactorily and to perform any maintenance work and repairs that may be required. Regular maintenance will include:</p> <ul style="list-style-type: none"> <li>• sediment removal from drains and sediment basins;</li> <li>• installation, proper operation and routine maintenance of any flocculant dosing equipment;</li> <li>• replacement and or repair of sediment control structures as required; and</li> <li>• repair of areas that become unstable following periods of high flow.</li> </ul>	In Control	Monitored as part of quarterly inspection regime by Specialist Environment. Last inspection completed in June 2023.	
Complaints and Non-compliance Management	9.1	<p>Community complaints and enquiries may also be received in person by any employee of IMC, with details to be immediately shared with the Community Team for investigation. All CWEA complaints received in relation to Appin Mine will be managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.</p> <p>Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint. An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.</p>	In Control	No complaints regarding CWEA activities received in FY23.	

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Non-Compliance, Corrective Action and Preventative Action	9.2	Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification.	In Control	Events are logged in G360, and change management of non-compliances are logged in GISTM folders and annual report.	
Notification of Pollution Incidents to Government Authorities and the Public	9.3	In accordance with Condition 7 of Schedule 6 of the Project Approval and Condition R2 of EPL 2504, IMC is to notify DPIE, EPA and other relevant agencies of any incident that has caused (or threatens to cause) material harm to the environment.	In Control	No pollution incidents relating to CWEA activities occurred in FY23.	
Reporting and Review	10.1.1	IMC will report on the performance of the CWEAMP in the Annual Review. The Annual Review is prepared in accordance with the requirement of Condition 4 of Schedule 6 of the Project Approval and is submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the South32 website.	In Control	Annual Review is submitted as required. Copies of previous Annual Reviews are available on the IMC website.	
Reporting and Review	10.1.2	The Emplacement Rehabilitation Monitoring Report is included as an appendix in the Annual Review.	In Control	Report was submitted to DCCEEW on 20/07/2023.	
Reporting and Review	10.1.3	A summary of the CWEA monitoring results (where applicable), including details of exceedances and non-compliances (as determined in accordance with Section 9.2 of the CWEAMP), will be provided on the South32 website in the 14-day report.	In Control	Report is available on the IMC website.	

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Exceedance/non-compliance notifications	10.2	In the event that an exceedance or non-compliance of the relevant air quality, noise or water quality criteria is confirmed, a notification will be made.	In Control	No air quality, noise or water quality exceedances or non-compliances at the CWEA were identified in FY23.	
Review of CWEAMP	10.3	In accordance with Condition 5 of Schedule 6 of the Project Approval, the CWEAMP will be reviewed, and if necessary revised, within three months, of: <ul style="list-style-type: none"> <li>• the submission of an Annual Review;</li> <li>• the submission of an incident report;</li> <li>• the submission of an Independent Environmental Audit (IEA) report; or</li> <li>• any modification to the conditions of the Project Approval (unless the conditions require otherwise).</li> </ul>	In Control	Last reviewed and approved 12/12/2020 by State government, 28/01/2021 by Federal government.  Plan is reviewed post submission of the Annual Review and is currently in draft pending completion of consultation with local Aboriginal parties.	
Independent Environmental Audit	10.4.1	In accordance with Condition 9 of Schedule 6 of the Project Approval, and Condition 18 of the EPBC Approval, an IEA shall be commissioned every three years, that will include a review of the CWEAMP. The report is required to be submitted to the Secretary within six weeks of completion of the audit, in accordance with Condition 10 of Schedule 6.  The IEA Report is also required to be submitted to the Minister of DAWE in accordance with Condition 18 of the EPBC Approval within six weeks of completion of the IEA.	In Control	The last IEA was undertaken in 2022. The IEA Report was submitted to DAWE as required.  The next IEA is scheduled in 2025.	
ISO 14001	10.4.2	External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.  Internal Governance Reviews of the CWEAMP are nominally undertaken on an annual basis.	In Control	The last re-certification audit was undertaken in June 2021. The last surveillance audit was undertaken in June 2023.  The last Governance Review was undertaken in May 2022 with the next review in Q3 2023.	

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			Outcome	Comment & Evidence	Proposed Action
<b>AUDIT REVIEW</b>					
Section	MP Ref.	Requirement / Obligation			
Bulli Seam Operations Project Environmental Assessment	1.5	South32 has committed to clearing no more than 9 ha of SSTF over the life of the project.	In Control	This target has not been exceeded.	
Monitoring, Record Keeping & Reporting	3	Monitoring, record keeping and reporting will be conducted as per the BioBanking Agreement, Annexure D. This will include an Annual BioBank Report to include the information required under Annexure D, Condition 2.5.	In Control	Reports submitted as required	
Monitoring, Record Keeping & Reporting	3	A copy of the BioBank report will be included in the Annual Review as an appendix and be submitted to the Department of Agriculture, Water and Environment (DAWE) to satisfy the EPBC Approval conditions.	In Control	BioBank report is included as an Appendix in the Annual Review.	
Management Plan Review	4	In accordance with Condition 5A of EPBC Approval 2010/5350, Biobanking Agreement 215 is considered to be an Offset Management Plan for the purposes of Condition 4 and therefore approval from the Minister of the SSTF Offset Management Plan is not required for this, or future, revisions of the management plan.	In Control	Updated SSTF Management Plan provided to DAWE for information in July 2021.	

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BioBanking Agreement ID number: 215	Ref.	Requirement / Obligation			
Use of the biobank site General responsibilities	3.1	Except as otherwise permitted by this agreement, the landowner must not carry out any act or omit to carry out any act, or cause or permit any act to be carried out or any act not to be carried out which act or omission may harm biodiversity values on the biobank site, including but not limited to any native animals, native plants, threatened species, populations and ecological communities, and their habitats. NOTE: The clearing of native vegetation that is otherwise permissible in accordance with the NV Act (whether it is permissible under a PVP, routine agricultural management activity (as defined under the NV Act), or is otherwise permitted under Part 3 of that Act) can only be carried out on the biobank site to which this agreement applies if it is also permissible under this agreement. Item 5.1 of the management actions contained in Section 1 of Annexure C sets out the limited circumstances in which native vegetation can be cleared on the biobank site. Annexure C also contains limited exceptions in relation to when a landowner is not required to comply with the management actions contained in Annexure C.	In Control	As per Management Actions comments below.	

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Use of the biobank site Cultural heritage	3.2	To avoid any doubt, nothing in this agreement is to be construed as authorising (including, but not limited to, by way of a consent, permit, approval or authorisation of any kind for the purposes of Part 6 of the NPW Act) any person to damage or to cause or permit damage to an Aboriginal object or Aboriginal place in, on or under the biobank site.	In Control	As per Management Actions comments below.	
Use of the biobank site Obtaining of consents, permits and authorisations	3.3	The landowner is responsible for obtaining all necessary licences, consents, authorisations, permits or approvals in order to lawfully comply with and carry out its obligations under this agreement or to undertake or enable any other identified matter under clause 3.5 and/or clause 3.6	In Control		
Use of the biobank site Development	3.4.1	<p>The landowner must not carry out, or cause or permit to be carried out, any development (as defined under clause 1 above) on the biobank site, unless the development:</p> <p>3.4.1 - is permitted or required under Annexure C, or</p> <p>3.4.2 - is identified in the table entitled 'Permissible development on the biobank site' contained in clause 3.5 or identified in the table entitled 'Permissible human activities on the biobank site' contained in clause 3.6</p>	In Control	As per Management Actions comments below.	

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<p>Use of the biobank site Permissible development</p>	<p>3.5</p>	<p>The landowner shall be permitted to carry out, or cause or permit to be carried out, the development specified in the following table in the management zone specified in the table:</p> <p>* All Management zones - Any development within the meaning of section 127 (1) of the Act reasonably considered necessary to remove or reduce an imminent risk of serious personal injury or damage to property.</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	
<p>Use of the biobank site Permissible development</p>	<p>3.5</p>	<p>The landowner shall be permitted to carry out, or cause or permit to be carried out, the development specified in the following table in the management zone specified in the table:</p> <p>* All Management Zones - Any development permitted or required as part of a management action under Annexure C, including but not limited to maintaining existing access tracks on the biobank site, building shed/s to store weed control chemicals or other pesticides on the biobank site, building fences to manage stock on the biobank site and building structures to restore natural water flow regimes.</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	

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<p>Use of the biobank site Permissible development</p>	<p>3.5</p>	<p>The landowner shall be permitted to carry out, or cause or permit to be carried out, the development specified in the following table in the management zone specified in the table:</p> <p>* All Management Zones - Construction of fencing to prevent stock incursion.</p>	<p>In Control</p>	<p>Signage and fencing as per the BBA are in good working order.</p> <p>In the 2022 reporting period there was minor damage to the top strand of the boundary fence with the neighbour to the south from falling branches during high wind. This fence was repaired in September 2022. There has been no known incursion of stock onto the site since the previous reporting period.</p> <p>The 2022 annual audit by BCT occurred on 29 September 2022. The Next Audit will be scheduled for after August 2023.</p>	
<p>Use of biobank site Permissible human activities</p>	<p>3.6</p>	<p>Notwithstanding clause 3.1, the landowner may carry out or cause or permit to be carried out any human activities specified in the following table, in the management zone specified in the table:</p> <p>* All Management Zones - Any human activity reasonably considered necessary to remove or reduce an imminent risk of serious personal injury or damage to property.</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	



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<p>Use of biobank site Permissible human activities</p>	<p>3.6</p>	<p>Notwithstanding clause 3.1, the landowner may carry out or cause or permit to be carried out any human activities specified in the following table, in the management zone specified in the table:</p> <p>* All Management Zones - Any activity or any development permitted or required as part of a management action under Annexure C, including but not limited to mustering stock or feral herbivores including with mechanised vehicles, spraying or mechanically removing weeds, planting tube stock or sowing seeds of native vegetation, using drip torches, thinning native vegetation, disturbing soil temporarily to control erosion, encouraging regeneration, controlling nutrients or restoring natural flow regimes, laying baits, trapping or otherwise controlling vertebrate pests and feral herbivores and overabundant native herbivores.</p>	<p>In Control</p>	<p>As per Management Actions comments below.</p>	
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Use of biobank site Permissible human activities	3.6	<p>Notwithstanding clause 3.1, the landowner may carry out or cause or permit to be carried out any human activities specified in the following table, in the management zone specified in the table:</p> <p>* All Management Zones - Passive recreation, with the exception of overnight stays and/or camp fires, is permissible on the land to the extent that the condition of vegetation on site is not degraded. Passive recreation can include but is not limited to activities such as walking and bird watching.</p>	In Control	As per Management Actions comments below.	
Use of biobank site Permissible human activities	3.6	<p>Notwithstanding clause 3.1, the landowner may carry out or cause or permit to be carried out any human activities specified in the following table, in the management zone specified in the table:</p> <p>* All Management Zones - Any activity required to undertake permissible development</p>	In Control	As per Management Actions comments below.	
Management actions and management plans	4.1	<p>The landowner must carry out or procure the carrying out of the management actions in accordance with the timing, manner and requirements of Annexure C.</p>	In Control	As per Management Actions comments below.	

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Management actions and management plans	4.2	<p>The landowner must:</p> <p>i) implement or procure the implementation of; and</p> <p>ii) comply or procure the compliance with</p> <p>the management plans in accordance with the timing, manner and requirements of Annexure C</p> <p>NOTE: The management actions listed in Annexure C include requirements to take certain action and requirements to refrain from taking certain action.</p>	In Control	As per Management Actions comments below.	
Management actions and management plans	4.3	<p>Unless otherwise indicated by Annexure C, the landowner must ensure that;</p> <p>i) the management actions to be carried out in accordance with clause 4.1; and</p> <p>ii) the management plans to be implemented and complied with in accordance with clause 4.2</p>	In Control	As per Management Actions comments below.	
Monitoring, record keeping and reporting	7.1	The landowner must comply with the monitoring and record keeping requirements as set out in Annexure D.	In Control	As per Management Actions comments below.	

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Monitoring, record keeping and reporting	7.2	The landowner must submit an annual report complying with the requirements set out in Annexure D to the Chief Executive within the timeframe specified in Annexure D.	In Control	Reports submitted as required.	
Monitoring, record keeping and reporting	7.3	<p>The landowner must notify the Chief Executive in writing as soon as practicable after becoming aware of any failure to comply with this agreement or any other incident at the biobank site (or surrounds) which results or may result in a sudden or significant decline of biodiversity values at the biobank site. In particular, the landowner must notify the Chief Executive of:</p> <p>7.3.1 - the nature, location and time of the incident</p> <p>7.3.2 - the impact of the incident on biodiversity values</p> <p>7.3.3 - the measures that have been taken or will be taken in response to the incident</p> <p>7.3.4 - any provision of this agreement which may have been breached</p> <p>7.3.5 - the extent of any damage caused or permitted by the incident</p>	In Control	<p>Trespass and unauthorised removal of trees in August 2019. Incident report was provided to the Biodiversity Conservation Trust as required by this condition. BCT satisfied with the report and actions taken by South32.</p> <p>No other incidents have occurred as of 10/08/2023.</p>	

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Use of the land by servants, agents, leases or licensees	8	The landowner must incorporate all relevant requirements of this agreement in any lease or licence issued for the biobank site, and must at all times ensure that any servant, contractor, consultant, agent, lessee or licensee occupying the biobank site area shall be aware of, and not undertake any act inconsistent with, the landowner's obligations under this agreement.	In Control	Landcare have been provided a copy of the agreement as required.	
Change of land ownership of subdivision of land	9.1	<p>The landowner must notify the Chief executive in writing of any change of:</p> <p>9.1.1 - ownership of the biobank site, or any part thereof, within seven (7) days after the change of ownership of the biobank site; or</p> <p>9.1.2 - lessee of the biobank site, or any part thereof, within twenty-eight (28) days after the change of lessee or licensee of the biobank site.</p> <p>The notice must include the name and address and other relevant contact details of the new landowner, lessee or licensee.</p>	N/A	Not triggered	

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Change of land ownership of subdivision of land	9.2	The landowner must provide a copy of this agreement, including a copy of each management plan and a copy of all records required to be kept under the record keeping requirements, to the transferee before completion of the assignment, transfer, disposal or sale of any interest in the biobank site.	N/A	Not triggered	
Change of land ownership of subdivision of land	9.3	The landowner must notify the Chief Executive in writing no less than 14 days before the biobank site is subdivided.	N/A	Not triggered	
Change of land ownership of subdivision of land	9.4	The landowner cannot assign, transfer, dispose of or sell its rights, title or interest in part of the land containing any area of the biobank site unless the landowner and the Minister have first agreed to vary the agreement to apportion the obligations and rights under the agreement in respect of that part of the biobank site that will be assigned, transferred, disposed of or sold.	N/A	Not triggered	

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<p>Right to enter biobank site for research and monitoring</p>	<p>10.1</p>	<p>The landowner must permit access to the biobank site at any time to the Minister, the Chief Executive, an authorised officer or an officer of OEH for the purpose of carrying out research or monitoring in relation to the biodiversity values on the biobank site for which biodiversity credits have been created under this agreement, but only where the person has given reasonable notice to the landowner and the landowner's agent, lessee or licensee, of the intention to enter the biobank site for that purpose and the nature of the research or monitoring that will be conducted. In exercising its right of access under this clause, the Minister, the Chief Executive, an authorised officer or an officer of OEH must ensure that such access does not:</p> <p>10.1.1 - result in physical or radio interference which obstructs, interrupts or impedes the use or operation of any telecommunications network and telecommunications service of a lessee or licensee of a part of the land; or</p> <p>10.1.2 - interfere with the electricity supply separate from the landowner's electricity supply to any part of the land occupied by a lessee or licensee.</p>	<p>In Control</p>	<p>BCT have been given access as required for the purpose of the annual audit.</p>	
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Right to enter biobank site for research and monitoring	10.2	The Minister, Chief Executive, an authorised officer or an officer of OEH may make a written request to the landowner to consent to any other person specified in the written request to enter the biobank site for the purpose of carrying out the research or monitoring referred to in clause 10.2, whether or not that person will accompany the Minister, Chief Executive, an authorised officer or an officer of OEH. The landowner will not unreasonably withhold consent.	In Control	Not triggered	
Ownership of the land and registration of this agreement	13.4	If the landowner elects to identify the exact boundaries of the biobank site on the Deposited Plan for the land, the landowner must bear any additional costs of registration.	N/A	Not triggered	
Variation and termination	14.1	Subject to clause 14.2, this agreement can only be varied or terminated in accordance with the Act.	N/A	Not triggered	
Dispute resolution	16.1	Where there is a dispute, difference or claim (dispute), the party raising the dispute must notify the other party in writing of the nature of the dispute, including the factual and legal basis of the dispute.	N/A	Not triggered	



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Dispute resolution	16.2	Within 14 days of the written notice, the Chief Executive and the landowner, or nominated senior representatives of the parties, must confer to attempt to resolve the dispute, and if the dispute cannot be resolved within twenty-one (21) days of the written notice, the Chief Executive and the landowner will refer the matter to mediation.	N/A	Not triggered	
Dispute resolution	16.3	The parties will agree on the terms of appointment of the mediator and the terms of the mediation in writing within twenty-eight (28) days, failing which the mediation will be at an end and either party may commence court proceedings in respect of the dispute, difference or claim.	N/A	Not triggered	
Dispute resolution	16.4	If the matter has not been resolved within 28 days of the appointment of the mediator, the mediation process will be at an end and either part may commence court proceedings in respect of the dispute, difference or claim.	N/A	Not triggered	

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Notices	21.1.	Any notice, consent, information, application or request that must or may be given or made to a party is only given or made if it is in writing and delivered or posted to that party as its address set out (in the agreement), or faxed to that party at its fax number set out (in the agreement).	N/A	Not triggered	
<b>Annexure A: Maps of biobank sites</b>	<b>Ref.</b>	<b>Requirement / Obligation</b>			
Maps of Biobank site	Map A	Map A - Biobank site boundary map dated 01/03/2016.	In Control		
Maps of Biobank site	Map B	Map B - Vegetation zones, management zones and photo points map dated 16/05/2016.	In Control		
Maps of Biobank site	Map C	Map C - <i>Grevillea parviflora</i> subsp. <i>Parviflora</i> locations dated 09/05/2016.	In Control		
Maps of Biobank site	Map D	Map D - <i>Epacris purpurascens</i> var. <i>Purpurascens</i> locations dated 10/05/2016.	In Control		
Maps of Biobank site	Map E	Map E - Koala habitat polygon dated 13/05/2016	In Control		
<b>Annexure C: Management actions and management plans</b>	<b>Ref.</b>	<b>Requirement / Obligation</b>			

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<p>Standard Management Actions Grazing</p>	<p>Section 1</p>	<p>Stock must not be permitted to graze in any area, remove stock immediately - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Quarterly site visits for this reporting period, include: 20 Oct 2021, 16 Feb 2022, 17 Jun 2022, 13 Jul 2022, 04 Aug 2022.</p> <p>No stock observed in all management zones on each site visit. There has been minor damage to the top strand of the boundary fence with the neighbour to the south from falling branches during high wind. A contractor has been sourced to make repairs in Aug/Sept 2022.</p> <p>Grazing by stock animals has ceased on the property to the south since the change in ownership and there has been no known incursion into the site since the previous reporting period.</p>	
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<p>Standard Management Actions Weed Control</p>	<p>Section 1</p>	<p>Comply with Weed MP - Section 3 - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Weed control at MZ1, MZ2, MZ3 and Transmission Line (TL) easement and edges of MZ6 and MZ7 adjoining easement on each site visit using herbicide spot spraying, with a quick spray™ unit (in the TL) and hand-pulling of weed species listed in BioBanking Agreement (BBA) 215. It is noted that there has been limited access to MZ3 due to the ongoing above average rainfall. Without vehicle access there is limited capacity to spray this area with a quick spray unit and all weed control must be done by walking to the site with 15-20 kg knapsacks.</p> <p>Maintenance sweeps for key weed threats through MZ6 and MZ7. No access permitted to MZ4 and MZ5 due to the high cliffs and gorges, however no weeds observed in adjoining management zones during maintenance sweeps.</p> <p>Herbicides have been used on the BioBanking site during site visits to undertake management actions (i.e. weed control) in each respective management zone as listed in the BBA. A list of herbicides used at each visit is available (if required).</p> <p>Slashing in the TL was planned for July 2022 however this has been deferred until August/September 2022 subject to more favourable weather conditions.</p>	
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<p>Standard Management Actions Weed Control</p>	<p>Section 1</p>	<p>Review Weed Management Plan every 4 -6 years.          Notify Chief Executive in writing within 14 days of commencement of review.          Findings of the review must be submitted to Chief Executive within 3 months of commencing the review.          Chief executive to determine if update is required.          Landowner must submit updated plan within 3 months of this request.          Update must cover matters as per 2.2. of Section 1.          - Ongoing from first payment date</p>	<p>In Control</p>	<p>BioBanking Agreement 215 agreed on 1 February 2017, with the first payment date being 20 July 2017.</p> <p>Landcare were engaged to undertake the review on 23 June 2023.</p> <p>The BCT was notified of the commencement of the review on 4 July 2023.</p> <p>The review was submitted on 19 July 2023.</p>	
<p>Standard Management Actions Fire</p>	<p>Section 1</p>	<p>Comply with Fire MP          - Ongoing from first payment date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No ecological burns are planned in any zone until at least 2026 and then the site will be reconsidered for future ecological burns in a mosaic pattern across the site.</p>	

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<p>Standard Management Actions Fire</p>	<p>Section 1</p>	<p>Review Fire Management Plan every 4 - 6 years.          Notify Chief Executive in writing within 14 days of commencement of review.          Findings of the review must be submitted to Chief Executive within 3 months of commencing the review.          Chief executive to determine if update is required.          Landowner must submit updated plan within 3 months of this request.          Update must cover matters as per 3.2. of Section 1.          - Ongoing from first payment date</p>	<p>In Control</p>	<p>BioBanking Agreement 215 agreed on 1 February 2017, with the first payment date being 20 July 2017.</p> <p>Landcare were engaged to undertake the review on 23 June 2023.</p> <p>The BCT was notified of the commencement of the review on 4 July 2023.</p> <p>The review was submitted on 19 July 2023.</p>	
<p>Standard Management Actions Fire</p>	<p>Section 1</p>	<p>Do not light fires on the Biobank site other than for purposes of ecological burning of if permitted as a permissible activity as per Item 4, Clause 3.6.          - Ongoing from commencement date</p>	<p>In Control</p>	<p>No ecological burns are planned in any zone until at least 2026 and then the site will be reconsidered for future ecological burns in a mosaic pattern across the site.          Monitoring observations report no evidence of recent fire activity during site visit (Management report suggests last burn was in 2004).</p> <p>Acacia spp. in MZ 2 and MZ 7 continue to exhibit senescence. Fuel loads approx. 25 tonnes per hectare on average.</p> <p>No evidence of recent fire activity during all six site visits (BBA suggests last burn/wildfire was in 2004).</p>	

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<p>Standard Management Actions Human Disturbance</p>	<p>Section 1</p>	<p>No activities that will adversely effect biodiversity must be carried out except those permitted under Clause 3.6          - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>In August 2019, a breach report was prepared and submitted to the BCT in regard to trespass and damage to the boundary fence and the illegal felling of CPW species including Ironbark species.</p> <p>Comments as per the South32 Appin BioBanking Agreement Annual Report 2022:</p> <p>Signage and fencing as per the BBA are in good working order.</p> <p>No waste was observed on the site during the site visits during this reporting period.</p>	
<p>Standard Management Actions Human Disturbance</p>	<p>Section 1</p>	<p>Human activities that have negative effect on biodiversity are permitted if they are listed under Clause 6 or if they are undertaken as part of the management plans          - Ongoing from commencement date</p>	<p>In Control</p>	<p>Trespass and unauthorised removal of trees in August 2019. Report was provided to the Biodiversity Conservation Trust as required.</p> <p>No other events occurred within FY23.</p>	

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Standard Management Actions Human Disturbance	Section 1	Must not store or dispose of waste - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Action Completed Satisfactorily - No stored waste observed during site inspection.</p> <p>No evidence of additional or new waste was observed during the site 6 monthly visits (inspected 16 February and 4 August 2022).</p>	
Standard Management Actions Human Disturbance	Section 1	Must take all reasonable steps to remove waste deposited by others, or which is otherwise present on the site - Ongoing from first payment date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No waste has been observed on the site during quarterly site visits this year.</p> <p>Action Completed Satisfactorily - No stored waste observed during site inspection.</p>	
Standard Management Actions Human Disturbance	Section 1	Signage must be installed and maintained to deter human disturbance including dumping. Signage must be the biobanking signs available by OEH - Within 3 months of first payment date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Signage and fencing as per the BBA have been installed and are in good working order.</p> <p>Action Completed Satisfactorily.</p>	



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Standard Management Actions Human Disturbance	Section 1	Fencing of 3 km of the site. \$4500 allocated every three years to maintain fencing. Single sign to be installed at each of the two locked gates - Within 3 months of first payment date	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.  Signage and fencing as per the BBA have been installed and are in good working order.  Action Completed Satisfactorily.	
Standard Management Actions Human Disturbance	Section 1	Retain the management access track on the Cataract River side - Ongoing from commencement date	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.  Existing access track retained.  Action Completed Satisfactorily.	
Standard Management Actions Retention of regrowth and remnant Veg	Section 1	Native veg must not be cut down, felled, thinned, logged, killed, destroyed, poisoned, ringbarked, uprooted, burnt etc. Except in accordance with Fire Management Plan or Permissible Development under Clause 3.5 - Ongoing from commencement date	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.  Several CPW canopy species were illegally felled in MZ1 in August 2019. Some sections of the trees were removed from the site, no other evidence of vegetation being killed, destroyed or poisoned onsite occurred during this reporting period. No evidence or observation of recent ringbarking or tree felling onsite (except for the reported incident) since commencement of the BBA).  Action Completed Satisfactorily - No evidence of recent disturbance to native vegetation observed. Previously disturbed area recovering well.  No evidence of fire activity.	

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Standard Management Actions Replanting or supp planting	Section 1	Planting required in the 0.5 Ha Management Zone 3 - 250 plants. Record date of planting - commencing from first payment date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>As per the Section 6.6 of the BBA, a planting program has been implemented as a "local planting day", with preparation on 15/05/18 and planting on 22/05/18 for the species listed in the planting schedule.</p> <p>Action Completed Satisfactorily.</p>	
Standard Management Actions Replanting or supp planting	Section 1	Protect plants from grazing for two years or until 50 cm high. Record the date when the plant height requirements are met. - commencing from first payment date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Plant guards have been maintained around plantings.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Standard Management Actions        Replanting or supp planting</p>	<p>Section 1</p>	<p>Survey the plants for success        - Conduct first survey 24 months after completion of planting, then every 12 months for 5 years</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Currently there is a 90% success rate in survivability of the canopy species planted. However, the seedlings are being significantly grazed by native and non-native herbivores on the site.</p> <p>Action Completed Satisfactorily.</p> <p>Comments as per Annual Report (submitted August 2023):</p> <p>As per the Section 6.6 of the BBA, a planting program was implemented as a "local planting day" on 22/05/18 for the species listed in the planting schedule within MZ3.</p> <p>Survivability is approx. 50-60% as of 22 June 2023 and this increase is likely attributed to the seedling becoming more visible as the grasses in the site cure and brown off, making smaller seedlings easier to identify. The seedlings continue to be grazed by native and non-native herbivores on the site.</p>	
<p>Standard Management Actions        Replanting or supp planting</p>	<p>Section 1</p>	<p>Seeds and plants used for planting must be obtained from locally collected provenances, unless reasons to do otherwise.        - Conduct first survey 24 months after completion of planting, then every 12 months for 5 years</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Illawarra Landcare confirmed by email on 26/9/19 that all plantings were sourced from Western and South Western Sydney.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Standard Management Actions Retention of Dead Timber</p>	<p>Section 1</p>	<p>Don't remove dead timber except for firewood for one household (landowner) or fencing repairs. - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Quarterly site visits. Specific site visit for illegal timber felling in MZ1 On 9 Aug 2019. CPW canopy species were illegally removed. Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.</p> <p>No evidence of dead timber removal observed during inspection.</p>	
<p>Standard Management Actions Retention of Dead Timber</p>	<p>Section 1</p>	<p>Timber brought from outside must be documented - Ongoing from commencement date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No additional timber has been introduced to the site since commencement of the BBA. Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.</p> <p>No evidence of dead timber removal observed during inspection.</p> <p>Action Completed Satisfactorily.</p>	

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Standard Management Actions Erosion Control	Section 1	Take reasonable steps to prevent, control erosion - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No areas identified across the site which currently require any supplementary erosion control or stabilisation. Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.</p> <p>No evidence or erosion observed during site inspection.</p> <p>Action Completed Satisfactorily.</p>	
Standard Management Actions Erosion Control	Section 1	Don't remove rocks from the site - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No rock removal has occurred on the site since the commencement of the BBA.</p> <p>No evidence of rock removal observed during inspection.</p> <p>Action Completed Satisfactorily.</p>	
Standard Management Actions Erosion Control	Section 1	Can bring rocks from outside the site but once onsite cant be removed. - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>No rock removal has occurred on the site since the commencement of the BBA.</p> <p>No evidence of rock removal observed during inspection.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Additional Management Actions          Control of Feral and Overabundant Native Herbivores</p>	<p>Section 2</p>	<p>Comply with the Management Plan          - Ongoing from first payment date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit to be scheduled for after August 2023.</p> <p>Negligible feral or overabundant native herbivory in all areas except MZ3. Grazing in MZ3 is likely by wallabies, kangaroos and goats (no goat scats observed onsite to date). In accordance with the BBA annual inspection required for species traces. Opportunistic observations made during weed control and maintenance sweeps for all zones during either the annual and/or quarterly site visits.</p> <p>Action Completed Satisfactorily.</p>	
<p>Additional Management Actions          Control of Feral and Overabundant Native Herbivores</p>	<p>Section 2</p>	<p>Review Management Plan every 4 -6 years.          Notify Chief Executive in writing within 14 days of commencement of review. Findings of the review must be submitted to Chief Executive within 3 months of commencing the review. Chief executive to determine if update is required.          Landowner must submit updated plan within 3 months of this request. Update must cover matters as per 3.2. of Section 1.          - Ongoing from first payment date</p>	<p>In Control</p>	<p>BioBanking Agreement 215 agreed on 1 February 2017, with the first payment date being 20 July 2017.</p> <p>Landcare were engaged to undertake the review on 23 June 2023.</p> <p>The BCT was notified of the commencement of the review on 4 July 2023.</p> <p>The review was submitted on 19 July 2023.</p>	

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<p>Additional Management Actions Vert Pest Management</p>	<p>Section 2</p>	<p>Comply with Vertebrate Pest MP - Ongoing from first payment date</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Minimal rabbit scratching/scat mounds observed in transmission easement. No rabbit burrow/warrens found on property. Numerous (generally inactive) wombat burrows also did not show signs of rabbits in residence. Fox scats were observed in the transmission line easement (29 April 2019, 6 August 2020).No goat scats have been observed during quarterly site visits. However, there is potential for goats to access the site (and graze in MZ3) as goats have been be sighted in the same gorge at another site serviced by Landcare Australia at Douglas Park. Liaison with Greater Sydney Region LLS is currently in progress to include the site in the regions upcoming Spring and Autumn fox baiting program due the presence of fox scats at the site.</p> <p>Action Completed Satisfactorily.</p>	
<p>Additional Management Actions Vert Pest Management</p>	<p>Section 2</p>	<p>Review Pest Management Plan every 4-6 years. Notify Chief Executive in writing within 14 days of commencement of review. Findings of the review must be submitted to Chief Executive within 3 months of commencing the review. Chief executive to determine if update is required. Landowner must submit updated plan within 3 months of this request. Update must cover matters as per 3.2. of Section 1. - Ongoing from first payment date</p>	<p>N/A</p>	<p>BioBanking Agreement 215 agreed on 1 February 2017, with the first payment date being 20 July 2017.</p> <p>Landcare were engaged to undertake the review on 23 June 2023.</p> <p>The BCT was notified of the commencement of the review on 4 July 2023.</p> <p>The review was submitted on 19 July 2023.</p>	

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Additional Management Actions Nutrient control	Section 2	Fertilisers or pesticides not to be used except for weed or pest control - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No fertilizers have been used on the site since the commencement of the BBA.</p> <p>No evidence of fertiliser or pesticide use observed during site inspection. Herbicide use appears to be appropriate for implementation of management actions.</p> <p>Action Completed Satisfactorily.</p>	
Additional Management Actions Control of exotic fish	Section 2	Not relevant to this site - Ongoing from first payment date	N/A	Not relevant to this site	
Additional Management Actions Maintenance or reintroduction of natural flow regimes	Section 2	Don't impede natural flow regimes - Ongoing from commencement date	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No evidence of artificial structures being constructed to impede natural flow regimes observed during site inspection.</p> <p>No artificial structures installed to impede the natural flow regimes on the site. Natural flow regimes are maintained on the site in accordance with the BBA.</p> <p>Action Completed Satisfactorily.</p>	



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<p>Standard Management Plan Weed Management Plan</p>	<p>Section 3</p>	<p>Spray/Slashing in Management Zones          - Spray/Slashing 4 times per year (MZ1-3). Some moment zones only required once per year (MZ4, 5 &amp; 6)</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Level and type of weed control reported by landowner is consistent with agreement.</p> <p>2023 weed management activities:          -Weed control at MZ1, MZ2, MZ3 and Transmission Line (TL) easement and edges of MZ6 and MZ7 adjoining easement on each site visit using herbicide spot spraying, with a quick spray™ unit (in the TL) and hand-pulling of weed species listed in BioBanking Agreement (BBA) 215.          - Maintenance sweeps for key weed threats through MZ6 and MZ7. No access permitted to MZ4 and MZ5 due to the high cliffs and gorges, however no weeds observed in adjoining management zones during maintenance sweeps.          - Herbicides were used on the BioBanking site during site visits to undertake management actions (i.e. weed control) in each respective management zone as listed in the BBA. A list of herbicides used at each visit is available (if required).          - Slashing in the TL is planned for Spring 2023 subject to favourable weather conditions and slasher availability.</p> <p>Action Completed Satisfactorily.</p>	
<p>Standard Management Plan Weed Management Plan</p>	<p>Section 3</p>	<p>Site inspections as weed treatments applied.          Annual inspection and Monitoring Report          - Annually from first payment date</p>	<p>In Control</p>	<p>Included in South32 BioBanking Agreement Annual Report. 2023 report due 19 August.</p>	

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Standard Management Plan Fire for Conservation	Section 3	Fires intervals between 7 and 30 years - Once every 12 to 30 years	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.  No planned burning in any zones until 2026.  Action Completed Satisfactorily.	
Standard Management Plan Fire for Conservation	Section 3	Exclude fire until 2026. Unplanned fires permitted. Must not burn >25% of the site at any one time. - Once every 12 to 30 years	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.  No planned burning in any zones until 2026.  Action Completed Satisfactorily.	
Standard Management Plan Fire for Conservation	Section 3	In MZ5 totally exclude fire other than wildfire - Once every 12 to 30 years	In Control	Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.  No evidence of recent fire activity during site visits (BBA suggest last burn/wildfire was in 2004).  No evidence of recent fire activity observed during inspection.  Action Completed Satisfactorily.	
Standard Management Plan Fire for Conservation	Section 3	Visual monitoring in 2026 as per MP table - 2026	N/A	Not required until 2026	

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Standard Management Plan Fire for Conservation	Section 3	Monitoring prior to and after burning as per table - 2026 or following a wildfire	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No evidence of recent fire activity during all visits (BBA suggest last burn/wildfire was in 2004).</p> <p>No evidence of recent fire activity observed during inspection.</p> <p>Action Completed Satisfactorily.</p>	
Standard Management Plan Fire for Conservation	Section 3	Periodic trittering along fence lines is permitted but must not affect canopy or mid storey - Every 5 years	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No evidence of recent fire activity during all visits (BBA suggest last burn/wildfire was in 2004).</p> <p>No evidence of recent fire activity observed during inspection.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Standard Management Plan          Control of Feral and Overabundant Native Herbivores</p>	<p>Section 3</p>	<p>Monitoring of number and impacts on annual basis          - No or negligible occurrence on the site</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence.</p> <p>Tubestock planted in MZ3 to be protected with tree guards.</p> <p>Annual inspections of species traces and potential impacts by suitably qualified restoration ecologist or environmental scientist.</p> <p>Minimal rabbit activity observed. Heavy grazing of plantings (above tree guards) in MZ3 due to kangaroos and possibly goats – although goats haven't been observed on the site.</p> <p>Action Completed Satisfactorily.</p>	
<p>Standard Management Plan          Control of Feral and Overabundant Native Herbivores</p>	<p>Section 3</p>	<p>Protect MZ3 Planting          - Review annually</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence.</p> <p>Tubestock planted in MZ3 protected with tree guards.</p> <p>Annual inspections of species traces and potential impacts by suitably qualified restoration ecologist or environmental scientist.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Standard Management Plan Control of Feral and Overabundant Native Herbivores</p>	<p>Section 3</p>	<p>Species traces and potential impacts          - Annually</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>No control required due to no or negligible impacts and no or low levels of occurrence.</p> <p>Tubestock planted in MZ3 protected with tree guards.</p> <p>Annual inspections of species traces and potential impacts by suitably qualified restoration ecologist or environmental scientist.</p> <p>2022 Monitoring observations:          Negligible feral or overabundant native herbivory in all areas except MZ3. Grazing in MZ3 is likely by wallabies, kangaroos and goats (no goat scats observed onsite to date). In accordance with the BBA annual inspection required for species traces. Opportunistic observations made during weed control and maintenance sweeps for all zones during either the annual and/or quarterly site visits.</p> <p>Action Completed Satisfactorily.</p>	
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<p>Standard Management Plan          Vertebrate Pest Management Plan</p>	<p>Section 3</p>	<p>1080 baiting          - If warranted (Consult OEH/LLS)</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Annual monitoring for traces and scats to record date, location and estimated number of pest species identified. 1080 baiting program for fox/dogs/rabbits to be implemented if required, in consultation with LLS.</p> <p>No evidence of vertebrate pest activity observed during site inspection. Monitoring identified some fox activity in MZ1, MZ2 and in the TL. No Goat scats have been observed during site visits.</p> <p>Following liaison with Greater Sydney Region Local Land Services the site is currently included in the regional Spring and Autumn fox baiting program due to the presence of fox scats and observations at the site.</p> <p>Action Completed Satisfactorily.</p>	
<p>Standard Management Plan          Vertebrate Pest Management Plan</p>	<p>Section 3</p>	<p>Den fumigation or habitat removal          - If warranted</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Annual monitoring for traces and scats to record date, location and estimated number of pest species identified. 1080 baiting program for fox/dogs/rabbits to be implemented if required, in consultation with LLS.</p> <p>No evidence of vertebrate pest activity observed during site inspection. Monitoring identified some fox activity.</p> <p>Action Completed Satisfactorily.</p>	

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<p>Standard Management Plan          Vertebrate Pest Management Plan</p>	<p>Section 3</p>	<p>Qualitative observation for traces and scats          - Annually</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Annual monitoring for traces and scats to record date, location and estimated number of pest species identified. 1080 baiting program for fox/dogs/rabbits to be implemented if required, in consultation with LLS.</p> <p>No evidence of vertebrate pest activity observed during site inspection. Monitoring identified some fox activity.</p> <p>Action Completed Satisfactorily.</p>	
<p><b>Annexure D: Monitoring, reporting and record keeping requirements</b></p>	<p>Ref.</p>	<p><b>Requirement / Obligation</b></p>			
<p>Monitoring</p>	<p>1.3</p>	<p>Photo Points          - Within 12 months or commencement date and every 12 months thereafter</p>	<p>In Control</p>	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>The landowner must ensure that photographs are taken at photo-points at each of the locations and in the direction identified in the table titled 'Locations of photo points' shown in section 1.2, Annexure D of the biobanking agreement, within 12 months of the commencement date and then at least every 12 months thereafter.</p> <p>No photos were taken from PP10 for WHS reasons due its location in a steep gully. This is an acceptable minor variation.</p> <p>Action Completed Satisfactorily.</p>	

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Monitoring	1.3	Percentage of ground cover present on the biobank site - Annually	In Control	<p>Comments as per last annual audit by BCT (site visit 29/09/2022). The next audit will be scheduled for after August 2023.</p> <p>Quarterly site visits for this reporting period, include 20 October 2021, 16 February 2022, 17 June 2022, 13 July 2022, 04 August 2022. No stock incursion has allowed groundcover to be maintained and/or increase in density across the site over the previous 5 years due to the installation of the exclusion fencing (refer to photopoints for further detail) heavy rainfall in the region in 2021 and 2022 has significantly increased growth of existing groundcover (and weed species due the weed bank in the soils within the disturbed areas of the site).</p> <p>Action Completed Satisfactorily.</p>	
Monitoring	1.3	Number of stock and dates when stock have entered - Quarterly	In Control	<p>As per South32 Appin West Biobanking Agreement Annual Report 2023.</p> <p>No stock observed in all management zones on each site visit.</p> <p>Grazing by stock animals has recommenced on the property adjoining the southern boundary. There has been no incursion into the site since during the reporting period.</p>	



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Monitoring	1.3	Physical condition of fencing - control of stock - control of humans - control of ferals and overabundant herbivores - control of vertebrates pests  - Quarterly	In Control	<p>As per South32 Appin BioBanking Agreement Annual Report 2023.</p> <p>Access for management purposes includes South32 and Landcare Australia (land management contractor) staff.</p> <p>There is no ability for stock or unauthorized motor vehicles to access the site with the current exclusion fencing in place.</p> <p>Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts would be reported to South32 and then escalated to the BCT as per BBA.</p>	
Monitoring	1.3	Records of human disturbance - Bi-annually	In Control	<p>As per South32 Appin BioBanking Agreement Annual Report 2023.</p> <p>Access for management purposes includes South32 and Landcare Australia (land management contractor) staff.</p> <p>There is no ability for stock or unauthorized motor vehicles to access the site with the current exclusion fencing in place.</p> <p>Routine inspections conducted at each site visit to ensure fencing is secure and that there have been no incursions. Any incursions and associated impacts would be reported to South32 and then escalated to the BCT as per BBA.</p> <p>There has been minor damage to the top strand of the boundary fence with the neighbour to the south from falling branches during high wind. A contractor was sourced to make repairs in Aug/Sept 2022.</p>	

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Monitoring	1.3	Evidence of erosion - Bi-annually	In Control	As per South32 Appin BioBanking Agreement Annual Report 2023.  No areas identified across the site that currently require any supplementary erosion control or stabilisation. Observations made during maintenance sweeps for all zones during annual and quarterly sites visits.	
Monitoring	1.3	Evidence of waste - Bi-annually	In Control	As per South32 Appin BioBanking Agreement Annual Report 2023.  No evidence of any new waste was observed during the site visits (inspected 09 November 2022 and 22 June 2023).	
Reporting	2	Landowner must complete and submit and annual report to the Chief Executive for approval using the annual reporting template.	In Control	Previous report submitted on 10 August 2022.  2023 Report due for submission on 19 August 2023.	



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**Appendix 15: WaterNSW Special and Controlled Areas Consent (F2020/1545) -  
Annual Statement of Compliance**

# Schedule 6 – Annual Statement of Compliance with Consent Conditions

## Consent Holder

Illawarra Coal Holdings Pty Ltd

## Consent Number

F2020/1545

## Reporting Period

1 July 2022 - 30 June 2023

## Compliance with Consent Conditions

1. Were all the following documents complied with during the reporting period? (tick a box)

Consent/Approval	Yes	No
a. Conditions of this Consent;	✓	
b. All Statutory Approvals;	✓	
c. Any environmental management plans, rehabilitation plans, revegetation plans, soil and water management plans, water monitoring plans or other plans required by Water NSW.	✓	

2. If you answered “No” to any part of Question 1, please supply the name of the non-compliance / incident and the date the written report was provided to Water NSW, in the table below:

Non-Compliance / Incident (one line)	Date written report provided to Water NSW
Illawarra Coal Holdings Pty Ltd has reported on the following in the Dendrobium Mine and Cordeaux Colliery FY23 Annual Review:	
A rockfall at occurred at Wongawilli Creek Waterfall 54 which is a exceedance of the performance measure in Schedule 3 Condition 13 of the Longwall 18 SMP Approval.	The DA3B Impact Report dated 8/08/2022
Rock falls and fracturing were identified at registered Aboriginal Heritage sites Sandy Creek 21 (52-5-0273) and DM15 (52-2-3639). These sites are located above Longwall 19.	The DA3B Impact Report dated 29/03/2023
IMC executed an Enforceable Undertaking with NRAR under Section 336E of the WM Act in regard to alleged unlicensed water take by Dendrobium Mine.	N/A
Official Caution was received from the Resources Regulator for the drilling of a borehole under an approval that had expired.	2 August 2023

3. How many pages have you attached?

(Each attached page must be initialled by the person(s) who signs Section 4 of this Statement of Compliance)

The Statement of Compliance has been attached as an Appendix to the:

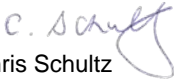
- Dendrobium Mine and Cordeaux Colliery Annual Review FY23 (Appendix 8)
- Appin Mine Annual Review FY23 (Appendix 15)

These Annual Reviews meet the requirement of Condition 4.3.1 of Consent F2020/1545 for an annual report to be submitted by 30 September for the reporting period.

#### 4. Signature and certification

The Statement of Compliance must only be signed by a person(s) with legal authority to sign it as set out below:

- By affixing the common seal in accordance with *Corporations Act 2001*, or
- By 2 directors, or
- By a director and a company secretary, or
- By a person delegated to sign on the company's behalf in accordance with the *Corporations Act 2001* and approved in writing by Water NSW to sign on the company's behalf.

Signature: 

Name: Chris Schultz  
(printed)

Position Superintendent Environment (signed under Power of Attorney dated 17 March 2023)

Date: 1 September 2023

Signature:

Name:  
(printed)

Position

Date:

SEAL (if signing under seal)

The Consent Holder can request Water NSW approval for the compliance requirements of this Consent be linked to and built into other compliance reporting that may be required under approvals issued under the EP&A Act.



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## **Appendix 16: Annual Rehabilitation Report**

Note that at the time of submission of the Annual Rehabilitation Report, there were issues with the template in the Resources Regulator Portal that resulted in the answers to the following questions being switched:

- *The rehabilitation monitoring carried out in the annual reporting period.*
- *Rehabilitation monitoring program findings.*



**NSW  
Resources  
Regulator**

ARR0001115

# **APPIN COLLIERY ANNUAL REHABILITATION REPORT**

Friday 1 July 2022 to Friday 30 June 2023

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## Summary table

DETAIL	
Mine	Appin Colliery
Reference	ARR0001115
Annual report period commencement date	Friday 1 July 2022
Annual report period end date	Friday 30 June 2023
Forward program	FWP0001015
Mining leases	CL 388 (1973), MPL 200 (1973), ML 1473 (1992), MPL 201 (1973), ML 1433 (1992), CCL 767 (1973), ML 1382 (1992), ML 1574 (1992), CCL 724 (1973), CL 381 (1973), ML 1698 (1992), ML 1678 (1992)
Lease holder(s)	Endeavour Coal Pty Ltd
Contact	Amy Alice Bradbury
Date of submission	Friday 29 September 2023

## Important

The department may make the information in your report and any supporting information available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your report to be confidential, please communicate this to the department via the message function on this submission within the NSW Resources Regulator Portal.

## Mine details

### Project description

Appin Mine consists of the merged Appin, Tower, and West Cliff collieries. Appin Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary company of Illawarra Coal Holdings Pty Ltd (ICHPL), which is 100% owned by South32 Limited. Key areas associated with the current operations include Appin North, West and East Pit Tops, Appin East Ventilation Shaft 1/2 and 3 sites, Appin West Ventilation Shaft 6 and Ventilation Shaft 7/8 sites, Douglas North Substation site, West Cliff Coal Preparation Plant, Coal Wash Emplacement Area and North Cliff Mine site.

ICHPL received Project Approval 08\_0150 from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011 for current and proposed mining of the Bulli Seam Operations for the next 30 years, and production of up to 10.5 Mtpa of ROM coal. This approval incorporates underground mining, transport and emplacement activities undertaken 24 hours a day, seven days per week.

### Life of mine

18 years

### Current development consents, leases and licences

#### Development consents granted under the *Environmental Planning and Assessment Act 1979*

PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150  
PA08/0150

#### Authorisations covering the mining area granted under the *Mining Act 1992*

CL 388 (1973), MPL 200 (1973), ML 1473 (1992), MPL 201 (1973), ML 1433 (1992), CCL 767 (1973), ML 1382 (1992), ML 1574 (1992), CCL 724 (1973), CL 381 (1973), ML 1698 (1992), ML 1678 (1992)

**Any other approvals, licences, or authorities issued by government agencies that are relevant to the progress of mining operation and rehabilitation activities**

Appin Area 7 Longwalls 707 - 710 SMP Approval  
Appin Longwalls 709-711 and 905 Extraction Plan  
Environment Protection Licence – 2504  
Appin Area 9 Longwalls 901-904 Extraction Plan

**Summary of the scope and/or purpose of the new applications or modifications to existing approvals (if applicable)**

From 17 October 2022, a variation to CCL 724 (1973) was approved. Changes to CCL 724 (1973) can be found on the Illawarra Metallurgical Coal (IMC) website:  
<https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

**Changes to land ownership and land use**

No changes to land ownership or land use occurred during the annual reporting period.

# Surface disturbance and rehabilitation activities during the reporting period

## Surface disturbance and rehabilitation activities that were conducted and an analysis of the progress against the rehabilitation schedule

The Appin West Engineering Building was demolished in the reporting period. It was replaced with the Muster Shed. One redundant chemical storage bund adjacent to the stockpile area demolished at Appin East. No rehabilitation associated with the site was undertaken.

Progressive rehabilitation of the Coal Wash Emplacement Area (CWEA) has been undertaken during the reporting period in accordance with the approved CWEA Management Plan (CWEAMP). During the reporting period there was growth medium establishment for ~0.7 ha. Progress of rehabilitation in the CWEA is detailed in the Annual CWEA Monitoring Report as published in the FY23 Annual Review on the IMC website: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

Monitoring of revegetation at the BioBanking sites was undertaken during the reporting period. Refer to the FY23 Annual Review on the IMC website for more details: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

Bulk earthworks were undertaken at the Appin Mine Ventilation and Access Project (AMVA Project). This included clearing of vegetation on the site, excavation, scrape and fill, stockpiling and hydro-mulching of batters and stockpiles.

## Rehabilitation planning activities that were conducted, including any specialist studies

Site investigations and approvals planning was conducted for legacy sites and the rehabilitation program. Studies were continued to inform the closure planning process, including:

- Stage 2 of the heritage building assessment; and
- an historic operations liability assessment.

A site inspection occurred at the Bulli Shafts during the reporting period with representatives from WaterNSW and the Resources Regulator. Constraints associated with rehabilitation of these sites was discussed.

The North Cliff Rehabilitation Execution Plan (NCREP) was developed in FY23. The NCREP was distributed to external stakeholders and feedback was incorporated into the documents and planning process. An Aboriginal Objects Due Diligence Assessment and Biodiversity Assessment were completed. Refer to the FY23 Annual Review for further details, found on the IMC website: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

Discussions have occurred with the National Parks and Wildlife Service regarding the removal of redundant powerlines between North Cliff and Appin North in the Dharawal National Park.

Site inspections on the Georges River were undertaken to inform a Review of Environmental Factors, Aboriginal Objects Due Diligence Assessment, Biodiversity Assessment and to develop the detailed scope of works for commencement of rehabilitation under the Georges River Rehabilitation Plan (GRRP).

## Overview of subsidence repair and/or remediation works undertaken

During the reporting period land access agreements to undertake the approved GRRP were progressed. A preferred contractor was onboarded to undertake the works. Results from the WC21 rehabilitation trial at Dendrobium Mine will confirm the specific methodology to be used in Georges River. The WC21 rehabilitation trial was completed in FY23 following significant delays due to rainfall and catchment access limitations. The outcomes of the trial will be monitored for at least six months, pending rainfall to assess the effectiveness of the trial.

## Overview of rehabilitation management and maintenance activities

Erosion and sediment control was conducted at the AMVA Project site as per the Construction Environmental Management Plan.

In the CWEA, sediment traps were maintained and erosion was controlled by progressive emplacement of rocks and logs over topsoil in early stages of rehabilitation.

Approximately 1.6 ha of freshly topsoiled material in the CWEA was seeded in March 2023.

Weed control was undertaken at Appin East, Appin West and Appin North Pit top sites. Targeted weed control occurred within the CWEA including slashing of perennial grasses and weed spraying.

Further details can be found within the FY23 Annual Review, located on the IMC website: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

## Details of any rehabilitation actions taken as required by any letters, notices or directions issued by government agencies, including the NSW Resources Regulator

The Rehabilitation Management Plan were revised following feedback from the Department of Planning and Environment (DPE). The Rehabilitation Objectives were revised following feedback from the NSW Resources Regulator (RR).

Pampas Grass control was undertaken at North Cliff.

**Details of any rehabilitation areas that have achieved the final land use**

No rehabilitation areas achieved final land use during the annual reporting period.

**Key production milestones**

MATERIAL	UNIT	FWP0001015 YEAR 1	THIS REPORT
<b>Stripped topsoil</b> <small>(if applicable)</small>	(m <sup>3</sup> )	33,220	53,343
<b>Rock/overburden</b>	(m <sup>3</sup> )	0	0
<b>Ore</b>	(Mt)	4.54	3.8
<b>Reject material<sup>1</sup></b>	(Mt)	0.6	0.62
<b>Product</b>	(Mt)	3.9	3.16

<sup>1</sup> This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

## Disturbance and rehabilitation statistics

### Current disturbance and rehabilitation progression

ELEMENT	UNIT	THIS REPORT
A Total surface disturbance footprint	(ha)	280.89
B Total active disturbance	(ha)	215.06
C Land prepared for rehabilitation	(ha)	9.12
D Ecosystem and land use establishment	(ha)	5.84
E Ecosystem and land use development	(ha)	48.94
F Rehabilitation completion	(ha)	1.94

### Rehabilitation key performance indicators (KPIs)

ELEMENT	UNIT	THIS REPORT
G Total new active disturbance area	(ha)	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
H New rehabilitation commenced during annual reporting period	(ha)	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
I Established rehabilitation	(ha)	50.88
J Annual rehabilitation to disturbance ratio	%	NA - this value will display after 2nd year ARR submission as calculation relies on comparison between sequential yearly ARR data
K Rehabilitated land to total mine footprint	%	18.11

## Progressive achievement of established rehabilitation

ELEMENT	UNIT	THIS REPORT
L Established rehabilitation - agricultural final land uses	%	1.61
M Established rehabilitation - native ecosystem final land uses	%	98.3
N Established rehabilitation - other/non-vegetated final land uses	%	0.01

## Variation to the rehabilitation schedule

### Identify the components of the most recent forward program that were not achieved

The stripped topsoil was greater than predicted in Year 1 of the Forward Program. This is primarily due to construction work at the AMVA Project. All works were conducted in compliance with AMVA Project Construction Environmental Management Plan and the Early Works – Construction Environmental Management Plan.

The Ecosystem and Land Use Establishment was less than predicted in the Forward Program, primarily due to progress within the CWEA. This was in part due to lesser clearing and associated progressive rehabilitation activities during periods of high rainfall early in FY23, slowing overall soil and bedrock removal and limiting soil availability for rehabilitation works.

Additionally, the final landform for Stage 3 Coal Wash Emplacement Area is being reviewed. Due to this, the emplacement operations were adjusted to not complete final landform heights based on the previous design, and instead fill areas that had additional capacity towards the new design. Rehabilitation of areas that were forecast to reach final landform heights and undergo rehabilitation were put on hold during FY23 until the new design is finalised. This also limited the areas that could be cleared over FY23 as areas approved for clearing under the current design were no longer planned to be cleared.

### Key factors that delayed progressive rehabilitation

Clearing and associated progressive rehabilitation for the CWEA was partly limited due to high rainfall and wet weather conditions in early FY23. Additionally, the final landform for Stage 3 CWEA is currently being reviewed. This has resulted in less progressive rehabilitation, as areas that approached final landform design did not undergo rehabilitation as the design was expected to change. Coal wash was redirected to areas with additional capacity rather than being used to complete final landform heights as detailed by the current design. Additionally, clearing did not commence in areas that were approved for clearing under the current design,



this limited available areas for clearing which resulted in less soil and bedrock material being acquired for rehabilitation.

Progression of land access agreements to undertake the approved GRRP has been slower than anticipated, due to the number of landholders and their requirements. Land access agreements continue to be progressed, however ongoing land access challenges may impact Year 2 and Year 3 schedule. The WC21 rehabilitation trial was also delayed due to catchment closures and the 6-month monitoring period extended until Q1 FY24. As such, availability of results from the WC21 rehabilitation trial to confirm the specific methodology to be used in Georges River was delayed.

**Outline actions that will be included in the forward program and carried out to minimise disturbance and undertake progressive rehabilitation as far as reasonably practical**

Disturbance will be accounted for and monitored through a permit to disturb and approved pre-clearing process, this operates to minimise unnecessary disturbance as each area is required to be approved by an Environmental Representative who is aware of the clearing allocation and requirements for each area approval.

Within the CWEA the area of land cleared and dedicated as the active emplacement area will be restricted to an operational size of 18 ha (where practical, with a maximum area of 21 ha) and will be progressively rehabilitated to achieve this. This is recorded and managed through internal audits of rehabilitation and disturbance datasets on a quarterly basis or when required. Soil from clearing areas is not stockpiled where possible and is utilised directly on areas that have reached final landform design. This enables progressive rehabilitation as clearing occurs.

Land access agreements will continue to be progressed for the GRRP.

Studies associated with the rehabilitation of the North Cliff site will continue to be progressed.

# Rehabilitation monitoring and research findings

## Rehabilitation monitoring

### The rehabilitation monitoring carried out in the annual reporting period

Findings from monitoring within the CWEA include:

- 1) Quarterly Inspections: Revealed visual vegetation growth from previous years by photo point comparison, outlined areas of erosion that may need to be maintained, and identified any areas growing with exotic plant cover to inform contractors of areas to concentrate weed management efforts.
- 2) Annual Inspections: Monitored the success of Key Performance Indicators, including:
  - a) Adequate regeneration of translocated communities
  - b) The degree to which fauna (native) use the rehabilitated CWEA, including constructed habitats.

The 2022 Annual Report concluded the rehabilitation areas were within or above the local benchmarks for most of the biometric attributes. Weed incursion remains the key threat to the rehabilitation of the CWEA, with bush regeneration efforts required to maintain exotic species coverage. The endangered shrub *Persoonia hirsuta* was recorded in 2022 within Stage 2. Six additional *P. hirsuta* and four *A. bynoeana* were observed just outside Stage 4 of the CWEA. The habitat features within the rehabilitation are being occupied by native mammals, reptiles and birds. As the rehabilitation matures, it is expected that native fauna abundance will increase further. Rosenberg's Goanna (*Varanus rosenbergi*) listed as Vulnerable under the BC Act was recorded once at Site 4. Photo point monitoring revealed that overall, the native plant cover in all translocation areas is continuing to improve over time.

## Status of performance against rehabilitation objectives and rehabilitation completion criteria

### The monitoring program that has been implemented

Rehabilitation monitoring is undertaken in accordance with the Rehabilitation Management Plan (RMP). Rehabilitation progression within the CWEA is monitored in accordance with the CWEAMP. The RMP and CWEAMP can be found on the IMC Website:  
<https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

**Are all rehabilitation areas in Landform Establishment phase or higher represented in the monitoring program to assess performance against the rehabilitation objectives and approved or, if not yet approved rehabilitation completion criteria and final landform and rehabilitation plan?**

Yes

**Year rehabilitation areas will be included as part of the monitoring program**

**An appraisal of whether rehabilitation is moving towards achieving the proposed rehabilitation objectives, approved or, if not yet approved, rehabilitation completion criteria and final landform and rehabilitation plan as soon as reasonably practicable.**

Rehabilitation is managed and progressing in accordance with the approved RMP. Rehabilitation within the CWEA is progressing as per the CWEAMP. Rehabilitation along the Georges River is progressing as per the GRRP.

Due to the anticipated long life of the mine, and the requirement of most surface facilities for operational function, detailed rehabilitation and monitoring programs for surface facilities will be developed closer to the time of closure. Rehabilitation plans will be formed to align with the proposed final landform and land-use.

Rehabilitation completion criteria will be developed following the approval of the rehabilitation objectives and therefore have not been considered in this appraisal.

### Appraisal description

Rehabilitation is moving towards achieving the final land use as soon as reasonably practicable.

### Rehabilitation monitoring program findings

Monitoring of the CWEA was conducted in accordance with the CWEAMP.

Monitoring of the Georges River was undertaken in accordance with the GRRP.

Annual monitoring of revegetation at the Biobanking sites was undertaken during the reporting period and included as appendices in the FY23 Annual Review.

For more details refer to the IMC website: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

Research summary:

In FY23 IMC supported the writing of an honours dissertation through Mount Annan Botanic Gardens and University of Technology Sydney around pollination ecology and pollinator networks. This research project commenced in July 2022 and was submitted in May 2023. The dissertation included an investigation into the pollinator community in the rehabilitation areas in the CWEA compared to remnant reference bushland in the surrounding area. This research is deemed beneficial to the *P. hirsuta* population translocated within the rehabilitation area given

its preference for outcrossing. The research may also serve as a novel means to determine how the pollinator community returns to a rehabilitation area, which may be of value to rehabilitation outcomes in terms of ecosystem recovery and sustainable plant diversity.

A Bushfire Research and Trial literature review was undertaken in FY21, and coal wash sampling in the CWEA was undertaken in FY22. The results of the sampling were incorporated into the literature review, with the report being provided to IMC in April 2023. The conclusions/recommendations in the literature review were as follows:

- Vegetation rehabilitation on the Appin North CWEA can withstand a bushfire (bushfire resilience indicator) and that germination and evidence of recovery would be observed after a burn.
- Subterranean coal wash material is unlikely to be exposed to a radiant heat intensity and duration that would have potential to ignite the coal wash reject material.
- Bushfire on the CWEA rehabilitation has a low (inconsequential) risk of ignition of the coal wash combustibles and the existing surrounding landscape would offer containment of a fire and prevent potential spread from the rehabilitation area.

This work indicates that there is limited and manageable risk associated with bushfire on the CWEA.

**Performance issues and their causes including identification of any knowledge gaps that must be addressed**

Nil.

## Outcomes of rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	UPDATEDDATE OF COMPLETION	STATUS	ON TRACK?	ON TRACK UPDATE
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ARR000111

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### Outcomes of completed trials and research

N/A

## Attachment 1 – Reporting Definitions

REPORTING CATEGORY	DEFINITION
<p><b>A1</b> Total disturbance footprint – surface disturbance</p>	<p>All areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to surface disturbance activities.</p> <p>The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion (see definitions below).</p> <p>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.</p>
<p><b>A2</b> Underground Mining Area</p>	<p>Underground mining operations areas/subsidence management areas.</p>
<p><b>B</b> Total active disturbance</p>	<p>Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).</p>
<p><b>C</b> Rehabilitation – land preparation</p>	<p>Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation– decommissioning, landform establishment and growth medium development.</p> <p>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation.</p>

REPORTING CATEGORY	DEFINITION
<p><b>D</b> Ecosystem and land use establishment</p>	<p>Includes the area which has been seeded/planted with the target vegetation species for the intended final land use. However, vegetation has not matured to a stage where it can be demonstrated that it will be sustainable for the long term and or require only a maintenance regime consistent with target reference/analogue sites.</p> <p>Typically, rehabilitation areas would be in this phase for at least two years (and usually more) before rehabilitation can be classified as being in the ecosystem and land use development phase. This phase does not apply to infrastructure areas that are being retained as part of final land use for the site.</p>
<p><b>E</b> Ecosystem and Land Use Development</p>	<p>Rehabilitation has matured to a level where target revegetation outcomes are on a trajectory towards meeting the final rehabilitation objectives and rehabilitation completion criteria (as verified by monitoring).</p> <p>This phase includes infrastructure areas that are to be retained for an approved post mining land use, following completion of all necessary measures to render the infrastructure fit for this purpose (for example structural integrity).</p>
<p><b>F</b> Rehabilitation Completion</p>	<p>The NSW Resources Regulator has determined in writing that the mining area has achieved the approved rehabilitation objectives and approved rehabilitation completion criteria and final landform and rehabilitation plan following the submission of <i>Form: ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate and/or notification of mine or petroleum site closure</i>.</p>
<p><b>G</b> New active disturbance area</p>	<p>The area of any new active disturbance that has been created during the annual reporting period (definition A1 in Table 5).</p>
<p><b>H</b> New rehabilitation commenced during annual reporting period</p>	<p>The sum of any new rehabilitation commenced in the annual reporting period. These areas may be in the rehabilitation land preparation phase or the ecosystem &amp; land use establishment phase (definitions C and D in Table 5).</p>
<p><b>I</b> Established rehabilitation (hectares)</p>	<p>The total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E &amp; F in Table 5).</p>



REPORTING CATEGORY	DEFINITION
<p><b>J</b> Annual rehabilitation to disturbance ratio</p>	<p>The rehabilitation to disturbance ratio (H/G) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the year. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that year are the same.</p>
<p><b>K</b> % Rehabilitated land to total mine footprint</p>	<p>The proportion of the total mine footprint (area of land that has been disturbed by past or present surface disturbance activities) that has established rehabilitation (<math>I/A1 \times 100</math>). For open cut mining, the proportion of the total mine footprint verified to be “established rehabilitation” should substantially increase as an operation progresses towards mine closure.</p>
<p><b>L</b> Established rehabilitation for agricultural final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E &amp; F in Table 5) that have been returned to an agricultural final land use.</p>
<p><b>M</b> Established rehabilitation for native ecosystem final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or rehabilitation completion phase (definitions E &amp; F in Table 5) that have been returned to native ecosystem final land use.</p>
<p><b>N</b> Established rehabilitation for other/non-vegetated final land uses (hectares)</p>	<p>The percentage of total area of land that is verified to be within either the ecosystem and land use development phase or the rehabilitation completion phase (definitions E &amp; F in Table 5) that have been returned to other/non-vegetated final land use.</p>

## Attachment 2 – Definitions

WORD	DEFINITION
<b>Active</b>	In the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
<b>Active mining phase of rehabilitation</b>	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
<b>Analogue site</b>	In the context of rehabilitation, an analogue site is a ‘reference site’ that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains.
<b>Annual rehabilitation report and forward program</b>	As described in the Mining Regulation 2016.
<b>Annual reporting period</b>	As defined in the Mining Regulation 2016.
<b>Closure</b>	A whole-of-mine-life process, which typically culminates in the relinquishment of the mining lease. It includes decommissioning and rehabilitation to achieve the approved final land use(s).
<b>Decommissioning</b>	The process of removing mining infrastructure and removing contaminants and hazardous materials.
<b>Decommissioning Phase of Rehabilitation</b>	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or ‘fit for purpose’ built infrastructure to be retained for future use(s) following lease relinquishment.

WORD	DEFINITION
<b>Department</b>	The Department of Regional NSW.
<b>Disturbance</b>	See Surface Disturbance.
<b>Disturbance area</b>	<p>An area that has been disturbed and that requires rehabilitation.</p> <p>This may include areas such as on-licence exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped), and areas requiring rehabilitation that are temporarily stabilised (i.e. managed to minimise dust generation and/or erosion).</p>
<b>Domain</b>	<p>An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.</p>
<b>Ecosystem and Land Use Development</b>	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved rehabilitation objectives and completion criteria.</p> <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.</p> <p>This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.</p>
<b>Ecosystem and Land Use Establishment</b>	<p>This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.</p>
<b>Exploration</b>	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
<b>Final landform and rehabilitation plan</b>	As defined in the Mining Regulation 2016.
<b>Final land use</b>	As defined in the Mining Regulation 2016.
<b>Form and way</b>	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department’s website.
<b>Growth Medium Development</b>	<p>This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short lived pioneer species).</p> <p>This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.</p>
<b>Habitat</b>	Has the same meaning as that term under the <i>Biodiversity Conservation Act 2016</i> and the <i>Fisheries Management Act 1994</i> (as relevant).
<b>Indicator</b>	An attribute of the biophysical environment (e.g. pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (i.e. defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
<b>Land</b>	As defined in the <i>Mining Act 1992</i> .
<b>Landform Establishment</b>	<p>This phase of rehabilitation consists of the processes and activities required to construct the final landform.</p> <p>In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).</p>
<b>Large mine</b>	As defined in the Mining Regulation 2016.
<b>Lease holder</b>	The holder of a mining lease.

WORD	DEFINITION
<b>Life of mine</b>	The timeframe of how long a mine is approved to mine, from commencement to closure.
<b>Mine rehabilitation portal</b>	<p>Means the NSW Resources Regulator’s online portal that lease holders must use (via a registered account) to:</p> <ul style="list-style-type: none"> <li>■ upload rehabilitation geographical information system (GIS) spatial data</li> <li>■ develop rehabilitation GIS spatial data (using online tracing functions)</li> <li>■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities.</li> </ul> <p>Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of lease holders.</p>
<b>Mining area</b>	As defined in the <i>Mining Act 1992</i> .
<b>Mining domain</b>	A land management unit with a discrete operational function (e.g. overburden emplacement), and therefore similar geophysical characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
<b>Mining land</b>	As defined in the <i>Mining Act 1992</i> .
<b>Native vegetation</b>	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
<b>Overburden</b>	Material overlying coal or a mineral deposit.
<b>Performance indicator</b>	An attribute of the biophysical environment (for example pH, slope, topsoil depth, biomass) that can be used to demonstrate achievement of a rehabilitation objective. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion, that is, a defined end point. It may be aligned to an established protocol and used to evaluate changes in a system.

WORD	DEFINITION
<b>Phases of rehabilitation</b>	<p>The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:</p> <ul style="list-style-type: none"> <li>■ active mining</li> <li>■ decommissioning</li> <li>■ landform Establishment</li> <li>■ growth medium development</li> <li>■ ecosystem and land use establishment</li> <li>■ ecosystem and land use development.</li> </ul>
<b>Progressive rehabilitation</b>	<p>The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.</p>
<b>Rehabilitation Completion</b>	<p>The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of <i>Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate</i> application by the lease holder.</p>
<b>Rehabilitation Completion criteria</b>	<p>As defined in the Mining Regulation 2016.</p>
<b>Rehabilitation cost estimate</b>	<p>As defined in the Mining Regulation 2016.</p>
<b>Rehabilitation management plan</b>	<p>As defined in the Mining Regulation 2016.</p>
<b>Rehabilitation objectives</b>	<p>As defined in the Mining Regulation 2016.</p>
<b>Rehabilitation risk assessment</b>	<p>As defined in the Mining Regulation 2016.</p>
<b>Rehabilitation schedule</b>	<p>The defined timeframes for progressive rehabilitation set out in the forward program.</p>

WORD	DEFINITION
<b>Relevant stakeholders</b>	Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes: <ul style="list-style-type: none"> <li>■ the relevant development consent authority</li> <li>■ the local council</li> <li>■ the relevant landholder(s)</li> <li>■ community consultative committee (if required under the development consent) or equivalent consultative group</li> <li>■ affected land holder(s)</li> <li>■ government agencies relevant to the final land use</li> <li>■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities)</li> <li>■ local Aboriginal communities, and</li> <li>■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.</li> </ul>
<b>Risk</b>	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
<b>Secretary</b>	The Secretary of the Department.
<b>Security deposit</b>	An amount that a mining lease holder is required to provide and maintain under a mining lease condition, to secure funding for the fulfilment of obligations under the lease (including obligations that may arise in the future).
<b>Surface disturbance</b>	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
<b>Tailings</b>	A combination of the fine-grained solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water <sup>2</sup> .
<b>Waste</b>	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

<sup>2</sup> Commonwealth of Australia (DITR), 2007. *Tailings Management*.

## Attachment 3 – Rehabilitation Complaints

DATE	COMPLAINANT	COMPLAINT DETAILS	RESPONSE DETAILS	STATUS OF RESPONSE	DATE RESPONSE COMPLETED (IF APPLICABLE)
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## Attachment 4 – Stakeholder consultation

DATE	STAKEHOLDER	CONSULTATION ACTIVITIES AND FORMS	MATTERS SUBJECT TO CONSULTATION	ACTIONS TAKEN
6 Sep 2022	Department of Planning and Environment, NSW Resources Regulator	<ul style="list-style-type: none"> <li>Email correspondence</li> </ul> <p>Note: Correspondence occurred over multiple dates.</p>	Rehabilitation Management Plan, particularly: <ul style="list-style-type: none"> <li>Feedback received on Rehabilitation Management Plan (6/09/2022)</li> <li>Refusal of Final Landform Plan (1/05/2023)</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation Management Plan revised</li> <li>Final Landform Plan revised and approved on 4 September 2023</li> </ul>
10 Aug 2022	Biodiversity Conservation Trust	<ul style="list-style-type: none"> <li>Email correspondence</li> </ul> <p>Note: Consultation occurred over multiple dates.</p>	Annual Biobanking Reports, particularly: <ul style="list-style-type: none"> <li>Submission of Annual Biobanking report for BA 215 (10/08/2022) and BA 382 (19/08/2022)</li> </ul>	<ul style="list-style-type: none"> <li>Reports accepted by Biodiversity Conservation Trust</li> </ul>
1 May 2023	NSW Resources Regulator	<ul style="list-style-type: none"> <li>Email correspondence</li> </ul>	Rehabilitation Objectives, particularly: <ul style="list-style-type: none"> <li>Refusal of Rehabilitation Objectives Statement</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation objectives revised and approved on 4 September 2023</li> </ul>
30 Jun 2023	Department of Planning and Environment, National Parks and Wildlife Service, Tharawal Aboriginal Land Council, Landholders, Appin Community Consultative Committee	<ul style="list-style-type: none"> <li>Email and phone correspondence</li> <li>Offsite meetings</li> </ul> <p>Note: Consultation occurred over multiple dates.</p>	Georges River Rehabilitation Project, including: <ul style="list-style-type: none"> <li>Update on the progress of Georges River Rehabilitation Project</li> <li>Land access arrangements</li> <li>Review of Environmental Factors</li> <li>Proposed locations of tracks and staging areas</li> </ul>	<ul style="list-style-type: none"> <li>Development of land access agreements</li> <li>Review of the GRRP</li> </ul>
30 Jun 2023	Tharawal Local Aboriginal Land Council, Appin Community	<ul style="list-style-type: none"> <li>Email correspondence</li> </ul>	Coal Wash Emplacement Area Rehabilitation, particularly: <ul style="list-style-type: none"> <li>Appin North CWEA Aboriginal Heritage signage</li> </ul>	<ul style="list-style-type: none"> <li>Consulted on the path to allocate a signal for the BC2 on Stage 3 and provided feedback on content.</li> </ul>

# APPIN COLLIERY ANNUAL REHABILITATION REPORT

ARR0001115 | Friday 1 July 2022 to Friday 30 June 2023

DATE	STAKEHOLDER	CONSULTATION ACTIVITIES AND FORMS	MATTERS SUBJECT TO CONSULTATION	ACTIONS TAKEN
	Consultative Committee	<ul style="list-style-type: none"> <li>Onsite meetings</li> </ul> <p>Note: Consultation occurred over multiple dates.</p>	<p>Stage 3</p> <ul style="list-style-type: none"> <li>Provide information of the progress of stage 3 and updates regarding actions for Stage 4</li> </ul>	<p>Awaiting to erect the sign</p> <ul style="list-style-type: none"> <li>Awaiting methodology of consultation regarding Aboriginal Heritage sites on Stage 4</li> </ul>
2 Dec 2022	Resources Regulator	<ul style="list-style-type: none"> <li>Email correspondence</li> </ul>	<p>Forward Program, particularly:</p> <ul style="list-style-type: none"> <li>Requesting IMC to nominate a contact person in relation to the mining lease(s) for the purposes of the Mining Act 1992</li> <li>Requesting IMC publish the Forward Program on the IMC website</li> </ul>	<ul style="list-style-type: none"> <li>Evidence submitted of nominated contact person provided previously</li> <li>Forward Program published to the IMC Website</li> </ul>
30 Jun 2023	NSW Resources Regulator, Crown Lands, Environmental Protection Authority, Department of Planning and Environment (DPE) - Water Group, Transport for NSW, DPE - Environment and Heritage Group, National Parks and Wildlife Service, Tharawal Aboriginal L	<ul style="list-style-type: none"> <li>Email correspondence</li> <li>Onsite meetings</li> </ul> <p>Note: Consultation occurred over multiple dates.</p>	<p>North Cliff Rehabilitation, particularly:</p> <ul style="list-style-type: none"> <li>External agency consultation regarding IMC's proposed North Cliff Rehabilitation Execution Plan</li> </ul>	<ul style="list-style-type: none"> <li>Revision of the North Cliff Rehabilitation Execution Plan to address external stakeholder feedback (not yet submitted)</li> </ul>
30 Jun 2023	National Parks and Wildlife Service	<ul style="list-style-type: none"> <li>Email correspondence</li> <li>Teams Meetings</li> </ul> <p>Note: Consultation occurred over multiple</p>	<p>Removal of powerlines between North Cliff and West Cliff, particularly:</p> <ul style="list-style-type: none"> <li>In principle agreement for scope of works and approvals required to rehabilitate North Cliff powerline</li> </ul>	<ul style="list-style-type: none"> <li>Further investigations / studies underway to inform IMC position with NPWS for rehabilitation scope and pathways</li> </ul>

# APPIN COLLIERY ANNUAL REHABILITATION REPORT

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DATE	STAKEHOLDER	CONSULTATION ACTIVITIES AND FORMS	MATTERS SUBJECT TO CONSULTATION	ACTIONS TAKEN
		dates.		
30 Jun 2023	NSW Resources Regulator, Water NSW	<ul style="list-style-type: none"><li>Email correspondence</li><li>Onsite meetings</li></ul> <p>Note: Consultation occurred over multiple dates.</p>	Bulli Shafts Rehabilitation, particularly: <ul style="list-style-type: none"><li>Preliminary discussions to inform initiation of Bulli shafts rehabilitation</li></ul>	<ul style="list-style-type: none"><li>Letter from NSW Resources Regulator requesting IMC commence investigations to inform rehabilitation of these sites</li></ul>

## Attachment 5 – Plans

Plan 1A-Current Status of Mining and Rehabilitation.zip

Plan 1B-Current Landform Contours.zip

Annual Report (LARGE MINE) v1.6